Syllabification and Phrasing in Three Dialects of Sudanese Arabic

by

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Sudanese Arabic

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Abstract

This study is a synchronic derivational analysis of phonological phenomena in three dialects of Sudanese Arabic. Its main goal is to provide a unified prosodic account of syncope and of the phonological processes functioning as strategies of repairing unsyllabified segments in the dialects of Urban Central Sudanese Arabic, Shukriiya, and Hamar. The domains of these processes are argued to follow from the degree of restriction that dialects place on word-level and phrase-level syllabification. To this end, the study proposes an analysis of syllabification in the three dialects that identifies the degree to which word-level syllabification is exhaustive, the segments that may be marked extrasyllabic and the conditions regulating their extrasyllabic status, the phrasal level at which these segments must be syllabified, and the level at which alteration to syllable structure is disallowed. In identifying the degrees of restriction dialects place on syllabification and resyllabification, the analysis provides a principled explanation for the levels of repair of unsyllabified segments as well as the domains of syncope. The study also provides an analysis of word stress and an analysis of phonological phrase formation. By revealing and accounting for the
interesting phonological patterns attested in these dialects, the study aims to contribute to the area of Arabic phonology in general and to research on the typology of Arabic dialects in particular. In addition to the analyses proposed, its substantial contribution in this regard is a significant body of original data that is being analysed for the first time. With respect to dialects of Sudanese Arabic, the study represents a new direction of enquiry, one that seeks to disentangle their respective grammars and reveal the interesting ways in which they pattern alike and diverge.
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# List of Abbreviations

1. 1\textsuperscript{st} person  
2. 2\textsuperscript{nd} person  
3. 3\textsuperscript{rd} person  
CA Classical Arabic  
f. feminine  
Imp. Imperative  
m. masculine  
MSA Modern Standard Arabic  
neg. negative  
Pass. Passive  
pl. plural  
Poss. possessive  
Recip. reciprocal  
Ref. reflexive  
SCA Sudanese Colloquial Arabic  
sg. singular  
UCSA Urban Central Sudanese Arabic  
Voc. vocative
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Appendix 1: Map of Sudan

Appendix 2: Dialect Locations
Chapter 1: Introduction

1.0 Background

Although the number of Arabic dialects native to Sudan is not known, a cursory examination suffices to describe them as numerous and existing in an increasingly complex and fluid context. As Gasim (1965: 41) notes, “[it] is difficult to speak of a Sudanese colloquial language in general, simply because there is not a single dialect used simultaneously in all the regions where Arabic is the mother tongue. Every region and almost every tribe has its own brand of Arabic.” Although this characterization of the linguistic situation is not uncommon in the rest of the Arabic speaking world, formal studies on Sudanese dialects of Arabic are sparse in comparison. The earliest documented work consists primarily of vocabulary lists and textbooks written by British government officials and missionaries (Amery 1905, Worsley 1925, Hillelson 1925 and 1935, Nicholson 1935, and Trimingham 1946, among others). The main purpose of these publications was to create an effective means of communication between officials of the colonial Anglo-Egyptian government and their subordinate native administrators.¹

With respect to phonology, apart from Reichmuth (1983) on the Shukriiya dialect, the few comprehensive formal studies found are limited to the dialect labeled Sudanese (Colloquial) Arabic. This is usually defined as the dialect spoken in the central region of Sudan or the dialect of Khartoum and its environs. The two pioneering studies in this area are Hamid (1984) and Mustapha (1982), who provide thorough descriptions of various aspects of the

¹ Kaye (1976: 1-90) provides a comprehensive review of these texts and other similar work done in the first half of the twentieth century.
phonology of Sudanese Arabic. It is important to note that, due to the nature of the data on which they are based, these seminal studies provide descriptive analyses that are representative of several varieties of Sudanese Arabic rather than of the grammar of an individual dialect. This point is best illustrated by Hamid’s (1984: 3) description of his analysis of “Sudanese Colloquial Arabic [SCA]” which is based on the “variety ... spoken in the middle part of the Sudan.” He states:

And given the fact that in the Sudan there is no one single dialect, this study cannot claim to cover all varieties of SCA. Nevertheless, it can claim to cover most of the major properties shared by these varieties to the extent that the analysis presented in the following discussion can be assumed to be more or less applicable to the main features of most of the other varieties.

The statement that the analysis is based on the variety spoken in the central region seems irreconcilable with the claim that it describes most of the major properties shared by varieties of Sudanese Arabic. However, this apparent contradiction is straightforwardly explained if we recognize the complexity of the linguistic situation in the central region of Sudan. For socio-economic and political reasons, an influx of migration from the peripheries to this region has been steadily increasing for decades. Naturally, its resulting context is one in which speakers of most, if not all, varieties of Sudanese Arabic as well as other native languages in the country coexist. This is particularly evident in urban centres where regional varieties are so prevalent that they have become an integral part of everyday life. In his study on the influence of native languages

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2 In addition to Arabic, a large number of native Nilo-Saharan, Niger-Congo, and Afro-Asiatic languages are found in the areas surrounding the central region of Sudan. For more information on these languages, see Lewis et al (2013).

3 For a detailed discussion of the linguistic situation in Sudan, see Miller (2006) and references therein.
on Sudanese dialects of Arabic, Gasim (1965: 41) indirectly confirms this reality by confining his analysis to the dialect of Khartoum, because he considers it “representative of more or less all the regions using Arabic as their mother tongue in the Sudan.”

Given the linguistic situation described above, it is not surprising that studies on Sudanese (Colloquial) Arabic, defined as the variety spoken in the central region, are based on conflated data. In fact, that must be the case if one of their goals is to provide a descriptive analysis of features common to most varieties rather than features of individual grammars. During the course of the current study, this point will be illustrated with reference to Hamid’s (1984) description of some phonological phenomena.

1.1 Scope and goals of the current study

In the context described above, the current study is a synchronic analysis of phonological phenomena in three dialects of Sudanese Arabic. One of its goals is to provide a unified prosodic account of syncope and of the phonological processes functioning as strategies of repairing unsyllabified segments in the dialects of Urban Central Sudanese Arabic (UCSA), Shukriiya, and Hamar. The respective prosodic domains of these processes are argued to follow from the degree of restriction that each dialect places on word-level and phrase-level syllabification. To this end, the study proposes an analysis of syllabification in the three dialects that identifies the degree to which word-level syllabification is exhaustive. For the dialects that allow extrasyllabic segments, the analysis identifies the type of segments that may be marked extrasyllabic, their positions, any further conditions regulating their extrasyllabic status, and the phrasal level
at which these segments must be properly syllabified. The analysis also
identifies the level at which syllabification is fixed and further alteration to
syllable structure is disallowed. In identifying the degrees of restriction
individual dialects place on syllabification and resyllabification, the proposed
account provides a principled explanation for the levels of repair of unsyllabified
segments as well as the domains of syncope in these dialects.

By shedding light on the interesting ways in which the three dialects of
Sudanese Arabic pattern with respect to syllabification, the study aims to
contribute to the area of Arabic phonology in general and to research on the
typology of Arabic dialects in particular. In addition to the analysis proposed, its
substantial contribution in this regard is a significant body of original data that is
being analyzed for the first time.

Phrasal syllabification across the word boundary is a pervasive feature in
all dialects of Arabic, including Classical and Modern Standard Arabic. Yet, I
am not aware of any studies attempting to identify the degree to which
syllabification above the word level is constrained. Extending the prosodic
approach adopted in the current study to other dialects of Arabic may have
interesting implications on syllable typology and syllabification in Arabic.

Finally, the current study represents a new direction of enquiry with
respect to dialects of Arabic spoken in Sudan, one that seeks to disentangle the
respective grammars of these dialects and shed light on the interesting ways in
which they pattern alike and diverge.

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4 For examples of phrasal syllabification in modern dialects of Arabic, see Younes (2008).
1.2 Assumptions

The current study is developed within a rule-based derivational approach to describing and analyzing phonological phenomena. In identifying the domains of phonological rules, the study adopts a standard version of prosodic phonology (Selkirk 1980, 1981a, 1984, and 1986; Nespor and Vogel 1982, 1983, and 1986; and Hayes 1989a). The central area of inquiry of this framework is the nature of the phonology-syntax interface, which was born out of the observation that some phonological rules are sensitive to the edges of syntactic constituency. To account for this fact, it is assumed that these rules apply within prosodic domains, which are derived with reference to syntactic structure.\(^5\) Within a derivational model such as the one adopted in this study, the mapping between syntactic structure and prosodic domains is usually achieved through bracketing algorithms that mark boundaries of prosodic constituents at the edges of syntactic constituents.\(^6\) The constituents of prosodic structure are organized in a prosodic hierarchy. The instantiation of the hierarchy given in (1) below is based on Selkirk (2011: 437).\(^7\)

---

\(^5\) Proposals that domain-sensitive phonological rules refer directly to syntactic structure are also made by Cooper and Paccia-Cooper (1980); Kaisse (1985); Oden (1987), (1990), and (2000); Wagner (2005) and (2010), among others.

\(^6\) In a constraint-based approach, the mapping is achieved through alignment of edges of prosodic and syntactic constituents (Selkirk 1996 and 2000, Truckenbrodt 1995 and 1999, and Kahnemuyipour 2003, among others). Alternatively, it is achieved through correspondence constraints between syntactic and prosodic constituents (Selkirk 2009). For a detailed discussion of these approaches, see Selkirk (2011).

\(^7\) Selkirk (2011) does not include the Utterance level.
(1) The Prosodic Hierarchy

\[
\begin{array}{c}
U & \text{Utterance} \\
| & \\
I & \text{Intonational Phrase (I-Phrase)} \\
| & \\
P & \text{Phonological Phrase (P-Phrase)} \\
| & \\
W & \text{Phonological Word} \\
| & \\
Ft & \text{Foot} \\
| & \\
\sigma & \text{Syllable}
\end{array}
\]

For the purposes of the present study, the phonological word is defined as a phonologically independent unit of segmental material with one primary stress. In the dialects discussed here, this unit typically consists of a stem together with any accompanying affixes and clitics.\(^8\) Above the phonological word, the P-Phrase is perhaps the most investigated level. It has been identified as the domain of various phonological phenomena that is derived with reference to syntactic maximal projections.\(^9\) The I-Phrase is typically defined as the domain of an intonation contour; the edges of this domain correspond to positions of possible pauses.\(^10\) The highest level in the hierarchy is the Utterance, which may consist of one or more I-Phrases.\(^11\)

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\(^8\) For more discussion on the nature and constituency of the phonological word, see Revithiadou (2011) and references therein.


\(^10\) For a detailed discussion on tone and its representation, see Arvaniti (2011) and references therein.

\(^11\) For more discussion on the nature of the Utterance, see Nespor and Vogel (1986: 221-247).
1.3 A note on syntactic structures

Edge effect has been shown not to coincide with maximal projections of functional heads or with adjunction structure.\textsuperscript{12} For ease of exposition, I do not include inflectional categories or adjunction structure in the syntactic trees used to illustrate the prosodic domains of phonological phenomena. Thus, although I assume that an adjective modifying a noun adjoins at the level of NP as represented in (2a) below, I consistently give the simplified structure in (2b).

(2) a. \[
\text{NP} \quad \text{AP} \quad \text{NP}
\]
   \[
   \text{NP} \quad \text{AP}
\]

1.4 Nature of the dialects

UCSA, Shukriiya, and Hamar are three dialects of Arabic native to Sudan.\textsuperscript{13} As apparent from its descriptive name, UCSA is spoken primarily in urban areas in the central region of Sudan. Roughly defined, this region includes the capital Khartoum and its surroundings and extends southward to Sennar on the Blue Nile and Kosti on the White Nile. Like many dialects of Sudanese Arabic, Shukriiya and Hamar are named after the groups who speak them. The Shukriiya tribe inhabits the Butana region east of the Blue Nile and the Hamar tribe inhabits the western part of Kordofan region.

1.5 Data sources

The data on which the current study is based come primarily from my own field research conducted in 1997. My method of data collection was recording

\textsuperscript{12} See Truckenbrodt (1999) for examples and a detailed discussion.

\textsuperscript{13} See appendices 1 and 2.
speakers telling folk tales or describing everyday life events. With the permission of participants, I also recorded live conversations taking place in coffee shops, market places, and social gatherings at homes. All the long utterances used to illustrate prosodic domains of phonological phenomena come from these recordings. After each recording session, I listened to the data and transcribed utterances that contained phrasal domains of phonological processes. In a follow up session I verified the domains by checking for consistency of phrasing. My method was to repeat a given utterance with the recorded phrasing and ask a consultant for acceptability judgments. I then repeated the same utterance with a different phrasing. To vary the phrasing, I would allow the application of rules across word boundaries or block rules from applying across boundaries. The order of the two repetitions was reversed when I tested a second utterance with the same consultant. It was also reversed when I tested an utterance with more than one consultant. The variation in phrasing was always evaluated in terms of rate of speech. When asked for judgments, consultants either deemed the utterance acceptable or commented that it sounded “too fast”, “fast”, “slow”, or “too slow”. Based on these judgments, I label the two acceptable rates in UCSA and Hamar “normal” and “fast”. In Shukriiya, the acceptable rates are labeled “normal” and “narrative.” The latter is the slower of the two and is typically used in storytelling.

The data representative of UCSA is based on the speech of 27 speakers, 17 males and 10 females whose ages range between 15 and 68 years. They come from the cities of Wad Medani, Rufaa, Al-Hasahiisa, Ad-Duweim, Khartoum, Khartoum North, and Omdurman. To minimize the possibility of data conflation, all the UCSA speakers considered in this study are at least second-
generation dwellers of their respective cities. The data representative of the Shukriiya dialect is based on the speech of 17 male speakers whose ages range between 35 and 75 years. They come from a cluster of villages around Sayyaal An-najaada located about 20 kilometers east of the city of Rufaa. The data representative of the Hamar dialect is based on the speech of 3 male speakers whose ages range between 35-45. They originally come from An-Nahud area in western Kordofan. At the time of the interview, they had been living in the city of Wad-Medani for 4 years.

1.6 Organization of the thesis

The following three chapters deal with UCSA, Shukriiya, and Hamar, respectively. They follow a fairly parallel organization. Each chapter begins with a discussion of the patterns of syncope attested at the word and phrase levels. It is argued that the domain of syncope is a reflex of the degree of restriction that dialects impose on resyllabification. This is followed by a discussion of the processes functioning as strategies of repairing unsyllabified segments. It is argued that the level at which segments are repaired follows from the degree of restriction imposed on initial syllabification. Chapter five is devoted to presenting an analysis of syllabification in the three dialects and Chapter 6 outlines future research.
Chapter 2: The Urban Central Sudanese Arabic Dialect

2.0 Introduction

In this chapter I consider the Urban Central Sudanese Arabic dialect (UCSA). In establishing the degree of restriction this dialect places on syllabification and resyllabification, I examine the processes of syncope, consonant deletion, and epenthesis. I begin by examining syncope, whose target is the underlined vowel in the sequence (V C V C V). At the phrase level, syncope occurs when this structural description is met across two adjacent words. For ease of exposition, I adopt Hamid's (1984) terms to describe phrasal syncope. I use the terms left-hand syncope (LHS) to refer to cases where the target vowel is in the left-hand word and right-hand syncope (RHS) to refer to cases where the vowel is in the right-hand word. A peculiar fact about syncope in UCSA is that LHS has a smaller domain of application than RHS. I develop a theory of phrasing of P-Phrases in UCSA and demonstrate that while LHS applies within the P-Phrase level, RHS applies within the I-Phrase level.

I argue that the asymmetry in the domain of application of this rule is an epiphenomenon; it is a reflex of the restriction on the domains of application of resyllabification rules. Specifically, I argue that resyllabification in UCSA is unrestricted up to the P-Phrase level. Above this level, resyllabification rules may apply within the I-Phrase but only if their respective domains include new environments, that is, environments that become visible to phrase-level phonology after the P-Phrase. I provide further evidence for the P-Phrase as a significant level for syllabification in UCSA based on the domain of consonant deletion. That is, some unsyllabified segments may be retained up to the P-Phrase level where, if they are not properly syllabified, they are stray-erased. In
order to identify the extent to which initial syllabification is exhaustive, I examine the process of epenthesis and conclude, accordingly, that segments must be properly syllabified at the word level. The only exception to this generalization is the second member of a root-final geminate. This consonant may be retained unsyllabified up to the P-Phrase level. At this level basic syllabification is fixed and all segments must be properly syllabified.

2.1 Syncope in UCSA
Perhaps one of the most prevalent processes among dialects of Arabic is syncope. It has two features that seem to be present in all dialects. First, its target is invariably a short unstressed vowel in an open syllable and, second, it tends not to target vowels that are part of inflectional endings. Otherwise, dialects exhibit variation with respect to the context of deletion and place feature of the target vowel. In anticipation of discussing the effects of syncope in UCSA, I begin with a brief overview of the patterns encountered in Arabic dialects.\footnote{For proposals linking syncope patterns to syllable typology in Arabic dialects, the reader is referred to works such as Broselow (1992), Kiparsky (2003), Watson (2007), and Farwaneh (2009).}

With respect to the context of deletion, syncope tends to be context-free in dialects that allow complex syllable margins. Examples of these dialects include Lebanese (Haddad 1984), Tripoli Libyan (Al-Ageli 1996), Syrian (Cowell 1964 and Adra 1999), San’ani (Watson 2002), Jordanian (Abu-Abbas 2003), and Hadhrami (Bamakhramah 2009). In dialects that do not allow complex margins, the potentially syncopated vowel tends to be preceded by an open syllable. Otherwise, the syncope is blocked. This group includes Cairene (Broselow 1976 and 1992, Kenstowicz 1980, and Watson 2002); Sudanese (Hamid 1984); and
Makkan (Abu-Mansour 1987 and 2011, Gouskova 2003, Kabrah 2004, and Bamakhramah 2009). All things being equal, the difference between the two groups amounts to reversing the relative ranking of the syncope constraint and the constraint against complex margins.

We can also distinguish two groups of dialects based on the place specification of the target vowel. To my knowledge, Cantineau (1936: 49) is the first to designate this distinction. In his description of Lebanese Arabic, he uses the term “les parlers non différenciels” to refer to varieties that syncopate low as well as high vowels, and the term “les parlers différenciels” to refer to those syncopating only high vowels. Examples of the two groups are the varieties he labels “Centre-Nord” et “Centre-Sud”, respectively. This distinction has become fairly common in the literature on syncope in contemporary dialects of Arabic. However, when the terms non-differential and differential are used explicitly, they are frequently attributed inaccurately to Cantineau (1939) instead of Cantineau (1936). Examples of non-differential dialects include Syrian (Cowell 1964 and Adra 1999), Iraqi (Odden 1978), Tripoli Libyan (Al-Ageli 1995), San’ani (Watson 2002), and Hadhrami (Bamakhramah 2009). Examples of differential dialects include Cairene (Broselow 1976 and 1992, Kenstowicz 1980, and Watson 2002); Makkan, which further restricts syncope to the front vowel i (Bakalla 1979, Gouskova 2003, Kabrah 2004, and Abu-Mansour 2011); Lebanese (Haddad 1984); Sudanese (Hamid 1984); and Jordanian (AbuAbbas 2003).

---

2 Fleisch (1974) provides a thorough description of the features of these varieties accompanied with a meticulous body of data.
In the context described above, UCSA is a differential dialect that does not allow complex margins. That is, syncope in this dialect targets a short unstressed high vowel in an open syllable when preceded by an open syllable. In the two sections to follow, I discuss the patterns of syncope attested at the word and phrase levels, respectively.

2.1.1 Syncope at the word level

To demonstrate the patterns of syncope at the word level, consider the examples in (1) below.

  a. sádur sádr-u sádr-ak 'chest'
  b. dárjáb dárb-u dárb-ak 'path'
  c. fúnduk fúnduk-u fúnduk-ak 'mortar'
  d. máw¿id máw¿id-u máw¿id-ak 'rendez vous'
  e. kiláab kiláab-u kiláab-ak 'dogs'
  f. *klááb mulaáh-u mulaáh-ak 'stew'
  g. ?abú? ?abúu-w ?abúu-k 'father'
  h. maf¿i maf¿i-w maf¿i-k 'walking'

The alternation pattern exhibited by the forms in (1a) and (1b) leads us to conclude that the underlying representation of the noun includes a high vowel whose deletion is triggered by affixation of a vowel-initial suffix. The rest of the data represent cases where deletion of a high vowel in an open syllable is blocked. Examples (1c)-(1f) show the significance of the preceding environment. In the former two examples, where the high vowel is deleted, the syllable containing the syncopated vowel is preceded by an open syllable. In contrast, the high vowel does not delete in (1c) and (1d) where it is preceded by a closed
syllable. In this case syncope is blocked because its output would contain a syllable with a complex margin. For the same reason, deletion does not occur in (1e) and (1f) where the syllable containing the high vowel is word initial. In the latter case, the output of syncope would result in a syllable with a complex margin irrespective of suffixation. Examples (1g) and (1h) show that deletion of stem-final vowels is also blocked. We observe that these vowels are long in the corresponding suffixed forms. In section 2.3.2.1, I argue that these vowels are long in the underlying form of the stem and are shortened in word-final position. Finally, the suffixed forms in the second column (1c)-(1f) show that syncope in CSA, like in other dialects of Arabic, does not target vowels that are part of inflectional endings. The high vowel of the third person masculine singular possessive suffix -u escapes deletion even though it occurs in an open syllable that is preceded by an open syllable.

Returning to the following environment, suffixification of a vowel-initial affix has the effect of syllabifying the coda of the syllable containing the high vowel into an onset of the following syllable. This is due to the fact that UCSA, like all dialects of Arabic, imposes a total ban on onsetless syllables. This effect is audible in surface syllabification and is illustrated by the example in (2a).

(2)  Noun      Noun-3.m.sg.Poss.      Noun-2.m.sg.Poss.      Gloss
a. fūn.duk fūn.du.ku fūn.du.kak ‘mortar’
b. sā.dur sā.du.ru → sād.ru sā.du.rak → sād.rak ‘chest’
c. dā.rīb dā.rī.bu → dār.bu dā.rī.bak → dār.bak ‘path’

As shown in (1), the forms in (2b) and (2c) further undergo syncope whereas the form in (2a) does not. Accordingly, we can make the generalization that syncope

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4 Affixations to these stems triggers two alternations in the suffix form: the third person possessive suffix -u surfaces as a glide w and the vowel of second person suffix -āk deletes.
5 Kiparsky (2003: 149) describes this as “Arabic’s undominated ranking of Onset.”
deletes a short unstressed high vowel in an open syllable when it is preceded by an open syllable. This is tentatively stated in (3) below, where a lower case “v” represents the target vowel.

(3) Syncope:

\[
\begin{array}{c}
\sigma \\
| \\
V \\
\end{array}
\begin{array}{c}
\sigma \\
\sigma \\
C \\
\sigma \\
V
\end{array}
\]

In the following section, I examine the behaviour of syncope above the word level.

2.1.2 Syncope at the phrase level

Hamid (1984) provides the first detailed account of phrasal syncope in the literature of Sudanese Colloquial Arabic (SCA). He describes two rules of syncope that apply across a word boundary. The rules apply in two opposite directions (left-to-right and right-to-left) deleting short high unstressed vowels. He defines the level at which these rules apply as phrasal.\(^6\) Noting that they do not delete final or initial vowels of words, Hamid proposes the rule in (4) below to represent the two types of syncope (p. 122):

(4) \( \left\{ \begin{array}{l} +\text{syl} \\ +\text{high} \\ -\text{stress} \end{array} \right\} \rightarrow \emptyset / V (\#) C \_ C (\#) V \)

He notes that the rule, when applying from right-to-left, is "merely phonological in nature [operating] automatically whenever its phonological condition is met" (p. 116). When it applies in the opposite direction, however, "it seems to be sensitive, to some extent, to a certain syntactic relationship between the relevant

\(^6\) It is important to note that such a statement implies that the rules apply at the same level. I will return to this point later.
elements” (pp. 117-18). Some of the examples he uses to illustrate this point are given in (5) and (6) below (pp. 116-119).

(5) Right-hand syncope (RHS): \[ V\#C \_ V \]
    a. \( V + \text{Obj} \)  
        \( \text{kátab-u} \), \( \text{kitáab} \)  
        \( \rightarrow \) \( \text{kátabu ktáab} \)  
        ‘They wrote a book.’
    b. \( S + V\text{-Obj} \)  
        \( \text{ʕáli} \), \( \text{ʕirífl-na} \)  
        \( \rightarrow \) \( \text{ʕáli} \), \( \text{ʕífna} \)  
        ‘Ali knew us.’
    c. \( N + N \)  
        \( \text{dáwa} \), \( \text{kubáar} \)  
        \( \rightarrow \) \( \text{dáwa gbáar} \)  
        ‘medicine for adults’
    d. \( N + \text{Adj} \)  
        \( \text{karáasi} \), \( \text{kutáar} \)  
        \( \rightarrow \) \( \text{karáasi ktáar} \)  
        ‘many chairs’
    e. \( \text{Prep} + N \)  
        \( \text{fi} \), \( \text{kitáab} \)  
        \( \rightarrow \) \( \text{fi ktáab} \)  
        ‘in a book’

(6) Left-hand syncope (LHS): \[ VC \_ C\#V \]
    a. \( V + \text{Obj} \)  
        \( \text{ʃiríb} \), \( \text{al-qáhwa} \)  
        \( \rightarrow \) \( \text{ʃirb algáhwa} \)  
        ‘He drank the coffee.’
    b. \( S + V \)  
        \( ?\text{al-kálib} \), \( \text{ákal} \)  
        \( \rightarrow \) \( ?\text{alkálib ákal} \)  
        cf. *\( ?\text{alkálb ákal} \)  
        ‘The dog ate.’
    c. \( N + \text{Rel. clause} \)  
        \( ?\text{al-kálib} \), \( \text{al-ákal-u} \)  
        \( \rightarrow \) \( ?\text{alkálb alákalu} \)  
        ‘the dog that ate it’
    d. \( N + N \)  
        \( \text{ʃúyul} \), \( \text{áḥmad} \)  
        \( \rightarrow \) \( \text{ʃúyîl áḥmad} \)  
        ‘Ahmed’s job’
    e. \( N + \text{Adj} \)  
        \( ?\text{at-táajir} \), \( \text{as-suudáani} \)  
        \( \rightarrow \) \( ?\text{attáajr assuudáani} \)  
        ‘the Sudanese merchant’

---

\(^{7}\) Italics are used to indicate cases where the rule fails to apply.
Observing that RHS consistently applies in cases such as those in (5) while LHS is blocked in cases similar to those in (6b) and (6f), Hamid (1984) argues that LHS is sensitive to the syntactic relation between the two words triggering its application. He compares syntactic structures of cases in which the rule applies to those of cases in which it is blocked and concludes that it applies only when the left-hand word governs the right-hand one (pp. 119-121). This is illustrated by comparing the structures of (6e) and (6f) given below in (7a) and (7b), respectively.

(7) a. \[ \text{NP} \quad \text{Adj} \quad \text{NP} \quad \text{AP} \]
\[ \text{attaaajr} \quad \text{assudaani} \quad \text{attaaajr} \quad \text{amiin} \]
\[ \text{‘the Sudanese merchant’} \quad \text{‘The merchant is honest’}. \]

Accordingly, Hamid proposes the following syntactic constraint to be observed "upon the application of phrasal syncope" (p. 121):

(8) In phrase structure where one of the two adjacent words triggers the application of syncope to the other, syncope applies to the right-hand word once its phonological condition is met, regardless of the syntactic relation between the two, and applies to the left-hand word if the left-hand word governs the right-hand one.\(^8\)

Thus, he concludes that the rule stated in (4) above, together with the constraint in (8), accounts for the behavior of syncope in SCA.

Although the patterns described above are those attested in UCSA, Hamid’s (1984) account of syncope is problematic on both empirical and conceptual grounds. As I demonstrate in the following sections, there are cases

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\(^8\) Hamid (1984) defines government in terms of the head-complement relation. That is, "the head of a phrase ... governs its complement" (footnote (3) p. 131).
where LHS fails to apply even though the syntactic constraint in (8) is satisfied. There are also cases where RHS fails to apply even though its segmental environment is met. Hamid’s account proposes that two rules of syncope that apply in opposite directions exist in SCA. These rules are analyzed uniformly as applying at the same phrasal domain. In the following sections, I propose an account of syncope that is both empirically adequate and conceptually more desirable. Implementing a prosodic approach, I will demonstrate that LHS and RHS are in fact instantiations of the same rule operating at different prosodic levels. While the domain of LHS is the P-Phrase, the domain of RHS is the I-Phrase.

2.1.3 A prosodic account of syncope in UCSA

In this section I develop a prosodic account of syncope demonstrating that LHS and RHS are instantiations of the same rule operating at different prosodic levels. I begin by examining LHS. I propose an algorithm that derives the P-Phrase from the syntax in UCSA and show that this algorithm accurately characterizes the prosodic level of LHS. I then turn to RHS and show that it applies at the I-Phrase level.

2.1.3.1 The domain of LHS: The P-Phrase

The standard phonological diagnostic of a prosodic level is the existence of phonological processes whose domain is characterized by that prosodic level. In this section I provide evidence for the existence of a P-Phrase in UCSA in terms

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Henceforth, I use the terms LHS and RHS for ease of exposition only. The terms designate two instantiations of the same rule at different prosodic levels rather than two separate rules.
of the domain in which LHS operates. I propose a basic algorithm of P-Phrase formation along the lines of the Designated Category (DC) Parameter and the End Parameter hypotheses as stated in Hale and Selkirk (1987). These hypotheses state that 1) only one DC \( X_{\text{max}} \) (or \( X_{\text{head}} \)) is relevant to defining the prosodic level PL \( i \) and 2) only one end of DC \( i \) (right or left) is relevant to the formation of PL \( i \). As a working hypothesis I assume that the DC that is relevant to defining the domain of the P-Phrase in UCSA is \( X_{\text{max}} \). I further assume that the edge of the DC that is relevant to the formation of the P-Phrase is the right edge. Accordingly, I propose the algorithm of P-Phrase formation in (9) below.

(9) P-Phrase Formation:

Form a P-Phrase boundary at the right edge of every \( X_{\text{max}} \) in the input.

Assuming that LHS applies at the P-Phrase, I will now show that the algorithm in (9) accurately defines the domain of its application. Consider (10) below, where LHS applies, deleting the underlined vowel of the verb.

(10)

\[
\begin{align*}
\text{VP} & \quad \text{NP} \\
V & \quad \text{N} \\
\text{f\textipa{i}rib} & \quad \text{al-gahwa} & \rightarrow & \left[ \text{f\textipa{i}rib al-gahwa} \right]_p \\
\text{[X}_{\text{max}} & \quad \text{[X}_{\text{max}} \quad \text{X}_{\text{max}}] \\
\text{[X}_{\text{head}} & \quad \text{[X}_{\text{head}}] \\
dr ank(3.m.sg.) & \quad \text{the-coffee} \\
\text{He drank the coffee.}'
\end{align*}
\]

According to the algorithm in (9), the edge relevant to P-Phrase formation is the right edge of \( X_{\text{max}} \). It is evident from example (10) that the relevant DC is not \( X_{\text{head}} \). If we were to assume the relevant end to be the right edge of \( X_{\text{head}} \), the utterance would be parsed in two P-Phrases corresponding to the right edge of V
and the right edge of N. Likewise, if the relevant end were to be the left edge of \(X^{\text{head}}\), the utterance would be parsed in two P-Phrases corresponding to the left edge of N and the left edge of V. In either case, the word containing the target vowel would be parsed in a P-Phrase separate from that of the word containing the triggering environment. In effect, LHS should fail to apply in both cases since its structural description would not be met. Accordingly, we conclude that the relevant DC is \(X^{\text{max}}\). The relevant edge of \(X^{\text{max}}\) cannot be the left edge. The rule, then, would fail to apply since the left end of its domain would be the left edge of NP. Instead, the relevant edge must be the right edge of \(X^{\text{max}}\). Accordingly, the two words in (10) are parsed within the same P-Phrase by the P-Phrase Formation algorithm in (9).

Evidently, this algorithm accurately characterizes the domain of application of LHS. This is further supported by the fact that it also predicts the context in which LHS is blocked. Consider (11) below.

\[
\begin{array}{c}
\text{S} \\
\text{NP} & \rightarrow \\
\text{VP} & \\
\text{N} & \text{V} & \text{NP} \\
\text{al-kalib} & \text{akal} & \text{al-\text{	extdegree}a\text{d}um} \\
\text{\[X^{\text{max}}\]} & & \rightarrow (\text{al-kalib})_p (\text{akal al-\text{	extdegree}a\text{d}um})_p \\
\text{the-dog} & \text{ate(3.m.sg.)} & \text{the-bone} \\
\text{\[\]X^{\text{max}}\]} & & \text{\textquoteright The dog ate the bone}\text{\textquoteright}.
\end{array}
\]

As predicted by the P-Phrase Formation algorithm in (9), LHS is blocked from deleting the high vowel of the first NP.\(^\text{10}\) This is because the end relevant to P-

---

\(^\text{10}\) The definite article in the first word is phonetically preceded by a glottal stop to satisfy an Onset requirement. Like all dialects of Arabic, UCSA imposes a total ban on onsetless syllables.
Phrase formation is the right edge of $X^{\text{max}}$; in this case it is the right edge of NP. Accordingly, the second word which contains the right-hand context of the rule is parsed in a P-Phrase separate from the word containing the potentially syncopated vowel. We can now define the environment of LHS based on (10) and (11). The domain of LHS is the P-Phrase as defined by the algorithm in (9). LHS applies if the word containing the target vowel and the word containing the triggering context are in the same P-Phrase. It is blocked above the P-Phrase, i.e., when the two words are in separate P-Phrases. Further evidence for this analysis comes from (12) where the LHS applies in one environment and fails to do so in another.

(12)

\[
\begin{array}{c}
\text{S} \\
\text{NP} \\
\text{N} \\
\text{al-kaat\text{"i}b} \\
\text{the-writer} \\
\text{X}^{\text{max}} \\
\text{VP} \\
\text{V} \\
\text{ukul} \\
\text{eat(2.m.sg.Imp.)} \\
\text{X}^{\text{max}} \\
\text{NP} \\
\text{at-tamur} \\
\text{the-dates} \\
\text{X}^{\text{max}} \\
\end{array}
\]

You, the writer, eat the dates!

Scanning the input for the right edge of $X^{\text{max}}$, P-Phrase Formation parses the utterance in (12) into two P-Phrases. The first one contains the first word and the second one contains the last two words. Accordingly, LHS is blocked from deleting the high vowel of the first word. This is because the second word, which contains the triggering environment, is in a separate P-Phrase. The rule

---

When such syllables occur word-initially, they are repaired at the phrase level by one of two strategies. The first one involves resyllabifying the coda of the final syllable of the immediately preceding word into an onset of the offending syllable. If such syllabification is not possible, the onset is phonetically realized as a glottal stop by default. In the next chapters we will see that the same facts are observed in Shukriiya and Hamar.
applies deleting the high vowel in the second word because the relevant two words are in the same P-Phrase.

Based on the discussion of examples (10)-(12) above, the P-Phrase Formation algorithm in (9) accurately defines the P-Phrase as the domain of application of LHS in UCSA. Before proceeding to consider factors affecting the parsing of P-Phrases, I discuss two more cases to demonstrate that the segmental environment alone is insufficient for triggering LHS. Instead, the rule applies only within the appropriate prosodic domain, namely the P-Phrase as derived by the algorithm in (9). First, consider the examples in (13) and (14) below. These have the same structures as Hamid’s (6e) and (6f), respectively.

(13)

```
(13)  NP
     /     \
    N      AP
         |     |
         A     |
         at-taajir al-kabiir \[X^\text{max}\] \rightarrow (?at-taajir al-kabiir)_p

the-merchant the-big
‘the big merchant’
```

P-Phrase Formation parses the above utterance into one P-Phrase. Accordingly, LHS is predicted to apply deleting the high vowel in the first word and, in fact, it does. Now compare (13) to (14) below.

(14)

```
(14)  S
     /     \
    NP    AP
       /     |
      N      A
         |
         at-taajir anaani \[X^\text{max}\] \[X^\text{max}\] \rightarrow (?at-taajir)_p (anaani)_p

the-merchant selfish
‘The merchant is selfish’
```
At the segmental level, (14) and (13) have the same phonological environment required for the application of LHS. However, while the latter is parsed into one P-Phrase, the former is parsed into two P-Phrases. This is consistent with the fact that LHS is blocked in (14) since the two relevant words are in separate P-Phrases.

Finally, let’s compare (15) below to (11). In the latter, LHS is blocked from applying to the high vowel in the first word [al-kalib] ‘the dog’. In the former, it applies deleting this vowel even though, at the segmental level, the two examples have identical environments. This is because the two relevant words are parsed within the same P-Phrase in (15) but in separate P-Phrases in (11).

(15)

According to P-Phrase Formation, the utterance in (15) is parsed into two P-Phrases.11 Since the first two words are parsed within the same P-Phrase, LHS

---

11 It should be noted here that (15) in fact consists of three P-Phrases. I will demonstrate in the following section that factors such as the weight of phonological material influence P-Phrase formation, parsing an utterance into a number of P-Phrases greater than that allowed by the algorithm in (9). What is relevant at this point is the fact that although in (11) and (15) the
applies deleting the high vowel in the first word. The last two words are parsed in separate P-Phrases. As a result LHS is blocked from applying to the high vowel in [alˈcədʒum] ‘the bone’.

To conclude, in this section I have provided a prosodic account of the domain of LHS in terms of a theory of phrasing of P-Phrases. I have demonstrated that the domain of LHS in UCSA is the P-Phrase, which is derived from the syntax by the P-Phrase Formation algorithm in (9). I have also shown that LHS consistently applies within this domain and is consistently blocked above it. Clearly, the syntactic-government-based analysis proposed by Hamid (1984) equally accounts for the facts discussed thus far. However, in the following section I examine more data and show that, unlike the phrasing analysis, the government-based analysis is empirically inadequate.

2.1.3.2 Phonological weight and P-Phrase Formation

Further investigation of UCSA data reveals that while P-Phrase Formation is unaffected by rate of speech, it is sensitive to the number of phonological words to be parsed in a single P-Phrase. Recall that I use the term phonological word (W) to refer to any phonologically independent unit of segmental material with one primary stress. Typically this unit consists of a stem and any accompanying affixes and clitics. I have already established that LHS applies in the P-Phrase. To demonstrate the effect of the weight factor on the parsing of P-Phrases, I consider cases where the rule is blocked within the domain derived by P-Phrase segmental environment triggering LHS is met, the rule is blocked in the former but not in the latter.
Formation in (9). I argue that, although the P-Phrase is derived with reference to syntactic information, it is not determined by it. Rather, constraints on the weight of phonological material allowed in a P-Phrase force the parsing of the output of the algorithm in (9) into finer P-Phrases. I then modify the algorithm accordingly. Accounting for these facts provides strong support for the present analysis over that of Hamid (1984). The latter analysis inaccurately predicts that LHS applies whenever the syntactic condition required for its application is met.

Let’s first consider the structure in (16) below. In (17), I give all the possible corresponding phrasings of the utterance.

(16)

```
NP
  / \ 
N   NP
   / \ 
  N   AP
   |   |
  kutub al-kaatib al-kabiir
```

book the-writer the-old

(17)

Normal/Fast rate:

a. (kutb al-kaatib)$_p$ (al-kabiir)$_p$ (W W)$_p$ (W)$_p$

b. *(kutb al-kaatib$_p$ al-kabiir)$_p$ *(W W W)$_p$

c. *(kutb)$_p$ (al-kaatib al-kabiir)$_p$ *(W)$_p$ (W W)$_p$

d. ?(kutb)$_p$ (al-kaatib)$_p$ (al-kabiir)$_p$ ?(W)$_p$ (W)$_p$ (W)$_p$

Slow rate

Based on the algorithm of P-Phrase formation in (9), (16) consists of only one phonological phrase corresponding to the right edge of $X^{\text{max}}$. Accordingly, we

---

12 The observation that prosodic constituency and the syntax are not isomorphic dates back to Chomsky and Halle (1968). Subsequently, a multitude of studies have shown that non-syntactic considerations influence the formation of P-Phrases (Nespor and Vogel 1986, Ghini 1993, Inkels and Zec 1990a and 1990b, Dresher 1994, Truckenbordt 1995 and 1999, and Kahnemuyipour 2003, among others).

13 This is considered to be a marked rate of speech; one that is used, for example, in dictation. The corresponding phrasing in (17) is judged as too slow.
predict the phrasing of this utterance to be as in (17b) where all three words are parsed within the same P-Phrase and both high vowels are deleted by LHS. However, this prediction is not borne out by UCSA data. This suggests that the P-Phrase Formation algorithm in (9) is sensitive to more than just the right edge of $X^{\text{max}}$. It is also sensitive to the weight of phonological material that may be parsed within the same P-Phrase. Leaving aside the marked parse of slow speech in (17d), phrasing does not seem to be sensitive to rate of speech. The fact that the only acceptable parsing is (17a) clearly indicates that there is a restriction on the number of phonological words that may be parsed within a single P-Phrase. Specifically, the output of the algorithm in (9) is further parsed into finer phrases consisting maximally of two phonological words. The fact that (17a) is acceptable while (17c) is not may be taken to suggest that there is a further restriction on the distribution of phrases based on weight. That is, only the first P-Phrase may consist of two words; the following phrases may consist of one word each. However, further examination of UCSA data shows this not to be the case. The phrasing in (17a) is a function of the odd number of phonological words in the output of the P-Phrase Formation algorithm in (9). To illustrate this point, consider the more complex example in (18) where P-Phrase Formation yields an even number of words.

---

14 Hamid (1984: 125) provides two examples similar to (16) above in which double application of LHS does occur in SCA. Although this observation is not consistent with UCSA data, I show in the following two chapters that it is consistent with the Shukriiya and Hamar dialects. Furthermore, I show that this dialectal variation follows from an accurate characterization of the phrasal level of syncope in each dialect. That is, while LHS is blocked beyond the P-Phrase level in UCSA, it applies up to the I-Phrase level in Shukriiya and Hamar.
According to P-Phrase Formation in (9), (18) consists of two P-Phrases. Relevant to our present discussion is the first P-Phrase, which consists of four phonological words. If the right edge of $X^{\text{max}}$ is the determining factor in P-Phrase Formation, we expect LHS to apply deleting all three high vowels in (18). As the phrasings in (19) indicate, this is not the case.

(19)

Normal/Fast rate:

<table>
<thead>
<tr>
<th></th>
<th>Phrase</th>
<th>Phonology</th>
</tr>
</thead>
<tbody>
<tr>
<td>a</td>
<td>(?ar-raahil al-wišil)$_p$ (af-farq al-bašiidi)$_p$</td>
<td>(W W)$_p$ (W W)$_p$</td>
</tr>
<tr>
<td>b</td>
<td>*(?ar-raahil al-wišil)$_p$ (af-farq)$_p$ (al-bašiidi)$_p$</td>
<td>*(W W)$_p$ (W W)$_p$ (W W)$_p$</td>
</tr>
<tr>
<td>c</td>
<td>*(?ar-raahil)$_p$ (al-wišil af-fariq)$_p$ (al-bašiidi)$_p$</td>
<td>*(W)$_p$ (W W)$_p$ (W W)$_p$</td>
</tr>
<tr>
<td>d</td>
<td>*(?ar-raahil)$_p$ (al-wišil)$_p$ (af-farq al-bašiidi)$_p$</td>
<td>*(W)$_p$ (W)$_p$ (W W)$_p$</td>
</tr>
<tr>
<td>e</td>
<td>*(?ar-raahil al-wišil af-fariq al-bašiidi)$_p$</td>
<td>*(W W W W)$_p$</td>
</tr>
<tr>
<td>f</td>
<td>*(?ar-raahil al-wišil af-fariq)$_p$ (al-bašiidi)$_p$</td>
<td>*(W W W)$_p$ (W)$_p$</td>
</tr>
<tr>
<td>g</td>
<td>*(?ar-raahil)$_p$ (al-wišil af-fariq al-bašiidi)$_p$</td>
<td>*(W)$_p$ (W W W)$_p$</td>
</tr>
</tbody>
</table>

Slow rate:

<table>
<thead>
<tr>
<th></th>
<th>Phrase</th>
<th>Phonology</th>
</tr>
</thead>
<tbody>
<tr>
<td>h</td>
<td>*(?ar-raahil)$_p$ (al-wišil)$_p$ (af-fariq)$_p$ (al-bašiidi)$_p$</td>
<td>*(W)$_p$ (W)$_p$ (W)$_p$ (W)$_p$</td>
</tr>
</tbody>
</table>

The phrasing of (18) provides further evidence for the conclusion that P-Phrase Formation is sensitive to phonological weight. Again, leaving aside the marked

\[15\] The complementizer [al-] does not count as a phonological word. It is a clitic on the following verb.
parse of slow speech in (19h), phrasing is not sensitive to rate of speech but to the number of words to be parsed within the same P-Phrase. Furthermore, the acceptable phrasing in (19a) is evidence that there is no restriction on the distribution of phonological phrases with respect to weight.\textsuperscript{16} Instead, a P-Phrase must consist of two words where possible. This of course depends on the number of words that the initial phrasing yields. Given the phrasing in (17) and (19) above, we conclude that the output of the algorithm in (9) is parsed from left-to-right into finer phrases consisting maximally of two words each. If the output of the initial parsing consists of an odd number of words, as is the case in (17), the rightmost phrase in the final output will consist of one word. Alternatively, if the output of the initial phrasing consists of an even number of words, as in (19), the result of the final parsing is an even number of P-Phrases consisting of two words each.

Based on the discussion above, we conclude that the output of P-Phrase Formation (9) is subject to a phrasing algorithm whereby primitive phonological phrases are parsed with respect to weight, yielding P-Phrases that consist maximally of two words each. Accordingly, I propose the modified algorithm of P-Phrase Formation in (20).

(20) P-Phrase Formation:

\begin{enumerate}
\item Form a P-Phrase boundary at the right edge of each $X^{\text{max}}$ in the input.
\item From left-to-right, parse the output of (a) into finer P-Phrases that consist maximally of two words each.
\end{enumerate}

\textsuperscript{16} In this respect UCSA is similar to Italian. Ghini (1993) shows that the formation of P-Phrases in Italian is affected by the weight of phonological material. However, Italian is different in that the distribution of P-Phrases is affected by factors such as symmetry and balance of weight.
Thus stated, the algorithm in (20) provides an accurate characterization of the domain of LHS.

To summarize, in this section I examined LHS and proposed a P-Phrase Formation algorithm that accurately characterizes its prosodic domain in UCSA. I have demonstrated that although the P-Phrase Formation algorithm is sensitive to syntactic information, it is not determined by it. Rather, prosodic factors such as the weight of phonological material contribute to P-Phrase Formation. I have also demonstrated that this analysis is superior to the government-based analysis of Hamid (1984).

In the following section, I turn to examine RHS. I provide evidence against Hamid’s (1984) assumption that this rule applies at the same level as LHS and show that it applies up to the level of the Intonational Phrase (I-Phrase) and not beyond.

2.1.3.3 The domain of RHS: The I-Phrase

The observation made by Hamid (1984), that RHS applies whenever its phonological environment is met, indicates that the domain of application of this rule is larger than the P-Phrase, the domain of LHS. However, although it is true that the rule applies up to a level higher than the P-Phrase, the statement that it is automatic applying whenever its phonological, i.e. segmental, environment is met is descriptively inaccurate. I provide evidence below that the rule applies up to the I-Phrase level and not beyond. That is, RHS is blocked when the word containing the target vowel and the word containing the left-hand context of the rule are in two separate I-Phrases. In identifying the prosodic level of I-Phrase, I
follow the commonly held view of the I-Phrase as the domain of an intonation contour (Nespor and Vogel 1986).

Turning to the task of identifying the domain of RHS, consider the examples in (21) and (22) below. To demonstrate that RHS applies above the P-Phrase level, I indicate only the edges of $X^{\text{max}}$ relevant to P-Phrase Formation in (21a) and (22a). In (21b) and (22b), I give the final output of P-Phrase Formation.

(21) lamma wiṣil-na al-hilla ligii-na aj-jamaa‘s a rahal-u when arrived-1.pl. the-village found-1.pl. the-people left-3.pl
‘When we arrived at the village, we found that the people had already left.’

a. Input to P-Phrase Formation:
   $[[\text{llama}],[[\text{wiṣilna}],[[\text{al-hilla}]],[\text{ligiina}],[[\text{aj-jamaa}s]],[\text{NP}][\text{rahal-u}]]]$\text{VP}

b. Output of P-Phrase Formation:
   $(\text{llama} \text{wiṣil-na}), (\text{al-hilla}), (\text{ligi-na aј-jamaa}s), (\text{rahal-u})$

c. Fast rate: $(\text{llama} \text{wiṣil-na al-hilla ligiina aј-jamaa}s \text{ rahal-u})_U$

d. Normal rate: $(\text{llama} \text{wiṣil-na al-hilla} (\text{ligiina aј-jamaa}s \text{ rahal-u})_U$

(22) اةوالماا ؤلی lįḥig-na rįkib-na ـارابیت-u
as soon as Ali caught up(3.m.sg.)-1.pl. rode-1.pl. car-3.m.sg.
‘As soon as Ali caught up with us, we drove his car.’

a. Input to P-Phrase Formation:
   $[[\text{awwalmaa}],[[\text{ali}],[\text{liḥig-na}]], [[\text{rıkib-na}]], [[\text{aрабiit-u}]]]$\text{VP}

b. Output of P-Phrase Formation:
   $(\text{awwalmaa }\text{ali}),(\text{liḥigna}),(\text{lıkib-na }\text{aрабiit-u})$

c. Fast rate: $(\text{awwalmaa }\text{али лиḥig-na rıkib-na }\text{aрабiit-u})_U$

d. Normal rate: $(\text{awwalmaa }\text{али лиḥig-na} (\text{lıkib-na }\text{aрабiit-u})_U$

Each of the examples in (21) and (22) forms the domain of one intonation contour in fast speech. Accordingly, it is parsed into one I-Phrase. This is shown in (21c) and (22c). RHS applies throughout the I-Phrase deleting the high vowels in both examples. Note that the second application of RHS in (21c) and both applications in (22c) occur across P-Phrase boundaries. Evidently, the domain of RHS is larger than the P-Phrase, the domain of LHS. To identify the exact nature
of this domain, we need to consider the cases where RHS is blocked. In normal rate of speech, each of (21) and (22) forms the domain of two distinct intonation contours. As shown in (21d) and (22d), each is parsed into two I-Phrases accordingly. Crucially, note that the second application of RHS is blocked in both examples where the word containing the target vowel and the word containing the left-hand context of the rule are parsed in separate I-Phrases. This is clear evidence that the domain of application of RHS is the I-Phrase. The rule is blocked above this level even when its segmental environment is met.

To conclude, in the previous sections I have developed a prosodic account of syncope. I have proposed a theory of phrasing of P-Phrases in UCSA and demonstrated that while LHS applies up to the level of the P-Phrase, RHS applies up to the level of the I-Phrase. This asymmetry in the domain of application of the two rules is a rather peculiar fact since LHS and RHS are instantiations of the same process. In section 2.1.3.6, I argue that this fact follows directly from the restriction on the domain of resyllabification in UCSA. At this point, it is appropriate to further examine the significance of prosodic levels above the word to phonological processes in UCSA. In the following section, I show that the levels of P-Phrase and I-Phrase are domains of phonological processes other than syncope.

2.1.3.4 P-Phrase and I-Phrase as domains of phonological processes in UCSA

In this section I provide further evidence for the significance of the P-Phrase and I-Phrase as domains of phonological processes in UCSA. First I examine the
process of consonant deletion and show that the theory of phrasing proposed in the previous sections accurately characterizes the domain of this process. Then I examine a number of assimilation processes and show that they apply up to the I-Phrase level.

2.1.3.4.1 P-Phrase: The domain of consonant deletion

UCSA has roots that end in two-consonant clusters at the underlying level. In the majority of cases, the cluster is a full geminate (e.g., /mahall/ ‘place’, /sinn/ ‘tooth’, /jidd/ ‘grandfather’, /mafakk/ ‘screw driver’, and /malaff/ ‘dossier’). In a few other cases, the cluster is a nasal-C sequence which surfaces either as a full geminate (/bint/ → [bitt] ‘girl’) or as a partial geminate consisting of a homorganic nasal-stop sequence (/janb/ → [jamb] ‘near’, /‘ind/ ‘at’). In unaffixed forms, the second member of the cluster is stray-erased if it cannot be properly syllabified at the phrase level. In this section I show that the level at which this segment is deleted is the P-Phrase as defined by the algorithm in (20) above.

To demonstrate the facts, let’s begin by considering the forms in (23) and (24) where roots are followed by vowel-initial suffixes. In these examples, the second member of the root-final cluster is syllabified as an onset of the following syllable (syllable boundary is indicated by a dot).

(23) a. /bint-ik/ → [bit.tik]
girl-2.f.sg.
‘your daughter’

b. /umm-ik/ → [?um.mik]
mother-2.f.sg.
‘your mother’
In unaffixed forms, however, the second member of the root-final cluster cannot be properly syllabified at the word level because UCSA does not allow complex syllable margins. Where possible, this consonant is repaired at the phrase level by being syllabified as an onset of the initial syllable of the following word. Where syllabification in this manner is not possible, the consonant is stray-erased. This is illustrated by the examples in (25) and (26) below.

(25) a. /biːnt/ //ahmad/ → (biːnt) ahmad → [biːnt ahmad] 

girl Ahmed

‘Ahmed’s daughter’

b. /biːnt/ //jazaː/ → (biːnt) jazaː → [biːnt jazaː]

girl Shaza

‘Shaza’s daughter’

(26) a. /janb/ //ahmad/ → (janb) ahmad → [janb ahmad] 

near Ahmed

‘near Ahmed’

b. /janb/ //jazaː/ → (janb) jazaː → [janb jazaː]

near Shaza

‘near Shaza’

As indicated by the output of word-level syllabification, the root-final consonant in (25) and (26) is not properly syllabified at the word level. In (25a) and (26a), the root is followed by a word that begins with a vowel. Recall that UCSA imposes a total ban on onsetless syllables. As shown in the corresponding surface forms, this motivates the phrasal syllabification of the root-final consonant into the onset position of the initial syllable of the following word. In

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17 The assimilation rule responsible for the [t ~ j] alternation in [bit] ‘girl’ is discussed in the next section.
(25b) and (26b), on the other hand, such syllabification is not possible since the word following the root begins with a consonant. As is apparent from the corresponding surface forms, the root-final unsyllabified segment is stray-erased. Evidently, the second member of the root-final cluster in the above examples is retained up to a phrasal level where, if it cannot be properly syllabified, it is deleted.

I demonstrate below that the P-Phrase, as defined by the algorithm in (20) above, is the phrasal level at which the unsyllabified root-final consonant is deleted. Consider the examples in (27) below.

(27)


In both examples, the first word ends in a geminate whose second member cannot be properly syllabified at the word level and the second word begins with a vowel. Thus, at the segmental level the two examples are identical with respect to the context of the unsyllabified segment. Nonetheless, the second member of the geminate is syllabified as an onset of the initial syllable of the second word in (27a) but not in (27b). In the latter, syllabifying the second member of the geminate in this manner yields an unacceptable form. Similarly, deleting it and inserting a glottal stop in the onset position of the initial syllable of the second word is disallowed. Instead, the unsyllabified member of the geminate is deleted and it is now the remaining member that is syllabified as an onset of the initial syllable of the second word. This raises a rather intriguing question; since it is
possible to syllabify into onset, what forces consonant deletion in (27b)? The answer to this question hinges on an accurate characterization of the respective contexts of the unsyllabified segments. As it turns out, the seemingly unpredictable behaviour of the unsyllabified segments in (27a) and (27b) follows from the fact that the two utterances differ with respect to prosodic constituency. To demonstrate this point, I give the relevant syntactic structures of (27a) and (27b) and the corresponding output of the P-Phrase Formation algorithm in (28a) and (28b), respectively.

(28)  a. \[[\text{al-bit}]_N \text{ [[al-kabiira]}_{AP}]_{NP} \rightarrow ((?\text{al.bit.})_W (\text{al.kabiira})_W)_P  \\

b. \[[[\text{al-bit}]_N]_{NP} [[\text{akalat}]}_V]_{VP} \rightarrow ((?\text{al.bit.})_W ((\text{a.kalat})_W)_P)

The phrasing in (28a) yields one P-Phrase consisting of two words while the phrasing in (28b) yields two P-Phrases consisting of one word each. Thus, repairing the second member of the geminate by syllabifying it into onset in (27a) occurs within the same P-Phrase. In contrast, if the unsyllabified segment in (27b) were to be repaired in the same manner, it would have to be syllabified across the P-Phrase boundary. In other words, it would have to be repaired within the I-Phrase. We have seen that phrasal syllabification does occur across P-Phrases. In fact, the remaining member of the geminate in (27b) is syllabified in exactly this way. Consequently, deletion of the second member of the geminate in (27b) cannot be explained in terms of a restriction on the domain of phrasal syllabification. Instead, it must follow from a restriction on the phrasal level at which this segment must be repaired. That is, the unsyllabified segment is deleted because it cannot be properly syllabified at the P-Phrase level. To satisfy the Onset requirement, the remaining member of the geminate is, subsequently, syllabified into the onset position of the initial syllable of the
second word. I revisit this issue in section 2.1.3.6. For the purposes of the present discussion, we note that the second member of a root-final cluster is retained up to the P-Phrase level. At this level, it is repaired through syllabification within the same P-Phrase as in (27a). If this is not possible, as in (27b), the consonant is stray-erased. Accordingly, we conclude that the phrasal level at which deletion occurs is the P-Phrase.

In summary, the process of consonant deletion discussed in this section provides further evidence for the significance of the P-Phrase as a domain of phonological processes in UCSA. In the following section, I examine processes that apply at the I-Phrase level.

2.1.3.4.2 I-Phrase: The domain of assimilation processes

In this section, I consider three types of assimilation processes relevant to the goal of our present discussion. These processes operate at both the word and phrase levels. Hamid (1984) notes that when they apply at the phrase level they are not subject to the syntactic constraint imposed on the application of LHS. Viewed in terms of the analysis of syncope proposed here, this means that the domain of the assimilation processes is larger than the P-Phrase, the domain of LHS. In this section I show that the phrasal domain of these processes is the I-Phrase.

To establish the relevant facts, I begin by giving a general description of the processes and illustrate their effects at the word level. All three processes are anticipatory involving voice, place, and manner features. Voice assimilation

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18 As is the case in many Arabic dialects, assimilation is quite prevalent in UCSA. For a detailed description of the different types of assimilation in Sudanese Arabic, see Mustapha (1982) and Hamid (1984).
occurs between two adjacent obstruents with the first one acquiring the voice properties of the second. Place assimilation involves a nasal consonant assimilating the place of an immediately following consonant. In manner assimilation, which involves homorganic obstruents, a stop becomes a fricative when immediately followed by a fricative. The data in (29)-(31) illustrate voice, place, and manner assimilation, respectively.

<table>
<thead>
<tr>
<th>(29)</th>
<th>Root</th>
<th>Perfect-3.m.sg.</th>
<th>Imperfect-3.m.sg.</th>
<th>Gloss</th>
</tr>
</thead>
<tbody>
<tr>
<td>a.</td>
<td>d-x-l</td>
<td>daxal</td>
<td>yitxul</td>
<td>‘enter’</td>
</tr>
<tr>
<td></td>
<td>g-f-l</td>
<td>gafal</td>
<td>yikfil</td>
<td>‘close’</td>
</tr>
<tr>
<td></td>
<td>z-k-r</td>
<td>zakar</td>
<td>yiskur</td>
<td>‘mention’</td>
</tr>
<tr>
<td></td>
<td>y-s-l</td>
<td>yasal</td>
<td>yixsil</td>
<td>‘wash’</td>
</tr>
<tr>
<td>b.</td>
<td>t-ʃ-b</td>
<td>tiʃib</td>
<td>yidʃab</td>
<td>‘become tired’</td>
</tr>
<tr>
<td></td>
<td>k-b-t</td>
<td>kabat</td>
<td>yigbut</td>
<td>‘suppress’</td>
</tr>
<tr>
<td></td>
<td>s-ʃ-n</td>
<td>saʃan</td>
<td>yizʃin</td>
<td>‘imprison’</td>
</tr>
<tr>
<td></td>
<td>f-ʃ-r</td>
<td>faʃar</td>
<td>yiʃʃur</td>
<td>‘feel’</td>
</tr>
</tbody>
</table>

(30) /sakan-kum/ → [sakəŋkum]
    residence-Poss.2.pl.
    ‘your residence’

(31) a. /iʃ-tʃaawaf-u/ → [ʔiʃʃaawafu]
    Recip.-saw-3.pl.
    ‘They saw each other.’

    b. /iʃ-tʃaalaf-u/ → [ʔiʃxaalafu]
    Recip.-disagreed-3.pl.
    cf. *[ʔiʃxaalafu]
    ‘They disagreed with each other.’

The data in (29) consist of trilateral roots and their corresponding perfect and imperfect verbal forms of measure I. We observe that the root-initial consonant exhibits voicing alternation in the verbal forms. In the perfect forms, the consonant remains voiced in (29a) and voiceless in (29b). In the imperfect forms, on the other hand, it is devoiced in the former and voiced in the latter. This alternation is predictable from the position of the consonant. Specifically, in the verbal template of the imperfect forms, the first and second consonants of the root are adjacent. Evidently, this context triggers voice assimilation. Since the
second consonant is voiceless in (29a) and voiced in (29b), this results in
devoicing in the former and voicing in latter. In (30), the coronal nasal of the
noun stem becomes velar as result of assimilating the place of the initial
consonant of the possessive suffix /-kum/. In (31a) the coronal stop of measure
VI reciprocal prefix /it-/ becomes a fricative when the stem begins with a
coronal fricative. Example (31b) shows that for manner assimilation to take
place the relevant segments must be homorganic.

Now let’s examine the behaviour of these processes at the phrase level.
Consider the parsing of examples (32)-(34) into I-Phrases.

(32) lamma al-maṭar-a šabb-at gafal al-baab
when the-rain-f. poured-3.f.sg. closed(3.m.sg.) the-door
‘When it started to rain, he closed the door.’
a. Fast rate: ((amma al-maṭar-a šabb-ad gafal al-baab))$_U$
b. Normal rate ((amma al-maṭar-a šabb-at) (gafal al-baab))$_U$

(33) kullumaa ja-axud zaman kullumaa jibga asʃab
as long 3.m.sg-take time as long 3.m.sg-become harder
‘The more time you spend on it, the harder it gets.’
a. Fast rate ((kullumaa jaaxuz zaman kullumaa jibga asʃab))$_U$
b. Normal rate ((kullumaa jaaxuz zaman) (kullumaa jibga asʃab))$_U$

(34) yoom al-xamiis al-faat ūf-ta hasan fi al-suũq
day Thursday that-went saw-1.sg. Hassan at the-market
‘Last Thursday I saw Hassan at the market place.’
a. Fast rate ((yoom al-xamiis al-faat ūf-ta hasan fi al-suũq))$_U$
b. Normal rate ((yoom al-xamiis al-faat) (ūf-ta hasan fi al-suũq))$_U$

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19 In CA and MSA, which do not allow complex margins, the standard assumption is that the
prefix underlying form is /t-/ and affixation invariably results in #tC cluster. This is resolved by
epenthesis of the high vowel itC which receives a default glottal stop onset. Hamid (1984: 93)
proposes the same analysis for SCA. However, in section 2.2.2.1 provide conclusive evidence that
the underlying form of the prefix is /it-/ in UCSA.
In fast speech, each of the above utterances constitutes the domain of one intonation contour and is parsed into one I-Phrase accordingly. At a normal rate of speech, on the other hand, each utterance forms the domain of two distinct intonation contours and is parsed into two I-Phrases. Assimilation occurs in the former case but is blocked in the latter. This is because in the latter case the target of assimilation is parsed in the first I-Phrase while the triggering segment is parsed in the second. Thus, Voicing assimilation, whose target is the final consonant in /šabb-at/ ‘poured’, occurs in (32a) but is blocked in (32b).

Likewise, place assimilation occurs in (33a) changing the alveolar nasal in /zaman/ ‘time’ to a velar nasal, but is blocked in (33b). Note that in this example manner assimilation, whose target is the final stop in /ja-axud/ ‘take’, occurs in (33a) and (33b). This is predicted by the fact that in both cases the relevant segments are within the same I-Phrase. Contrastively, manner assimilation occurs in (34a), changing the final stop in /faat/ ‘went’ into a fricative, but is blocked in (34b) where the relevant segments are in two separate I-Phrases. Finally, note that place assimilation, whose target is the final nasal in /hasan/, predictably occurs in (34a) and (34b). This is because the target and the trigger are parsed within the same I-Phrase in both.

In conclusion, I argued in sections 2.1.2.2 and 2.1.2.3 that the prosodic levels of P-Phrase and I-Phrase accurately characterize the domains of LHS and RHS, respectively. In this section, I have provided evidence that sentence phonology in UCSA is not limited to syncope. By accounting for the pattern of consonant deletion, I have shown that the P-Phrase is a significant level for syllabification. I have also demonstrated that I-Phrase is the domain of
assimilation involving manner, place, and voice features. What is unique to syncope is the fact that it straddles two different phrasal domains. For our purposes, then, the central question arising from the previous discussion is: if LHS and RHS are indeed instantiations of the same process, as I maintain, why do they exhibit asymmetry in their respective domains? I provide the answer to this question in section 2.1.3.6. In the following section, I review Abu-Mansour’s (2011) account of syncope in Makkan Arabic.

2.1.3.5 Abu-Mansour’s (2011) account of syncope in Makkan Arabic
Abu-Mansour (2011) describes patterns of syncope in Makkan Arabic almost identical to those reported by Hamid (1984) for SCA. She proposes a constraint-based prosodic analysis that is argued to account for both word and phrase level syncope in Makkan. Given the striking similarities between the patterns of syncope in the two dialects, it is necessary to review her analysis and explore the possibility of extending it to UCSA. In the next section, I compare data from Abu-Mansour (2011) and Hamid (1984) to demonstrate the extent to which the patterns are similar. However, upon reviewing Abu-Mansour’s account in the following section, it becomes apparent that it is empirically inadequate.

2.1.3.5.1 The patterns of syncope in Makkan Arabic
Based on Abu-Mansour’s (2011: 37) description, word-level patterns of syncope in Makkan differ from those described by Hamid for SCA only trivially; the context of deletion is the same and both dialects are differential. The only difference is that the target vowel in Makkan is predominantly the high front
vowel *i* with the back vowel *u* syncopating in a significantly restricted number of word classes. Such degree of similarity is hardly surprising as it is not limited to syncope. The two dialects also have similar patterns of epenthesis. Of direct relevance to our purposes, however, is the fact that the Makkan patterns of phrasal syncope described by Abu-Mansour are strikingly similar, if not identical, to those reported by Hamid for SCA. I illustrate this point below by comparing data from the two dialects.

In the following examples, I give the Makkan Arabic data in the first column. These are taken from Abu-Mansour (2011: 38-40). In the second column, I give the SCA data, which are taken from Hamid (1984: 116-119). In the third column, I give the corresponding syntactic structures. In some of the examples, the Makkan and SCA data are identical. In others, they differ partially or entirely with respect to lexical selection but their syntactic structures are the same. Some of Hamid’s examples, introduced in previous sections, are repeated here for convenience.

Let us begin by considering examples of RHS, which doesn’t exhibit edge effect in either dialect. These are given in (35) below.

\textsuperscript{20} Abu-Mansour cites Bakalla (1979) and Kabra (2004), who give the same description of syncope in Makkan.
(35) RHS (CV#C _ CV): Insensitive to the edges of $X^{max}$

<table>
<thead>
<tr>
<th>Makkan Arabic</th>
<th>SCA</th>
<th>Syntactic Structure</th>
</tr>
</thead>
<tbody>
<tr>
<td>a. katab-u # kitaab wrote-they book</td>
<td>katab-u kitaab</td>
<td>V NP</td>
</tr>
<tr>
<td>'They wrote a book.'</td>
<td>wrote-they (a)book</td>
<td>'They wrote a book.'</td>
</tr>
<tr>
<td>$\rightarrow$ katabu kitaab</td>
<td>$\rightarrow$ katabu kitaab</td>
<td></td>
</tr>
<tr>
<td>b. karaasi # kubaar chairs big</td>
<td>karaasi kutaar chairs many</td>
<td>N AP</td>
</tr>
<tr>
<td>'big chairs'</td>
<td>'many chairs'</td>
<td></td>
</tr>
<tr>
<td>$\rightarrow$ karaasi kbaar</td>
<td>$\rightarrow$ karaasi kbaar</td>
<td></td>
</tr>
<tr>
<td>c. ?ab-u # su'aad father-of Su'aad</td>
<td>dawa kubaar medicine (of) adults</td>
<td>N NP</td>
</tr>
<tr>
<td>'Su'aad’s father'</td>
<td>'medicine for adults'</td>
<td></td>
</tr>
<tr>
<td>$\rightarrow$ ?abu su'aad</td>
<td>$\rightarrow$ dawa qabaar</td>
<td></td>
</tr>
<tr>
<td>d. saami # sjimic-na</td>
<td>'ali c'irif-na</td>
<td>NP VP</td>
</tr>
<tr>
<td>Sami heard-us</td>
<td>Ali knew-us</td>
<td></td>
</tr>
<tr>
<td>'Sami heard us.'</td>
<td>'Ali knew us.'</td>
<td></td>
</tr>
<tr>
<td>$\rightarrow$ saami smic-na</td>
<td>$\rightarrow$ ali c'rifna</td>
<td></td>
</tr>
<tr>
<td>e. ?awlaad ?uxt-i # su'yaar sons sister-my little</td>
<td>?awlaad faa'tma kubaar sons(of) Fatima old</td>
<td>NP AP</td>
</tr>
<tr>
<td>'My sister’s sons are little.'</td>
<td>'Fatima’s sons are old.'</td>
<td></td>
</tr>
<tr>
<td>$\rightarrow$ ?awlaad ?uxtī šyaar</td>
<td>$\rightarrow$ ?awlaad faa'tma qabaar</td>
<td></td>
</tr>
<tr>
<td>f. ?adee-t walad-u # kitaab</td>
<td>?addee-t walad-u kitaab</td>
<td>V NP NP</td>
</tr>
<tr>
<td>gave-I son-his book</td>
<td>gave-I son-his (a) book</td>
<td></td>
</tr>
<tr>
<td>'I gave his son a book'</td>
<td>'I gave his son a book'</td>
<td></td>
</tr>
<tr>
<td>$\rightarrow$ ?adeet waladu ktaab</td>
<td>$\rightarrow$ ?addeet waladu ktaab</td>
<td></td>
</tr>
</tbody>
</table>

In all of the examples, the underlined high vowel in the right-hand word deletes regardless of the syntactic structure. The domain of RHS spans the left edge of $X^{max}$ in (35a)-(35c) and in (35d)-(35f) it spans the right, as well as the left, edge of $X^{max}$. Accordingly, we conclude that RHS is insensitive to the edges of $X^{max}$ in both dialects. 22

21 In the Makkan data, the sign (#) seems to have a double function. Abu-Mansour uses it conventionally to indicate word boundary in examples such as (35a)-(35d) and also to indicate the edge of $X^{max}$ as in (35e) and (35f).

22 There are two incidental points regarding the Makkan data. First, in (35c) the form [?ab-u] ‘father-of’ is inaccurately glossed. There is no overt morpheme corresponding to English of in the Arabic construct state. In CA and MSA, where the form is [?abuu], the final long vowel is the nominative ending. Contemporary spoken dialects of Arabic, however, lost the case system of
Turning to LHS, let us first consider examples where it applies across the left edge of $X^{\text{max}}$. These are given in (36) below.

(36) LHS (VC __ C#V): Insensitive to the left edge of $X^{\text{max}}$

<table>
<thead>
<tr>
<th>Makkian Arabic</th>
<th>SCA</th>
<th>Syntactic Structure</th>
</tr>
</thead>
<tbody>
<tr>
<td>a. fiṣrīb # al-mūjā</td>
<td>fiṣrīb al-qāhwa</td>
<td>V NP</td>
</tr>
<tr>
<td>drank the-water</td>
<td>drank(he) the-coffee</td>
<td></td>
</tr>
<tr>
<td>‘He drank the water.’</td>
<td>‘He drank the coffee.’</td>
<td></td>
</tr>
<tr>
<td>→ fiṣrāl mūjā</td>
<td>→ fiṣr al-qāhwa</td>
<td></td>
</tr>
<tr>
<td>b. fiḥim # inn-u yaltāăn</td>
<td>fiḥim inn-u yaltāăn</td>
<td>V CP</td>
</tr>
<tr>
<td>understood that-he wrong</td>
<td>understood(he) that-he wrong</td>
<td></td>
</tr>
<tr>
<td>‘He understood that he was wrong.’</td>
<td>‘He understood that he was wrong.’</td>
<td></td>
</tr>
<tr>
<td>→ fiḥm innu yaltāăn</td>
<td>→ fiḥm innu yaltāăn</td>
<td></td>
</tr>
<tr>
<td>c. al-kaatīb as-sāʿūudi</td>
<td>at-taajir as-suudaani</td>
<td>N AP</td>
</tr>
<tr>
<td>the-writer the-Saudi</td>
<td>the-merchant the-Sudanese</td>
<td></td>
</tr>
<tr>
<td>‘the Saudi male writer’</td>
<td>‘the Sudanese merchant’</td>
<td></td>
</tr>
<tr>
<td>→ alkaatīb assaʿūudi</td>
<td>→ attaajir assuudaani</td>
<td></td>
</tr>
<tr>
<td>d. kutub # ahmād</td>
<td>ḫūyul ahmād</td>
<td>N NP</td>
</tr>
<tr>
<td>books Ahmad</td>
<td>job (of) Ahmed</td>
<td></td>
</tr>
<tr>
<td>‘Ahmād’s books’</td>
<td>‘Ahmād’s job’</td>
<td></td>
</tr>
<tr>
<td>→ kutb ahmād</td>
<td>→ ḫūy′l ahmād</td>
<td></td>
</tr>
</tbody>
</table>

The underlined high vowel in the left-hand word deletes in all examples indicating that LHS applies across the left edge of $X^{\text{max}}$ in both dialects.

Finally, let us consider examples of LHS exhibiting right-edge effect. These are given in (37) below.

---

CA. In these dialects, the final vowel in [‘abu] is not a morpheme but part of the noun stem meaning “father”. The second point has to do with the form [‘adee-t] ‘I gave’ in (35f). Like most dialects spoken in the Arabian Peninsula, Makkān Arabic predominantly uses a different verb [‘addeet]. Also, according to two speakers of Makkān, if they were to use the form in (35f), they would pronounce it as [‘addeet]. It is likely that both (35c) and (35f) are misprints.
(37) LHS (VC __ C#V): Blocked by the right edge of X$^{\text{max}}$

<table>
<thead>
<tr>
<th>LHS (Makkan Arabic)</th>
<th>SCA</th>
<th>Syntactic Structure</th>
</tr>
</thead>
<tbody>
<tr>
<td>a. al-kaatib # a-nt-ahar</td>
<td>al-kalib akal</td>
<td>NP VP</td>
</tr>
<tr>
<td>‘The writer commit suicide’</td>
<td>‘The dog ate’</td>
<td></td>
</tr>
<tr>
<td>→ alkaatib antahar</td>
<td>→ alkalib akal</td>
<td></td>
</tr>
<tr>
<td>cf. *alkaatb antahar</td>
<td>cf. *alkalb akal</td>
<td></td>
</tr>
<tr>
<td>b. al-muhaasib # amiin</td>
<td>at-taa¡jir amiin</td>
<td>NP AP</td>
</tr>
<tr>
<td>‘The cashier honest’</td>
<td>‘The merchant honest’</td>
<td></td>
</tr>
<tr>
<td>→ almuhaasb amiin</td>
<td>→ attaajir amiin</td>
<td></td>
</tr>
<tr>
<td>cf. *almuhaasb amiin</td>
<td>cf. *attaajr amiin</td>
<td></td>
</tr>
<tr>
<td>c. badlat al-kaatib # ad-Ôadiida</td>
<td>badlat al-kaatib aj-Ôadiida</td>
<td>N NP AP</td>
</tr>
<tr>
<td>suit the-writer the-new</td>
<td>suit (of) the-writer the-new</td>
<td>‘the new suit of the writer’</td>
</tr>
<tr>
<td>→ badlat alkaatib aÔÔadiida</td>
<td>→ badlat alkaatib aÔÔadiida</td>
<td></td>
</tr>
<tr>
<td>cf. *badlat alkaatb aÔÔadiida</td>
<td>cf. *badlat alkaatb aÔÔadiida</td>
<td></td>
</tr>
<tr>
<td>d. fahham al-kaatib # inn-u yaltaan</td>
<td>fahham at-taa¡jir inn-u yaltaan</td>
<td>V NP CP</td>
</tr>
<tr>
<td>made understand the-writer that he wrong</td>
<td>made to understand(he) the-merchant that-he wrong</td>
<td></td>
</tr>
<tr>
<td>→ fahham alkaatib innu yaltaan</td>
<td>→ fahham attaa¡jir innu yaltaan</td>
<td></td>
</tr>
<tr>
<td>cf. *fahham alkaatb innu yaltaan</td>
<td>cf. *fahham attaajr innu yaltaan</td>
<td></td>
</tr>
</tbody>
</table>

The underlined high vowel in the left-hand word fails to delete in all examples indicating that LHS is blocked by the right edge of X$^{\text{max}}$ in both dialects.

Evidently, the patterns of phrasal syncope in the two dialects are the same. In effect, Abu-Mansour’s account of syncope in Makkan is an account of syncope in SCA. Consequently, one has to review her account before investigating the possibility of extending it to UCSA.

2.1.3.5.2 Abu-Mansour’s account

Abu-Mansour’s analysis draws on Optimality Theory (Prince and Smolensky 1993), Correspondence Theory (McCarthy and Prince 1995), and the Alignment
Theory of the syntax-phonology interface (Selkirk 1995). The analysis is argued to capture three significant generalizations about syncope (pp. 36 and 54). First, it shows that both word-level and phrase-level syncope follow from the interaction of the same set of constraints; second, it provides supporting evidence for the role of alignment constraints and Selkirk’s Edge-based Theory in characterizing domains of interface processes; and third, by showing that both RHS and LHS “as well as the assumed discrepancy in the behaviour of the latter” are due to the dominance of the alignment constraints, the analysis “eliminates the need for reference to” RHS and LHS in favour of a distinction between application and under-application of syncope. In this section, I review the analysis focusing on phrase-level syncope and show that, not only is it empirically inadequate, but also it does not succeed in capturing any of these generalizations.

Abu-Mansour (2011: 48) adopts the account of word-level syncope proposed by Gouskova (2003) and modified by Kabrah (2004). The relevant constraints are given in (38)-(40) below. Under this analysis, syncope is due to the dominance of the constraint *Nuc/i,u over the faithfulness constraint MaxV. The former markedness constraint, which penalizes syllables with less harmonic nuclei, is outranked by the well-formedness constraint *Complex, accounting for the fact that Makkah Arabic does not allow complex margins. The ranking of these constraints is given in (41), which combines two tableaux from Abu-Mansour (2011: 46).

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23 The latter is an extension of the Generalized Alignment constraint format of McCarthy and Prince (1993a).
(38)  *NUC/i,u
The high vowels /i/ and /u/ are prohibited as syllable peaks.

(39)  *COMPLEX
Complex margins are prohibited.

(40)  MAX-IO (V)
No deletion of vowels.

(41)  Word-level syncope
*COMPLEX>>*NUC/i,u>>MAXV
Input /kaatib-a/  ‘female writer’
Input /yidarrisu/  ‘they study’

<table>
<thead>
<tr>
<th>Input</th>
<th>*COMPLEX</th>
<th>*NUC/i,u</th>
<th>MAX-IO (V)</th>
</tr>
</thead>
<tbody>
<tr>
<td>/kaatib-a/</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>a. ן ק at.ba</td>
<td></td>
<td></td>
<td>*</td>
</tr>
<tr>
<td>b. kaa.ti.ba</td>
<td></td>
<td>*!</td>
<td></td>
</tr>
<tr>
<td>/yidarrisu/</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>a. י הד ר .ri .su</td>
<td></td>
<td>**</td>
<td></td>
</tr>
<tr>
<td>b. ydar .ri .su</td>
<td>*!</td>
<td>*</td>
<td>*</td>
</tr>
<tr>
<td>c. yi .darr .su</td>
<td>*!</td>
<td>*</td>
<td>*</td>
</tr>
</tbody>
</table>

Turning to phrase-level syncope, Abu-Mansour (2011: 49) begins by considering RHS. She introduces the constraints MAX-MORPH and ALIGN (L) given in (42) and (43), respectively. The first one is a faithfulness constraint based on McCarthy and Prince (1993b). It requires faithful input-output mapping of morphemes. The second one is an alignment constraint due to Selkirk (1995). It requires that the left edge of the maximal projection of a lexical head be aligned with the left edge of a P-Phrase. The relevant ranking of these constraints is given in tableau (44) (Abu-Mansour 2011: 50). Because Abu-Mansour does not indicate the location of the P-Phrase edges on candidates, I have added the syntactic structures corresponding to each input for ease of reference.

24 This form is inaccurately glossed. It means ‘they teach’.
(42) MAX-MORPH
Morphemes of inputs must be faithfully mapped into their corresponding outputs.

(43) ALIGN (Lex_{max}, L; PPh, L)
Align the left edge of a maximal phrasal projection with the left edge of a phonological phrase.

(44) Application of RHS across the left edge of X_{max}
*C_{COMPLEX,MAX-MORPH}>>*Nuc/i,u>> ALIGN (L)>>MAX-IO (V)

Input /katabu#kitaab/ ‘They wrote a book.’
Input /?abu#su^aad/ ‘Suaad’s father’

<table>
<thead>
<tr>
<th>Input: V NP /katab-u#kitaab/</th>
<th>*COMPLEX</th>
<th>MAX-MORPH</th>
<th>*Nuc i,u</th>
<th>ALIGN (L)</th>
<th>MAX (V)</th>
</tr>
</thead>
<tbody>
<tr>
<td>a. ka.ta.bu.ki.taab</td>
<td></td>
<td>**!</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>b. ka.tab.ki.taab</td>
<td>![image]</td>
<td>![image]</td>
<td>![image]</td>
<td>![image]</td>
<td>![image]</td>
</tr>
<tr>
<td>c. ![image]ka.ta.buk.taab</td>
<td>![image]</td>
<td>![image]</td>
<td>![image]</td>
<td>![image]</td>
<td>![image]</td>
</tr>
<tr>
<td>d. ka.tabk.taab</td>
<td>![image]</td>
<td>![image]</td>
<td>![image]</td>
<td>![image]</td>
<td>![image]</td>
</tr>
<tr>
<td>e. ka.ta.bu.ktaab</td>
<td>![image]</td>
<td>![image]</td>
<td>![image]</td>
<td>![image]</td>
<td>![image]</td>
</tr>
</tbody>
</table>

| Input: N NP /?abu#su^aad/    | ![image] | ![image] | ![image] | ![image] |
| f. ![image]?a.bu.su^aad       |          | ![image] | ![image] | ![image] |
| g. ![image]?a.bu.s^aad        | ![image] | ![image] | ![image] | ![image] |
| h. ![image]?a.bus.^aad        |          | ![image] | ![image] | ![image] |

In (44) candidate (a) is eliminated for incurring two violations of the markedness constraint *Nuc/i,u. Candidate (b) loses for deleting the vowel of the third person plural subject suffix, violating the undominated faithfulness constraint MAX-MORPH. While candidates (d) and (e) delete the marked high vowel, they incur fatal violations of the higher-ranking constraint *Complex. The winning candidate (c) incurs only one violation of *Nuc/i,u. This ranking also predicts the winning candidate (h). Similar to (c), the latter incurs one violation of *Nuc/i,u. Apparently, each of these candidates also incurs one violation of the lower-ranking constraint ALIGN (L). However, assuming that the location of the

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25 I use square brackets [] to signal marks missing from Abu-Mansour’s tableaus.
left edge of the P-Phrase is to the left of the NP $p[k.taab]$ in (c) and to the left of
the NP $p[s.aad]$ in (h), it is not evident how either candidate violates ALIGN (L).
In both, the onset of the syncopated vowel is syllabified as a coda of the
preceding syllable. Thus, if there is indeed a violation incurred here, it seems to
be against syllabification across the left edge of the P-Phrase rather than against
the alignment of that edge with the left edge of $X_{\text{max}}$.

Abu-Mansour, then, considers cases of LHS applying across the left edge
of $X_{\text{max}}$. She shows that, with the addition of the undominated constraint ONSET
given in (45) below, these can be accounted for with the same ranking established
for RHS. This is illustrated by the tableau (46) (Abu-Mansour 2011: 51).

(45)  ONSET
All syllables must have onsets.

(46)  Application of LHS across the left edge of $X_{\text{max}}$

\[ \text{ONSET,}\ast\text{COMPLEX} \gg \ast\text{NUC}_{i,u} \gg \text{ALIGN (L)} \gg \text{MAX-IO (V)} \]

\begin{verbatim}
Input  /frib#al-mooja/  ‘He drank the water.’
Input  /badlat#al-kaatib#adג-דגadiid/  ‘the new writer’s suit’
\end{verbatim}

\begin{table}[h]
\centering
\begin{tabular}{|c|c|c|c|c|}
\hline
Input: V NP & ONSET & COMPLEX & *NUC & ALIGN \\
/\text{nirib#al-mooja/} & & & i,u & (L) |
\hline
a. jì.rib.al.moo.ja & *! & & & |
\hline
b. jì.ri.bal.moo.ja & & & *! & * & * \hline
c. ꝋjir.bal.moo.ja & & & * & * & * \hline
\hline
Input: N N AP & & & & |
/\text{badlat#al-kaatib adג-דגadiid/} & & & & |
\hline
d. bad.lat.al.kaa.tib.adג. \\
\text{דג. diid} & *!* & & & |
\hline
e. bad.la.tal.kaa.ti.badג. \\
\text{דג. diid} & & & *!* & | \hline
f. ꝋbad.la.tal.kaat.badג. \\
\text{דג. diid} & & & | & * & * \hline
\end{tabular}
\end{table}
Candidate (a) is eliminated for violating the undominated ONSET and (b) loses to (c) because the former incurs two violations of *NUC/i,u while the latter incurs only one. Similarly, candidate (f) wins over (d) and (e), which incur fatal violations of ONSET and *NUC/i,u, respectively. Here too, the winning candidates are assigned one mark each for violating ALIGN (L). As noted with respect to the candidates in (44) above, it is not evident how this is incurred. If there is a violation, it is not against ALIGN (L) but against syllabification across the left edge of the P-Phrase. In this case, it is the syllabification of the coda of the syncopated vowel as an onset of the following syllable.

Before proceeding to the last set of examples, one remark is in order. Given the double-function of the boundary sign in the Makkan data and the ambiguous translation of the second input in (46) [badlat#al-kaatib#adъ-ъadiid] ‘the new writer’s suit’, one might falsely assume that this is an instance of syncope applying across the right edge of X\text{max}. Unambiguously glossed, the example means ‘the suit of the new writer’. Because the adjective [adъ-ъadiid] modifies the immediately preceding noun [al-kaatib], no edge effect is expected between the two lexical heads.\footnote{Edge effects have been shown not to coincide with adjunction structure (see Truckenbrodt 1999 for discussion and examples).} This being the case, all of the examples of phrasal syncope considered so far involve the mode of application common to both RHS and LHS; that is, syncope applying across the left edge of X\text{max}.

The last set of data Abu-Mansour discusses is that of LHS exhibiting right-edge effect. She adopts Selkirk’s (1995) constraint ALIGN (R) in (47) below, which requires the right edge of the maximal projection of a lexical head to be aligned with the right edge of a P-Phrase. To account for the right-edge effect of LHS,
this constraint is ranked above *NUC i,u. This is illustrated in the tableau (48) (Abu-Mansour 2011: 52-53).

(47) ALIGN (Lex_{max}, R; PPh, R)
Align the right edge of a maximal phrasal projection with the right edge of a phonological phrase.

(48) Under-application of LHS across the right edge of X_{max}
ONSET,ALIGN (R)>>*NUC/i,u>>ALIGN (L)>>MAX-IO (V)

Input /badlat#al-kaatib#adʐ-ʔ الذىda/  ‘the writer’s new suit’
Input /darabik#ahmad/  ‘Ahmed hit you.’

<table>
<thead>
<tr>
<th>Input: N NP AP badlat al-kaatib # adʐ-ʔ الذىda</th>
<th>ONSET</th>
<th>ALIGN (R)</th>
<th>*NUC i,u</th>
<th>ALIGN (L)</th>
<th>MAX-IO (V)</th>
</tr>
</thead>
<tbody>
<tr>
<td>a. bad.la.tal.kaa.tib.adʐ. ʔ الذىa.dii.da</td>
<td>*!</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>b. bad.la.tal.kaat.badʐ. ʔ الذىa.dii.da</td>
<td></td>
<td></td>
<td></td>
<td>*</td>
<td></td>
</tr>
<tr>
<td>c. ʔ bad.la.tal.kaa.ti.badʐ. ʔ الذىa.dii.da</td>
<td></td>
<td></td>
<td></td>
<td>*</td>
<td></td>
</tr>
</tbody>
</table>

Input: VP NP darabik#ahmad

d. ʔa.ra.bik.ah.mad |   *!   |           |          |          |            |
| e. ʔa.rab.kah.mad |      |           |          |           |            |
| f. ʔa.ra.bi.kah.mad |       |          |          | *         | [*]        |

In (48), candidate (a) loses for violating the undominated constraint ONSET.

According to Abu-Mansour, (b) is eliminated because it incurs two violations of ALIGN (R). One violation “is incurred through the deletion of the high vowel and the other through resyllabification of b as an onset” of the following syllable (p. 52). The winning candidate (c) incurs only one violation of ALIGN (R) through resyllabification of b. The same ranking is argued to produce the winning candidate (f). Once again, it is questionable how violations of alignment are

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27 In contrast to the second input in (46) above, the adjective [adʐ-ʔ الذىda] in this input modifies the first noun [badlat]. In this case, an edge effect is expected due the intervening maximal projection NP.
incurred. It is not obvious why the deletion of the high vowel in (b) and (e), which is a violation of MAX-IO (V), is also a fatal violation of ALIGN (R). Neither is it obvious why (c) and (d) violate ALIGN (R) rather than some other constraint against syllabification across the P-Phrase boundary.

Abu-Mansour, then, concludes that her account captures the three generalizations about syncope stated at the beginning of this section. However, it is not obvious how this conclusion follows from the analysis reviewed above. The analysis does rely on the relative ranking of one constraint, *NuC/i,u, to account for the deletion of high vowels, but that does not amount to showing that word-level and phrase-level syncope follow from the interaction of the same constraints. Setting aside the questions regarding the violations of the alignment constraints, it is also not obvious how the analysis shows that both RHS and LHS “as well as the assumed discrepancy” of the latter are due to the dominance of the alignment constraints. This is because the analysis deals with data representing only two patterns of syncope in Makkan. The first one is the application of syncope across the left edge of \(X^{\max}\). This is shown for both RHS and LHS in tableaus (44) and (46), respectively. The second pattern is the under-application of LHS across the right edge of \(X^{\max}\) shown in tableau (48). This leaves the application of RHS across the right edge of \(X^{\max}\), which is illustrated by the Makkan data in (35d)-(35f), unaccounted for. It may be the case that Abu-Mansour has excluded this pattern based on her assumptions about the formation of P-Phrases in Makkan. I discuss this point below.

In her discussion of the phrasing of structures consisting of heads with two complements (pp. 44-45), Abu-Mansour does consider one example of RHS
applying across the right edge of $X^{max}$. She illustrates this with reference to examples (35f) and (37d), repeated here as (49a) and (49b), respectively.

(49) Multiple complements phrasing in Makkan

a. ‘I gave his son a book’

\[ ?\text{adeet walad-u} \# \text{kitabet} \]

\[ \rightarrow ?\text{adeet waladu kitaab} \]

b. ‘He made the writer understand that he was wrong.’

\[ \text{fahham al-kaatib} \# \text{inna yalataan} \]

\[ \rightarrow \text{fahham alkaatib innu yaltaan} \]

In each example, the verb has two complements. Abu-Mansour gives the phrasing indicated under the syntactic structures. She states that this phrasing (p. 44) “is in line with Selkirk’s findings for Chi Mwi:ni ...[where the] complement immediately following a lexical head is included in a derived domain with that head, whereas the second complement will never be in the same domain.” Therefore, she assumes that these examples have the same phrasing as that proposed for Chi Mwi:ni by Selkirk (1986: 390). Although this assumption is justifiable with respect to (49b), it is not with respect to (49a). LHS is blocked in the former, indicating that the two complements are in separate domains. This is the case in the Chi Mwi:ni examples where the distribution of long vowels is consistent with the phrasing. In contrast, RHS does apply in (49a), indicating that the two complements are in the same domain. The question of multiple complements phrasing notwithstanding, Abu-Mansour’s analysis cannot account for this pattern of RHS. Since the right edge of $X^{max}$ is precisely the context in which LHS is blocked, Abu-Mansour’s fixed ranking of the same set of constraints will also block RHS from applying in this context. This is illustrated in (50) below.
As expected, RHS is blocked in the predicted winning candidates (a) and (d), while the actual winning candidates (c) and (f), based on Abu-Mansour’s analysis, incur fatal violations of ALIGN (R).

To conclude, Abu-Mansour (2011) does not provide a unified account of the attested patterns of syncope. Although the analysis does establish the domain of LHS in Makkah as the P-Phrase, it gives a partial account of RHS. An account of syncope must be able to characterize the respective domains of LHS and RHS and offer insights about how and why they are different. Given the similarities between Makkah and UCSA, the domain of RHS in the former may turn out to be the I-Phrase. Obviously, this is yet to be investigated but, assuming that is the case, Abu-Mansour’s analysis may be extended to account for RHS as well. One possibility of achieving this, which I will not pursue here, is through adopting a serial model of OT (Kiparsky 2003 and to appear and Bermúdez-Otero 1999, 2002, 2003, 2004, and in preparation). Then, one can
assume that Abu-Mansour’s constraint ranking holds at the P-Phrase level. At the I-Phrase level the relative ranking of ALIGN (R) and *NUC/i,u is reversed, allowing the application of RHS across the right edge of $X^{\text{max}}$. Depending on how the earlier questions regarding the nature of the violations of the alignment constraints are resolved, it is conceivable that such an analysis would accurately characterize the domains of application and under-application of syncope. Nonetheless, the central question we need to answer is: why does RHS “apply” and LHS “under-apply”? I address this issue in the following section.

2.1.3.6 Explaining the asymmetry: The interaction between syncope and resyllabification

I have demonstrated earlier that RHS applies up to the I-Phrase level while LHS applies up to the P-Phrase level. This is a peculiar fact since RHS and LHS are essentially the same process. Contextually, they differ only with respect to the position of the target in relation to the trigger. In fact, such a difference is not even necessary to include in the most general descriptive statement of the rule; syncope targets a short high unstressed vowel in an open syllable when it is preceded by an open syllable. The question, then, is how do we explain the seemingly anomalous asymmetry in the domain of application of this process? In this section, I argue that the answer to this question follows from an accurate characterization of the interaction between syncope and syllabification or, more accurately, resyllabification. In the following discussion, I assume that

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28 See Watson (2012: 897-98) for a similar suggestion.
29 This section is based on an earlier version written in collaboration with B. Elan Dresher in Ali and Dresher (1995) and further developed in Ali (1996).
syllabification is an iterative process applying at the word and phrase levels. I use the term resyllabification to refer to structure-changing syllabification rules that reassign segments already affiliated with one syllable to another syllable. Given this view of syllabification, I argue below that the asymmetry in the domain of application of syncope is a reflex of restrictions on the domain of application of resyllabification.

As a starting point for characterizing the interaction between syncope and resyllabification, compare (51a) to (51b) below.

(51) Effects of syncope
   a. Before syncope:
      \[
      \begin{array}{c}
      \sigma \\
      V & C & v & C & V
      \end{array}
      \]
   b. After syncope:
      \[
      \begin{array}{c}
      \sigma \\
      V & C & \emptyset & C & V
      \end{array}
      \]

In terms of syllable structure, syncope has the effect of resyllabifying the onset of the syncopated vowel into the coda of the preceding syllable. This is shown in (51b). Indeed, if this consonant is not able to immediately resyllabify in this way, the syncope is blocked. This is the significance of the left-hand context of the rule. For syncope to apply, the syncopated vowel must be preceded by an open syllable. If the syllable containing the potentially syncopated vowel is word-initial, or if it is preceded by a closed syllable, its onset cannot resyllabify as a coda and syncope is blocked. The right-hand context of the rule is there to ensure that the consonant following the syncopated vowel will end up in the onset position of the next syllable, if not already there.

\[30\text{ In section 2.2 I motivate this assumption on empirical grounds.}\]
In the following analysis, I assume that resyllabification precedes syncope.

I assume that vowels capable of being syncopated, i.e. high short unstressed vowels, do not retain their onsets if they can be resyllabified as codas. To simplify the discussion, I label these vowels “weak”. Also, I assume that a weak vowel is strengthened if supported by a coda. I call the rule responsible for resyllabifying the onset of the weak vowel into a coda of the preceding syllable Onset Defection. This is given in (52) below.

(52) Onset Defection

After Onset Defection, syncope applies to a weak vowel that is alone in its syllable. Thus, syncope can be formalized as in (53) below.

(53) Syncope

Given this view of syncope, restrictions on its application where the segmental conditions appear to be met must be due to some restrictions on resyllabification. Specifically, they must be due to a restriction on the application of Onset Defection. I now demonstrate how this view of the relation between resyllabification and syncope explains the asymmetry in the domain of application of the latter.

Let us start by considering LHS. We have observed that this rule applies within the P-Phrase. To illustrate this point, consider the derivation of (15) given in (54) below.
Given the assumption that syllabification occurs first at the word-level, the output of the word-level phonology is given in (54a). Syncope cannot apply at this level. This is because at the word level the potentially weak vowel is in a closed syllable, that is, it is supported by a coda. This is why Onset Defection is blocked, effectively blocking syncope. However, as soon as the second word enters into the derivation within the P-Phrase, the coda of the final syllable of the first word is resyllabified as an onset of the initial syllable of the following word. This is shown in (54b). Now the weak vowel is in an open syllable and Onset Defection applies. This in turn triggers syncope to delete the weak vowel which is now alone in the syllable. The last two steps are shown in (54c) and (54d), respectively.

Before we consider RHS at the level of I-Phrase, let’s first examine how it applies at the P-Phrase level. This is demonstrated by the derivation of (5a) given in (55) below.

The output of word-level phonology is given in (55a). Because the syllable containing the weak vowel is word-initial, Onset Defection cannot apply at this level. However, as soon as the word enters the derivation at the phrase level, the open syllable at the end of the preceding word becomes visible to Onset Defection. The rule then applies across the word boundary as shown in (55b).
Subsequently, syncope applies to the weak vowel. This is essentially the same derivation we observed with regard to LHS in (54). The only difference is that in RHS there is no need for Resyllabification into Onset. This is because word-level syllabification ensures that the consonant following the weak vowel is already syllabified as an onset of the final syllable of the second word.

Let us now consider why LHS is blocked when the two words are not in the same P-Phrase. Consider the derivation of (11) given in (56) below.

(56) LHS blocked in I: \text{alkálīb ákal } \rightarrow \text{alkálīb ákal}
   
   a. W: Syllabification: \ 
      \[(\text{al. ká. līb})_w ((\text{á. kal})_w)\]
   b. P: P-Phrase Formation \ 
      \[((\text{al. ká. līb})_w)_p ((\text{á. kal})_w)_p\]
   c. I: Resyllabification into Onset: \ 
      \[((\text{al. ká. līb})_w)_p ((\text{á. kal})_w)_p)\]
   d. Onset Defection: \text{B L O C K E D}

The output of word-level phonology is given in (56a). As shown in (56b), the two words are parsed in separate P-Phrases at the phrase level. It is important to note here that the first P-Phrase is formed before the second word becomes visible to phrase level phonology. As soon as this word enters the derivation within the I-Phrase level, Resyllabification into Onset applies across the P-Phrase boundary; this is shown in (56c). The weak vowel is now in an open syllable; nevertheless, syncope cannot occur. The problem must then be with Onset Defection. As a first approximation, then, I propose that Onset Defection is blocked after the P-Phrase level. Recall that Onset Defection is a resyllabification rule, i.e., a structure-changing rule. Accordingly, we may view the restriction on its domain of application as a restriction on the level at which alteration to syllable structure is permitted. In other words, Onset Defection is blocked above the P-Phrase because at this level syllabification is fixed and alteration to basic syllable structure is disallowed.
However, this constraint needs to be refined. We have just noted in (56c) that Resyllabification into Onset, which is also a structure-changing rule, applies after the P-Phrase. Therefore, we need to explain the fact that alteration to syllable structure is allowed after the P-Phrase in this case and not in the case of Onset Defection. Note that there is a crucial difference between the domain of Resyllabification into Onset in (56c) and what would be the domain of Onset Defection if it were to apply in (56d). In the former, resyllabification occurs in a new environment, that is, an environment that is invisible to phrase level phonology before the formation of the first P-Phrase. The position targeted by Resyllabification into Onset is that of the onset of the initial syllable of the second word. At the phrase level, this word enters into the derivation only after the first P-Phrase is formed. Contrastively, the domain of resyllabification, if Onset Defection were to apply, would differ in a significant way. Recall that this rule applies only when the weak vowel is in an open syllable. Accordingly, if it were to apply to the vowel in (56), it would have to apply after Resyllabification into Onset, that is, after the first P-Phrase is formed. In other words, its domain would entirely be within the already formed P-Phrase. Evidently, this is not allowed.\footnote{31}

The restriction on alteration to syllable structure after the P-Phrase level, then, is not categorical. Rather, alteration to syllable structure is allowed after this level but only in a new environment, an environment that becomes visible to

\footnote{31 This is reminiscent of Kiparsky’s (1982) Strict Cycle Condition (SCC). The basic idea is that, in any given cycle, a rule is blocked from applying to a substring of the input that is entirely contained in a previous cycle. A rule applies once its structural description is met in “a derived environment” resulting from 1) the application of rules or 2) morpheme concatenation. Applied to the present analysis, the notion of “derived environment” includes contexts resulting from word concatenation. For a detailed discussion and proposal to extend principles governing rule application in lexical phonology to phrasal phonology see Rice (1990).}
phonological rules only after the P-Phrase. The domain of application of
resyllabification rules is constrained accordingly. That is, resyllabification rules
apply above the P-Phrase level only if their respective domains include
environments that do not exist before the P-Phrase. With reference to (56) above,
this restriction explains why Onset Defection is blocked above the P-Phrase level,
effectively blocking syncope, while Resyllabification into Onset is not. Indeed, as
I demonstrate in the following discussion, the asymmetry in the domain of
application of syncope follows directly from this restriction.

Having accounted for the domain of LHS, I now turn to RHS and show
that its domain follows directly from the same restriction on resyllabification
stated above. I demonstrate this point with reference to the derivation of (5b)
given in (57) below.

(57) RHS in I: ʕáli ʕí.říña → ʕáli ʕríña
   a. W: Syllabification: ʕáli (ʕí. říña)ₕ
   b. P: P-Phrase Formation: ʕáli (ʕí. říña)ₕ
   c. I: Onset Defection: (((ʕáli)ₕ)ₕ (ʕí. říña)ₕₕ)ₕ
   d. Syncope: (((ʕáli)ₕ)ₕ (ʕí. říña)ₕₕ)ₕ

The output of word-level phonology is given in (57a). As indicated in (57b), the
two words are parsed in different P-Phrases. Again, note here that the second
word enters into the derivation within the I-Phrase, that is, after the first P-
Phrase is formed. This is the point at which the open syllable in the first word
becomes visible to Onset Defection which, as indicated in (57c), applies
rendering the weak vowel alone in its syllable. The vowel is then deleted. The
crucial observation here is that the domain of Onset Defection in (57) refers to an
environment that becomes visible only after the P-Phrase level. In (56), on the
other hand, its domain falls entirely within an already formed P-Phrase. Given
the restriction UCSA imposes on resyllabification above the P-Phrase, Onset
Defection applies in the former but is blocked in the latter. This, in turn, explains why LHS applies only up to the P-Phrase level while RHS applies up to the I-Phrase level. After the P-Phrase level, only the domain of resyllabification involving the onset of the right-hand weak vowel includes a new environment. This is because the right-hand word becomes visible to phrase-level phonology only after the preceding P-Phrase has been formed.

Finally, let us examine why RHS is blocked when its segmental environment spans the I-Phrase boundary. This is demonstrated with reference to the derivation of (21d) given in (58) below.

(58) RHS blocked above I: al˛illa lĳiina → alhilla lĳiina

   a. W: Syllabification       (al. hil. la)ₜ  (li. gii. na)ₜ
   b. P:                      (...(al. hil. la)ₜ)ₚ
   c. I: I-Phrase Formation        (...(al. hil. la)ₜ)ₜ  ((li. gii. na)ₜ...)_l
   d. Onset Defection: BLOnset Defection: BLOCKED

The output of word-level syllabification is given in (58a). The second word is not given in (58b) because it only enters into the derivation after the I-Phrase level. In (58c) the first I-Phrase boundary is formed after the first word. Only at this point does the second word become visible to phrase-level phonology. As indicated in (58d), Onset Defection is blocked, effectively blocking syncope.

Evidently, resyllabification is not permitted above the I-Phrase level even when its domain involves a derived environment.

To summarize the discussion thus far, I have demonstrated that the asymmetry in the domain of application of syncope follows directly from the restriction on the domain of resyllabification. Above the P-Phrase level, resyllabification rules may apply within the I-Phrase only if their respective
domains include environments that do not exist before the P-Phrase. This is because basic syllabification is fixed at this level.

Further evidence that the P-Phrase is a significant level for syllabification in UCSA is provided by the rule of consonant deletion discussed in section 2.1.2.4.1. We have observed that the second member of a root-final CC cluster is subject to stray erasure unless it can be syllabified within the P-Phrase. To illustrate this point, consider the derivation of (27a) given in (59) below.

\[(59)\]
\[
\text{W-final geminate syllabified within P}
\]
\[
a. \text{W: Syllabification:} \quad (\text{al. bit. } \mathcal{T})_w(\text{al. ka. bii .ra})_w \\
b. \text{P: Syllabification into Onset:} \quad ((\text{al. bit. } \mathcal{B})_w(\text{al. ka. bii .ra})_w)_p
\]

As indicated by the output of word-level phonology in (59a), the underlined consonant at the end of the first word cannot be properly syllabified at the word level. The point to note here is that this stray consonant may not be erased at the word level. Instead, it is retained up to the P-Phrase level where it is syllabified across the word boundary as an onset of the initial syllable of the following word. This is shown in (59b).

Now let us consider an example where this word-final stray consonant cannot be syllabified within the same P-Phrase. I demonstrate this with reference to the derivation of (27b) given in (60) below.

\[(60)\]
\[
\text{W-final geminate stray-erased at P}
\]
\[
a. \text{W: Syllabification:} \quad (\text{al. bit. } \mathcal{T})_w(\text{a. ka. lat})_w \\
b. \text{P: P-Phrase Formation:} \quad ((\text{al. bit. } \mathcal{T})_w(\text{a. ka. lat})_w)_p \\
c. \text{P: Stray Erasure:} \quad ((\text{al. bit. } \varnothing)_w(\text{a. ka. lat})_w)_p \\
d. \text{I: Resyllabification into Onset:} \quad (((\text{al. bi. } \mathcal{B})_w(\text{a. ka. lat})_w)_p)_i
\]

As indicated in (60b), the two words are parsed in separate P-Phrases. Evidently the stray segment must be properly syllabified within the same P-Phrase. In other words, it must be repaired before the I-Phrase level. Since this is not possible, the segment is deleted (60c). Note also that as soon as the second word
enters the derivation, within the I-Phrase, the first member of the geminate is now resyllabified as an onset of the following word. Once again, the domain of Resyllabification into Onset in (60d) includes an environment that becomes visible to phrase-level phonology after the P-Phrase level.

Based on the above discussion, we tentatively conclude that syllabification remains freely in progress until the P-Phrase level. More accurately, no restrictions are placed on resyllabification up to the P-Phrase level. At the end of this level, however, basic syllabification is fixed and all segments must be properly syllabified. Further alterations to this syllable structure are possible within the I-Phrase only in derived environments, that is, environments that do not exist before the P-Phrase because they result from word concatenation. The asymmetry in the domain of application of syncope is a mere reflex of these restrictions on resyllabification.

2.1.4 Conclusion

In the previous sections, I have shown that syncope in UCSA is a single rule which applies in the phrasal phonology. I have argued that the phonological phrase is derived from the syntax by the algorithm in (20). I have explained the asymmetry in the domain of application of syncope in terms of the restriction on resyllabification above the P-Phrase level. Specifically, I have concluded that no restrictions are placed on resyllabification until the P-Phrase level and that at the end of this level basic syllabification is fixed. At the I-Phrase level, alterations to syllable structure are possible only in new environments. Given this account of the syncope facts, one might conclude that initial syllabification in SCA is not
exhaustive. That is, unsyllabified segments are tolerated up to the P-Phrase level. Indeed, one might extrapolate from the lack of motivation for word-level syllabification, thus far, that initial syllabification occurs at the P-Phrase level. In turn, each of these conclusions makes specific predictions with respect to the level at which the process of epenthesis applies in UCSA. I explain this point below.

Consider the stray consonants in the sequences CVCC and CVC. Conceivably a number of processes, functioning as strategies of repairing unsyllabified segments such as these, may be available to the language. Relevant to the present discussion are the two processes of epenthesis and syllabification. If we adopt the two assumptions that initial syllabification applies at the word level and that unsyllabified segments are disallowed, we predict that epenthesis applies at the word level creating a new syllable by inserting a vowel before or after the stray consonant. This is shown in (61) below.\(^\text{32}\)

\[
\begin{align*}
\text{(61)} & \\
\text{a. } & (CVC.C)_w \rightarrow (CVC.C_v)_w \text{ or } (CV.C_vC)_w \\
\text{b. } & (C.CVC)_w \rightarrow (C_v.CVC)_w \text{ or } (vC.CVC)_w
\end{align*}
\]

On the other hand, if we assume that unsyllabified segments are tolerated up to the P-Phrase level, we predict that the same segments may be repaired through syllabification at the P-Phrase level. This is because, given the appropriate environment, phrase-level syllabification may incorporate the unsyllabified consonant into the edge of an adjacent syllable.\(^\text{33}\) This is illustrated in (62) below.

\[
\begin{align*}
\text{(62)} & \\
\text{a. } & (CVC.C)_w(V.CVC)_w \rightarrow (CVC.CV.CVC)_p \\
\text{b. } & (CV.C\overline{V})_w(C.CVC)_w \rightarrow (CV.C\overline{V}C.CVC)_p
\end{align*}
\]

\(^{32}\) I use lowercase italicized \(v\) to represent an epenthetic vowel.

\(^{33}\) We have already seen this in our discussion of root-final clusters in section 2.1.2.4.1.
The word following the underlined consonant in (62a) begins with a vowel. This allows the stray consonant to be syllabified as an onset of the following syllable at the P-Phrase level. Similarly, the word preceding the underlined consonant in (62b) ends with a vowel. This makes it possible for the stray consonant to be syllabified as a coda of the preceding syllable at the P-Phrase level. Note that the assumption regarding the level at which initial syllabification applies has no bearing on this prediction. If it applies at the word level, then its output contains unsyllabified segments that are repaired at the phrase level as shown in (62). If it applies at the phrase level, then the input to syllabification consists entirely of unsyllabified segments. In either case, unsyllabified segments are repaired at the phrase level through syllabification. Crucially though, the assumption that unsyllabified segments are tolerated up to the P-Phrase level, where they can be repaired through phrasal syllabification, predicts that epenthesis ought to apply only at the P-Phrase level. Specifically, it ought to apply only in the absence of the environments necessary for syllabifying the stray consonant into the edge of an adjacent syllable; that is, when a word-final unsyllabified segment is followed by a word that begins with a consonant and when a word-initial unsyllabified segment is preceded by a word that ends with a consonant. This is illustrated in (63a) and (63b), respectively.

\[(63)\]
\[\begin{align*}
\text{a. } & (\text{CVC}_w, \text{CV.CVC}_w) \rightarrow (\text{CVC}_w, \text{CV.CVC})_p \text{ or } (\text{CV.CVC}_w, \text{CV.CVC})_p \\
\text{b. } & (\text{CV.CVC}_w, \text{CVC}_w) \rightarrow (\text{CV.CVC}_w, \text{CV.CVC})_p \text{ or } (\text{CV.CVC}_w, \text{CV.CVC})_p
\end{align*}\]

However, we shall see in section 2.4 that this prediction is inaccurate. A closer examination of epenthesis in UCSA reveals that this process functions as a strategy of repairing unsyllabified segments at the word level. However, before I demonstrate this point and discuss its implications with respect to the degree of
restriction UCSA places on syllabification, we need to examine the two types of epenthesis reported in the literature.

2.2 Epenthesis in UCSA

The prevalence of epenthesis in Arabic has made it one of the primary diagnostic tools for research on syllable types in the language. Indeed, the most basic typological distinction established between dialects is based on the two patterns of epenthesis utilized to repair unsyllabified consonants. In the first pattern, the epenthetic vowel appears to the right of the consonant (CCC > C.Cv.C). Dialects in which this pattern is attested include Cairene (Mitchell 1956); Makkan (Abu-Mansour 1987); and Sudanese (Worsley 1925, Mustapha 1982, and Hamid 1984). In the second pattern, the vowel appears to the left of the consonant (CCC > CvCCC). This pattern is attested in dialects such as Iraqi (Erwin 1963), Damascene (Cowell 1964), Eastern Libya (Owens 1984), and again Sudanese (Hamid 1984). In the following discussion, I use the terms Cv pattern to refer to the former and vC pattern to the latter. Both terms are due to Kiparsky (2003).

The literature on Arabic syllable typology offers various approaches to characterizing the difference between the two groups of dialects. Selkirk (1981b) proposes a syllable theory in which the unsyllabified consonant is assigned to the onset position in the Cv dialects and to the rhyme in the vC dialects. In another version of syllable theory, Broselow (1992) argues that the unsyllabified consonant is linked directly to the syllable node in the Cv dialects, which she labels “onset dialects”. In the vC dialects, labeled “rhyme dialects”, it is adjoined to a mora. Farwaneh (1995), building on proposals originally made by Ito (1986, 1989), argues that the divergence in the position of the epenthetic vowel follows
from the direction of syllabification. That is, syllabification is left-to-right in the Cv dialects and right-to-left in the vC dialects. Utilizing the Generalized Alignment constraint format of McCarthy and Prince (1993a), Mester and Padgett (1994) express this directionality effect of syllabification in terms of alignment constraints. 

The literature on the phonology of Sudanese Arabic reports both patterns of epenthesis described above. In the Cv pattern, discussed in Hamid (1984) and Broselow (1992), a vowel is inserted to the right of a VCC# sequence, yielding VC.Cv#. In the vC pattern, discussed in Hamid (1984) and Kenstowicz (1986, 1994), a vowel is inserted to the left of a #CCV sequence, yielding #vC.CV. The relevant point for the purposes of our discussion is the prosodic level at which epenthesis occurs. However, I maintain that the vC pattern is unmotivated in UCSA and that it involves vowels that are in fact underlying. Therefore, it is necessary that I address the arguments underlying this analysis in detail. I begin this section with a brief review of the Cv account and show that it deals with alternation patterns that can best be explained in terms of epenthesis. Then, I consider the two arguments on which the vC account is based and demonstrate that they are inconsistent with the UCSA facts and that the vowel in question is underlying in this dialect. Accordingly, I conclude that there is evidence only for the Cv pattern in UCSA. Finally, I demonstrate that this type of epenthesis occurs at the word level and discuss the significance of this fact in relation to the degree of restriction UCSA places on syllabification.

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34 For more recent proposals and detailed discussion of the syllable typology in Arabic, see Kiparsky (to appear, 2003); Watson (2007); Bamakhramah (2009); and Farwaneh (2009).
2.2.1 The Cv pattern of epenthesis

Broselow (1992) proposes a unified account of the processes of epenthesis and syncope in the Cairene, Makkan, Sudanese, and Iraqi dialects of Arabic. She argues that these processes are motivated by a constraint that requires syllables to be "maximally and optimally bimoraic" (p. 5). The theoretical claims and assumptions of Broselow’s accounts of these processes have no bearings on the present discussion. Relevant to the task at hand, however, is the nature of the vowels she treats as epenthetic in Sudanese Arabic. Quoting Hamid (1984), Broselow merely notes that in this dialect an epenthetic vowel a is inserted to the right of an underlying VCC# sequence creating, thereby, a new syllable the onset of which is the second consonant in the sequence. In the following section, I provide arguments for this pattern of epenthesis in UCSA.

One such argument is based on the alternation pattern exhibited by the homophonous first person singular and second person masculine singular subject suffixes. This is illustrated in (64) below.

(64)  a. maʃee-t  ‘I/you went’  sakat-ta  ‘I/you became silent’
            ligii-t  ‘I/you found’  nahat-ta  ‘I/you carved’
            saʃee-t  ‘I/you watered’  masak-ta  ‘I/you held’
            laaʃee-t  ‘I/you met’  lihis-ta  ‘I/you licked’
            biʃii-t  ‘I/you became’  daxal-ta  ‘I/you entered’
            jisʃii-t  ‘I/you recovered’  sakan-ta  ‘I/you lived’

The subject suffixes (64) alternate between [-t] in (a) and [-ta] in (b). Thus, either the vowel is present underlingly and is deleted in the former, or it is epenthetic in the latter. A deletion analysis is easily refuted based on the behavior of the first person plural and second person feminine singular subject suffixes, which have the forms [-na] and [-ti], respectively. Unlike the first person singular and second person masculine singular suffixes, these suffixes have the same –CV
form with both types of verbs in (64). Thus, we have the forms [maʃee-na], [maʃee-ti] and [sakat-na], [sakat-ti]. A deletion account of the alternation pattern in (64) would inaccurately predict *[maʃee-n] and *[maʃee-t] parallel to the forms in (a). Contrastively, an epenthesis analysis of the alternation pattern is well motivated. The verbs in (a) end in a vowel while those in (b) end in a consonant. The obvious conclusion, then, is that both suffixes have the underlying form /t/. Accordingly, suffixation to the verbs in (b) results in a word-final two-consonant cluster. This triggers the insertion of the low vowel a to the right of the cluster, resulting in a new syllable the onset of which is the second consonant. As such, epenthesis is motivated in terms of the constraint on syllable structure referred to in earlier sections, namely that UCSA does not allow complex syllable margins. Affixation to the verbs in (b) results in a segment that cannot be properly syllabified which is, subsequently, repaired through epenthesis. As I argue below, this view is supported by the distribution facts of superheavy syllables of the form CVCC, the only form that has a complex coda.

Superheavy syllables of the form CVCC are extremely rare in UCSA, occurring in surface forms in possibly no more than three loan words. These are [baʃk] ‘bank’, [tajk] ‘tank’, and [lajŋ] ‘brand’.35 Recall that UCSA has roots that end in a two-consonant cluster consisting of either a full or partial geminate. Crucially, this cluster is never tautosyllabic in surface forms. In section 2.1.3.4.1, we saw that the second member of the geminate in unaffixed forms is deleted at the P-Phrase level if it cannot be syllabified as an onset of the initial syllable of

35 I am not able to corroborate the presence of [bumb] ‘bomb’ in UCSA, which Hamid (1984: 24) lists along with [baʃk] and [tajk]. Incidentally, the third form [lajŋ] is not an independent word in UCSA. It only occurs as part of a compound with different forms of the adjective [jadjid] “new” as in [jadjid lajŋ] and [jadjid-a lajŋ] meaning “brand new-m.sg.” and “brand new-f.sg.,” respectively. According to Gasim (2002: 899), this form is Persian in origin.
the following word. An interesting observation to make here is that, unlike the word-final unsyllabified segments arising from affixation in (64)b, the unsyllabified second member of the root-final geminate, which is also word final, is not repaired through epenthesis. To demonstrate this point, consider the syntactic structure and the corresponding phrasing of the surface forms in (65) and (66) below.

(65)  
\[\text{place Ikhlas} \rightarrow (\text{ma. \textit{hal. li}x. laas})_{\text{P}}\]

'a. [[ma. \textit{hal. l}]_{\text{N}} [ix. laas]_{\text{NP}}]_{\text{P}} \rightarrow (\text{ma. \textit{hal. li}x. laas})_{\text{P}}$

'Ikhlas’s place’

b. [[ma. \textit{hal. l}]_{\text{N}} [ta. haa. ni]_{\text{NP}}]_{\text{P}} \rightarrow (\text{ma. \textit{hal. li}x. laas})_{\text{P}}$

'Tahani’s Place’

cf. *[ma. \textit{hal. la.ta. haa. ni}]

(66)  
\[\text{near Ikhlas} \rightarrow (\text{jam. bi}x. laas})_{\text{P}}\]

a. [[\textit{ba}n. b]_{\text{P}} [ix. laas]_{\text{NP}}]_{\text{PP}} \rightarrow (\text{jam. bi}x. laas})_{\text{P}}$

‘near Ikhlas’

b. [[\textit{ba}n. b]_{\text{P}} [ta. haa. ni]_{\text{NP}}]_{\text{PP}} \rightarrow (\text{jam. bi}x. laas})_{\text{P}}$

‘near Tahani’

cf. *[jam. ba.ta. haa. ni]

Similar to the data discussed in section 2.1.3.4.1, the second member of the geminate in (65) and (66) cannot be properly syllabified at the word level. In the (a)-examples, this consonant is syllabified at the P-Phrase level as an onset of the initial syllable of the second word. In the (b)-examples, where syllabification in this manner is not possible, the unsyllabified consonant is stray-erased. As evidenced by the starred forms, the second member of the geminate is not repaired through epenthesis. In this respect, it is different from the word-final unsyllabified segments arising from affixation in (64b). I revisit this point in section 2.4. For the purposes of our current discussion, we note that the result of
both repair strategies is a syllable with one consonant in the coda position. This is clear evidence that UCSA does not allow complex codas.\textsuperscript{36}

Returning to epenthesis, examining the behavior of unsyllabified segments rendered word-internal through affixation reveals that the ban on complex syllable margins also motivates this process. This is illustrated by affixation to roots ending in geminates in (67) and to the homophonous subject suffixes in (68) below.\textsuperscript{37}

\begin{align*}
(67) & \\
\text{a.} & /\text{mahall-na}/ & \rightarrow & \text{ma. hal. } \text{\^na} & \rightarrow & [\text{ma. hal. la. na}] & \text{cf. } *[\text{ma. hal. } \emptyset \text{ na}]
\\
\text{b.} & /\text{mahall-kum}/ & \rightarrow & \text{ma. hal. } \text{\^kum} & \rightarrow & [\text{ma. hal. la. kum}] & \text{cf. } *[\text{ma. hal. } \emptyset \text{ kum}]
\\
\text{c.} & /\text{janb-na}/ & \rightarrow & \text{jam. b. na} & \rightarrow & [\text{jam. ba. na}] & \text{cf. } *[\text{jam. } \emptyset \text{ na}]
\\
\text{d.} & /\text{janb-kum}/ & \rightarrow & \text{jam. b. kum} & \rightarrow & [\text{jam. ba. kum}] & \text{cf. } *[\text{jam. } \emptyset \text{ kum}]
\\
(68) & \\
\text{a.} & /\text{gaabal-t-na}/ & \rightarrow & \text{gaa. bal. } \text{\^t. na} & \rightarrow & [\text{gaa. bal. ta. na}] & \text{cf. } *[\text{gaa. bal. } \emptyset \text{ na}]
\\
\text{b.} & /\text{gaabal-t-kum}/ & \rightarrow & \text{gaa. bal. } \text{\^t. kum} & \rightarrow & [\text{gaa. bal. ta. kum}] & \text{cf. } *[\text{gaa. bal. } \emptyset \text{ kum}]
\\
\end{align*}

In the above examples, the intermediate stage represents the output of word-level syllabification. In (67), the roots are followed by consonant-initial suffixes. The second member of the geminate cannot be properly syllabified as part of

\textsuperscript{36} Dickins (2007: 77-79) reports a few forms in Central Urban Sudanese ending with a CC cluster. However, as he notes citing Mustapha (1982), heterorganic clusters “have alternate forms with a final -i (particularly among less educated speakers).” This is not surprising because in MSA and CA word-final CC# clusters are prevalent in pre-pausal position, a fact that explains their presence in the speech of educated speakers.

\textsuperscript{37} The possessive and object suffixes are homophonous. Based on forms such as galam ‘pen’, galam-na ‘our pen’, galam-kum ‘your (pl.) pen’, faaf ‘he saw’, faaf-na ‘he saw us’, and faaf-kum ‘he saw you (pl.)’, the underlying forms of the suffixes are /-na/, and /-kum/, respectively.
either of the neighbouring syllables since syllabification in this way would always create a complex margin. The same situation results from affixation to the subject suffix in (68). As indicated by the corresponding surface forms, this triggers the epenthesis repair strategy observed in (63b) above, allowing the stray consonant to be properly syllabified as an onset of the epenthetic vowel. Thus, not only is an epenthesis analysis of the forms in (67) well motivated, it is the only plausible explanation of the alternation in the forms of the suffixes [na~ana] and [kum~akum].

At this juncture, it is appropriate to note the following facts regarding the nature of unsyllabified segments observed thus far and their respective repair strategies. Word-final and word-internal unsyllabified segments that arise from affixation are repaired through epenthesis while the second member of a root-final geminate, which is also word-final, is repaired through deletion. I have shown in section 2.1.3.4.1 that deletion occurs at the P-Phrase level. In section 2.4, I will address the question of the level at which epenthesis occurs.

In summary, the above discussion provides conclusive evidence for the Cv pattern of epenthesis in UCSA. I have demonstrated that epenthesis provides the only plausible explanation for the alternation patterns displayed by affixes in UCSA. Furthermore, I have argued that this process is motivated by a constraint on syllable structure that bans complex margins. In the following section, I discuss the second type of epenthesis, proposed in Hamid (1984) and Kenstowicz (1986, 1994). I show that the facts on which their analyses are based are better explained in terms other than those of epenthesis and, consequently, that the vowels they consider to be epenthetic are in fact underlying.
2.2.2 The vC pattern of epenthesis

Hamid (1984) and Kenstowicz (1986, 1994) propose similar analyses to account for the behaviour of the initial vowel in the perfect stem of measures V, VI, VII, VIII, and X in SCA. Both analyses assume a rule that inserts a vowel i to the left of an underlying #CCV sequence, allowing for the syllabification of the stray consonant as a coda.\(^{38}\) I illustrate this with reference to the triliteral roots in (69) below.

(69) Root | Perfect Stem | Perfect Form | Gloss
-------|-------------|-------------|--------
a. k-l-m | V tC\(_1\),aC\(_2\),aC\(_3\) | ?tkállam | ‘he spoke’
b. s-?-l | VI tC\(_2\),aaC\(_2\),aC\(_3\) | ?itsáa?al | ‘he wondered’
c. f-γ-l | VII nC\(_1\),aC\(_2\),aC\(_3\) | ?injáyal | ‘he became preoccupied’
d. f-γ-l | VIII C\(_1\),taC\(_2\),aC\(_3\) | ?íttáyal | ‘he worked’
e. f-s-r | X staC\(_1\),C\(_2\),aC\(_3\) | ?istáfsar | ‘he inquired’

In the second column containing the bare perfect stems, the three consonants with subscripts represent the positions of the root radicals given in the first column. That is, C\(_1\) represents the first radical, C\(_2\) the second, and C\(_3\) the third. In the third column I give the corresponding surface forms. According to the epenthesis accounts, the underlying form of the perfect stem begins with a CC cluster. Because SCA does not allow complex margins, the vowel i is inserted to the left of the cluster allowing for the stray consonant to be syllabified as a coda. To satisfy the onset requirement, a glottal stop is inserted in the onset position of the epenthetic vowel.

The arguments for the epenthesis account outlined above rest on two observations made by Hamid (1984). The first one concerns an alternation pattern exhibited by the initial vowel of the perfect stem of measures V, VI, VII,

\(^{38}\) It should be noted that Hamid and Kenstowicz propose analyses that differ in many respects, but the relevant point to our discussion is the fact that they both assume a vC pattern of epenthesis in SCA.
VIII, and X. Hamid reports that neither the default onset nor the initial vowel \( i \) is present in the surface when the stem is preceded by a word that ends in a vowel. The second observation concerns a seemingly idiosyncratic stress pattern exhibited by the imperfect stem of measures VII and VIII. Hamid notes that the initial syllable of these forms never receives stress even though it is the only heavy syllable in the word.\(^{39}\) To demonstrate how these two observations are used to invoke the epenthesis analysis, let us consider the examples of measures VII and VIII in (70) and (71), respectively.\(^{40}\) The former is based on Kenstowicz (1986: 117) and the latter on Hamid (1984: 93).

\[
\begin{align*}
(70) & \quad a. \text{nkat}_a & \rightarrow & \text{?iŋ.ká.tal} \\
& & \text{Pass.-killed(3.m.sg.)} & \text{‘He was killed.’} \\
& b. \text{al-wal}_a & \text{d}_a & \rightarrow \text{?al.wa.la.díŋ.kátal} \\
& & \text{the-boy Pass.-killed(3.m.sg.)} & \text{‘The boy was killed.’} \\
& c. \text{wala}_d & \text{d}_a & \rightarrow \text{wa.la.duŋ.ká.tal} \\
& & \text{boy-his Pass.-killed(3.m.sg.)} & \text{‘His son was killed.’}
\end{align*}
\]

\[
\begin{align*}
(71) & \quad a. \text{ṭa}_y & \rightarrow \text{?jf.tá.yal} \\
& & \text{worked(3.m.sg.)} & \text{‘He worked.’} \\
& b. \text{ka}_m & \text{ṭa}_y & \rightarrow \text{ka.maa.líf.tá.yal} \\
& & \text{Kamal worked(3.m.sg.)} & \text{‘Kamal worked.’} \\
& c. \text{wala}_d & \text{ṭa}_y & \rightarrow \text{wala.duf.tá.yal} \\
& & \text{boy-his worked(3.m.sg.)} & \text{‘His son worked.’}
\end{align*}
\]

\(^{39}\) This statement excludes the final syllable since in this position heavy syllables pattern like light syllables with respect to stress assignment.

\(^{40}\) I refer to measures VII and VIII because they make the strongest case for the epenthesis account, as they are used to lend support for both the alternation and stress arguments. However, the conclusion reached on the basis of the following discussion is equally valid with respect to the initial vowel in measures V, VI, and X.
According to Hamid and Kenstowicz, the initial CC cluster in the a-examples triggers epenthesis of i followed by the insertion of the default glottal stop into the onset position. The apparent anomalous stress pattern in these forms is interpreted as further evidence for the epenthetic nature of the initial vowel and is explained by ordering stress assignment before epenthesis. In the b-examples, where the first word ends in a consonant, i-epenthesis is triggered for the same reason as in the a-examples but, instead of the default onset, the coda of the last syllable in the preceding word is syllabified as an onset of the epenthetic vowel. In contrast, epenthesis does not occur in the c-examples where the first word ends in a vowel. Instead, the stray consonant is syllabified as a coda of the preceding vowel. In the two sections to follow, I address the arguments forming the basis of the epenthesis account.

2.2.2.1 The first argument: The alternation pattern

As mentioned above, the first argument is based on the pattern of alternation exhibited by the initial vowel of the perfect stem of measures V, VI, VII, VIII, and X. Although this pattern is common in dialects of Arabic, including many of those spoken in Sudan, it is not attested in UCSA. To demonstrate this fact, let us consider the UCSA surface forms equivalent to (70) and (71). These are given in (72) and (73), respectively.

41 For instance, this pattern is attested in CA and MSA. In both, the standard analysis is that the initial vowel in these measures is epenthetic (Holes 2004 and Ryding 2005 among others). This analysis is based primarily on the view that underlying word-initial vowels in these dialects do not delete in the context of a preceding vowel. In addition to CA and MSA, the alternation pattern is also attested in many spoken dialects such as Cairene and San’ani (Watson 2002). We will see in the next chapter that it is attested in Shukriiya as well. Similar to the situation in UCSA, however, I will demonstrate that the alternation facts in Shukriiya are best explained in terms other than those of epenthesis and that the initial vowel of the perfect stem is underlying.
As indicated by the c-examples, the initial vowel of the perfect stem is present in the surface form even when the preceding word ends in a vowel. The only alternation pattern observed is that of the onset of the initial syllable of the stem. Clearly, vowel epenthesis is not a plausible account for this pattern. In fact the only reasonable conclusion one can draw based on these data is that the initial vowel of the perfect stem is underlying. In the a-examples, the onset of this vowel is realized as a glottal stop by default. In the b-examples, the onset requirement is satisfied at the phrase level by syllabifying the coda of the final syllable in the first word as an onset of the initial vowel of the verbal stem. This syllabification is not possible in the c-examples because the first word ends in a vowel. Consequently, a glottal stop is inserted to resolve the hiatus resulting from the initial vowel of the verbal stem and that of the preceding word coming together at the phrase level. Further support for this view comes from cases where the two vowels are of the same quality. These are given in (74) below.

(74)  a.  c̣ali  inkatal → c̣a.li  iŋ.ka.tal → c̣a.liiŋ.ka.tal  
      Ali  Pass.-killed-3m.sg.  
      ‘Ali was killed.’

      b.  inti  ʔiftaʔal-ti → ʔin ti  ʔifu.ʔal.ti → ʔin tiif.ʔal.ti  
      you-f.sg.  worked-2.f.sg.  
      ‘You worked.’

In the above examples, the intermediate stage represents the output of word-level syllabification. At the phrase level, hiatus arises when a word ending with a vowel is followed by a word that begins with a vowel. In cases where the two
vowels are of different qualities, the hiatus is resolved by inserting a glottal stop in the onset position of the second vowel. This is illustrated by the c-examples in (72) and (73). If the vowels are of the same quality, as exemplified by the forms in (74), they are syllabified within one syllable whose nucleus is a long vowel. The latter case is equally problematic for the epenthesis account. Such an account would fall short of explaining the long vowel in (74), since it assumes that epenthesis does not occur in the context of a preceding vowel.

Further evidence for this analysis comes from examining the behavior of underlying initial vowels of varying qualities. Consider the examples in (75)-(79) below.

(75) a. minu inti → mi.nu in.ti → mi.nu.?in.ti
   who 2.f.sg.
   ‘Who are you?’

   b. lee-ki inti → lee.ki in.ti → lee.kiin.ti
   for-2.f.sg. 2.f.sg.
   ‘for you’

(76) a. intu a-g⁵ud-u → in.tu ag⁶u.du → ?in.tu.?ag⁶u.du
   2.pl. Imp.-sit-pl.
   ‘(you) Sit!’

   b. inta a-g⁶ud → in.ta ag⁶ud → ?in.taag⁶ud
   2.m.sg. Imp.-sit
   ‘(you) Sit’

(77) a. inti a-mʃi → in.ti amʃi → ?in.ti.?amʃi
   2.f.sg. Imp.-go
   ‘(you) Go!’

   b. inta amʃi → in.ta amʃi → ?in.taamʃi
   2.m.sg. Imp.-go
   ‘(you) Go!’

(78) a. ism-u ahmad → is.mu ah.mad → ?is.mu.?ah.mad
   name-3.m.sg. Ahmed
   ‘His name is Ahmed.’
Once again, the intermediate stage represents the output of word-level syllabification. In (75a) the pronoun inti ‘you’ is preceded by a word that ends in a vowel of a different quality than that of the initial vowel of the pronoun.

Hiatus arises at the phrase level when the two vowels are adjacent. As indicated above, this is resolved by inserting a glottal stop in the onset position of the second vowel. In (75b), on the other hand, the final vowel of the preceding word is identical to the initial vowel of the pronoun. Thus, the result of the resyllabification process is a syllable whose nucleus is a long vowel. The same observations are true with respect to the behavior of the initial vowels of the imperative forms in (76) and (77) and those of the proper names in (78) and (79).

In the a-examples, the final vowel of the first word is of a different quality than the initial vowel of the second one. Consistently, a glottal stop appears in the onset position of the latter. In the b-examples, where the two vowels are of the same quality, they are resyllabified as the nucleus of the same syllable.

Evidently, the epenthesis account is not consistent with the facts revealed in the above discussion. The alternation pattern described by Hamid is not attested in UCSA. Furthermore, the initial vowel of the perfect stem in this dialect exhibits the same patterns observed in underlying word-initial vowels of varying qualities. These facts lead us to conclude that the initial vowel of the
perfect stem of measures V, VI, VII, VIII, and X is part of the underlying form in UCSA. In the next section, I address the second argument for the epenthesis account.

2.2.2.2 The second argument: Failure of the initial vowel to receive stress

The second argument for the epenthesis account crucially hinges on Hamid’s (1984) analysis of stress in SCA. According to this analysis, the main accent is assigned to the heavy syllable in a word containing only one heavy syllable. Consequently, the stress pattern of measures VII and VIII is deemed to be idiosyncratic because stress falls on the light penultimate even though the initial syllable is heavy. This seemingly anomalous stress is interpreted as evidence that the initial vowel is not present at the level at which stress is assigned. In the following section, I examine the stress patterns in UCSA and refute Hamid’s analysis on observational, empirical, and conceptual grounds. I propose an alternative analysis and show that the seemingly idiosyncratic stress of measures VII and VIII follows directly from the stress-assigning algorithm.

To summarize the discussion thus far, I have considered the two arguments that Hamid (1984) and Kenstowicz (1986) provide for a $\text{vC}$ pattern of epenthesis in Sudanese Arabic. I have demonstrated that the alternation pattern, which is the basis for the first argument, is not consistent with the facts of UCSA. With regard to the second argument, I demonstrate below that the fact that the relevant vowel does not receive stress is predicted by an adequate analysis of stress in UCSA.
2.3 Stress Assignment

I begin this section with a brief review of Hamid’s (1984) analysis of stress in SCA. I show that the analysis is based on partially inaccurate observations and, as a consequence, makes empirically unfounded predictions. Subsequently, I propose an alternative analysis of stress in UCSA and demonstrate that it is empirically more adequate and conceptually more desirable. Furthermore, I show that the proposed stress-assigning algorithm accurately predicts the fact that the vowel of the passive prefix does not receive stress even when it is the only heavy syllable in the word.

2.3.1 Hamid’s (1984) analysis of stress

Hamid summarizes the stress pattern of SCA by the following statement (p. 37):

(80) a. Stress the heavy syllable in the word if there is only one heavy syllable;
    b. if there is more than one heavy syllable, stress the rightmost one;
    c. otherwise, stress the first syllable in the word.

Noting that word-final heavy syllables of the form CVC fail to attract stress, he assumes that a word-final consonant is extrametrical. He, then, proposes to account for the stress facts by an iterative rule that 1) forms unbounded left-dominant feet from right to left and 2) forms a right-dominant word tree (p. 46).

The first problematic point about Hamid’s analysis is that it is observationally inaccurate. According to the statement in (80a), if a word has one heavy syllable that syllable receives stress. Further examination of UCSA data shows this is not always the case. Consider the data in (81) below.
(81) a. zambálak cf. *zámbalak ‘pendulum’
b. ṣabyáři < /ṣabyarii/ cf. **ābyari ‘genius’
c. samkári < /samkarii/ cf. *sámkari ‘blacksmith’
d. tantázir cf. *tántázir ‘she waits’
e. muštárik cf. *múštārik ‘participant’
f. manjúlik cf. *máŋjúlik ‘Manjúlik’
g. muntásir cf. *muŋtašir ‘Muntasir’
h. baarjúyul cf. *báarjuyul ‘an obese man’

Given final consonant extrametricality, Hamid’s rule inaccurately predicts stress to be assigned to the initial syllable, since it is the only heavy syllable in the word. This problematic stress pattern is the same as that of the perfect stem of measures VII and VIII discussed in the previous section. However, the fact that the nuclei of the heavy syllables in these forms are underlying vowels precludes any ordering account analogous to that Hamid and Kenstowicz propose for the initial vowel of the perfect stem. Evidently, Hamid’s analysis makes empirically unfounded predictions, an expected consequence of the fact that it is based on partially inaccurate observations.

Another problematic issue regarding Hamid’s analysis is his treatment of the apparent idiosyncratic stress pattern of the imperfect subject prefix. He reports that this prefix has two allomorphs [Ca-] and [Ci-] whose distribution, he maintains, is sensitive to both the phonological shape and morphological identity of the immediately following segmental material. The allomorph [Ca-] appears before measures beginning with a cluster of two consonants, provided that both consonants are root radicals, while the allomorph [Ci-] appears before measures beginning with a CV sequence as well as measures beginning with a cluster of two consonants of which only one is a root radical. The former allomorph receives stress but the latter does not (p. 53 and pp. 182-185). In (82) below, I use triliteral roots to illustrate Hamid’s account of the allomorphy and stress patterns
of the third person masculine singular imperfect prefix with verbal measures I-X.  

<table>
<thead>
<tr>
<th>(82)</th>
<th>Root</th>
<th>Imperfect Stem</th>
<th>Imperfect Form</th>
<th>Gloss</th>
</tr>
</thead>
<tbody>
<tr>
<td>a.</td>
<td>d-x-l</td>
<td>-C₁C₂uC₃</td>
<td>ja-dxul</td>
<td>‘he enters’</td>
</tr>
<tr>
<td>b.</td>
<td>d-r-s</td>
<td>-C₁aC₂iC₃</td>
<td>ji-dárris</td>
<td>‘he teaches’</td>
</tr>
<tr>
<td>c.</td>
<td>s-f-r</td>
<td>-C₁aaC₂iC₃</td>
<td>ji-saafir</td>
<td>‘he travels’</td>
</tr>
<tr>
<td>d.</td>
<td>r-s-l</td>
<td>IV -C₁C₂iC₃</td>
<td>ja-rsil</td>
<td>‘he sends’</td>
</tr>
<tr>
<td>e.</td>
<td>k-l-m</td>
<td>V -tC₁aC₂aC₃</td>
<td>ji-tkállam</td>
<td>‘he speaks’</td>
</tr>
<tr>
<td>f.</td>
<td>s-?-l</td>
<td>VI -tC₁aaC₂aC₃</td>
<td>ji-tsáal</td>
<td>‘he wonders’</td>
</tr>
<tr>
<td>g.</td>
<td>f-γ-l</td>
<td>VII -nC₁aC₂aC₃</td>
<td>ji-nféíl</td>
<td>‘he becomes preoccupied’</td>
</tr>
<tr>
<td>h.</td>
<td>f-γ-l</td>
<td>VIII -C₁taC₂iC₃</td>
<td>ji-ftáíl</td>
<td>‘he works’</td>
</tr>
<tr>
<td>i.</td>
<td>f-s-r</td>
<td>X -staC₁C₂aC₃</td>
<td>ji-stásar</td>
<td>‘he inquires’</td>
</tr>
</tbody>
</table>

The affixed imperfect forms given in the third column are those corresponding to Hamid’s account. Of the nine measures, only I (82a) and IV (82d) begin with a two-consonant cluster where both consonants are root radicals [-C₁C₂]. Hamid maintains that the allomorph [ja-] appears with these forms and the vowel of the prefix is stressed as predicted by his rule. The allomorph [ji-] appears with measures II (82b) and III (82c), which begin with [-C₁V] and [-C₁VV], respectively. It also appears with measures beginning with a cluster of two consonants only one of which is a root radical. Hamid includes the remaining five measures in the latter group: measures V (82e) and VI (82f), beginning with [-tC₁]; measure VII (82g), beginning with [-nC₁]; measure VIII (82h), beginning with [-C₁t]; and measure X (82i), beginning with [-st]. In measures VII and VIII, the vowel of the prefix fails to receive stress even though it is the only heavy syllable in the word. Hamid proposes to account for these facts by lexically marking the allomorph [Ci-] extrametrical (p. 54).

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42 Like most, if not all, spoken dialects of Arabic, UCSA does not utilize measure IX found in CA and MSA.

43 Incidentally, in measure X neither of the consonants [-st] is a root radical. Thus, assuming that Hamid’s characterization of the allomorphy facts is accurate, a simpler and more accurate statement of the generalization would be that [Ca-] appears before a CC cluster where both consonants are root radicals and [Ci-] is the elsewhere variant.
It is ambiguous whether Hamid’s analysis is intended to account for the
behaviour of the third person masculine singular prefix or that of the entire
paradigm of imperfect subject prefixes. He describes the allomorphs in terms
general enough to suggest that he is referring to the entire paradigm. However,
the examples he gives consist exclusively of the third person masculine singular
prefix.\footnote{This may be attributed to the fact that it is a standard practice in the Arabic linguistic tradition
to use the third person masculine singular as a citation form when illustrating grammatical
phenomena.} In either case, Hamid’s characterization of the stress pattern and
allomorphy facts is inconsistent with the behaviour of the imperfect prefixes in
UCSA. I address this point below.

Let us first consider the third person masculine singular form. Although
this prefix does have the two allomorphs observed by Hamid, I am not able to
find any data in UCSA supporting the stress and allomorphy distribution
patterns he describes.\footnote{The evidence given here is based on the speech of 27 native speakers of UCSA including
myself.} In fact, the allomorph [ji-] appears with all of the verbal
measures in (82) above. This includes measures I ([ji-dxul] ‘he enters’) and IV
([ji-rsil] ‘he sends’) where the vowel of the prefix receives stress. Moreover, the
allomorphy is not sensitive to the morphological identity of the cluster following
the prefix. The allomorph [ja-] occurs before a cluster of two consonants the first
of which is a glottal stop and the allomorph [ji-] occurs elsewhere. The cluster
[?C] arises in derivations involving roots whose initial radical is a glottal stop.
The morphological identity of the second consonant is inconsequential. As the
data in (83) below illustrate, the second consonant may be a radical or an affix.

\begin{tabular}{lllll}
\textbf{(83) Root} & \textbf{Measure} & \textbf{Imperfect Form} & \textbf{Gloss} \\
\hline
a. ?-k-l & I -C_1,C_2,uC_3 & ja-?kul & jaa.kul & ‘he eats’ \\
b. ?-x-d & I -C_1,C_2,uC_3 & ja-?xud & jaa.xud & ‘he buys’ \\
\end{tabular}
In (83a)-(83d), the cluster [C] arises in the derivation of the imperfect form of measure I. In (83e) and (83f), it arises in the derivations of measures IV and X, respectively. In all three measures, the second consonant in the cluster is also a radical. In (83g) the cluster arises in the derivation of measure VIII but here the second consonant -t- is not a root radical; it is an affix that is part of the verbal pattern. In either case, the glottal stop is absent in the surface form and the preceding vowel is long. As it turns out, syllables of the form CV? are not attested in any dialect of Sudanese Arabic including UCSA, Shukriiya, and Hamar. Accordingly, the absence of the glottal stop is simply explained in terms of a phonotactic constraint banning syllables with a glottal stop in the coda position. The derivation of these forms yields a cluster in which the glottal stop can only be syllabified as a coda and is deleted as a result. In turn, this triggers compensatory lengthening of the prefix vowel. In contrast, the glottal stop appears in the surface forms of the rest of the examples where the allomorph [ji-] is used. This is because no cluster arises in the derivations of measure II and III (83h)-(83j). In (83k)-(83m), the derivations of measures V, VI, and VII give rise to

\[ \text{In a subgrammar of UCSA, the glottal stop is assimilated by the preceding nasal resulting in the surface form [jinnákil].} \]
a CC cluster but here the glottal stop is the second consonant. In all four measures, the glottal stop is syllabified as an onset of the second syllable.47

I am also not able to find any data substantiating the allomorphy and stress pattern described by Hamid in dialects neighbouring UCSA. The majority of these dialects exclusively use the form [ja-]. These include Shaaygiyya, Rubaaṭaab, some varieties of Ja‘aliyya and Shukriyya, and some rural varieties of Al-Gezira dialects.48 Similar to the situation in UCSA, in these dialects the form is stressed with measures I ([já-dxul] ‘he enters’) and IV ([já-rsil] ‘he sends’) but not with measures VII ([ja-njáyil] ‘he becomes preoccupied’) and VIII ([ja-jtáyil] ‘he works’). Thus, regardless of the dialectal variation, the vowel of the same allomorph is predictably stressed with measures I and IV but is anomalously unstressed with measures VII and VIII. Consequently, lexical extrametricality cannot be invoked to account for this seemingly idiosyncratic stress pattern. Obviously, it would be highly undesirable to stipulate that the prefix is extrametrical with measures VII and VIII but not with I and IV. In the next section, I demonstrate that the behaviour of this prefix follows directly from an accurate characterization of the algorithm responsible for assigning stress in UCSA.

Hamid’s characterization of the behaviour of the imperfect prefix is equally problematic if it is intended to account for the entire paradigm. Based on

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47 This is similar to the alternation pattern of the first person singular imperfect prefix [?V-] in CA and MSA. Although in these dialects a glottal stop may occupy the coda position, it may not do so in a syllable whose onset is a glottal stop. That is, the constraint in these dialects is against syllables of the form [?V?]. Thus, /?a-?kulu/ ‘I eat’ surfaces as [?a.ku.lu] but /na-?kulu/ ‘we eat’ surfaces as [na?.ku.lu]. The corresponding surface forms in Sudanese dialects of Arabic are [?aa.kul] and [naa.kul], respectively.

48 The Ja‘aliyya, Rubaaṭaab, and Shaaygiyya dialects are spoken in a region north of Khartoum extending along the River Nile from around Greater Shendi in the south to Greater Merowe in the north. Al-Gezira is the region between the Blue Nile and the White Nile extending south of Khartoum to Sinar (also spelt Sennar) and Kosti.
the allomorphy facts, we can identify two groups of speakers of UCSA. Although both groups exhibit the [ja-] ~ [ji-] allomorphy of the third person masculine singular form described above, they differ with respect to the remaining affixes in the paradigm. The first group, comprising the majority of UCSA speakers, exhibits allomorphy throughout the entire paradigm. However, the distribution of the allomorphs is different from that described by Hamid: the form [Ca-] is used with measures I, II, III, and IV while [Ci-] is used with measures V, VI, VII, VIII, and X. Speakers in the second group do not exhibit allomorphy but exclusively use the form [Ca-]. More importantly, regardless of the presence or absence of allomorphy, the stress pattern of the remaining prefixes is identical to that of the third person masculine singular form discussed above. To demonstrate this fact, consider the imperfect paradigms of (82a), (82d), (82g), and (82h) given in (84a), (84b), (84c), and (84d), respectively.  

<table>
<thead>
<tr>
<th></th>
<th>a. ‘to enter’</th>
<th>b. ‘to send’</th>
<th>c. ‘to become preoccupied’</th>
<th>d. ‘to work’</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.pl.</td>
<td>ná-dxul</td>
<td>ná-rsil</td>
<td>na-nfáyl</td>
<td>na-ftáyl</td>
</tr>
<tr>
<td>2.m.sg</td>
<td>tá-dxul</td>
<td>tá-rsil</td>
<td>ta-nfáyl</td>
<td>ta-ftáyl</td>
</tr>
<tr>
<td>2.f.sg</td>
<td>tá-dxul-i</td>
<td>tá-rsil-i</td>
<td>ta-nfáyl-i</td>
<td>ta-ftáyl-i</td>
</tr>
<tr>
<td>2.m.pl.</td>
<td>tá-dxul-u</td>
<td>tá-rsil-u</td>
<td>ta-nfáyl-u</td>
<td>ta-ftáyl-u</td>
</tr>
<tr>
<td>2.f.pl.</td>
<td>tá-dxul-an</td>
<td>tá-rsil-an</td>
<td>ta-nfáyl-an</td>
<td>ta-ftáyl-an</td>
</tr>
<tr>
<td>3.m.sg</td>
<td>ji-dxul</td>
<td>ji-rsil</td>
<td>ji-nfáyl</td>
<td>ji-ftáyl</td>
</tr>
<tr>
<td>3.f.sg</td>
<td>tá-dxul</td>
<td>tá-rsil</td>
<td>ta-nfáyl</td>
<td>ta-ftáyl</td>
</tr>
<tr>
<td>3.m.pl.</td>
<td>ji-dxul-u</td>
<td>ji-rsil-u</td>
<td>ji-nfáyl-u</td>
<td>ji-ftáyl-u</td>
</tr>
<tr>
<td>3.f.pl.</td>
<td>ji-dxul-an</td>
<td>ji-rsil-an</td>
<td>ji-nfáyl-an</td>
<td>ji-ftáyl-an</td>
</tr>
</tbody>
</table>

49 It is important to emphasize the point that the presence and absence of allomorphy represent features of two sub-grammars of UCSA rather than variation in the speech of individual speakers. Naturally, all UCSA speakers judge the forms [Ca-] and [Ci-] as acceptable but I am not aware of any cases where the same speaker exhibits allomorphy with some forms and not with others.

50 Like many urban dialects of Arabic, UCSA lost the gender distinction in the plural of the second and third person forms in favour of the masculine form. However, this distinction is maintained in many Sudanese dialects including Shukriiya and Hamar.
Note that the high vowels of measures VII and VIII undergo syncope in the forms given in bold face. Evidently, all imperfect prefixes behave in an identical manner with regard to stress. They receive stress with verbal measures I and IV but fail to do so with measures VII and VIII even though in the latter forms the vowel of the prefix is the only heavy syllable in the word. This being the case, extending Hamid’s analysis to account for these facts would entail adopting the undesirable stipulation referred to earlier. That is, all imperfect prefixes would have to be marked extrametrical with measures VII and VIII but not with I and IV.

In conclusion, the above discussion reveals that Hamid’s analysis of stress is problematic in significant ways. I have demonstrated that the analysis is based on partially inaccurate observations and, as a result, it makes empirically unfounded predictions. Moreover, maintaining this analysis entails adopting a conceptually undesirable stipulation, namely, that elements may be arbitrarily marked extrametrical. In the following section, I provide an alternative analysis of stress that overcomes these limitations. Also, I show that the stress-assigning algorithm posited by this analysis accurately predicts the seemingly idiosyncratic behavior of the initial vowel of the perfect form of measures VII and VIII as well as that of the imperfect prefixes.

2.3.2 An alternative analysis of stress

Apart from a few lexical differences that will be discussed in section 2.3.2.5, the stress facts are essentially the same in UCSA, Shukriiya, and Hamar.

Accordingly, the analysis developed here accounts for the assignment of stress in
all three dialects. Because of its relevance to stress assignment, I begin by addressing the length alternation pattern exhibited by stem-final vowels. Then, I review the syllable inventory and propose a stress-assigning algorithm for the three dialects. I show that this algorithm accurately predicts the placement of stress even in the forms treated as anomalous by Hamid’s analysis. I then present evidence for secondary stress and show that the proposed algorithm accurately predicts the location of the secondary accent as well. I conclude the section by examining idiosyncratic stress exhibited by two sets of inflectional affixes.

### 2.3.2.1 The quality of word-final vowels

Underlying stem-final vowels in UCSA, Shukriiya, and Hamar display an alternation pattern attested perhaps in all spoken dialects of Arabic. Vowels alternate between being short at the end of the word and long when followed by a suffix. This is illustrated in (85) below.

\[(85)\begin{array}{lll}
\text{Word-finally} & \text{Before a suffix} \\
\text{a.} & \text{?áxu} & \text{?axúu-kum} & \text{‘your(m.pl.) brother’} \\
\text{b.} & \text{máfi} & \text{mašii-na} & \text{‘our walking’} \\
\text{c.} & \text{zuºama} & \text{zuºamáa-na} & \text{‘our leaders’} \\
\text{d.} & \text{dá¿a} & \text{da¿a-na} & \text{‘he invited us’} \\
\text{e.} & \text{má¿a} & \text{ma¿a-na} & \text{‘with us’} \\
\text{f.} & \text{¿uf-ti} & \text{¿uf-ti-na} & \text{‘you(f.) saw us’} \\
\text{g.} & \text{simiº-na} & \text{simiº-náa-kum} & \text{‘we heard you(m.pl.)’} \\
\end{array}\]

The stem-final vowel is part of a noun in (85a)-(85c) and is part of a verb in (85d). In (85e) it is part of a preposition and in (85f) and (85g) it is part of a subject suffix. In all cases, the vowel is short word-finally and long in the suffixed forms. There are no exceptions to this alternation pattern and there are neither forms with long vowels word-finally nor forms with short underlying vowels
before suffixes. To my knowledge, the only dialects in which length appears in surface forms word-finally as well as in affixed forms are CA and MSA. Thus, in these dialects the forms corresponding to (85d) are [ðáº¢aa] and [ðaº¢á·a-naa].

Analyses of this alternation pattern in Arabic dialects belong to two groups. The first assumes that the underlying vowels in these forms are short and that there is a lengthening rule in the suffixed forms. This is the proposal made by Broselow (1976) and Watson (2002) for Cairene, Abdul-Kharim (1980) and Haddad (1984) for Lebanese and Palestinian, and Hamid (1984) for Sudanese. The second group assumes that the vowels are long in the underlying forms and are shortened word-finally. This analysis is proposed by Abdo (1969) and Abu-Salim (1982) for Lebanese and Palestinian, Abu-Mansour (1987) and Kabrah (2004) for Mekkan, Glover (1988) for Omani, and McCarthy (2005) for Cairene. Given the lack of decisive arguments for one analysis over the other, it is not surprising that both shortening and lengthening are, in some cases, proposed to account for the alternation pattern in the same dialect. McCarthy (2005: 2) comments that this divergence of opinions might lead one to think “that the underlying length of stem-final vowels in colloquial Arabic is indeterminate.” He proposes to resolve this indeterminacy by appealing to two aspects of Optimality Theory (Prince and Smolensky 1993): richness of the base (ROTB) and the universality of the constraint-set (CON). Given ROTB, stems ending in consonants, short vowels, and long vowels are all available to the grammar of Cairene. Still, only two surface patterns are attested: stem-final consonants and

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51 Kabrah (2004: 27) argues that word-final long vowels do appear in surface forms in Mekkan but only when the two vowels belong to separate morphemes. Thus /katabnaa/ ‘we wrote’ surfaces as [katábna] but /katabna-a-u/ ‘we wrote it (m)’ surfaces as [katabnaa], where the first vowel is part of the subject suffix and the second is part of the object suffix. It is not clear to me how we can tell which is which.
vowels that alternate in length. Observing a typologically responsible theory of CON, McCarthy argues that there is no evidence for a mapping that deletes underlying long vowels both word-finally and before suffixes while retaining underlying short vowels word-finally and lengthening them before suffixes. Similarly, although underlying short vowels do undergo lengthening, there is no evidence that this occurs before suffixes. In contrast, there is typological support for shortening of long vowels word finally. Accordingly, McCarthy concludes that the underlying stem-final vowels in Cairene are long and that “final shortening … is linked with resistance to final stress (p. 21).”

In addition to McCarthy’s typological argument outlined above, indirect evidence for a shortening analysis in UCSA, Shukriiya, and Hamar can be summarized in four points. First, stem-final vowels in UCSA exhibit an alternation pattern upon suffixation of the third person masculine singular affix /-u/ that is indicative of word-final shortening.52 The suffix may only surface as a glide [-w] when preceded by a vowel. Thus, suffixation to the forms in (85a-g) yields [ʔaxúu-w] ‘his brother’; [maʃii-w] ‘his walking’; [zuʃamáa-w] ‘his leaders’; [daʃaa-w] ‘he invited him’; [maʃáa-w] ‘with him’; [ʃuf-tii-w] ‘you (f.) saw him’; and [simiʃ-náa-w] ‘we heard him’. The stem-final long vowels in these forms are predictably assigned stress. However, the suffix does not surface in one variety of UCSA that deletes word-final glides. Significantly still, the final stressed vowel is short in the surface forms yielding [ʔaxú]; [maʃi]; [zuʃamá]; [daʃá]; [maʃá]; [ʃuf-tí]; and [simiʃ-ná], respectively. Evidently, the long vowel is shortened when rendered word final as a result of glide deletion.

52 This is the underlying form of the homophonous third person masculine singular possessive and object suffixes in UCSA.
Second, there is historical evidence that the stem-final vowels in questions were long at the underlying level. Indeed, as I mentioned at the beginning of this section, they are long in surface forms word-finally as well as in affixed forms in CA and MSA. Of course, this does not necessarily imply that these vowels are long synchronically. Rather, if we are to assume that they are short at the underlying level in contemporary dialects, we need to have some evidence that they were reanalysed at some point in the development of these dialects. To my knowledge, no such evidence exists.

Third, a shortening analysis is more consistent with the fact that word-final position is a weakening position in these dialects. For instance, all three dialects degeminate and devoice consonants word-finally. In addition, one variety of UCSA deletes word-final glides.

The fourth point is based on the correlation between length and stress. Underlying vowels are consistently long before suffixes and are consistently assigned the main accent. Lengthening might, then, be motivated in terms of a preference for penultimate stress. However, this view is somewhat weakened by the fact that not all vowels show this pattern. Thus, the underlying vowel of the second person feminine singular suffix in (85f) is long and stressed before a suffix but the epenthetic vowel of the masculine suffix -ta in [júf-ta] ‘you saw’, [júf-ta-na] ‘you saw us’ cf. *[juf-táa-na] is not.

In my discussion of stress assignment in UCSA, Shukriiya, and Hamar, I assume that underlying stem-final vowels are long and are shortened word-finally. The only two exceptions to this are the third person masculine singular possessive suffix -u (e.g., [walad-u] ‘his son’) and the feminine singular ending -a (e.g., [ja'ár-a] ‘a tree’). The former does not exhibit length alternation because it
never appears in suffixed forms. The latter does not exhibit alternation because it has an allomorph -at that appears in genitive forms. These can be suffixed (e.g., [fajar-at-na] ‘our tree’) or construct state (e.g., [fajar-at hasan] ‘Hassan’s tree’).

2.3.2.2 The syllable inventory

The three dialects share the same syllable inventory, which consists of light syllables of the form CV, heavy syllables of the forms CVC and CVV, and superheavy syllables of the forms CVVC. Citing examples from Broselow et al. (1995, 1997), Watson (2011: 3009) states that syllables of the latter form are not attested morpheme-internally in Sudanese but are attested word-internally through suffixation. This is observed in the derivation /laa∫ib-iin/ → [laa∫biin] ‘playing (m.pl.’). Although it is true that the majority of word-internal CVVC syllables arise from affixation, syllables of this form do occur in mono-morphemic words as well (e.g., saargel ‘worm’). Given these distribution facts, I assume that the final consonant in syllables of this form is not stray. The mechanism through which this consonant is affiliated with the syllable has no bearing on the stress analysis. It may be adjoined to the preceding syllable node along the lines argued for in McCarthy (1979) or adjoined to the preceding mora along the lines of mora-adjunction proposed by Broselow (1992). In either case, superheavy syllables of the form CVVC are bimoraic. None of the three dialects allows superheavy syllables of the form CVCC. Indeed, when a postvocalic CC sequence arises through affixation or from roots ending in geminates, it invariably triggers a repair strategy. Depending on the type of segments involved and the position of the cluster, the repair strategy may be epenthesis,
deletion, or syllabification across the word boundary at the phrase level. Accordingly, I assume that the second consonant in a CVCC# sequence is stray.

2.3.2.3 The stress-assigning algorithm

The analysis of stress I propose here is based on the metrical theory developed in Hayes (1981, 1985, 1987, 1995) and Halle and Vergnaud (1987). In this theory, which uses bracketed grids instead of trees, stress is assigned as follows. An algorithm of foot-construction parses a word into feet and a word layer is formed on the output of this initial parse. Its head (main stress) is then assigned by a rule to either the right or left edge. This rule is subject to the Continuous Column Constraint which states that a grid containing a column with a mark on a higher layer and no mark on a lower one is illformed (Hayes 1995: 34-35). The statements given in (86) below summarize the stress pattern in the three dialects.

(86) a. Stress a superheavy final syllable:

- mawaa'id 'appointment/schedule'
- xabbár < /xabbar-t/ 'I/you told'
- mahál < /mahall/ 'place'
- ṣaargéél 'worm'
- ṣaaʃméeg 'robe'
- kubáar 'elders'
- ṭawláad 'children'
- taarfiix 'history/date'

53 In chapter five, I discuss the distribution pattern of superheavy syllables in more detail.
54 The data in (86) is representative of the stress pattern in all three dialects. However, in (86a) the form xabbár < /xabbar-t/ 'I/you told' is Shukriiya and Hamar. I demonstrate in the following chapters that an unsyllabified segment arising from affixation in these dialects is repaired through deletion. As we saw in section 2.2.1, this segment is repaired through epenthesis in UCSA whose equivalent surface form is xabbárta. Also, in (86d) the form ṭaxadar is Shukriiya and Hamar, and the forms ṭaʃagal and jaxabir are Shukriiya.
b. Otherwise, stress a heavy penultimate:
   - mahāṭa  ‘station’
   - mànzil  ‘house’
   - dawāna < /dawaana/  ‘our medicine’
   - manzilna < /manzilna/  ‘our house’

c. Otherwise, stress a heavy antepenultimate if the final is light:
   - māḥfaṣa  ‘wallet’
   - dārdafā  ‘chatting’
   - mànzilu  ‘his house’

d. Otherwise, stress the penultimate or antepenultimate, whichever is separated from the preceding heavy syllable by an even number of syllables or, if there is no preceding heavy syllable, from the left edge of the word:
   - zamāblak  ‘pendulum’
   - ?iftākar  ‘he thought’
   - mustāfa < /mustafaa/  ‘Mustafa’
   - zuṭama < /zuṭamaa/  ‘leaders’
   - ?āxadar  ‘green(m.sg.)’
   - ?āqagal  ‘be reasonable!’
   - jāxabir  ‘he knows’
   - màhāl  ‘drought’
   - fādara  ‘tree’
   - dāwa < /dawaa/  ‘medicine’

The stressing of final syllables in forms like mawāʕidi ‘appointment’ is consistent with our assumption that syllables of the form CVVC are bimoraic. Similarly, forms like xabbár from /xabbar-t/ ‘I/you told’ and mahāl from /mahall/ ‘place’ indicate that a syllable of the form CVC is also heavy when followed by a stray consonant at the end of the word. Accordingly, in the following analysis I assume that the post-vocalic consonant in a CVC syllable is moraic. In contrast, forms like māḥfaṣa ‘wallet’, mànzil ‘house’, dāwa from

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55 The data in (86b-d) include four forms ending in a short vowel -a and one form ending in a short vowel -u. The former is the feminine singular ending and the latter is the third person masculine possessive suffix. Recall that these vowels are short in the underlying form as they do not exhibit length alternation (see section 2.3.2.1).

56 Adopting Hayes’s (1989b) theory of moraic phonology, Davis (2011) suggests that geminates may be represented as underlyingly moraic in Arabic dialects. This is primarily based on the patterning of syllables of the form CVV and CVG (where G is a geminate) with respect to stress assignment. Citing Watson (2002), Davis notes that dialects like San’ani exhibit priority of stressing CVV and CVG syllables over CVC. For example, although stress typically falls on a final superheavy syllable, the penult CVG in dāw.wart ‘I/you looked for’ and CVV in sāa.fart
"/dawaa/ ‘medicine’, and dawa’ana from /dawaanaa/ ‘our medicine’, indicate that word-final heavy syllables of the form CVC and CVV do not attract stress. Evidently, the second mora associated with the coda in the former and that with the long vowel in the latter do not contribute to syllable weight in this position. Hayes (1995: 58) “somewhat tentatively” excludes the mora from the group of constituents that may be marked extrametrical. He gives two reasons for this: 1) “the absence of plausible cases” and 2) “unambiguous cases of mora extrametricality can be excluded by” observing a total ban on syllable-splitting foot construction. An example of the latter is a situation where the foot construction algorithm parses the first mora of a heavy syllable as part of one foot and the second mora as part of the next. The analysis I propose here strictly observes this ban on syllable-splitting foot construction. Moreover, the patterning of CVC and CVV observed above constitutes precisely the missing plausible case for invoking mora extrametricality. Accordingly, in the following analysis I assume that a word-final mora is extrametrical.57 Adopting the notational system proposed by Hayes to formulate stress rules, I propose the stress-assigning algorithm in (87) for the three dialects of UCSA, Shukriiya, and Hamar.

‘I/you travelled’ attract stress. Contrastively, the penult CVC in gam.bärt ‘I/you sat’ fails to do so. Given the assumption that both CVG and CVV are underlyingly bimoraic, Davis (2011: 888) notes that one could then argue that in this dialect Weight-by-Position applies only in words that would not otherwise have bimoraic syllables. That is, it applies in forms like gam.bärt, explaining the stressing of the final superheavy syllable, but not in forms like däw.wart and säa.fart, explaining the penultimate stress. However, underlying moraification of geminate consonants cannot be substantiated in the context of the three dialects under consideration. This is because the San’ani CVG and CVV patterning is not attested in any of UCSA, Shukriiya, or Hamar. Moreover, post-vocalic CC clusters in these dialects pattern like a CVC.C sequence regardless of whether the cluster consists of a geminate or heterorganic consonants and regardless of the position of the cluster in the word.

57 It should also be noted that Hayes does appeal to mora extrametricality, albeit reluctantly, in his analysis of CA words in Cairene (pp. 69-70).
(87)  a. Mora Extrametricality: \[ \mu \rightarrow <\mu> / _{\text{word}} \]
    b. Foot Construction: From left to right, parse the word into moraic trochees. Degenerate feet are forbidden absolutely.
    c. Word Layer Construction: End Rule Right

I now demonstrate how this algorithm accurately predicts the stress pattern stated in (86) above.

The examples in (88) below illustrate how stress is assigned to a final superheavy syllable.

(88)  a. \( (x) \) Word Layer Construction: ERR \( (x) \) Foot Construction: L to R \( \mu \mu \mu \mu \mu \) Mora Extrametricality: Blocked \( (m\ a\ w\ a\ a\ c\ i\ i\ d)_{w} \rightarrow \text{mawaa'iid} \) ‘appointment’

b. \( (x) \) Word Layer Construction: ERR \( (x) \) Foot Construction: L to R \( \mu \mu \mu \mu \mu \) Mora Extrametricality: Blocked \( (x\ a\ b\ b\ a\ r\ t)_{w} \rightarrow \text{xab.bár.t} \rightarrow \text{xabbár} \) ‘I/You told’

c. \( (x) \) Word Layer Construction: ERR \( (x) \) Foot Construction: L to R \( \mu \mu \mu \mu \mu \) Mora Extrametricality: Blocked \( (m\ a\ h\ a\ l\ l)_{w} \rightarrow \text{ma.hál.l} \rightarrow \text{mahál} \) ‘place’

Extrametricality is blocked in all three examples because the final mora is not at the designated edge of its domain (Hayes 1995: 57-58). All words contain a consonant separating the final mora from the right edge of the word. In (88a) and (88c), the initial light syllable is not footed because degenerate syllables are disallowed. Similarly, the ban on syllable splitting prevents the mora of the light syllable from being footed with the first mora of the following heavy syllable. In (88a) and (88b), the word is parsed into two feet and the End Rule assigns the main accent to the right-hand foot, correctly predicting the location of stress. In (88c), only one foot is constructed and is assigned main stress. Note that the unsyllabified segment arising from affixation in (88b) and the second member of
the geminate in (88c) cannot be stray-erased before stress is assigned. If they were, extrametricality would apply and stress would be assigned to the penult yielding *[xábar] and *[máhal], respectively. Incidentally, these are possible surface forms whose respective underlying representations end in a CVC sequence: [xábar] < /xabbar/ ‘he told’ and [máhal] < /mahal/ ‘drought’.

The examples in (89) below demonstrate how stress is assigned to a heavy penult.

(89) a. (  x   )  
    (  x   )  
    µ      µ      µ <µ>  
    (m a n z i l)w  →  mánzil ‘house’

b. (  x      )  
    (  x      )  
    µ      µ      µ      µ <µ>  
    (m a n z i l n a a)w  →  manzílnaa → manzílna ‘our house’

Extrametricality applies in both examples since the final mora is at the right edge of the word. In (89a) only one foot is constructed while in (89b) two feet are constructed and the End Rule designates the right-hand foot as the head of the word.

Now, I illustrate the stressing of a heavy antepenultimate when the final is light shown in (90) below

(90) (  x  )  
    (  x  )  
    µ      µ      µ <µ>  
    (m a h f a z a)w  →  máhfaža ‘wallet’

Extrametricality applies and only one foot is constructed. As a result, the heavy antepenultimate is assigned main stress. A relevant point to note here is that this example illustrates the difference between the three dialects under consideration, on the one hand, and Cairene on the other. The latter stresses the penultimate
yielding [mahfáza]. This is consistent with the fact that the four dialects have the same type of foot and the same settings for Foot Construction and End Rule but differ in that Cairene does not have mora extrametricality (Hayes 1995: 67-71 and 130-132).

Finally, I demonstrate the default stressing of the penultimate or antepenultimate, whichever is separated from the preceding heavy syllable by an even number of syllables or, if there is no preceding heavy syllable, from the left edge of the word. This is illustrated by the data in (91).

\begin{enumerate}
  \item \begin{enumerate}
    \item \text{Word Layer Construction: ERR}
    \item \text{Foot Construction: L to R}
    \item \text{Mora Extrametricality}
    \item \text{zambálak ‘pendulum’}
  \end{enumerate}
  \item \begin{enumerate}
    \item \text{Word Layer Construction: ERR}
    \item \text{Foot Construction: L to R}
    \item \text{Mora Extrametricality}
    \item \text{jáxabir ‘he knows’}
  \end{enumerate}
  \item \begin{enumerate}
    \item \text{Word Layer Construction: ERR}
    \item \text{Foot Construction: L to R}
    \item \text{Mora Extrametricality}
    \item \text{máhal ‘drought’}
  \end{enumerate}
\end{enumerate}

In all three examples, the final mora is at the right edge of the word and is rendered extrametrical. Foot Construction parses (91a) into two feet and the End Rule designates the right-hand one as the head of the word. In (91b) and (91c), only one foot is constructed and it receives main stress. Incidentally, (91b) shows that right-to-left footing would yield *[jaxábir].

The above examples demonstrate that the algorithm in (87) accurately predicts the stress pattern described in (86). I now show how the placement of stress is predicted in problematic forms for Hamid (1984). First consider the
passive prefix (measure VII) and verbal forms of measure VIII. These are given
in (92a) and (92b), respectively.

(92)  

a. \((x \quad x \quad \quad)\)  

Word Layer Construction: ERR  

\((x \quad \quad \quad)\)  

Foot Construction: \(L\) to \(R\)  

\(\mu \quad \mu \quad \mu \quad \mu \quad <\mu>\)  

Mora Extrametricality  

\((? \quad i \quad n \quad f \quad a \quad y \quad a \quad l)_w \rightarrow \text{?infşyal} \quad \text{‘he was preoccupied’}\)

b. \((x \quad x \quad \quad)\)  

Word Layer Construction: ERR  

\((x \quad \quad \quad)\)  

Foot Construction: \(L\) to \(R\)  

\(\mu \quad \mu \quad \mu \quad \mu \quad <\mu>\)  

Mora Extrametricality  

\((? \quad i \quad f \quad t \quad a \quad k \quad a \quad r)_w \rightarrow \text{?iftåkar} \quad \text{‘he thought’}\)

The location of main stress in these forms is accurately predicted by the
algorithm in (87). Accordingly, the fact that the initial vowel is not stressed no
longer constitutes a valid argument for a right-to-left epenthesis analysis.

Finally, let’s consider the issue of the seemingly inconsistent behavior of
the imperfect prefixes with respect to stress. The examples in (93) below show
how this is predicted by the algorithm in (87).

(93)  

a. \((x \quad \quad \quad)\)  

Word Layer Construction: ERR  

\((x \quad \quad \quad)\)  

Foot Construction: \(L\) to \(R\)  

\(\mu \quad \mu \quad \mu \quad <\mu>\)  

Mora Extrametricality  

\((j \quad i \quad k \quad t \quad i \quad b)_w \rightarrow \text{ji-ktib} \quad \text{‘he writes’}\)

b. \((x \quad x \quad \quad)\)  

Word Layer Construction: ERR  

\((x \quad \quad \quad)\)  

Foot Construction: \(L\) to \(R\)  

\(\mu \quad \mu \quad \mu \quad \mu \quad <\mu>\)  

Mora Extrametricality  

\((j \quad i \quad f \quad t \quad a \quad y \quad i \quad l)_w \rightarrow \text{jif-táyil} \quad \text{‘he works’}\)

Thus, the behavior of the imperfect prefixes follows directly from the stress-
assigning algorithm. We no longer need to stipulate that these affixes are
marked extrametrical with measures other than I and IV.

To conclude this section, the stress-assigning algorithm proposed in (87)
accurately predicts the placement of stress in all three dialects and accounts for
the seemingly anomalous stress cases in Hamid’s analysis. In the next section, I
examine evidence for secondary stress.
2.3.2.4 Secondary stress

Thus far, my discussion of stress has focused exclusively on the placement of main stress in UCSA, Shukriiya and Hamar. In this section, I present evidence for secondary stress in these dialects and demonstrate that the placement of the secondary accent is also predicted by the stress-assigning algorithm in (87) in a straightforward manner.\(^{58}\)

Evidence for secondary stress is observed in the interaction between stress and syncope. As I demonstrate in the next two chapters, the UCSA syncope rule discussed in section 2.1 is also operative in Shukriiya and Hamar, both at the word and the phrase levels. Relevant to our present discussion is the blocking effect of stress on phrasal syncope. Recall that syncope targets a high unstressed vowel in an open syllable when it is preceded by an open syllable. However, some high vowels fail to delete in this context. This is illustrated by the examples in (94) and (95) below.\(^{59}\)

\textbf{(94) a.} /fatal-naa/ /jidar-naa/ → fatálna jídárna
\begin{itemize}
  \item planted-1.pl.
  \item trees-1.pl.
\end{itemize}
\textit{We planted our trees.}

\textbf{(94) b.} /fatal-naa/ /jidarat-naa/ → fatálna jídarátna
\begin{itemize}
  \item planted-1.pl.
  \item tree-1.pl.
\end{itemize}
\textit{We planted our tree.}

\textbf{(95) a.} /afə-uu/ /suyaar-kun/ → ʔarə suyāarkun
\begin{itemize}
  \item nurture-3.m.pl.
  \item young(pl)-2.m.pl.
\end{itemize}
\textit{Nurture your young!}

\textbf{(95) b.} /add-uu/ /fugaraa-kun/ → ʔaddu fugarāakun
\begin{itemize}
  \item give-3.m.pl.
  \item poor(pl)-2.m.pl.
\end{itemize}
\textit{Give to your poor!}

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\(^{58}\) Although secondary stress is not perceived consistently as such, it is detected through its blocking effect on syncope.

\(^{59}\) Hamid (1984: 47-48) argues for secondary stress using data similar to the b-examples.
In each of the above examples, the underlined high vowel in the right-hand word is in an open syllable that is preceded by an open syllable at the phrase level. Yet, the vowel is deleted in the a-examples but not in the b-examples. The blocking of syncope in the latter forms indicates that the vowel bears a secondary accent. The algorithm in (87) accurately predicts the location of this accent. To demonstrate this, consider the assignment of stress in the right-hand words in (94) and (95) given below in (96) and (97), respectively.

(96) a. ( x )  

Word Layer Construction: ERR  
Foot Construction: L to R  
\( \mu \mu \mu \mu <\mu> \)  
Mora Extrametricality  
\( (f i d a r n a a a)_w \) \( \rightarrow f i d a r n a \) ‘our trees’

b. ( x )  

Word Layer Construction: ERR  
Foot Construction: L to R  
\( \mu \mu \mu \mu \mu <\mu> \)  
Mora Extrametricality  
\( (f i d a r n a a a)_w \) \( \rightarrow f i d a r n a \) ‘our tree’

(97) a. ( x )  

Word Layer Construction: ERR  
Foot Construction: L to R  
\( \mu \mu \mu \mu \mu <\mu> \)  
Mora Extrametricality  
\( (s u y a a r k u n)_w \) \( \rightarrow s u y a a r k u n \) ‘your young(pl.)’

b. ( x )  

Word Layer Construction: ERR  
Foot Construction: L to R  
\( \mu \mu \mu \mu \mu <\mu> \)  
Mora Extrametricality  
\( (f u g a a a k u n)_w \) \( \rightarrow f u g a a k u n \) ‘your poor(pl.)’

Since degenerate feet are absolutely forbidden, the initial syllables in the a-examples are not footed. The ban on syllable splitting prevents the mora of the light syllable from being footed with the initial mora of the following heavy syllable. Subsequently, the high vowels are deleted at the phrase level. In contrast, Foot Construction forms two feet in each of the b-examples. The first foot is over the leftmost two light syllables and the second is over the heavy penultimate. The latter is assigned main stress by the End Rule and the former
marks the location of the secondary accent on the initial syllable, blocking the application of phrasal syncope in effect.

To conclude, I have demonstrated that the algorithm in (87) accurately predicts the location of both primary and secondary stress. In the next section, I turn to examine forms exhibiting idiosyncratic stress.

2.3.2.5 Idiosyncratic cases
In this section I consider two sets of inflectional endings that behave idiosyncratically with respect to the stress-assigning algorithm. Here we will observe some variation between UCSA, Shukriiya, and Hamar because the suffixes in question do not behave in a uniform way across the three dialects. It should be noted that, with the exception of two cases, the idiosyncratic patterns of these affixes are equally challenging for Hamid’s (1984) algorithm.60

The first set of idiosyncratic affixes consists of the first person singular object suffix /-nii/ and possessive suffix /-ii/ which always occur word-finally.61 In UCSA, these suffixes always attract stress. Thus, after final vowel shortening /laagaa-nii/ ‘he met me’ and /beet-ii/ ‘my house’ surface as [laagáani] and [beeti], respectively. This pattern of stress suggests that Mora Extrametricality does not apply to these affixes. In Shukriiya and Hamar, on the other hand, the predicted penultimate stress [laagáani] and [béeti] is attested. To account for

60 In addition to the inflectional endings discussed here, epenthetic vowels also exhibit idiosyncratic stress pattern in that they seem to be invisible to the stress-assigning algorithm. This opaque stress–epenthesis interaction is also observed in Levantine and Iraqi dialects of Arabic (Broselow 1992 and Kiparsky 2003). Piggott (1995) accounts for this interaction by assuming that epenthetic vowels are weightless.

61 With the exception of first person singular forms, object and possessive suffixes are homophonous and behave in an identical manner with respect to stress. This is the case in CA and MSA and, to my knowledge, in all contemporary spoken dialects of Arabic.
these facts, I assume that these suffixes are inherently accented in UCSA but not in the latter dialects, and that the lexical accent has the effect of suspending Mora Extrametricality. This may be formally represented by adopting Halle and Idsardi’s (1995) approach to lexical stress. They assume that lexically accented morphemes trigger the marking of a syllable boundary (right or left), which is subsequently incorporated into the metrical structure. Applied to the present case, I assume that lexically accented morphemes in UCSA trigger the marking of a syllable boundary to the right. This boundary has the effect of suspending Extrametricality and, consequently, making the syllable visible to Foot Construction.62 This is illustrated in (98) below.

(98) a. (x ) Word Layer Construction: ERR
    (x μ μ μ μ μ μ) Mora Extrametricality: Suspended
    (l a a g a a n i i)iₜ → laagaanii → laagaani ‘he met me’

    b. (x ) Word Layer Construction: ERR
    (x μ μ μ μ) Mora Extrametricality: Suspended
    (b e e t i i)iₜ → beeti’i → beeti ‘my house’

In both examples, Extrametricality is suspended. Foot Construction forms three feet in (98a) and two in (98b) and main stress is assigned to the rightmost foot.

Note that in Shukriiya and Hammar, where the two suffixes are not lexically accented, Mora Extrametricality applies in both examples and the rightmost foot is formed on the heavy penultimate, yielding [laagáani] and [béeti], respectively.

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62 The standard treatment of lexically listed stress in metrical theories is to allow for the inclusion of metrical structure in the lexical entries (Hayes 1995: 31). However, the mechanisms for doing so vary across theories. For example, Idsardi (1992) proposes an algorithm that allows accented morphemes to trigger the marking of one edge (left/right) to which a subsequent parse of foot construction refers. In OT, lexical stress can be expressed by alignment constraints (e.g., Kiparsky to appear) where the stressed morpheme is parsed as a head of a foot thanks to a constraint requiring it to be aligned with the prominent edge of a foot. Lexical stress can also be expressed by a faithfulness constraint dictating that a (lexically) stressed element in the input must have a stressed correspondent in the output (see, for example, Pater 2000 on English lexical stress and Alderete 2001 on lexical accent in Cupéno).
The second set of idiosyncratic affixes consists of inflectional endings to which the stress-assigning algorithm is insensitive. These can be divided into two groups based on how they interact with stress assignment: 1) affixes that always occur word-finally and never affect the placement of stress and 2) affixes that do not affect the placement of stress when they are word-final but do so when rendered word-internal through concatenation. The first group consists of object and possessive endings and the second one consists of subject endings.

The first group consists of the homophonous second person singular object and possessive suffixes which do not affect the placement of stress in UCSA and Shukriiya. The masculine and feminine forms are /-ak/ and /-ik/, respectively. Their anomalous stress pattern is illustrated in (99) below.

(99) i. 
   a. ˝a'abal ˝a'abalak  cf.*˝aaba'lak  ˝aaba'lun
   ‘he met’  ‘he met you(m.)’  ‘he met them(m.)’
   ˝a'abalik  cf.*˝aaba'lik  ˝aaba'lna
   ‘he met you(f.)’  ‘he met us’
   b.  máktab máktabak  cf.*maktábak  maktábin
   ‘office’  ‘your(m.) office’  ‘their(f.) office’
   máktabik  cf.*maktábik  maktábkun
   ‘your(f.) office’

The antepenultimate stress in (99ii) indicates that the second person singular object and possessive suffixes are invisible to the stress-assigning algorithm.

This is in contrast to other object and possessive suffixes that trigger a stress-shift to the penultimate (99iii). Given these facts, I assume that the second person singular forms are extrametrical in UCSA and Shukriiya. As object and

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63 It should be noted that Hamid’s (1984) algorithm predicts the stress pattern of these two affixes.

64 In Shukriiya and a sub-grammar of UCSA, these suffixes have consonant-initial allomorphs (masculine -ka and feminine -ki), which occur after stems ending in vowels and exhibit predictable stress patterns: [šufná-ka] ‘we saw you(m.sg.)’, [šufnáa-ki] ‘we saw you(f.sg.)’ [rajaw-ka] ‘your(m.sg.) hope’, and [rajaw-ki] ‘your(f.sg.) hope’.
possessive suffixes, they always occur at the right edge of the word, satisfying
the Peripherality Condition on extrametrical constituents (Hayes 1995: 57-58).

These suffixes are not extrametrical in Hamar, where the predicted pattern of
penultimate stress is attested. In this dialect, the masculine form is /-ka/ and the
feminine is /-ki/. The forms corresponding to (99a) and (99b) are [kallámka],
[kallámki], [maktábka], and [maktábki], respectively.

The second group consists of four subject endings: the second person
feminine singular of the imperfect form /-ii/, the third person feminine singular
of the perfect form /-at/, the masculine plural /-uu/, and the feminine plural
/-ann/. The latter two appear on second person imperfect forms and third
person perfect and imperfect forms. In all three dialects, these affixes do not
affect the placement of stress when they are word-final but they do so when they
are followed by an object suffix. This is illustrated in (100) below.

(100) i.
   a. /tasmaçii/ → [táismaçi] cf. *[tasmáçi] tasmaçiiña
      ‘you(f.sg.) hear’                       ‘you(f.sg.) hear us’
   b. /kallamat/ → [kállamat] cf. *[kallámät] kallamáttkum
      ‘she told’                             ‘she told you(m.pl.)’
   c. /tasmaçann/ → [táismaçan] cf. * [tasmaçán] tasmaçánnu
      ‘you(f.pl.) hear’                     ‘you(f.pl.) hear him’
   d. /kallamann/ → [kállamän] cf. *[kallámän] kallamánnu
      ‘they(f.) told’                       ‘they(f.) told him’
   e. /jismaçann/ → [jismaçan] cf. * [jismáçan] jismaçánnu
      ‘they(f.) heard’                     ‘they(f.) hear him’
   f. /takallimuu/ → [takállimu] cf. *[takàllimu] takállimuña
      ‘you(m.pl. tell’                     ‘you(m.pl.) tell us
   g. /kallamu/ → [kállamu] cf. *[kallámu] kallamóona65
      ‘they(m.) told’                     ‘they(m.) told us’
   h. /jismaçuu/ → [jismaçu] cf. * [jismáçu] jismaçúuna
      ‘they(m.) hear’                     ‘they(m.) hear us’

In (99i), the subject markers are word-final. As is evident from the
antepenultimate stress, the suffixes are invisible to the stress assignment.

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65 The subject suffix /-uu/ has an allomorph [-oo] in suffixed perfect forms.
algorithm. However, in (99ii) where suffixation of the object endings creates a heavy penult, stress predictably falls on the vowels of the subject suffixes. Accordingly, I assume that these suffixes are extrametrical at the right edge of the word in all three dialects. Extrametricality is blocked in (99ii) where the suffixes are no longer peripheral as a result of concatenation. Consequently, they become visible to the stress-assigning algorithm and exhibit predictable stress. Although this account explains the idiosyncratic stress observed in (100), the third person feminine singular subject suffix /-at/ exhibits idiosyncratic stress in yet another context. I discuss this point below.

Based on the stress patterns observed in (100), we have concluded that the feminine suffix /-at/ is extrametrical at the end of the word in all three dialects. Like the other three subject suffixes, it exhibits a predictable stress pattern when concatenation results in a heavy penult. Unlike the other subject suffixes, however, the suffix /-at/ idiosyncratically attracts stress when it is followed by the third person masculine singular object suffix in UCSA and when it is followed by the second person singular object suffixes in UCSA and Shukriiya. This is illustrated in (101) where “V-at” is a verb marked for the third person feminine singular subject.66

\[
\begin{array}{llll}
(101) & i. V-at-2.m.sg. & ii. V-at-2.f.sg. & iii. V-at-3.m.sg. & \\
 & a. daʕátak & daʕátik & daʕátu & ‘she invited you/him’ \\
 & b. laaqátk & laaqátki & laaqátu & ‘she met you/him’ \\
 & c. saʔalátak & saʔalátik & saʔalátu & ‘she asked you/him’ \\
\end{array}
\]

We concluded, based on the stress pattern observed in (99a) above, that the second person singular object suffixes are extrametrical in UCSA and Shukriiya.

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Accordingly, the suffixed forms in (101i) and (101ii) are predicted to have antepenultimate stress. Instead, the feminine subject suffix attracts stress to the penultimate. Similarly, instead of the predicted antepenultimate stress, exceptional penultimate stress is attested in the forms containing the third person masculine singular object suffix /-u/ in (101iii). In the latter case, this penultimate stressing is anomalous in UCSA but not in Shukriiya, because the underlying form of the object suffix in Shukriiya is /-hu/. The h surfaces after stems ending in vowels but is deleted after stems ending in consonants: /laagaa-hu/ → [laagáahu] ‘he met him’ but /daʕat-hu/ → [daʕátu] ‘she invited him’. As is the case with all consonant-initial suffixes, stress is predictably assigned to the penultimate on suffixation with /-hu/ and the h is subsequently deleted. In UCSA, on the other hand, the underlying form of the suffix is /-u/, which surfaces as [u] after stems ending in consonants and as a glide [w] after stems ending in vowels: /daʕat-u/ → [daʕátu] ‘she invited him’ but /laagaa-u/ → [laagáaw] ‘he met him’, /ʔadduu-u/ → [ʔaddóow] ‘they gave him’, and /ʔaddii-u/ → [ʔaddiωw] ‘you(sg.) give(imperative) him’.\(^{67}\) As for Hamar, the vowel of the feminine subject suffix is predictably stressed in all suffixed forms because all object suffixes are consonant-initial in this dialect. Thus, the Hamar forms corresponding to (101a) are [daʕátka], [daʕátki], and, [daʕáthu], respectively.

Several accounts have been proposed for the idiosyncratic stress pattern of the feminine subject suffix in Arabic dialects. For example, McCarthy (1979) proposes a morphologically-governed rule in Cairene, which operates on suffixed forms creating a branching node over the subject suffix -it and any

\(^{67}\) Interestingly, in a sub-grammar of UCSA, speakers drop the glide and further shorten the now final vowel in [laagáaw], [ʔaddóow], and [ʔaddiiωw] yielding [laagá], [ʔaddó], and [ʔaddi], respectively.
following material (p. 452). For the same dialect, Watson (2002: 97) proposes that the direction of stress assignment is exceptionally reversed from left to right to right to left on suffixation to -it. For Sudanese, Hamid (1984: 55) proposes to diacritically mark the rime of the morpheme -at as heavy when followed by a suffix. For three groups of Egyptian dialects, Kiparsky (to appear: 138) proposes a constraint that aligns the vowel of the suffix with the dominant edge of a foot. Adra (1999: 73) proposes a similar analysis for the Baniasi dialect of Syria. For Mekkan, Kabrah (2004: 61-62) assumes that the morpheme is lexically stressed and proposes an identity constraint dictating that a stressed element in the input must have a stressed correspondent in the output.

The multitude of analyses aside, there is a peculiar fact about the idiosyncratic stress of the feminine subject suffix; namely, in all the dialects of Arabic in which it is attested, it is observed on suffixation with the object markers /-ak/, /-ik/ and /-u/. There is historical evidence that these object suffixes were consonant-initial. Indeed, they are consonant-initial in CA, MSA, and a few spoken dialects among which Hamar is one. In these dialects the affixes have the forms /-ka/, /-ki/, and /-hu/. The second person singular forms underwent metathesis in many dialects including UCSA and Shukriiya. As I mention in footnote (64), the consonant-initial variants are still attested on suffixation to stems ending in vowels in Shukriiya and, at least, one subgrammar of UCSA: [ʃufnáa-ka] ‘we saw you(m.sg.)’ and [ʃufnáa-ki] ‘we saw you(f.sg.)’. The third person masculine singular form was reanalyzed as /-u/ in many dialects, including UCSA but not Shukriiya and Hamar. The diachronic process responsible for the loss of the consonant is likely to have resembled the Shukriiya synchronic rule that deletes the h after stems ending in consonants. Thus, at
some point in the development of these dialects, all object suffixes were consonant-initial. This means that the vowel of the feminine subject marker was always stressed on suffixed forms because suffixation always created a heavy penultimate. It appears that this stress pattern was lexically listed and survived the reanalysis of the object suffixes.68

To sum up, while the idiosyncratic stress of the feminine subject suffix observed in (99b) leads us to conclude that it is extrametrical word-finally, its idiosyncratic stress observed in (101) leads us to conclude that it is inherently accented. To account for these facts, I assume that this suffix is extrametrical at the right edge of the word in all three dialects. In UCSA and Shukriiya, however, the suffix is also lexically accented. Thus, it triggers the marking of a syllable boundary to its right when it is not peripheral. Following Hayes (1995), I further assume that 1) extrametrical elements are not accessible to word layer labeling (p. 60) and 2) extrametricality may not chain. That is, “a constituent followed by an extrametrical constituent does not count as peripheral” (p. 107). In (102) below, I demonstrate how this analysis accounts for the idiosyncratic stress of the suffix both word-finally and in suffixed forms.

(102) a. \[(x)\] Word Layer Construction: ERR
    \[(x)\] Foot Construction: L to R
    \[\mu \mu \mu\] Exceptional Extrametricality
    \[(k a l l a m a t \langle a t\rangle_w) \rightarrow \text{\textasciitilde k\'allamat}\text{ ‘she told’}\]

b. \[(\ (x)\ )\] Word Layer Construction: ERR
    \[(x) (x)\] Foot Construction: L to R
    \[\mu \mu \mu \mu\] Exceptional Extrametricality
    \[(s a a l a t a t \langle a k\rangle_w) \rightarrow \text{\textasciitilde s\'al\'ata\‘tak}\text{ ‘she asked you(m.sg.)’}\]

---

68 Based on similar reasoning, Watson (2002: 98) suggests that a lexical account might be the correct one for the idiosyncratic stress of the feminine subject suffix -it in Cairene.
The above examples are representative of UCSA and Shukriiya. In (102a), the feminine subject suffix is marked extrametrical because it is at the right edge of the word. This means that its rhyme is not accessible to Foot Construction. As a result, only one foot is built and is assigned the main accent yielding antepenultimate stress. In (102b), the extrametrical object suffix occurs at the right edge of the word. The subject suffix is not extrametrical because non-peripheral. As a result, it triggers the marking of a syllable boundary to its right. Foot Construction forms two feet and the End Rule applies placing main stress on the vowel of the subject suffix. The Hamar forms corresponding to (102a) and (102b) also have antepenultimate and penultimate stress, respectively. Unlike in UCSA and Shukriiya, however, the subject suffix in Hamar is extrametrical but not inherently accented. Thus, the form corresponding to (102a) consists of only one foot which is assigned main stress by the End Rule. Recall that the object suffix is consonant-initial in Hamar. Thus, in the form corresponding to (102b), Foot Construction forms two feet and the End Rule assigns main stress to the heavy penultimate, yielding [sa’alátka].

Before concluding our discussion of stress, I will demonstrate how the analysis proposed here accounts for the placement of stress in a form containing two inherently accented suffixes. Such a form occurs in UCSA when the feminine subject suffix /-at/ is followed by the first person singular object suffix /-nii/. Recall that the latter is also inherently accented in this dialect. This is illustrated in (103) below.

69 The consonant in [-at] is syllabified as an onset of the following syllable. The formal question that arises here has to do with the licensing of the second mora in the rhyme. One possibility is to assume that this consonant is doubly linked to the mora in the rhyme and the onset position of the following syllable.
The object suffix triggers the marking of a syllable boundary to its right, suspending Extrametricality. The subject suffix is not extrametrical because it is non-peripheral and also triggers the marking of a syllable boundary to its right. Foot Construction forms three feet and the End Rule applies, assigning stress to the vowel of the first person object suffix. In Shukriiya and Hamar, where the object suffix is not lexically accented, Mora Extrametricality applies and the right-most foot is constructed on the rhyme of the subject suffix. The two dialects differ in that the suffix is lexically accented in Shukriiya but not in Hamar. In both dialects, this is the foot assigned main stress by the End Rule, yielding [ʃafatni].

2.3.3 Conclusion

The stress analysis proposed in this section accurately accounts for the stress patterns in the three dialects. I have demonstrated that this analysis is both empirically and conceptually superior to that of Hamid (1984).

In the previous sections, I have considered the two types of epenthesis reported to exist in Sudanese Arabic. These are the Cv pattern (Hamid 1984 and Broselow 1992) and the vC pattern (Hamid 1984 and Kenstowicz 1986, 1994). In the first pattern, the vowel a appears to the right of a VCC sequence. I have provided conclusive evidence that this pattern is attested in UCSA. In the second pattern, the vowel i appears to the left of a CCV sequence. The two arguments presented for the epenthetic nature of latter are based on the
alternation pattern of the initial vowel of the perfect stem of measures V, VI, VII, VIII, and X and the seemingly anomalous stress pattern of measures VII and VIII. After considering these arguments in relation to UCSA, it has become obvious that this pattern of epenthesis is unmotivated. With regard to the first argument, I have shown that the alternation pattern is not attested in this dialect. In addition, I have shown that the initial vowel of the perfect stem in UCSA patterns like underlying word-initial vowels of varying quality, a clear indication that this vowel is underlying. With respect to the second argument, I have demonstrated that the apparent idiosyncratic stress is predicted by an adequate analysis of stress. Accordingly, I conclude that there is only one pattern of epenthesis in UCSA, namely the Cv pattern. In the following section, I return to the task of identifying the prosodic level at which it applies.

2.4 The prosodic level of application of epenthesis

In section 2.2.1, we have seen that UCSA utilizes epenthesis to repair word-final and word-internal unsyllabified segments that arise from affixation. This is illustrated by the examples in (104)-(106), repeated here for convenience.

(104) /nahat-t/ → na. hat.ṭ → [na. hat. ta]
carved-1.sg. ‘I carved’

(105) a. /mahall-na/ → ma. hal. \ 1. na → [ma. hal. la. na]
place-1.pl. ‘our place’

(106) /gabal-t-na/ → gaal. bal. ṭ. na → [gaal. bal. ta. na]
met-2.m.sg.-1.pl. ‘you met us’

In (104), the word-final unsyllabified segment arises from affixation of the subject suffix to a stem ending in a consonant. In (105) and (106), the word-internal
unsyllabified segments arise from affixation to a stem ending in a geminate and affixation to the subject suffix, respectively. In all three cases, the stray consonant is repaired through syllabification as an onset of the epenthetic vowel a.

The task at hand is to identify the level at which epenthesis occurs. Our earlier conclusion that unsyllabified segments are tolerated up to the P-Phrase level predicts that epenthesis may not apply at the word level. Rather, it ought to apply only at the P-Phrase level in the absence of the environment necessary for syllabifying the stray segment into the edge of an adjacent syllable (see section 2.1.4). However, as the following discussion reveals, this prediction is not borne out by UCSA data. Consider the data in (107) and (108) below.

(107) \[[\text{gaabal-t}]_v \quad [\text{ixlaas}]_{NP}]_{VP} \rightarrow (\text{gaa.bal.ta})_w (\text{?ix.laas})_w)_p\)
\[\text{met-1sg. Ikhlas}\]
\[\text{I met Ikhlas.}\]

(108) \[[\text{nahat-t}]_v \quad [\text{isim-na}]_{NP}]_{VP} \rightarrow (\text{na.hat.ta})_w (\text{?i.sim.na})_w)_p\)
\[\text{carved-1sg. name-1.pls}\]
\[\text{I carved our name.}\]

In both examples, affixing the subject suffix results in a word-final unsyllabified consonant that is followed by a word beginning with a vowel. Note that in (108) affixation creates a geminate. According to the P-Phrase Formation algorithm in (20), the verb and its complement are parsed within the same P-Phrase in both examples. The conclusion that unsyllabified segments are tolerated up to the P-Phrase level predicts that epenthesis may not apply in either example. Instead, the stray consonant is expected to be retained up to the P-Phrase level where it is syllabified as an onset of the initial syllable of the following word. However, this prediction is inaccurate; syllabifying the stray consonant in this way yields the two unacceptable forms in (107) and (108). In both examples, the onset of the
initial syllable of the second word is the default glottal stop and the stray consonant is syllabified as an onset of an epenthetic vowel \(a\). Since the conditions for epenthesis exist at the word level, but not at the phrase level, it must be the case that the insertion of this vowel occurs at the word level.

Evidently, the word-final unsyllabified segment arising from adding the subject suffix to a verb ending in a consonant may not be retained unsyllabified. Rather, this segment is repaired at the word level through epenthesis even when affixation creates a geminate. Since the same strategy is utilized to repair word-internal unsyllabified segments resulting from affixation, we conclude that these segments are also repaired at the word level.

These findings are inconsistent with our conclusion that unsyllabified segments are retained up to the P-Phrase level. Recall that this conclusion is based on the behaviour of the second member of a root-final geminate discussed in section 2.1.3.4.1. We have seen that in unaffixed forms this segment remains unsyllabified up to the P-Phrase level. This is illustrated by the examples in (109) repeated here for convenience.

\[
\begin{align*}
\text{(109) a. } [[\text{al-bitt}]_N\text{ [al-kabiir-a]}_A]_\text{AP}_N \rightarrow ([?\text{al.bit.t}_w\text{ (al.kabiira)}_w)_P \\
\text{the-girl the-old-f.sg.} \\
\text{‘the older girl’} \\
\text{b. } [[[\text{al-bitt}]]_N\text{ [akal-at]}_V]_S \rightarrow ([?\text{al.bi.t}_w\text{ (a.ka.lat)}_w)_P \\
\text{the girl ate-3.f.sg.} \\
\text{‘The girl ate.’}
\end{align*}
\]

In (109a), the second member of the geminate is syllabified within the P-Phrase as an onset of the initial syllable of the following word. In (109b), it is deleted and the coda of the final syllable of the first word is now syllabified as an onset across the P-Phrase boundary; hence our conclusion that stray segments are retained up to the P-Phrase level where they are deleted if they cannot be
syllabified. Given the epenthesis facts, we need to revise this conclusion to reflect the behaviour of all types of unsyllabified segments in UCSA. In order to clearly identify the degree of restriction this dialect places on syllabification, we need to identify the type of segments that may remain unsyllabified above the word and the type of segments that may not. We also need to identify the level at which all segments must be properly syllabified. I address these points in the next section.

2.5 Syllabification in UCSA: A first look

Given the epenthesis facts, we are now able to identify the degree of restriction UCSA imposes on syllabification more accurately. Recall that our conclusion regarding the degree of restriction on resyllabification is based on the interaction between resyllabification rules and syncope. Specifically, I have concluded that resyllabification is free up to the P-Phrase level. Above this level, alteration to syllable structure is allowed only in derived environments. This conclusion remains unaffected by the epenthesis facts. Constraints on syllabification and resyllabification will be expressed formally in chapter five in the context of an analysis of syllabification. To conclude this chapter, I restate in general terms the degree to which these processes are restricted in UCSA.

In order to identify the extent to which syllabification is constrained in UCSA, we need to make a principled distinction between segments that are retained unsyllabified above the word level and those that must be repaired at the word level. We have observed that the final consonant in a root ending in a two-consonant cluster may remain unsyllabified up to the P-Phrase. In UCSA, this is either the second member of a full or partial geminate. In the previous
section, we have observed that the type of unsyllabified segments that must be repaired at the word level arise from affixation. In order to reflect these facts, our conclusion regarding the restriction on syllabification and resyllabification may be restated as follows: All segments must be properly syllabified at the word level. However, the second member of a word-final (partial) geminate may remain unsyllabified up to the P-Phrase level. At this level all segments must be properly syllabified and basic syllabification is fixed. Resyllabification rules may apply above the P-Phrase level only if their respective domains include new environments, i.e., environments that do not exist before the P-Phrase.

In concluding this section, it should be noted that the special status of word-final geminates with respect to syllabification is not surprising. The peculiar behaviour of geminates with respect to phonological rules is well documented (Hayes 1986; Schein and Steriade 1986; Kenstowicz and Pyle 1973; and Guerssel 1977, 1978). In this particular case, the behavior of these segments is consistent with historical facts in UCSA. Through historical development, all tri-radical roots of the form CVCC in CA have been reanalyzed into CVCVC in UCSA.\(^{70}\) The only roots that escaped this reanalysis process were those that end in a full or partial geminate.\(^{71}\)

2.6 Conclusion

In this chapter, I have examined the processes of syncope, consonant deletion, and epenthesis in UCSA. I have argued that the asymmetry in the domain of

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\(^{70}\) The standard assumption is that the proto-language of contemporary Arabic dialects is CA. For further discussion on the historical development of these dialects see Ferguson (1959), Blau (1965, 1988), Abdin (1966), Blanc (1970), and Versteegh (1997a & 1997b).

\(^{71}\) For a discussion of this reanalysis process in SCA, see Hamid (1984: 17-27).
application of syncope is a reflex of the restriction on the domains of application of resyllabification rules. I have demonstrated that an unsyllabified segment is retained up to the P-Phrase level if it is the second member of a geminate. Unsyllabified segments arising from affixation are repaired at the word level through epenthesis. Accordingly, I have concluded that in UCSA all segments must be properly syllabified at the word level. The exception to this is the second member of a word-final (partial) geminate, which is retained unsyllabified up to the P-Phrase level. At this level all segments must be properly syllabified and basic syllabification is fixed. Alterations to syllable structure within the I-Phrase are possible only in new environments. In the next chapter, I examine the Shukriiya dialect, which differs from UCSA in some interesting ways.
3.0 Introduction

The organization of this chapter is parallel to that of the previous one. In order to identify the degree of restriction Shukriiya places on syllabification and resyllabification, I examine the processes of syncope, degemination, epenthesis, and consonant deletion. We will see that phrase-level phonology in Shukriiya differs in a significant way from that in UCSA. Specifically, the domains of phrasal rules in Shukriiya cannot be accurately characterized with reference to syntactic structure. This is because there are no rules in this dialect whose respective domains are delimited by the edges of syntactic constituents. Instead, the respective domains of all phrasal rules are delimited by the edges of the I-Phrase.

I begin by examining syncope and show that the asymmetry observed in UCSA is not attested in Shukriiya. Instead, both LHS and RHS apply up to the I-Phrase level. I conclude accordingly that resyllabification in Shukriiya applies freely up to the I-Phrase level. At this level, syllabification is fixed and further alterations to syllable structure are disallowed. Then I examine the processes of degemination, epenthesis and consonant deletion, and identify their respective domains. I conclude, accordingly, that initial syllabification in this dialect is not exhaustive and that, while word-internal unsyllabified segments are repaired at the word level, word-final unsyllabified segments are retained up to the I-Phrase. At this level, segments that are not properly syllabified are stray-erased. Thus, both syllabification and resyllabification are less constrained in Shukriiya than they are in UCSA.

1 Recall that the relevant syntactic edge for our purposes are those of $X_{\text{max}}$ and $X_{\text{head}}$. 
3.1 Syncope in Shukriya

Similar to UCSA, Shukriya is a differential dialect in which syncope is attested at the word and phrase levels, targeting short high unstressed vowels in an open syllable that is preceded by an open syllable. In the following sections, I show that while word-level syncope has the same effect in the two dialects, phrase-level syncope is significantly different.

3.1.1 Syncope at the word level

The effect of syncope at the word level can be described with reference to the data in (1) below.

a. ʕibil ʕibli ʕiblak ‘camels’
b. ʕajuʁ ʕajribi ʕajrak ‘reward’
c. mukrim mukrimi mukrimak ‘host’
d. bundug bundugi bundugak ‘rifle’
e. blāad cf. *blāadı bilāadi bilāadak ‘land’
f. durāʕ cf. *durāʕı durāʕıak ‘arm’
g. ʕafu cf. *ʕafı ʕafúuj ʕafúuk ‘forgiveness’
h. hākī cf. *hāk hakīij hakīik ‘story telling’

Examination of the noun stems in (1) above reveals the same facts observed in UCSA. The forms in (a) and (b) indicate that affixation of the vowel-initial possessive suffix triggers the deletion of the underlined high vowel in the stem. The remaining forms illustrate contexts in which syncope fails to delete a high vowel in an open syllable. The forms in (c)-(f) show the significance of the preceding environment. The rule fails to apply in (c) and (d) where the high...
vowel is preceded by a closed syllable. Similarly, it fails to apply in (e) and (f), where the syllable containing the high vowel is in word-initial position. In both contexts, the output of syncope would result in a complex syllable margin. The forms in (g) and (h) show that syncope does not delete stem-final vowels. As I have argued in the previous chapter, these vowels are long in the underlying form and are shortened at the end of the word. This is supported by the fact that they surface as long vowels and bear stress in the affixed forms. Finally, the forms containing the first person singular possessive suffix -i illustrate the fact that syncope does not target vowels that are part of inflectional endings. The suffix vowel escapes deletion even though in (c)-(f) it occurs in an open syllable that is preceded by an open syllable.

Let us now consider the environment following the syncopated vowel. As we have seen in UCSA, adding the vocalic suffix has the effect of syllabifying the coda of the syllable containing the high vowel into an onset of the following syllable to satisfy the obligatory onset requirement. Once again, this effect is audible in surface syllabification and is illustrated by the forms in (2a).


a. můk.řım  můk.ři.mi  můk.ři.mak  ‘host’

b. ?i.bi?  ?i.bi.li → ?i.li  ?i.bi.lak → ?i.lak  ‘camels’


As we have seen in (1), the high vowels in the forms in (2b) and (2c) undergo deletion while the vowel in the form in (2a) does not. The generalization then is as in UCSA: syncope deletes a short unstressed high vowel in an open syllable when it is preceded by an open syllable. A tentative statement of this

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2 Note that affixation to these stems triggers the same alternations in the suffixes observed in UCSA: the first person possessive suffix -i surfaces as a glide j and the vowel of the second person masculine suffix -ak deletes.
generalization is given in (3) below, where a lower case “v” stands for the target of syncope.

(3) Syncope:
\[
\sigma \quad \sigma \quad \sigma \\
V \quad \text{v} \quad C \quad V
\]

Thus, at the word level syncope has the same effect in Shukriiya as it does in UCSA. At the phrase level, however, the situation is quite different. I address this point in the next section.

3.1.2 Syncope at the phrase level

We have observed that in UCSA syncope as a phrasal rule exhibits an asymmetry in terms of its domain of application; namely, while the domain of LHS is the P-Phrase, the domain of RHS is the I-Phrase. In this section I demonstrate that such an asymmetry is not attested in Shukriiya, and that regardless of the position of the target vowel syncope has the same phrasal domain. Furthermore, I show that the level of I-Phrase accurately characterizes this domain.

A first look at syncope as a phrasal rule in Shukriiya reveals that the rule seemingly behaves in a manner similar to that observed in UCSA. That is, it applies across a word boundary requiring the same segmental environment that it does in UCSA: V (#) C _ C (#) V. However, there is a significant difference between Shukriiya and UCSA with respect to phrasal syncope. Specifically, the asymmetry in the domain of application of the rule observed in UCSA is not attested in Shukriiya. Instead, the rule applies consistently within the same phrasal domain regardless of the position of the target vowel. To illustrate this fact, consider the examples of RHS and LHS given in (4) and (5), respectively.
(4) RHS: V#C_CV

a. S + V-Obj  rufrāʾa lḥīq-na  →  rufrāʾa lḥīqna
    Rufaʾa reached(3.m.sg.-3.m.pl.)
    ‘Rufaʾa caught up with us.’

b. V + Obj  jādda hušān-u  →  jādda ḥšānu
    saddled(3.m.sg.) horse-Poss.3.m.sg.
    ‘He saddled his horse.’

c. N + N  nábaḥi kiláab
    howling dogs
    ‘howling of dogs’

d. N + Adj  ḥiqla siyájra
    bush little
    ‘a little bush’

e. Prep + N  bēe ḍyāaʾ-u
    with arm-Poss.3.m.sg.
    ‘with his arm’

f. N + Pred  nīlāat-u kūbāar
    shoes-Poss.3.m.sg. big
    ‘His shoes are big.’

(5) LHS: VC_C#V

a. S + V  ?as-ṣāqur indálla
    the-eagle descended(3.m.sg.)
    The eagle descended.
    cf. *?aṣṣāqr indála

b. V + Obj  rīkib an-náaga
    rode(3.m.sg.) the-camel
    ‘He rode on the camel.’

    the-eagle that-snatched(3.m.sg.-3.m.sg.)
    ‘the eagle that snatched it’

d. N + N  rūbūʾ al-ṣījef
    quart (of) the-durra
    ‘a quart of durra’

e. N + Adj  ?al-bāriq al-gīibli
    the-lightning the-eastern
    ‘the eastern lightning’

f. N + Pred  ?al-mūḥur abrāq
    the-stallion (is) piebald
    ‘The stallion is piebald.’
    cf. *?almūḥur abrāq
As indicated by the data in (4) and (5), both RHS and LHS apply consistently whenever their respective segmental environment is met. With respect to RHS, this is the same behaviour we have observed in UCSA. However, the behaviour of LHS in Shukriiya differs from that of UCSA in a significant way. To illustrate the contrast between the two dialects, consider UCSA forms which correspond to the Shukriiya forms in (5a) and (5f) above. These are repeated here as (6a) and (6b), respectively.

(6) LHS in UCSA
      the-dog ate(3.m.sg.)  cf. *?al-kālb ákal
      ‘The dog ate.’
   b. N-Pred  ?at-tāajīr amīn  →  ?at-tāajīr amīn
      the-merchant (is) honest  cf. *?at-tāajīr amīn
      ‘The merchant is honest.’

As demonstrated in the previous chapter, LHS is blocked above the level of the P-Phrase in UCSA. Thus, it fails to apply to the forms in (6) since the two words triggering its application are in separate P-Phrases. However, the forms in (5a) and (5f) show this not to be the case in Shukriiya. In contrast to the forms in (6), the forms in (5) undergo syncope. Failure of the rule to apply here results in unacceptable forms. These facts indicate that LHS has a larger phrasal domain in Shukriiya than it does in UCSA.

In summary, the above discussion reveals two facts regarding syncope as a phrasal rule in Shukriiya. First, RHS and LHS apply consistently whenever their respective segmental environment is met. Second, LHS has a larger domain in Shukriiya than it does in UCSA. In fact, given the symmetrical domain of application of LHS and RHS, a more accurate generalization is that syncope as a
phrasal rule has a larger domain in Shukriiya than it does in UCSA.\(^3\) I turn to the task of identifying this domain below.

### 3.1.3 The phrasal domain of syncope

In order to identify the domain of syncope in Shukriiya, I consider two possible prosodic levels: the P-Phrase and the I-Phrase. I demonstrate below that, unlike the situation in UCSA, the domain of syncope is not accurately identifiable with reference to the P-Phrase. Instead, it is the level of I-Phrase that characterizes the domains of both RHS and LHS.

As a starting point, let us assume that the domain of syncope is the level of the P-Phrase which, based on the previous discussion, is larger than the P-Phrase in UCSA. The next step is to define the algorithm responsible for parsing utterances into P-Phrases. As the following discussion reveals, the domain of syncope cannot be accurately characterized with reference to the edges of syntactic constituents. This is because neither the edges of \(X^{\text{head}}\) nor those of \(X^{\text{max}}\) demarcate the domains of RHS and LHS. To illustrate this point, consider the structures of examples (4a) and (5a) repeated here as (7a) and (7b), respectively.

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\(^3\) This generalization lends support to the view of syncope argued for in the previous chapter; namely, that RHS and LHS are instantiations of the same process differing only with respect to word boundary. All things being equal, we expect RHS and LHS to apply within the same domain.
In (7a) RHS applies across the right edges of NP and N. It also applies across the left edges of VP and V. We observe the same facts with respect to LHS in the structure given in (7b). Evidently, the domain of syncope in Shukriiya is not delimited by the edges of syntactic constituents.4

The fact that the context of phrasal syncope straddles the edges of syntactic constituents does not constitute sufficient evidence to preclude the P-Phrase as a possible domain of the rule. Instead, it merely indicates that the domain is larger in Shukriiya than it is in UCSA. In other words, given the fact that the P-Phrase in the latter consists maximally of two words, this is evidence that the domain of syncope in Shukriiya consists of more than two words.

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4 Alternatively, one might assume that the relevant syntactic category in this case is the clause (S). As I demonstrate in the following discussion, however, this would be observationally inadequate. A closer examination of syncope in longer utterances reveals that it is not blocked by sentence boundaries.
Accordingly, it is conceivable that the domain of syncope in this dialect is also the P-Phrase but that P-Phrase formation in Shukriiya is determined by prosodic weight. However, I demonstrate below that the number of phonological words within the domain of syncope varies considerably and that the rule consistently applies within the I-Phrase and is consistently blocked above it. Accordingly, I conclude that the I-Phrase is the prosodic level that accurately characterizes the domain of syncope in Shukriiya.

Let us begin by establishing the domain of RHS. Consider examples (8)-(10) below.\textsuperscript{5}

(8) gaal-l-u in ṣazám-t wadd aj-jamri mubaarak maa bí-jii said-to-him if invite-you Wad Aj-Jamri Mubaarak neg. will-come ‘He said to him: “If you invite Wad Aj-Jamri, Mubaarak will not come.”’

a. Normal rate: 
((gaal-l-u n ṣazám wad aj-jamri mbaarak maa bí-jii)_1)\textsubscript{U}

b. Narrative rate: 
((gaal-l-u n ṣazám wad aj-jamri)_1 (mbaarak maa bíjjii)_1)\textsubscript{U}

(9) hiin-maa nihaas as-sinnaab dagga ḥuṣaan ab-falaṭ šahhal time-as drums the-Sinnaab beat stallion Ab-Falaj neighed ‘As soon as the Sinnaab sounded the drums of war, Ab-Falaj’s stallion neighed.’

a. Normal rate: 
((hiinmaa nhaas as-sinnaab dagga ḥṣaan ab-falaṭ šahhal)_1)\textsubscript{U}

b. Narrative rate: 
((hiinmaa nhaas as-sinnaab dagga)_1 (ḥṣaan ab-falaṭ šahhal)_1)\textsubscript{U}

\textsuperscript{5} Shukriiya has three rules not relevant to the present discussion which are responsible for some of the alternations in these data. The first one resolves a hiatus situation by deleting the second vowel in the sequence V # V. The second inserts a glottal stop in the onset position of an otherwise ill-formed syllable. These rules are responsible for the alternation in the forms of the definite article /al/ [ʔal ~ l] and the complementizer /in/ ‘if’ [ʔin ~ n]. The third rule is responsible for the [t ~ Ø] alternation of the second person singular subject suffix in (8).
In normal rate of speech each of the above utterances constitutes the domain of one intonation contour. In narrative style, however, each utterance constitutes the domain of two distinct intonation contours. Thus, an utterance forms one I-Phrase in the a-examples and two in the b-examples. RHS consistently applies in the former where the two relevant words are in the same I-Phrase. It is also consistently blocked in the latter where the two words involved are in separate I-Phrases. A particularly interesting case is example (10) which consists of three potential targets of syncope. These are the underlined high vowels in rúaalu ‘his men’, jígábbiluu ‘they turn’, and sijuufna ‘our swords’. The first two always undergo syncope while the third one is deleted only in (10a). This is explained by the fact that in this utterance all three words are in the same I-Phrase. In (10b), on the other hand, the third word is outside the domain of RHS since it is parsed in the second I-Phrase.

In conclusion, the above data clearly indicate that the domain of RHS is the I-Phrase. Next I examine the behaviour of LHS and show that the I-Phrase also characterizes the domain of this rule. Consider examples (11)-(13) below.

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6 Narrative style is deliberate and is characterized by a rate of speech that is slightly slower than normal.
Whenever the hyena came charging, he (the bull) jumped away.

If he asks for his forgiveness, Ab-Sin will grant it.

This one fights the knight guarding the northern front and the other one fights the knight guarding the southern front.

As noted with reference to the previous examples, each of the utterances in (11)-(13) constitutes the domain of one intonation contour in normal speech, but in narrative speech each utterance forms the domain of two distinct intonation contours. In the (a)-examples, LHS applies consistently deleting all target vowels. In the (b)-examples, on the other hand, the rule is blocked when the two relevant words are in separate I-Phrases. The domain of LHS is best characterized by the example in (13), which consists of two conjoined sentences.

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7 In the second I-Phrase, a default glottal stop appears in the onset position of the initial syllable. I address the significance of this fact in my discussion of the interaction between syncope and resyllabification.
This is because each word in this utterance contains either a trigger or a target of syncope or both.\footnote{The word jinaazil ‘fights’ contains two high vowels, the first of which is deleted by RHS and the second by LHS.} The first sentence contains four words with high vowels that are potential targets of LHS and the second one contains three. In (13a), where both sentences are parsed within the same I-Phrase, all seven vowels are deleted. In (13b), where each sentence forms an I-Phrase, LHS applies to the first and last three vowels and fails to delete the fourth since the target and the trigger are in separate I-Phrases. Incidentally, this utterance also illustrates the significant difference between Shukriiya and UCSA with respect to the domain of LHS. In (13a), for example, the domain of LHS contains seven words. This stands in sharp contrast with the situation in UCSA where the domain of LHS contains maximally two words.

Based on the discussion of the data in (8)-(13), we conclude that the domain of syncope is larger in Shukriiya than it is in UCSA and that both LHS and RHS apply at the I-Phrase level in the former. Before addressing this dialectal difference, I provide further evidence for the I-Phrase as a domain of phonological processes in Shukriiya.

### 3.1.4 The I-Phrase as a domain of phonological processes in Shukriiya

In the previous chapter we have seen that phonological processes are active at both the P-Phrase and the I-Phrase levels in UCSA. Whereas LHS and consonant deletion apply within the former, RHS and assimilation processes apply within the latter. Thus far, we have seen that both LHS and RHS apply within the I-
Phrase in Shukriiya. In this section I examine the processes of degemination and assimilation and show that these, too, are active within the I-Phrase level.

3.1.4.1 I-Phrase: The domain of degemination

Shukriiya has roots that end in two-consonant clusters at the underlying level. Similar to those in USCA, the cluster may consist of a full geminate (e.g., /ʔamm/ ‘uncle’, /mahall/ ‘place’, /ʕidd/ ‘well’) or a nasal-C sequence which surfaces either as a full geminate (/bint/ → [bitt] ‘girl’) or as a partial geminate consisting of a homorganic nasal-stop sequence (/janb/ → [jamb] ‘near’, /ʕind/ ‘at’). Unlike UCSA, the cluster in Shukriiya may also consist of heterorganic consonants (e.g., /ism/ ‘name’, /darb/ ‘path’, /milh/ ‘salt’). I examine the latter type in section 3.2. Regardless of its make up, however, the cluster is never tautosyllabic in surface forms. Relevant to our current discussion are the clusters consisting of full and partial geminates. In unaffixed forms, the second member of the cluster is stray-erased at some level if it cannot be properly syllabified. We have seen that this level is the P-Phrase in UCSA. In this section I show that the relevant level in Shukriiya is the I-Phrase.

Similar to the situation in UCSA, the second member of a geminate in Shukriiya is retained unsyllabified beyond the word level. This is illustrated with reference to the examples in (14) and (15) below.


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9 We have seen that superheavy syllables of the form CVCC are highly disfavoured in UCSA, appearing in the surface forms of only a few borrowed words. In Shukriiya, syllables with complex codas are disallowed. The Shukriiya forms corresponding to the two borrowed words in UCSA bājk ‘bank’ and tājk ‘tank’ are bājā and tājā, respectively.
b. قتل al-muṣrib → قتُنِ. d. al-muṣ. rib → قتُنِ. d. al-muṣ. rib
   ‘at the-sunset’
   ‘at sunset’

(15) a. َمَعِيدُ al-bitt. َدَتِ. ra. ga. dat → َمَعِيدُ al. bit. ra. ga. dat
   ‘The girl went to sleep.’
   ‘The girl lay down.’

b. قتل jaar-u → قتُنِ. d. jaa. ru → قتُنِ. d. jaa. ru
   ‘at his neighbour’s’

The first word in the (a)-examples ends in a full geminate and the one in the (b)-
examples ends in a partial geminate. In all cases, word-level syllabification
yields an unsyllabified segment at the end of the word. In both examples in (14),
where the second word begins with a vowel, this segment is syllabified at the
phrase level as an onset of the initial syllable of the following word. This
syllabification is not possible in either of the examples in (15) since the second
word in both begins with a consonant. As evident in the corresponding surface
forms, the unsyllabified segments are stray-erased. Evidently, the second
member of a word-final geminate is retained unsyllabified up to a phrasal level
where, if it cannot be properly syllabified, it is deleted. The next step is to
identify the phrasal level at which this deletion occurs.

Let us begin by considering the UCSA counterpart of (14a), given in (16)
below.

(16) َمَعِيدُ akal-at → َمَعِيدُ al. bit. a. ka. lat → َمَعِيدُ al. bi. ta. ka. lat
   ‘The girl ate.’
   ‘The girl ate.’

We observe that the stray member of the geminate is not deleted in (14a) but is
deleted in (16). This is evidence that the domain of degemination in Shukriyya is
larger than that in UCSA. It is also evidence that the domain in Shukriyya cannot
be readily characterized with reference to syntactic structure. This is so because
the domain of degemination is not consistently demarcated by the edges of \( X^{\text{head}} \) and \( X^{\text{max}} \). If that were the case, we would expect the stray consonant to be deleted in the example above. This is illustrated by the structure of (14) given in (17) below.

\[
(17) \quad \begin{array}{c}
\text{S} \\
\text{NP} & \text{VP} \\
\text{N} & \text{V} \\
\text{al-bitt} & \text{akal-at} & \rightarrow & \text{?al. bit. ūa. ka. lat} \\
\text{[X^{\text{max}}]} & \text{[X^{\text{max}}]} \\
\text{[X^{\text{head}}]} & \text{[X^{\text{head}}]} \\
\text{the-girl} & \text{ate-3.f.sg.} \\
\text{The girl ate.}
\end{array}
\]

Syllabification of the stray consonant into the onset position of the following syllable occurs across the right edges of N and NP as well as the left edges of V and VP. We may still assume that the relevant level is the P-Phrase and that it is larger in Shukriiya than it is in UCSA, i.e., it consists of more than two words.

As we have seen with syncope, however, further examination of degemination in Shukriiya reveals that weight is not a factor in characterizing the domain of the rule. Rather, the prosodic constituent of the I-Phrase is. To demonstrate this point, consider the phrasing of the utterances in (18)-(20) below.

\[
(18) \quad \text{dahiin in ā⁇ind-ak ā⁇jak al rafaagt-ak doolak} \\
\text{now if at-you doubt ask-imp. companions-your those} \\
\text{‘Now, if you have any doubts (about what I told you) ask your own companions.’}
\]

a. Normal rate:
\[((\text{dahiin in ā⁇ind-ak ā⁇jak. ūa. rafaagt-ak doolak})_{\text{U}})\]

b. Narrative rate:
\[((\text{dahiin in ā⁇ind-ak ā⁇jak}, (\text{?as⁇al rafaagt-ak doolak}))_{\text{U}})\]
(19) \( \text{ba}^c\text{ad-maa} \text{ xalaas rata}^c \text{ fi ad-dir} \text{ xad-l-u ra}^g\text{da} \) after finished grazed on the-grass took-for-him lie

‘After he (the bull) finished grazing on the grass, he lay down.’

a. Normal rate:

\( ((\text{ba}^c\text{ad-maa} \text{ xalaas rata}^c \text{ fi d-dir}. \text{ ra}. \text{ xad-l-u ra}^g\text{da}))_U \)

b. Narrative rate:

\( ((\text{ba}^c\text{ad-maa} \text{ xalaas rata}^c \text{ fi d-dir})_1 (?\text{axad-l-u ra}^g\text{da}))_U \)

(20) \( \text{gaal-l-ahun sa}^c\text{alt-u ab-sinn amur-kun t}^b\text{abb inq}^a\text{da} \) said-to-them asked-you Ab-Sin\text{I} affair-your surely done

‘He said to them: “So, you have sought Ab-Sin’s help? You most certainly won’t be disappointed.”’

a. Normal rate:

\( ((\text{gaal-l-ahun sa}^c\text{alt-u b-sin. na}. \text{ murkun t}^b\text{in. ga}^a\text{da})_U \)

b. Narrative rate:

\( ((\text{gaal-l-ahun sa}^c\text{alt-u b-sin})_1 (?,\text{amurkun t}^b\text{in. ga}^a\text{da})_U \)

As shown in the (a)-examples, each of the above utterances forms the domain of one intonation contour in normal speech. The (b)-examples, on the other hand, show that the same utterance forms the domain of two distinct intonation contours in narrative style. Stray erasure consistently fails to apply to the (a)-examples. Instead, stray consonants are syllabified as onsets of the following syllables. In the b-examples, however, syllabification of stray consonants across the I-Phrase boundary is consistently blocked. Consequently, the stray consonants are erased. The inability of syllabification to occur across the I-Phrase boundary is further supported by the fact that a default glottal stop appears in the onset position of the initial syllable in the second I-Phrase, the position into which stray consonants would be syllabified within the I-Phrase.

In conclusion, the above discussion provides further evidence for the significance of the I-Phrase level as a domain of phonological processes in Shukriiya. We have seen that this level accurately characterizes the domain of
the process of degemination. In the next section I consider assimilation processes in Shukriiya.

3.1.4.2 I-Phrase: The domain of assimilation processes

As is typical of Arabic dialects, assimilation is pervasive in Shukriiya. In this section, I examine instances of the three types of regressive assimilation discussed in the previous chapter in the context of UCSA. Recall that these involve laryngeal, place, and manner features and that they are operative at the word as well as the phrase level. In this section I demonstrate that their phrasal domain is the I-Phrase. The effect of these processes at the word level is illustrated by the examples in (21)-(23) below.

(21) /simi-ti/ → [simihti]  
heard-2-f.sg.  
‘You heard.’

(22) /in-ţabar-at/ → [ţiţabarat]  
Pass.-forced-3.f.sg.  
‘She was forced.’

(23) /a-t-şaalah/ → [aşşaalah]  
1.sg.-Ref.-reconsile  
‘I reconcile.’

In (21), the laryngeal feature spreads leftward from the voiceless consonant of the subject suffix to the preceding consonant of the stem. Similarly, in (22) the place feature spreads from the initial consonant of the stem to the nasal of the passive prefix. In (23) the manner feature spreads from the initial consonant of the stem to the reflexive prefix. Now, as a first step towards identifying the phrasal domain of these processes, consider examples (24)-(26).

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10 For a detailed description of the different types of assimilation in Shukriiya, see Reichmuth (1983: 73-77).
Based on the fact that spreading of the laryngeal, place, and manner features is not blocked in examples (24)-(26), respectively, we can conclude that the domain of the process cannot be accurately characterized with reference to the edges of syntactic constituents. As illustrated by the corresponding structures in (27)-(29), the edges of $X_{\text{head}}$ and $X_{\text{max}}$ do not block assimilation.
Spreading of features occurs across the left edges of V and VP and the right edges of N and NP. Thus, consistent with the phonological rules discussed so far, the domains of assimilation in Shukriya are not delimited by the edges of syntactic constituents. In the remainder of this section, I demonstrate that the level of I-Phrase also characterizes the domain of these processes.

Consider the utterances in (30)-(32) below with their corresponding phrasings.

(30) ta-{{{u}}}u{{u}}}m ta-{{{x}}}utta-{{{l}}}ak șiriq ta-{{t}}{{a}}{{f}}{{f}}{{f}}-ak minn ahal-ak
she-goes she-put-for-you curse she-drive-you from folks-your
‘Then she will put a curse on you so that you will be driven away from your own family.’

a. Normal rate:

\((ta-{{u}}}u{{u}}}m ta-{{{x}}}utta-{{{l}}}ak șiriq ta-{{t}}{{a}}{{f}}{{f}}{{f}}-ak minn ahal-ak)\)\(_U\)

b. Narrative rate:

\((ta-{{u}}}u{{u}}}m ta-{{{x}}}utta-{{{l}}}ak șiriq, (ta-{{t}}{{a}}{{f}}{{f}}{{f}}-ak minn ahal-ak)\)\(_U\)

(31) yugub axad-l-u zaman bakaan yitis muu in-țaraf
then took-for-him time place vanished-he neg. Pass.-known
‘It has been a long time now and no one knows where he disappeared.’

a. Normal rate:

\((yugub axad-l-u zaman bakaan yitis muu nțaraf)\)\(_U\)

b. Narrative rate:

\((yugub axad-l-u zaman, (bakaan yitis muu nțaraf)\)\(_U\)
As illustrated by the (a)-examples, each of the above utterances forms one I-Phrase in normal speech. The (b)-examples show that in narrative speech each utterance forms two I-Phrases. Whereas spreading of laryngeal, place, and manner features consistently occurs in the a-examples, it is blocked in the b-examples whenever the relevant segments are in separate I-Phrases.

Accordingly, we can conclude that the domain of all three type of assimilation in Shukriiya is the I-Phrase.

In conclusion, the processes of degemination and assimilation discussed above provide further evidence for the significance of the I-Phrase as a domain of phonological processes in Shukriiya. In the next section, I address the difference between Shukriiya and UCSA with respect to the behaviour of syncope and degemination. I argue that this dialectal difference follows from the different degrees of restriction that the two dialects place on syllabification and resyllabification.

3.1.5 The interaction between syncope and degemination with syllabification and resyllabification

We have observed that Shukriiya and UCSA differ with respect to the behaviour of syncope and degemination. In UCSA RHS applies up to the level of I-Phrase
whereas LHS and consonant deletion apply up to the level of P-Phrase. In Shukriiya, on the other hand, both RHS and LHS as well as degemination apply up to the level of I-Phrase. In this section, I argue that this dialectal difference is to be attributed to a difference in the degree of restriction that each dialect places on the processes of syllabification and resyllabification.

I argued in the previous chapter that the patterns of syncope are best understood and explained in terms of its interaction with resyllabification. Assuming that resyllabification precedes syncope, I have argued that the latter targets a weak vowel that is rendered alone in the syllable after its onset is resyllabified as a coda of a preceding syllable. To illustrate the interaction between syncope and resyllabification, consider the three rules stated in (33)-(35) below. The last two rules were introduced in the previous chapter and are repeated here for convenience.

(33) Resyllabification into Onset

\[ \sigma \sigma \sigma \]  
\[ (C \ V \ C)_w (V...)_w \]

(34) Onset Defection

\[ \sigma \sigma \sigma \]  
\[ C \ V \ C \ v \ C \ V \] “where v is weak”

(35) Syncope

\[ \sigma \sigma \sigma \]  
\[ C \ V \ C \ v \ C \ V \]

Resyllabification into Onset is not restricted to potentially syncopated vowels. To satisfy the obligatory onset requirement, this rule resyllabifies the coda of a word-final syllable into the onset position of the initial syllable in the following word. It is relevant only to phrasal LHS where the potentially syncopated vowel
occurs in a closed syllable at the end of the word. Resyllabification into Onset renders the vowel in an open syllable, a necessary condition for syncope to apply. In RHS the weak vowel is always rendered in an open syllable by word-level syllabification. I have argued that the asymmetry in the domain of application of syncope in UCSA is a reflex of the degree of restriction on the domains of resyllabification rules; namely, above the P-Phrase level, these rules may apply within the I-Phrase but only if their domains include derived environments, that is, environments that do not exist until the level of I-Phrase. Above the P-Phrase, only the domain of resyllabification involving the onset of the right-hand vowel meets this constraint. This is why LHS is blocked above the P-Phrase and RHS is blocked above the I-Phrase. Given this view of syncope, the fact that both RHS and LHS apply up to the level of I-Phrase in Shukriiya must be attributed to a lesser degree of restriction that this dialect places on resyllabification. That is, no restriction is placed on the domain of application of resyllabification rules up to the I-Phrase level. I demonstrate this point below with reference to the derivations of cases where RHS and LHS apply within the I-Phrase and the derivations of cases where they are blocked above it.

Beginning with RHS within the I-Phrase, consider the derivation of (10) given in (36) below.

(36) RHS within I: weenma rjaalu jīgabbiluu → weenma rjaalu jīgabbiluu
   a. W: Syllabification: (ween. ma)ₜ (ru. ūa. lu)ₜ (ji. gab. bi. luu)ₜ
   b. P: Onset Defection: (((ween. ma)ₜ (ru. ūa. lu)ₜ (ji. gab. bi. luu)ₜ)ₜ)
   c. Syncope: (((ween. ma)ₜ (ru. Ūa. lu)ₜ (j. ūgab. bi. luu)ₜ)ₜ)

The second and third words contain potentially syncopated vowels. The output of word-level syllabification is given in (36a). Onset Defection cannot apply at
this level because the syllable containing the weak vowel is word initial.
However, when the second word enters into the derivation at the phrase level, the open syllable at the end of the first word becomes visible to Onset Defection. The rule applies across the word boundary and the weak vowel is subsequently deleted. Now the third word enters into the derivation and the same steps are repeated. This time, however, Onset Defection applies across the P-Phrase boundary.

I now turn to illustrate LHS within the I-Phrase level. Consider the derivation of (13) given in (37) below.

(37) LHS within I: al-faaris al-haaris aš-ša˚iid → al-faars al-haars aš-ša˚iid

  a. W: Syllabification: 
     (al. faa. r˚s)\textsubscript{w} (al. haa. r˚s)\textsubscript{w} (aš. ša. ˚iid)\textsubscript{w}
  b. P: Resyllabification into Onset:
     (((al. faa. r˚. s)\textsubscript{w} ((al. haa. r˚. s)\textsubscript{w} (aš. ša. ˚iid)\textsubscript{w})\textsubscript{p})\textsubscript{I}
  c. Onset Defection:
     (((al.faa. ţ. s)\textsubscript{w} ((al.haar. ţ. s)\textsubscript{w} (aš.ša.˚iid)\textsubscript{w})\textsubscript{p})\textsubscript{I}
  d. Syncope:
     (((al.faa. Ø. s)\textsubscript{w} ((al.haar. Ø. s)\textsubscript{w} (aš.ša.˚iid)\textsubscript{w})\textsubscript{p})\textsubscript{I}

In this example, the first two words contain a potentially weak vowel each. The output of word-level syllabification is given in (37a). Onset Defection is blocked at this level because the potentially weak vowel is supported by a coda. However, when the second word enters into the derivation at the phrase level, Resyllabification into Onset applies, rendering the weak vowel in an open syllable. Subsequently, Onset Defection and syncope apply as before. The same process is repeated after the third word enters into the derivation. This time, however, Resyllabification into Onset applies across the P-Phrase boundary.

Given the domain of Onset Defection in (36) and that of Resyllabification into Onset in (37), we conclude that syllabification applies across the P-Phrase boundary in Shukriiya. To demonstrate that it is blocked by the I-Phrase
boundary, I consider cases where RHS and LHS are blocked. An example of the former is the derivation of (9) given in (38) below.

(38) RHS blocked above I: dagga hušaan → dagga hušaan

a. W: Syllabification \((\text{dag. ga})_w (\text{hu. šaan})_w\)
b. P: \((...(\text{dag. ga})_w)_p\)
c. I: I-Phrase Formation \((...(\text{dag. ga})_w)_p)_i ((\text{hu. šaan})_w...)_i\)
d. Onset Defection: BLOCKED

The output of word-level syllabification is given in (38a). The second word is not given in (38b) because it only enters into the derivation after the I-Phrase level. In (38c) the first I-Phrase boundary is formed after the first word. Only at this point does the second word become visible to phrase-level phonology. As indicated in (38d), Onset Defection is blocked, effectively blocking syncope.

Finally, let us consider a derivation where LHS is blocked above the I-Phrase. This is illustrated by the derivation of (11) given in (39).

(39) RHS blocked above I: daafir axadlu → daafir axadlu

a. W: Syllabification \((\text{daa. fir})_w (\text{a. xad. lu})_w\)
b. P: \((...(\text{daa. fir})_w)_p\)
c. I: I-Phrase Formation \((...(\text{daa. fir})_w)_p)_i ((\text{a. xad. lu})_w...)_i\)
d. Resyllabification into Onset: BLOCKED
e. Default Onset: \((...(\text{daa. fir})_w)_p)_i ((?a. xad. lu)_w...)_i\)

The derivation proceeds as in (38) above. The second word becomes visible to phrase-level phonology after the first I-Phrase is formed. As shown in (39d), Resyllabification into Onset is blocked from applying across the I-Phrase boundary. Instead, a default glottal stop appears in the onset position of the initial syllable in the second I-Phrase. Blocking of Resyllabification into Onset has the effect of blocking Onset Defection, which in turn explains why LHS is blocked above the level of I-Phrase.
Further evidence that the I-Phrase is a significant level for syllabification in Shukriiya comes from examining the context of degemination. We have seen in UCSA that the final consonant of a word ending in a geminate is subject to stray erasure unless it is syllabified within the P-Phrase. As I have demonstrated earlier, the relevant domain for syllabifying the stray consonant in Shukriiya is the I-Phrase. This is illustrated in (40) below.

(40) Word-final geminate syllabified within I
   a. W: Syllabification (fid. dir. r)_w (a. xad. lu)_w
   b. P: Syllabification into Onset ((..(fid. dir. r)_w)ₚ (a. xad. lu)_w...)ₚ

The unsyllabified segment at the end of the first word may not be erased at the word level. Instead, it is retained until the phrase level. As indicated in (40b), the segment is syllabified as an onset of the following syllable within the I-Phrase. If the stray consonant cannot be syllabified within the I-Phrase, however, it is erased. This is shown in (41).

(41) Word-final geminate stray-erased at I
   a. I: Syllabification (...(fid. dir. r)ₚ)ᵢ ((a. xad. lu)ₚ...)ᵢ
   b. Syllabification into Onset BLOCKED
   c. Stray Erasure (...(fid. dir. Ø)ₚ)ᵢ ((a. xad. lu)ₚ...)ᵢ
   d. Default Onset (...(fid. dir. )ₚ)ᵢ ((?a. xad. lu)ₚ...)ᵢ

The word and phrase level are the same as in (40). The second word becomes visible to phrase-level phonology after the first I-Phrase is formed. As indicated in (41b), Syllabification into Onset is blocked across the I-Phrase boundary. Subsequently, the stray consonant is erased and a glottal stop is inserted into the onset position of the initial syllable in the second I-Phrase.

To summarize, thus far I have demonstrated that RHS is blocked above the I-Phrase level because Onset Defection is blocked across the I-Phrase boundary. Similarly, LHS is blocked above the I-Phrase because
Resyllabification into Onset is blocked across the I-Phrase boundary. I have also shown that stray consonants in word-final position may not be erased at the word level. Instead, they are retained up to the I-Phrase level where they are either properly syllabified or erased. We can conclude on the basis of these facts that resyllabification in Shukriiya is free, being no more restricted than initial syllabification, up to the I-Phrase level. At the I-Phrase all segments must be properly syllabified and no alterations to the structure of the syllable are allowed. Accordingly, the difference between Shukriiya and UCSA with respect to the domains of application of syncope and degemination is explained in terms of the difference in the degree of restriction each dialect places on syllabification and resyllabification. In both dialects, initial syllabification is not exhaustive. Both allow the final consonant of a word ending in a geminate to remain unsyllabified beyond the word level. However, in Shukriiya this stray consonant must be repaired at the I-Phrase level, while in UCSA it must be repaired at the P-Phrase level. This is why consonant deletion applies at the I-Phrase in the former and the P-Phrase in the latter. A similar divergence is observed with respect to the degree of restriction these dialects place on resyllabification. In Shukriiya, resyllabification remains freely in progress up to the I-Phrase level; at this level syllabification is fixed and alterations to syllable structure are disallowed. This is why both RHS and LHS apply up to the I-Phrase level and are blocked beyond it. In UCSA, on the other hand, resyllabification remains freely in progress up to the P-Phrase level. At this level basic syllabification is fixed. Further alterations to the structure of the syllable in the I-Phrase are possible only in new environments. This is why LHS applies up to the P-Phrase while RHS applies up to the I-Phrase.
3.1.6 Conclusion

In the preceding sections, I have demonstrated that the level of I-Phrase is a significant domain of phonological processes in Shukriiya. In fact it is the only phrasal level which accurately characterizes the domain of phonological processes discussed thus far. I have shown that the I-Phrase is the domain of both RHS and LHS as well as degemination. I have also proposed to account for these facts in terms of the degree of restriction that this dialect places on syllabification and resyllabification. I have concluded that initial syllabification is not exhaustive, and that unsyllabified segments are tolerated up to the I-Phrase level. Similarly, no restrictions are placed on resyllabification up to the I-Phrase. At the I-Phrase level, however, syllabification is fixed and alterations to the structure of the syllable are disallowed.

Thus stated, the above account predicts that all unsyllabified segments, as opposed to only those that arise from stem-final geminates, are tolerated up to the I-Phrase. This means that all processes that function as strategies of repairing unsyllabified segments ought to apply within the I-Phrase. As the discussion in the following sections will show, this prediction is not completely accurate. Shukriiya has two more processes functioning as syllable repairing strategies: epenthesis and consonant deletion. In the following two sections, I examine each of these processes and identify the prosodic level at which it applies. Then, I modify the conclusion regarding the degree of restriction on syllabification and resyllabification accordingly.
3.2 Epenthesis

The two patterns of epenthesis attested in Shukriiya are quite similar, but not identical, to those discussed in the previous chapter. The first one is a Cv pattern, in which the low vowel $a$ appears to the right of an unsyllabified consonant. The second is a vC pattern, in which a high vowel ($i$ or $u$) appears to the left of an unsyllabified consonant. In this section, I present evidence for each of these patterns and identify their respective levels of application in Shukriiya.

3.2.1 The Cv pattern of epenthesis

Recall that Shukriiya has roots ending in two-consonant clusters that may consist of a full geminate, a partial geminate, or heterorganic consonants. In section 3.1.4.1, we saw that the second member of the geminate in unaffixed forms is deleted at the I-Phrase level if it cannot be properly syllabified. In this section, we will see that when any of the three types of cluster is rendered word-internal through affixation and the second consonant cannot be properly syllabified, it appears in the onset position of a low vowel $a$. This is illustrated by the data in (42)-(47) which consist of roots ending in a full geminate ((42) and (45)), a partial geminate ((43) and (46)), and a heterorganic cluster ((44) and (47)).

(42)  a. \( /\text{čamm-ik}/ \), uncle-2.f.sg. ‘your uncle’  
      \( \rightarrow \text{čam. mik} \)  
      \( \rightarrow [\text{čám. mik}] \)

      b. \( /\text{čamm-ak}/ \), uncle-2.m.sg. ‘your uncle’  
      \( \rightarrow \text{čam. mak} \)  
      \( \rightarrow [\text{čám. mak}] \)

(43)  a. \( /\text{jamb-ik}/ \), near-2.f.sg. ‘near you’  
      \( \rightarrow \text{jam. bik} \)  
      \( \rightarrow [\text{jám. bik}] \)
In (42)-(44), the cluster is rendered word-internal through affixation of vowel-initial suffixes. This makes it possible for the second consonant to be syllabified as an onset of the following syllable. In contrast, the suffixes in (45)-(47) are consonant-initial and word-level syllabification yields a word-internal unsyllabified segment. As indicated by the corresponding surface forms, the second member of the cluster appears as an onset of an epenthetic vowel $a$. The next task is to identify the level at which epenthesis applies.
The pattern of low vowel epenthesis described above is the same as that attested in UCSA. Recall that UCSA utilizes a-epenthesis to repair all word-internal unsyllabified segments as well as word-final unsyllabified segments that are part of affixes. I have argued, based on the latter context, that epenthesis applies at the word level in UCSA. Specifically, I have argued that the presence of the epenthetic vowel a in contexts where the word-final stray segments could be repaired through phrase level syllabification is conclusive evidence that epenthesis applies at the word level. That is because the context necessary for its application exists at the word but not the phrase level. The same argument cannot be made with respect to Shukriiya because in this dialect a-epenthesis is not utilized to repair word-final segments. In the absence of this diagnostic tool, then, how do we approach the task of identifying the level at which epenthesis occurs? I address this question below.

We have already seen that the second member of a word-final geminate is retained unsyllabified up to the I-Phrase level where, if it cannot be properly syllabified, it is deleted. By analogy, one might assume that the word-internal segment that is part of an affix is also retained unsyllabified up to the I-Phrase level. This would allow us to make the generalization that all unsyllabified segments are retained up to the I-Phrase level where if not properly syllabified, word-internal segments are repaired through epenthesis and word-final segments are stray-erased. Nonetheless, this approach would be problematic because it is incompatible with the standard and conceptually preferable view of extrasyllabicity. In a constrained theory of extrametricality (Hayes 1981, 1985, 1987, 1995), extrasyllabic elements are permitted only at one edge of the domain of syllabification rules and extraprosodic elements are permitted only at one
edge of the domain of stress rules. Given this view of extrametricality, the assumption that word-internal unsyllabified segments are retained up to the I-Phrase level is unjustifiable, especially in the absence of evidence to suggest that the domain of initial syllabification is smaller than the word. In fact, there is conclusive evidence to the contrary. As I demonstrate below, evidence from stress indicates that the domain of initial syllabification in all three dialects is the phonological word. This being the case, I conclude that word-internal unsyllabified segments are repaired at the word level.

I established in the previous chapter that the three dialects share the stress-assigning algorithm repeated for convenience in (87) below.

(48)  a. Mora Extrametricality: \[ \mu \rightarrow \langle \mu \rangle \]  
    From left to right, parse the word into moraic trochees.
    Degenerate feet are forbidden absolutely.

    b. Foot Construction: End Rule Right

    c. Word Layer Construction: End Rule Right

We have also seen that, with the exception of a few idiosyncratic cases, affixes exhibit predictable stress patterns with both nominal and verbal stems. I begin by illustrating this point with reference to nominal stems. The data in (49) below show that the masculine and feminine plural suffixes as well as the dual suffix predictably attract stress.

---

11 There is no evidence to assume that the domain of initial syllabification is the stem. If there were, one could assume that unsyllabified segments that are part of suffixes would then be permitted, as they would occur at the right edge of that domain.
Extrametricality is blocked in all three examples because there is a consonant separating the final mora from the right edge of the word. Foot construction builds three feet in (a) and two feet in (b) and (c) each. The End Rule assigns main stress to the right-hand foot, accurately predicting the location of the main accent.

With respect to verbal stems, the examples in (50) show that adding the subject suffix predictably triggers stress shift in (a) and that the same suffix attracts stress when followed by the object suffix in (b).
Extrametricality applies in both examples because the final mora is at the right edge of the word. Adding the second person subject suffix to the verb stem in (a) results in a heavy penultimate. Since degenerate feet are forbidden, this is the only syllable that is footed and assigned main stress. Similarly, suffixation of the first person plural object affix in (b) creates a heavy penult. Two feet are constructed and the penultimate is assigned main stress by the End Rule.

In conclusion, the fact that affixes generally exhibit predictable stress is clear evidence that the domain of syllabification is the phonological word and not the stem. Obviously, the domain of syllabification must include these affixes if they are to be visible to the stress-assigning algorithm. Therefore, in the absence of evidence suggesting otherwise, I assume that a-epenthesis in Shukriiya applies at the word level. Accordingly, we conclude that the unsyllabified second member of a root-final cluster that is rendered word-internal through affixation is repaired at the word level. In the next section, I examine the second pattern of epenthesis attested in Shukriiya.
3.2.2 The vC pattern of epenthesis

In the previous chapter, I reviewed the epenthesis account proposed by Hamid (1984) and Kenstowicz (1986, 1994) for the initial vowel of the perfect form of measures V, VI, VII, VIII, and X. Recall that the arguments for this account are based on Hamid’s two observations that the initial vowel is not present in the surface when the stem is preceded by a word ending with a vowel, and that, in measures VII and VIII, stress falls on the light penultimate even though the initial syllable is the only heavy syllable in the word. I have demonstrated that the seemingly idiosyncratic accent in the latter measures is in fact predicted by a more adequate analysis of stress in UCSA. This holds true for Shukriiya as well, since the two dialects have the same stress-assigning algorithm. As for the alternation facts, I have shown that the pattern attested in UCSA is not the same as that reported by Hamid and that it is best explained in terms of a hiatus resolution mechanism rather than epenthesis.

However, the pattern of alternation reported by Hamid is indeed attested in Shukriiya. Moreover, there is independent evidence for a vC pattern of epenthesis in this dialect. This means that the vC epenthesis account discussed in the previous chapter is based on facts that are more consistent with Shukriiya than they are with UCSA. It is, therefore, necessary that we examine the validity of this account with respect to the former dialect. In this section, I examine the alternation facts in Shukriiya and show that here, too, the epenthesis analysis is unjustifiable and conclude, accordingly, that the initial vowel of the perfect form is underlying. I then demonstrate that the only evidence for a vC pattern of epenthesis in Shukriiya comes from the alternation pattern of roots that end in heterorganic clusters.
3.2.2.1 The alternation pattern of the initial vowel of the perfect stem

Unlike UCSA, Shukriiya displays variation in the quality of the initial vowel of
the perfect form of measures V, VI, VII, VIII, and X. The predominant variant is
a, but in at least one variety the vowel is i. The latter variant is quite common in
a variety I will label Western Shukriiya, spoken in the western part of Al-Butana
region in villages around the town of Rufa’a. Two points regarding this
variation are pertinent to the purposes of our current discussion. First, the
presence of one vowel and the absence of the other represent features of two sub-
grammars of Shukriiya rather than variation in the speech of individual
speakers. Second, the same pattern of alternation is exhibited by the initial
vowel in both sub-grammars. The latter point is illustrated with reference to the
perfect form of measures VII and VIII given below in (51) and (52), respectively.

The data in these examples consist of surface forms. The sub-grammar with the
initial vowel a is labeled Sub-G1 and the sub-grammar with the initial vowel i is
labeled Sub-G2. For ease of exposition, I give the glossed forms to the left of the
arrows and their corresponding syllabified forms to the right of the arrows.

(51)  a. In isolation:

<table>
<thead>
<tr>
<th></th>
<th>Sub-G1</th>
<th>Sub-G2</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>?an-sáraq</td>
<td>?in-sáraq</td>
</tr>
<tr>
<td>Pass-.stolen(3.m.sg.)</td>
<td>→ ?an. sá. rag</td>
<td>→ ?in. sá. rag</td>
</tr>
</tbody>
</table>

‘It was stolen.’

12 This variation is attested in perfect forms of other measures as well. However, I limit our
discussion here to those relevant to the epenthesis issue. For a detailed description of the
measures utilized in Shukriiya and the forms of their respective stems, see Reichmuth (1983: 251-
274).

13 It is unlikely that this is coincidental as this part of the Butana region, where Shukriiya is
spoken, is a contact area neighbouring UCSA in which the initial vowel of these measures is
invariably i.

14 Since the alternation facts are identical for all the relevant perfect forms, I use measures VII and
VIII as a representative of the other measures.
b. After a word ending in a consonant:

Sub-G1  ?al-beet an-sàraq → ?al. bee. tan. sá. rag
Sub-G2  ?al-beet in-sàraq → ?al. bee. tin. sá. rag

the-house Pass.-stolen(3.m.sg.)

‘The house was broken into.’

c. After a word ending in a vowel:

Sub-G1  beet-u n-sàraq → bee. tun. sá. rag
Sub-G2  beet-u n-sàraq → bee. tun. sá. rag

house-his Pass.-stolen(3.m.sg.)

‘His house was broken into.’

(52)  a. In isolation:

Sub-G1  ?ajtáhar → ?aj. tá. har
Sub-G2  ?ıjtáhar → ?ıj. tá. har

became famous(3.m.sg.)

‘He became famous.’

b. After a word ending in a consonant:

Sub-G1  ?al-walad ajtáhar → ?al. wa. la. daş. tá. har
Sub-G2  ?al-walad ıjtáhar → ?al. wa. la. diş. tá. har

the-son became famous(3.m.sg.)

‘The son became famous.’

c. After a word ending in a vowel:

Sub-G1  walad-u ıjtáhar → wa. la. duş. táhar
Sub-G2  walad-u ıjtáhar → wa. la. duş. táhar

son-his became famous(3.m.sg.)

‘His son became famous.’

The (a)-examples represent the form of the perfect stem that occurs in isolation or at the beginning of an Intonational Phrase. We observe that the initial vowel appears at the surface and that it is preceded by a glottal stop onset. The initial vowel also appears at the surface in the (b)-examples, where the perfect stem is preceded by a word ending in a consonant. Instead of the glottal stop, however, the coda of the last syllable in the preceding word appears in the onset position of the initial syllable of the perfect stem. This is evidence that the glottal stop in the (a)-example is a default onset. In the (c)-examples, where the word preceding the stem ends in a vowel, the initial vowel observed in the previous two contexts does not appear in the surface form. Instead, the initial consonant
of the perfect stem is syllabified as a coda of the last syllable of the preceding word. This is the same alternation pattern described by Hamid (1984) which, if taken in isolation, lends support to the view that the underlying forms of the perfect stems in (51) and (52) are /nsarag/ ‘was stolen’ and /ftahar/ ‘became famous’, respectively. Under this view, epenthesis is triggered in the (a)-examples and the (b)-examples because the initial consonant of the stem cannot be properly syllabified. In the (c)-examples, epenthesis does not occur because the consonant can be repaired through syllabification as a coda of the last syllable of the preceding word. The variation in the quality of the initial vowel does not necessarily weaken this view. One could argue that in both cases the vowel is epenthetic and that the two sub-grammars merely differ in the quality of the epenthetic vowel. However, I provide conclusive evidence to the contrary of this view below.

A closer examination of relevant data from Shukriiya reveals that the alternation pattern described above is not particular to the initial vowel of the perfect stem. Instead, it is an instance of a more general pattern of alternation exhibited by word-initial vowels of varying qualities which, like the one found in UCSA, is best explained in terms of a hiatus resolution mechanism. To demonstrate this point, let us begin by examining the behaviour of word-initial vowels in examples (53)-(55) below.

(53) a. ittu ahafr-u → it.tu a.haf.ru → ?it.tu.haf.ru
you-m.pl. dig-Imp.-2pl. cf. *?it.tu.?a.haf.ru
'Dig!'

b. ana ahafr-u → a.na a.haf.ru → ?a.na.haf.ru
I dig-3.m.sg. cf. *?a.naa.haf.ru
'I dig it'
Each of the above examples consists of two words, the first of which ends with a vowel while the second one begins with a vowel. As shown in the corresponding syllabification, this results in a hiatus situation at the phrase level. The vowels in the (a)-examples are of different qualities while those in the (b)-examples are of the same quality. As evident from the unacceptable forms, the second vowel is consistently deleted, indicating that Shukriiya resolves hiatus by deleting the second vowel regardless of the quality of the vowels involved.\(^{15}\) Moreover, the alternation pattern observed in (53)-(55) above is identical to that exhibited by the initial vowel of the imperfect stem of measures VII and VIII in (51) and (52), respectively. In other words, the alternation pattern of the latter is an example of a more general pattern and, consequently, is not sufficient evidence that the vowel is epenthetic.

A crucial piece of evidence against analyzing the initial vowel of the perfect stem as epenthetic comes from the alternation pattern exhibited by

\(^{15}\) In this respect, Shukriiya is different from UCSA. In fact, the ungrammatical forms in Shukriiya are those expected in UCSA. Recall that in the latter, hiatus is resolved by keeping two vowels of different qualities in separate syllables by inserting a glottal stop into the onset position of the second vowel. When the vowels are of the same quality, they are syllabified as the nucleus of the same syllable.
underlying word-initial vowels. This is illustrated by examples (56) and (57) below.

(56) a. ism-u ahmad → is.mu ah.mad → ?is.muh.mad
   name-3.m.sg. Ahmed          cf. *?is.mu.ah.mad
   ‘His name is Ahmed.’

   b. ism-u umbariir → is.mu um.ba.riir → ?is.mum.ba.riir
   name-3.m.sg. Umbarir        cf. *?is.muum.ba.riir
   ‘His name is Umbarir.’

(57) a. ism-aha ijlal → is.ma.ha ij.laal → ?is.ma.ha.ij.laal
   name-3.f.sg. Ijlal          cf. *?is.ma.ha.ij.laal
   ‘Her name is Ijlal.’

   b. ism-i ijlal → is.mi ij.laal → ?is.mi.ij.laal
   name-1.sg. Ijlal            cf. *?is.mi.ij.laal
   ‘My name is Ijlal.’

The initial vowels of the proper names in (56) and (57) exhibit the same alternation pattern as those of the initial vowel of the perfect stem. They are consistently deleted when preceded by a word that ends in a vowel.

Accordingly, we conclude that the alternation pattern exhibited by the latter does not constitute evidence that the vowel is epenthetic. Instead, it is a pattern typical of word-initial vowels in Shukriiya and is best explained in terms of a hiatus resolution mechanism.

In the next section, I provide evidence for a vC pattern of epenthesis in this dialect based on the alternation pattern exhibited by root-final heterorganic clusters and show that it applies at the I-Phrase level.

3.2.2.2 The alternation pattern of root-final heterorganic clusters

Recall that, among the three dialects, Shukriiya is the only one that has roots ending in a heterorganic CC cluster. In the previous section, we saw that when the cluster is rendered word-internal through affixation to a consonant-initial
suffix, the second consonant of the cluster is repaired through a-epenthesis. In this section, I demonstrate that the second consonant is repaired through high vowel epenthesis when the cluster occurs in word-final position. The epenthetic vowel is u when the preceding vowel is u. Otherwise, it is i. To illustrate this, consider the noun stems in (58) and (59) below. For each stem, I give the surface unaffixed form as well as one example of an affixed form to facilitate the comparison between word-internal and word-final position.

<table>
<thead>
<tr>
<th>(58)</th>
<th>Noun</th>
<th>Unaffixed form</th>
<th>Noun+your(f.pl.)</th>
<th>Gloss</th>
</tr>
</thead>
<tbody>
<tr>
<td>a.</td>
<td>/ˈumr/</td>
<td>[ˈu. mur]</td>
<td>[ˈum. ɾa. kan]</td>
<td>‘age’</td>
</tr>
</tbody>
</table>
|     | cf. *[
|     |     | [ˈum. ɾa] | [*u. mur. kan] | |
| b. | /yubn/ | [yu. bun] | [yub. na. kan] | ‘injustice’ |
|     | cf. *[yub. na] | cf. *[yu. bun. kan] | |

<table>
<thead>
<tr>
<th>(59)</th>
<th>Noun</th>
<th>Unaffixed form</th>
<th>Noun+your(f.pl.)</th>
<th>Gloss</th>
</tr>
</thead>
<tbody>
<tr>
<td>a.</td>
<td>/ism/</td>
<td>[ʔi. sim]</td>
<td>[ʔis. ma. kan]</td>
<td>‘name’</td>
</tr>
<tr>
<td></td>
<td>cf. *[ʔis. ma]</td>
<td>cf. *[ʔi. sim. kan]</td>
<td></td>
<td></td>
</tr>
<tr>
<td>b.</td>
<td>/ilm/</td>
<td>[ʔi. lim]</td>
<td>[ʔil. ma. kan]</td>
<td>‘knowledge’</td>
</tr>
<tr>
<td></td>
<td>cf. *[ʔil. ma]</td>
<td>cf. *[ʔi. lim. kan]</td>
<td></td>
<td></td>
</tr>
<tr>
<td>c.</td>
<td>/darb/</td>
<td>[da. ri̯b]</td>
<td>[dar. ba. kan]</td>
<td>‘path’</td>
</tr>
<tr>
<td></td>
<td>cf. *[dar. ba]</td>
<td>cf. *[da. ri̯b. kan]</td>
<td></td>
<td></td>
</tr>
<tr>
<td>d.</td>
<td>/galb/</td>
<td>[ga. li̯b]</td>
<td>[gal. ba. kan]</td>
<td>‘heart’</td>
</tr>
<tr>
<td></td>
<td>cf. *[gal. ba]</td>
<td>cf. *[ga. li̯b. kan]</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Starting with the unaffixed forms in (58), we observe that the initial vowel of the stem is u and the second consonant in the cluster appears in the coda position of an epenthetic vowel u. In (59), the initial vowel of the stem is i in (a) and (b) and a in (c) and (d). In both contexts, the second consonant in the cluster appears in the coda position of an epenthetic vowel i. As indicated by the unacceptable forms, the unsyllabified consonant may only be repaired through high vowel epenthesis when it occurs in word-final position. Conversely, the unacceptable affixed forms indicate that the second consonant in the cluster may only be repaired through word-level a-epenthesis when it is word internal.
At this juncture, it is appropriate to point out another interesting feature that the Western Shukriiya dialect, referred to in the previous section, and UCSA have in common. Recall that all roots ending in heterorganic clusters in CA have been reanalyzed as CVCVC in UCSA. Many, but not all, of these roots underwent the same reanalysis in the Western Shukriiya dialect. Thus, the Western Shukriiya underlying forms corresponding to those in (58a) and (59b-d) are: /¿umur/ ‘age’; /÷ilim/ ‘knowledge’; /darib/ ‘path’; and /galib/ ‘heart’, respectively. The two roots in (58b) and (59a) have not been reanalyzed and, thus, have the same underlying forms in Western Shukriiya as in the other varieties. As expected, the reanalyzed forms display the same patterns in Western Shukriiya and UCSA. That is, affixation of a consonant-initial suffix to these forms does not trigger low vowel epenthesis as it does in the rest of the Shukriiya varieties. Instead, affixation of vowel-initial suffixes triggers syncope of the stem high vowel. Thus, /¿umur-kan/ ‘your (f.pl.) age’ and /darib-kan/ ‘your (f.pl.) path’ surface as /¿umúrkan/ and /daríbkan/, respectively while /¿umur-ak/ ‘your (m.sg.) age’ and /darib-ak/ ‘your (m.sg.) path’ surface as /¿úmrak/ and /da’rbak/, respectively.\(^{16}\) It is interesting to note here that the rule of high vowel epenthesis that accounts for the alternation exhibited by roots

\(^{16}\) Western Shukriiya shares with UCSA a few more features not relevant for the purposes of our current discussion. Indeed, the degree of similarity between the two varieties makes it necessary that we point out why the former is a sub-grammar of Shukriiya and not of UCSA. All of the salient features of the Shukriiya grammar, but not of UCSA grammar, are attested in Western Shukriiya. For example, the asymmetry in the domain of application of syncope attested in UCSA is not attested in this variety. Instead, both LHS and RHS apply within the I-Phrase level. Also, the fact that high vowel ehenthesis involves a subset of the forms observed in other varieties of Shukriiya notwithstanding, it is attested in Western Shukriiya but not in any sub-grammar of UCSA. Similarly, the consonant deletion pattern discussed in the next section is attested in all varieties of Shukriiya, including Western Shukriiya, but not in any sub-grammar of UCSA. The fact that UCSA and Western Shukriiya share features in common is to be expected given their geographical proximity. However, the degree of similarity between the two underscores the fluidity of the linguistic situation in Sudan and the degree of vigilance one must exercise when attempting to tease apart the respective grammars of the dialects involved.
ending in heterorganic clusters, such as those in (58) and (59) above, mirrors the historical process responsible for the reanalysis of these forms in UCSA and Western Shukriiya. I will return to this point in Chapter six. In the remainder of this section, I turn to the task of identifying the level of application of high vowel epenthesis.

The examples in (60) below indicate that the second member of a root-final CC cluster is retained unsyllabified above the word level.

(60) a. darb ahmad → dar\_b ah.mad → dar\_bah.mad  
path Ahmed  
'Ahmed’s path’

b. darb ¿ali → dar\_b ¿a.li → da.rib ¿a.li  
path Ali  
'Ali’s path’

In (60), word-level syllabification yields a word-final unsyllabified segment in both examples. In (a), the second word begins with a vowel, allowing for the stray segment to be repaired through syllabification as an onset of the following syllable. This syllabification is not possible in (b) because the second word begins with a consonant. As the corresponding surface form indicates, the unsyllabified segment is repaired through high vowel epenthesis.

The next step is to identify the prosodic level at which high vowel epenthesis occurs. As the example in (61) below indicates, that level is the I-Phrase.

(61) ?in xitii-t ad-darb ahal-ak bi-¿adil-u raas-ak  
if then departed-you the-path folks-your will-fix-the they head-your  
‘If you, then, stray away from the righteous path, your folks will set you straight.’

a. Normal rate: (?in xitii-t ad-dar. bahal-ak bi-¿adl-u raas-ak)  
b. Narrative rate: (?in xitii-t ad-da. rib) (?ahal-ak bi-¿adl-u raas-ak)
The underlined root-final segment, which cannot be properly syllabified at the word level, is followed by a word that begins with a vowel. In normal rate of speech, the utterance constitutes the domain of one intonation contour. In narration, on the other hand, it constitutes the domain of two distinct intonation contours. This is shown in the corresponding phrasings given in (61a) and (61b), respectively. The root-final segment is syllabified as an onset of the initial vowel of the following word in the former, but not in the latter. This is because phrasal syllabification is blocked across the I-Phrase boundary in Shukriiya. Consequently, the root-final segment is repaired through high vowel epenthesis and a default glottal stop appears in the onset position of the initial syllable in the second I-Phrase. Evidently, high vowel epenthesis applies at the I-Phrase level repairing a segment that cannot be properly syllabified within the I-Phrase.

3.2.3 Summary

The data discussed in the previous sections reveal that Shukriiya utilizes two patterns of epenthesis to repair an unsyllabified second member of a root-final cluster. In the Cv pattern a low vowel appears to the right of the unsyllabified consonant and in the vC pattern a high vowel appears to the left of the consonant. Low vowel epenthesis is utilized at the word level to repair unsyllabified segments rendered word-internal through affixation. This is the case regardless of whether the segment is the second member of a full geminate, a partial geminate, or a heterorganic cluster. High vowel epenthesis, on the other hand, is utilized at the I-Phrase level to repair only the second member of a heterorganic cluster in word-final position. I discuss the implications of these findings on the degree of restriction that Shukriiya places on syllabification in
section 3.4. In the next section, I examine consonant deletion, the last repair strategy utilized by Shukriiya.

3.3 Consonant deletion

The processes discussed thus far are utilized to repair an unsyllabified segment that is part of a root. In this section, I provide evidence that Shukriiya utilizes consonant deletion to repair an unsyllabified segment that is part of an affix. When this segment is rendered word-internal through affixation, it is repaired at the word level and when it occurs in word-final position, it is repaired at the I-Phrase level.

The only context that gives rise to an unsyllabified segment that is part of an affix results from suffixation of the homophonous first person singular and second person masculine singular subject affixes to a verb that ends in a consonant. This is illustrated by the examples in (62).

(62) a. 
  sa^ee-t  ‘I/you looked after’  rikib  ‘I/you rode’  cf. *rikib^a, *rikibi^t
  baaree-t  ‘I/you followed’  halaf  ‘I/you swore’  cf. *halaf^a, *halaf^i
  fifii-t  ‘I/you recovered’  ?akal  ‘I/you ate’  cf. *?akal^a, *?akal^i
  nisii-t  ‘I/you forgot’  sug  ‘I/you drove’  cf. *sug^a, *sug^i

b. 
  sa^ee-t  ‘I/you looked after’  rikib  ‘I/you rode’  cf. *rikib^a, *rikibi^t

The subject suffixes surface with verb stems ending in a vowel in (62a) but not with those ending in a consonant in (62b). Evidently, the two homophonous suffixes have the underlying form /t/. Affixation to the latter creates an unsyllabified segment that is subsequently deleted. As indicated by the unacceptable forms, this segment may not be repaired through either of the epenthesis rules attested in Shukriiya. I turn to the task of identifying the domain of consonant deletion below.
Examining forms in which the subject suffix is rendered word internal reveals that an unsyllabified segment resulting from affixation is stray-erased. This is demonstrated by the examples in (63) and (64) below.

(63)  

<table>
<thead>
<tr>
<th>a.</th>
<th>/xabbar-t-ik/</th>
<th>xab. bar. tî̯k</th>
<th>[xab. bár. tî̯k]</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>told-1.sg.-2.f.sg.</td>
<td>I told you.</td>
<td></td>
</tr>
</tbody>
</table>

b.  /našah-t-ak/  na. šah. ṭak  [na. šáh. ṭak]  

| adviced-1.sg.-2.m.sg. | I advised you. |

(64)  

<table>
<thead>
<tr>
<th>a.</th>
<th>/xabbar-t-kan/</th>
<th>xab. bar. ū. kan</th>
<th>[xab. bár. kan]</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>told-1.sg.-2.f.pl.</td>
<td>I told you.</td>
<td>cf. *[xab. bar. ū. ka. kan],</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>*[xab. bár. rî̯. kan]</td>
</tr>
</tbody>
</table>

b.  /našah-t-kun/  na. šah. ū. kun  [na. šáh. kun]  

<table>
<thead>
<tr>
<th>adviced-1.sg.-2.m.pl.</th>
<th>I advised you.</th>
</tr>
</thead>
<tbody>
<tr>
<td>cf. *[na. šáh. ū. ku. kun],</td>
<td></td>
</tr>
<tr>
<td>*[na. ša. hî̯. kun]</td>
<td></td>
</tr>
</tbody>
</table>

In the above examples, the subject suffix /-t/ is added to a verb that ends with a consonant, resulting in a potentially unsyllabified segment. In (63) the subject suffix is followed by a vowel-initial object suffix. As indicated by word-level syllabification, this makes it possible for the segment to be syllabified as an onset of the latter. In (64), where the object suffix is consonant-initial, word-level syllabification yields a word-internal unsyllabified segment. As indicated by the corresponding surface forms, this segment is deleted at the word level. The starred forms indicate that, unlike root-final segments, the unsyllabified segments in (64) may not be repaired through either word-level or phrase-level epenthesis in Shukriiya.

Examining forms in which the unsyllabified segment that is part of an affix occurs in word-final position reveals that the segment is retained beyond...
the word level. If it cannot be repaired through syllabification at the phrase level, the segment is deleted. This is illustrated by the data in (65) and (66) below.

(65) a. /xabbar-t/ /axawaan-ak/ \[→ xab. bar. t a. xa. waa. nak
  'I told your brothers.'

  b. /?akal-t/ /u-ßirib-t/ \[→ ?a.kal. t u. ßi. rib. t
  'I ate and drank.'

(66) a. /su˝-t/ /muraah-i/ \[→ sug. t mu. raa. hi
  'I drove my herd.'

  b. /ßirib-t/ /u-?akal-t/ \[→ ßi. rib. t u. ?a. kal. t
  'I drank and ate.'

As indicated by the output of word-level syllabification, the underlined consonant cannot be properly syllabified at the word level in any of the above examples. We observe in the surface forms of (65a) and (65b) that the consonant at the end of the first word is repaired at the phrase level through syllabification as an onset of the initial syllable of the following word. However, this syllabification is not possible in the rest of the examples. In (65b) and (66b), the unsyllabified consonant at the end of the second word is also utterance-final. In (66a), the unsyllabified consonant at the end of the first word is followed by a word that begins with a consonant. Similarly, the second word in (66b) begins

---

18 The examples in (65b) and (66b) consists of conjoined verb phrases. Regardless of its phonological form in the various dialects of Arabic, the conjunction meaning 'and' cliticizes to the following word. In Shukriiya, as well as in many spoken dialects including UCSA and Hamar, the underlying form of the conjunction is /u/. It surfaces as a vowel [u] before a consonant and as a back glide [w] before a vowel.
with the conjunction /u/ which surfaces as a glide [w].¹⁹ In both contexts, the underlined consonant cannot be properly syllabified and is stray-erased.

The next step, then, is to identify the phrasal level at which deletion occurs. The fact that the potentially unsyllabified consonant surfaces in (65b) is evidence that this level cannot be characterized with reference to syntactic structure. This is because the domain of consonant deletion is not consistently demarcated by the edges of $X^\text{head}$ and $X^\text{max}$. If it were, we would expect the stray consonant to be deleted in (65b) whose structure is given in (67) below.

(67)

\[
\begin{array}{c}
\text{VP} \\
\text{VP} \quad \text{VP} \\
\text{V} \quad \text{V} \\
\text{?akal-t} \quad \text{u-}jirib-\text{-t} \quad \Rightarrow \text{?a. kál. ūsī. rīb} \\
[[X^\text{max}]] \quad [X^\text{max}] \\
[X^\text{head}] \quad [X^\text{head}] \\
\text{ate-1.sg.} \quad \text{and-drank-1.sg.} \\
\text{‘I ate and drank.’}
\end{array}
\]

Syllabification of the stray consonant into onset occurs across the right edges of the first V and VP and the left edges of the second V and VP. This should not happen if the level at which this segment must be properly syllabified was delimited by the edges of $X^\text{head}$ and $X^\text{max}$. Evidently, the domain of consonant deletion cannot be characterized with reference to syntactic structure.

Like those of other phrasal rules in Shukriiya, the domain of consonant deletion is accurately characterized by the prosodic level of the I-Phrase. The data in (68)-(70) below demonstrate that syllabification of the stray consonant is consistently blocked across the I-Phrase boundary.

¹⁹ This is triggered by the deletion of the glottal stop, which is the first radical in the verbal stem /?akal-t/ ‘I ate’.
(68) dahiin in bajjat-t axatir ʕalee beet ʕamm-ak now if spent the night-you go to house uncle-your ‘This time if you spend the night there, visit your uncle’s family.’

a. Normal rate:
\[ ((\text{dahiin in bajjat} \_ \text{axatir} \_ \text{ʕalee beet} \_ \text{ʕamm-ak})_U) \]

b. Narrative rate:
\[ ((\text{dahiin in bajjat})_U \_ \text{ʕaxatir} \_ \text{ʕalee beet} \_ \text{ʕamm-ak})_U \]

(69) baʕad xalaas ʕibiʕ-t axad-t-l-i ʕamda jaa al-muyrib after already felt full-I took-I-for-me nap till the-sunset ‘Then, after I felt full, I took a nap until sunset.’

a. Normal rate:
\[ ((\text{baʕad xalaas ʕibiʕ-t} \_ \text{ʕaxad-t-l-i} \_ \text{ʕamda jaa l-muyrib})_U) \]

b. Narrative rate:
\[ ((\text{baʕad xalaas ʕibiʕ-t})_U \_ \text{ʕaxad-t-l-i} \_ \text{ʕamda jaa l-muyrib})_U \]

(70) haa zool in ruh-t kitil-t ahal-i maa ʕxabbir-uu-hun Voc. man if went-l-I was killed-I folks-my neg. tell-they-them ‘I am telling you, if I went and got killed they wouldn’t even have the decency to tell my folks.’

a. Normal rate:
\[ ((\text{haa zool in ruh kitil} \_ \text{ʔahal-i} \_ \text{маа ʕxabbir-uu-hun})_U) \]

b. Narrative rate:
\[ ((\text{haa zool in ruh kitil})_U \_ \text{ʔahal-i} \_ \text{маа ʕxabbir-uu-hun})_U \]

Each of the above utterances constitutes the domain of one intonation contour in normal speech and the domain of two intonation contours in narrative style. Accordingly, each utterance is parsed into one I-Phrase in the a-examples and two I-Phrases in the b-examples. The underlined consonants are unsyllabified segments resulting from adding the subject suffix to a verb ending in a consonant. In the (a)-examples the segment is consistently syllabified within the same I-Phrase as an onset of the initial vowel of the following word. In the (b)-examples, it is consistently deleted and a glottal stop appears in the onset position of the initial syllable in the second I-Phrase. This is consistent with our earlier conclusion that syllabification is blocked across the I-Phrase boundary.
Accordingly, we conclude that deletion occurs at the I-Phrase level whenever the stray consonant cannot be properly syllabified within the same I-Phrase.

To summarize, unsyllabified segments resulting from affixation of the subject suffixes are consistently repaired through consonant deletion. When they occur word-internally, they are repaired at the word level; when they occur word-finally they are repaired at the I-Phrase level. In the next section, I consider the implications of these findings on the degree of restriction that Shukriiya places on syllabification and resyllabification.

3.4 Syllabification in Shukriya: A first look
Unsyllabified segments in Shukriiya may arise in two contexts. The first one is the second consonant in a root-final CC cluster, which may consist of a full geminate, a partial geminate, or heterorganic consonants. The second one results from affixation of the homophonous first person singular and second person masculine singular subject suffixes to a stem ending in a consonant. The discussion in the previous section reveals that a word-internal unsyllabified segment that is part of a root is repaired at the word level through low vowel epenthesis. A word-final segment that is part of a root, on the other hand, is retained unsyllabified up to the I-Phrase level. At this level, the repair strategy differs depending on the membership of the segment; the second member of a full or partial geminate is deleted while the second member of a heterorganic cluster is repaired through high vowel epenthesis. In contrast, an unsyllabified segment that is part of an affix is consistently repaired through consonant deletion. When it occurs word-internally it is repaired at the word level and
when it occurs word-finally it is repaired at the I-Phrase level. The generalization that emerges from these findings is that word-internal unsyllabified segments are repaired at the word level while word-final segments are retained unsyllabified up to the I-Phrase level.

Given these facts, we are able to identify the degree of restriction that Shukriiya places on syllabification. Specifically, we have observed that unsyllabified segments are tolerated up to the I-Phrase level but only in word final position. At this level, they are either properly syllabified or erased. Word-internal unsyllabified segments, on the other hand, are repaired at the word level. Accordingly, we conclude that initial syllabification in Shukriiya is not exhaustive. With the exception of an extrasyllabic segment at the right edge of the word, all segments must be properly syllabified at the word level. At the I-Phrase level, all segments must be properly syllabified and extrasyllabic segments are disallowed. Our conclusion regarding the degree of restriction on resyllabification, which is based on the interaction between syncope and resyllabification rules, remains unchanged. I have concluded, based on the domain of syncope in Shukriiya, that resyllabification may apply freely up to the I-Phrase level. At this level, syllabification is fixed and alterations to syllable structure beyond the I-Phrase are disallowed.

3.5 Conclusion
Examination of the processes of syncope, degemination, epenthesis, and consonant deletion in Shukriiya reveals that phrase-level phonology is very active in this dialect. Perhaps one of the most interesting findings in this regard is the fact that, unlike the situation in UCSA, none of the phrasal rules in
Shukriiya applies in a domain that is delimited by the edges of syntactic constituents. Instead, the prosodic level of I-Phrase characterizes the domain of all phrasal rules in this dialect. This is reflected in the fact that syllabification and resyllabification are less restricted in Shukriiya than they are in UCSA. In the next chapter, I examine Hamar, which differs from both dialects in interesting details.
Chapter 4: The Hamar Dialect

4.0 Introduction

The organization of this chapter is similar to the previous two. To identify the degree to which syllabification and resyllabification are restricted in Hamar, I examine the processes of syncope, consonant deletion, and epenthesis. We will see that this dialect exhibits features similar to those in UCSA and Shukriiya, but also diverges from them in some interesting ways.

I begin by examining syncope and show that Hamar has the same pattern attested in Shukriiya; both RHS and LHS apply up to the I-Phrase level and are blocked above it. Accordingly, I conclude that Hamar places the same degree of restriction on resyllabification as does Shukriiya. That is, resyllabification is permissible up to the I-Phrase level. At this level, syllabification is fixed and further alterations to syllable structure are disallowed. Then, I consider strategies of repairing unsyllabified segments. I show that both word-internal and word-final unsyllabified segments in Hamar are consistently repaired at the word level. I conclude accordingly that, unlike the situation in UCSA and Shukriiya, initial syllabification in this dialect is exhaustive; all segments must be properly syllabified at the word level and extrasyllabic segments are disallowed. Thus, initial syllabification is more constrained in Hamar than it is in UCSA and Shukriiya.

4.1 Syncope in Hamar

Similar to UCSA and Shukriiya, Hamar is a differential dialect in which syncope is attested at the word and phrase levels. In this section, I demonstrate that while
word-level syncope exhibits the same pattern observed in the former two dialects, phrase-level syncope exhibits the pattern observed in Shukriiya.

4.1.1 Syncope at the word level

To demonstrate the effect of syncope at the word level, consider the noun stems in (1) below.

<table>
<thead>
<tr>
<th></th>
<th>Noun</th>
<th>Noun-1.sg.Poss.</th>
<th>Gloss</th>
</tr>
</thead>
<tbody>
<tr>
<td>a.</td>
<td>hábil</td>
<td>hábli</td>
<td>‘robe’</td>
</tr>
<tr>
<td>b.</td>
<td>šábur</td>
<td>šábru</td>
<td>‘patience’</td>
</tr>
<tr>
<td>c.</td>
<td>mánzil</td>
<td>mánzili</td>
<td>‘camp site’</td>
</tr>
<tr>
<td></td>
<td>cf. *máňzli</td>
<td></td>
<td></td>
</tr>
<tr>
<td>d.</td>
<td>húmbuk</td>
<td>húmbuki</td>
<td>‘wild berries’</td>
</tr>
<tr>
<td></td>
<td>cf. *húmbki</td>
<td></td>
<td></td>
</tr>
<tr>
<td>e.</td>
<td>sīlāah</td>
<td>sīláahí</td>
<td>‘weapon’</td>
</tr>
<tr>
<td></td>
<td>cf. *sīláah</td>
<td></td>
<td></td>
</tr>
<tr>
<td>f.</td>
<td>kubáar</td>
<td>kubáari</td>
<td>‘elders’</td>
</tr>
<tr>
<td></td>
<td>cf. *kúbaar</td>
<td></td>
<td></td>
</tr>
<tr>
<td>g.</td>
<td>hámúu</td>
<td>hamúuñj</td>
<td>‘father-in-law’</td>
</tr>
<tr>
<td></td>
<td>cf. *hám</td>
<td></td>
<td></td>
</tr>
<tr>
<td>h.</td>
<td>sáñi</td>
<td>sañiñj</td>
<td>‘striving’</td>
</tr>
<tr>
<td></td>
<td>cf. *sáñ</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

The data in (1) indicate that syncope has the same effect at the word level in Hamar as it does in UCSA and Shukriiya. It is evident from the alternation pattern exhibited by the forms in (a) and (b) that affixation of the vocalic suffix triggers the deletion of the stem high vowel. The rest of the examples show that syncope is blocked in the same contexts observed in the other two dialects. That is, deletion does not occur in the forms in (c)-(f) where the syllable containing the high vowel is not preceded by an open syllable. In (c) and (d), it is preceded by a closed syllable and in (e) and (f) it is the first syllable in the word. In either context, deletion of the high vowel would result in a complex syllable margin. Similarly, the stem-final vowels in (g) and (h) escape syncope even though they
are unstressed and are preceded by open syllables. The fact that these vowels are long and stressed in the affixed forms is consistent with the view I argued for in Chapter 2 that they are long in the underlying form and are shortened at the end of the word. \(^1\) Likewise, the fact that the final vowels in the affixed forms in (c)-(f) are not deleted even though they are preceded by open syllables indicates that syncope in Hamar does not target vowels that are part of inflectional endings.

With respect to the context following the syncopated vowel, the same facts observed in UCSA and Shukriiya are also observed in Hamar. Because all three dialects disallow onsetless syllables, affixation to the vocalic suffix triggers the syllabification of the coda of the high vowel into an onset, rendering the high vowel in an open syllable. As illustrated by the form in (2a) below, this effect is audible in surface syllabification.

(2) Noun Noun-1.sg.Poss. Gloss
a. màn.zìl màn.zì.li ‘camp site’
b. hà.bi.lì hà.bi.li → hàb.li ‘robe’
c. šà.bùr šà.bù.ri → šàb.ri ‘patience’

We have seen in (1) above that the suffixed form in (2a) does not undergo syncope while those in (2b) and (2c) do. Accordingly, we conclude that syncope in Hamar targets a short unstressed high vowel in an open syllable that is preceded by an open syllable.

In summary, the above discussion reveals that Hamar exhibits the same pattern of word-level syncope attested in UCSA and Shukriiya. In the next section, I examine phrasal syncope.

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\(^1\) As observed in UCSA and Shurkriiya, the possessive suffix -i surfaces as a glide j upon affixation to stems ending in a vowel.
4.1.2 Syncope at the phrase level

At the segmental level, the context of phrasal syncope in Hamar is the same as that in UCSA and Shukriiya; it spans the word boundary targeting the underlined vowel in the sequence V (#) C v C (#) V. In chapter two, I have demonstrated that the phrasal domain of syncope in UCSA is asymmetrical, with LHS applying up to the P-Phrase level and RHS applying up to the I-Phrase level. In the previous chapter, we saw that this asymmetry is not attested in Shukriiya. In this section, I show that the pattern of phrasal syncope in Hamar is similar to that in the latter. Specifically, I show that LHS and RHS have the same phrasal domain and that this domain is not delimited by the edges of syntactic constituents but is best characterized by the prosodic level of I-Phrase.

To illustrate this point, consider the examples of RHS and LHS given in (3) and (4), respectively.

(3) RHS: V#C.CV

a. S + V-Obj  тāaha rıkīb-ha  →  тāaha rıkība
   Taha  rode(3.m.sg.)-3.f.sg.
   ‘Taha mounted it (the mare).’

b. V + Obj  jádd-u  rukāab-hun  →  jáddu rukābhun
   saddled-3.m.pl.  horses-Poss.3.m.pl.
   ‘They saddled their horses.’

c. N + N  lo’ori  turāab  →  lòori tràab
   lorry (of)  dirt
   ‘a dirt truck (a truck used to transport dirt)’

d. N + Adj  bināyya  hléewa  →  bināyya hléewa
   girl  beautiful (diminutive)
   ‘a beautiful (little) girl’

e. Prep + N  lée humāar-hu  →  lee hmáarhu
   for donkey-Poss.3.m.sg.
   ‘for his donkey’
f. N + Pred  

\[ \text{?axwáan-ha} \quad \text{ku}táar \]  

brothers-Poss.3.f.sg. many  

\[ \rightarrow \quad \text{?axwàanha} \quad \text{ktáar} \]  

\begin{center}
‘She has many brothers.’
\end{center}

(4) LHS:VC_C#V

a. S + V  

\[ \text{?al-hábil} \quad \text{ingäta}^{c} \]  

the-robe broke-3.m.sg.  

\[ \rightarrow \quad \text{?alhàbl} \quad \text{ingäta}^{c} \]  

cf. *\text{?alhàbl} \quad \text{ingäta}^{c}  

\begin{center}
‘The robe broke.’
\end{center}

b. V + Obj  

\[ \text{libís} \quad \text{ad-diri}^{c} \]  

wore(3.m.sg.) the-armour  

\[ \rightarrow \quad \text{libís} \quad \text{addiri}^{c} \]  

\begin{center}
‘He put on the armour.’
\end{center}

c. N + Rel. clause  

\[ \text{?al-hábil} \quad \text{al-ingga}ta^{c} \]  

the-robe that-broke-3.m.sg.  

\[ \rightarrow \quad \text{?alhàbl} \quad \text{alingga}ta^{c} \]  

\begin{center}
‘the robe that broke’
\end{center}

d. N + N  

\[ \text{súru}^{c} \quad \text{al-múhur} \]  

rein (of) the-stallion  

\[ \rightarrow \quad \text{súru}^{c} \quad \text{almúhur} \]  

\begin{center}
‘the rein of the stallion’
\end{center}

e. N + Adj  

\[ \text{?aj-íahil} \quad \text{as-sayír} \]  

the-child the-little  

\[ \rightarrow \quad \text{?ajàahl} \quad \text{assayír} \]  

\begin{center}
‘the little child’
\end{center}

f. N + Pred  

\[ \text{?ar-rámul} \quad \text{áhamar} \]  

the-sand (is) red  

\[ \rightarrow \quad \text{?arrámul} \quad \text{áhamar} \]  

cf. *\text{?arrámul} \quad \text{áhamar}  

\begin{center}
‘The sand is red.’
\end{center}

The data in (3) and (4) indicate that, when the segmental environment is met, the high vowel deletes irrespective of the syntactic structure and the position of the target vowel. This is the same pattern observed in Shukriiya, which differs from that in UCSA with respect to LHS. I illustrate this point with reference to the UCSA and Shukriiya forms corresponding to the Hamar data in (4a) and (4f) above. The relevant UCSA and Shukriiya forms are repeated for convenience in (5) and (6), respectively.

(5) UCSA

a. S + V  

\[ \text{?al-kálib} \quad \text{áká}l \]  

the-dog ate (3.m.sg.)  

\[ \rightarrow \quad \text{?alkálib} \quad \text{ákál} \]  

cf. *\text{?alkálb} \quad \text{ákál}  

\begin{center}
‘The dog ate.’
\end{center}
b. N + Pred  
\[?\text{at-táajír} \rightarrow ?\text{attáajír}}\]
the-merchant (is) honest  
\[\text{The merchant is honest.'}\]

(6) Shukriiya

a. S + V  
\[?\text{āš-ságur indálla} \rightarrow ?\text{āšṣágr indála}\]
the-eagle descended-3.m.sg.  
\[\text{The eagle descended.'}\]

b. N + Pred  
\[?\text{al-múhr} \rightarrow ?\text{almúhr}\]
the-stallion (is) piebald  
\[\text{The stallion is piebald.'}\]

Deletion does not occur in the UCSA forms in (5) because the segmental context of syncope spans separate P-Phrases. In contrast, deletion occurs in the Shukriiya forms in (6) and the equivalent Hamar forms in (4a) and (4f), indicating that the domain of syncope in the latter two dialects is larger than that in UCSA. In section 3.1.3, I established that this domain is the I-Phrase in Shukriiya. In the following section, I show this to be the case in Hamar as well.

4.1.3 The phrasal domain of syncope

In identifying the phrasal domain of syncope in Hamar, I examine two possible prosodic levels: the P-Phrase and the I-Phrase. I show that, similar to the situation in Shukriiya, the respective domains of RHS and LHS are accurately characterized with reference to the I-Phrase but not with reference to the P-Phrase.

Let us first consider the assumption that the P-Phrase is the relevant prosodic level. This is problematic because the domain of syncope in Hamar cannot be consistently identified with reference to syntactic structure nor with reference to phonological weight. To demonstrate this point, consider the structures of examples (3a) and (4a), given in (7a) and (7b), respectively.
In (7a), the context of RHS spans the right edges of NP and N as well as the left edges of VP and V. The same fact is observed with respect to the context of LHS in (7b). Evidently, the respective domains of RHS and LHS are demarcated by neither the edges of $X_{head}$ nor the edges of $X_{max}$.

As I point out in the previous chapter, the fact that the context of syncope spans the edges of syntactic constituents does not preclude the possibility that it applies within the P-Phrase, but merely indicates that the domain in Hamar is larger than that in UCSA. Accordingly, it is possible that the relevant domain in Hamar is also the P-Phrase and that phrasing in this dialect is determined according to phonological weight. However, weight is an equally unreliable criterion for identifying the domain in question. This is because the number of phonological words within the domain of syncope in Hamar varies considerably.
On a par with the examples in (3) and (4), where the domain consists of two words, there are cases where the domain consists of three and four words. This is illustrated by the data in (8) below.

(8)  a. binayyaat-na   rugaab-na   fidaa-hin
     girls-our  necks-our  sacrifice-their
     ‘We sacrifice ourselves to protect our daughters.’
     →  binayyaat-na  rgaab-na  fd打响

b.  saraq  dirʕ al-aafs  al-ʕaar  ar-riheed
    stole(he)  armour  the-knight  who-guarding  the-reservoir
    ‘He stole the armour of the knight guarding the reservoir.’
    →  saraq dirʕ al-ffaars  al-ʕaar  ar-riheed

The two underlined vowels in (8a) are potential targets of syncope. As shown in the corresponding surface form, the vowels are deleted, indicating that the domain of syncope in this case consists of three phonological words. Similarly, the three underlined vowels in (8b) delete, indicating that the domain of syncope in the latter consists of four words.

In summary, the domain of syncope in Hamar is neither delimited by the edges of syntactic constituents nor is it identifiable with reference to phonological weight. Accordingly, we conclude that prosodic level that characterizes this domain is not the P-Phrase.

The second possibility to explore is that the I-Phrase is the prosodic level relevant to characterizing the domain of syncope. As the following discussion reveals, this is indeed the case. Syncope in Hamar consistently applies within the I-Phrase and is consistently blocked across its boundary. To demonstrate this fact, consider the examples of RHS and LHS given in (9) and (10), respectively.
(9) RHS blocked across the I-Phrase boundary
ba‘ad jaddee-na bukaar-na rikib-na gaaşdiin daar after saddled-1.pl. young camels-1.pl. rode-1.pl. aiming home hamar Hamar
‘After we saddled our young camels, we rode for the Hamar’s quarters.’

a. Fast rate:
   
   ((ba‘ad jaddee-na bkaar-na rikib-na gaaşdiin daar hamar))

b. Normal rate:
   
   ((ba‘ad jaddee-na bkaar-na) (rikib-na gaaşdiin daar hamar))

(10) LHS blocked across the I-Phrase boundary
‘You accused her of having an evil eye? What could she envy you for?’

b. Fast rate:
   
   ((xattee-tan fii ‘een-ha l-husd intan ta-hasidkan ‘alee jīnu))

c. Normal rate:
   
   ((xattee-tan fii ‘een-ha l-husud) (?intan ta-hasidkan ‘alee jīnu))

Each of the above utterances constitutes the domain of one intonation contour in fast speech. In normal rate of speech, however, it forms the domain of two distinct intonation contours. Accordingly, each utterance is parsed into one I-Phrase in (a) and two I-Phrases in (b). The example in (9) consists of two vowels that are potential targets of RHS. Both vowels delete in (9a) but only the first one deletes in (9b). This is to be expected if the domain of syncope is the I-Phrase. In the former case the segmental context of RHS is within one I-Phrase while in the latter it spans two I-Phrases. Similarly, the example in (10) contains one vowel that is a potential target of LHS which deletes in (10a) but fails to do so in (10b). Again, this is consistent with the fact that the segmental context of LHS is contained within one I-Phrase in the former but straddles two I-Phrases in the latter.
The pattern of phrasal syncope observed above is the same as that attested in Shukriiya. The fact that both RHS and LHS consistently apply within the I-Phrase and are consistently blocked beyond it constitutes conclusive evidence that the domain of syncope in Hamar is also the I-Phrase. This means that Hamar imposes the same degree of restrictions on resyllabification as does Shukriiya. In both dialects, resyllabification remains freely in progress up to the I-Phrase level, but at this level syllabification is fixed and alterations to syllable structure are disallowed. This is why syncope applies up to the I-Phrase level but not beyond. In the next section, I examine the processes utilized by Hamar as strategies of repairing unsyllabified segments and identify their respective levels.

4.2 Repairing unsyllabified segments

In this section I examine two types of unsyllabified segments in Hamar. The first one results from adding a consonantal suffix to a stem ending in a consonant, and the second one arises from roots ending in geminates. These unsyllabified segments are consistently stray-erased except for a word-internal second member of a geminate, which is repaired in a sub-grammar of Hamar through epenthesis. In order to establish the degree of restriction that this dialect places on initial syllabification, I examine these unsyllabified segments in two contexts: word-final and word-internal positions. For each context, I identify the level at which the segment is repaired or erased.

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2 See section 3.1.5 for the full discussion on the interaction between syncope and resyllabification.

3 This sub-grammar is represented by the speech of one Hamar consultant who consistently utilized epenthesis in this context. The other two consultants utilized consonant deletion.
4.2.1 Unsylabified segment arising from affixation

Unsyllabified segments arising from affixation in Hamar involve concatenation of the same morphemes as in UCSA and Shukriiya. In all three dialects, an unsyllabified segment that is part of an affix arises from adding the homophonous first person singular and second person masculine singular subject suffixes to a verb stem ending in a consonant. In Hamar, this is illustrated by the examples in (11) below.

(11) a.  
jazzée-t  ‘I/you sheared’  
faddée-t  ‘I/you saddled’  
šihii-t  ‘I/you woke up’  
wi’ii-t  ‘I/you wisened up’

b.  
malák  ‘I/you owned’  cf. *malakta  
daxál  ‘I/you entered’  cf. *daxalta  
wagaf  ‘I/you stood’  cf. *waqafta  
simī  ‘I/you heard’  cf. *simīta

The subject suffixes appear in the surface form with the stems ending in a vowel in (11a) but not with those ending in a consonant in (11b). This is the same pattern observed in Shukriiya in section 3.3. It is evident that the underlying form of these suffixes in Hamar is also /t/ and that affixation to the stems in (11b) results in an unsyllabified segment. As is the case in Shukriiya, this segment is subsequently deleted. The unacceptable forms confirm that, unlike UCSA, Hamar does not utilize the Cv pattern of epenthesis to repair this segment.4 The next step, then, is to identify the level at which the unsyllabified segment is deleted.

Let us first examine cases where the unsyllabified segment arising from affixation occurs in word-final position. These cases reveal that Hamar differs from Shukriiya in a significant way. I demonstrated in section 3.3 that this segment is retained in Shukriiya up to the I-Phrase level where it is deleted if it

4 We will see below that this is the pattern of epenthesis utilized by a subgrammar of Hamar to repair a word-internal unsyllabified second member of a geminate.
cannot be properly syllabified. Contrastively, deletion of this segment occurs at the word level in Hamar. To demonstrate this point, consider the Shukriiya and Hamar examples given in (12) and (13), respectively.

(12) Shukriiya
   a. naadee-t ahmad → naa. deet ah. mad → [naa. dée. ūah. mad]
      called-1.sg. Ahmad ‘I called Ahmad.’

   b. xabbar-t ahmad → xab. bar. ūah. mad → [xab. bár. ūah. mad]
      told-1.sg. Ahmad ‘I told Ahmad.’

(13) Hamar
   a. laaqee-t ahmad → laa. geet ah. mad → [laa. gëe. ūah. mad]
      met-1.sg. Ahmad ‘I met Ahmad.’

   b. kallam-t ahmad → kal. lam. ūah. mad → [kal. lá. mah. mad]
      told-1.sg. Ahmad ‘I told Ahmad.’

In the above examples, the second word begins with a vowel. In the a-examples, where the verb stem ends with a vowel, affixation of the consonantal subject suffix results in a segment that is properly syllabified at the word level. In both dialects, this segment is resyllabified at the phrase level as an onset of the initial syllable of the following word to satisfy the obligatory Onset requirement. Contrastively, the verb in the b-examples ends with a consonant. As a result, affixation yields a word-final segment that cannot be properly syllabified at the word level. As indicated by the surface form in (12b), this segment is retained up to the phrase level in Shukriiya and it escapes deletion because it can be properly syllabified as an onset of the initial syllable of the following word. This is not the case in Hamar. Not only is the segment absent from the surface in (13b), but the coda of the last syllable of the verb stem appears in the onset position of the
initial syllable of the second word. This is conclusive evidence that the word-final unsyllabified segment is deleted at the word level in this dialect.

Let us now examine cases where the unsyllabified segment that is part of an affix occurs word-internally. Consider the examples in (14) below.

\begin{align*}
(14) \quad a. \quad /\text{simi}^\varsigma-t\text{-kan}/ & \rightarrow \text{si. mi}^\varsigma. \text{t. kan} \rightarrow [\text{si. mi}^\varsigma. \text{kan}] \quad \text{cf. *}[\text{si. mi}^\varsigma. \text{t. a. kan}] \\
& \text{heard-1.sg.-2.f.pl.} \\
& \text{‘I heard you.’} \\

b. \quad /\text{madah}^\varsigma-t\text{-hin}/ & \rightarrow \text{ma. dah. t. hin} \rightarrow [\text{ma. dāh. hin}] \quad \text{cf. *}[\text{ma. dah. t. a. hin}] \\
& \text{praised-1.sg.-3.f.pl.} \\
& \text{‘I praised them.’}
\end{align*}

In the examples above, the subject suffix is added to a stem that ends with a consonant and is followed by a consonant-initial object suffix. Consequently, the output of word-level syllabification consists of a word-internal unsyllabified segment. As indicated by the corresponding surface forms, this segment may not be repaired through epenthesis but is deleted instead. I have established above that this type of segment is deleted at the word level when it is word final. In the absence of evidence to suggest otherwise, we conclude that it is also deleted at the word level when it is word internal. In the next section I examine the unsyllabified segments that arise from roots ending in geminates.

### 4.2.2 The second member of a root-final geminate

Like UCSA and Shukriiya, Hamar has roots that end in a two-consonant cluster which is never tautosyllabic in the surface forms. In Hamar, the cluster may consist of either a full or partial geminate. When the second member of the geminate cannot be properly syllabified, it is deleted except in a sub-grammar of
Hamar where it is repaired through epenthesis when it is word internal. I demonstrate below that both deletion and epenthesis occur at the word level.

For ease of exposition, I begin by illustrating the facts with reference to cases where the second member of the geminate is rendered word internal through affixation. Consider the roots ending in a full and partial geminates given in (15) and (16), respectively. The surface forms marked “Sub-G” are those from the sub-grammar that utilizes the Cv pattern of epenthesis.

(15) a. /sir-i/  
   secret-1.sg.  
   ‘my secret’  
   → sir. ri  
   → Sub-G → [sir. ri]

b. /sir-kan/  
   secret-2.f.pl.  
   ‘your secret’  
   → sir. r. kan  
   → Sub-G → [sir. rə. kan]

c. /sir-hin/  
   secret-3.f.pl.  
   ‘their secret’  
   → sir. r. hin  
   → Sub-G → [sir. rə. hin]

(16) a. /Ôan-b-i/  
   near-1.sg.  
   ‘near me’  
   → Ôam. bı  
   → Sub-G → [Ôam. bı]

b. /Ôan-b-kan/  
   near-2.f.pl.  
   ‘near you’  
   → Ôam. b. kan  
   → Sub-G → [Ôam. ba. kan]

c. /Ôan-b-hin/  
   near-3.f.sg.  
   ‘near them’  
   → Ôam. bı. hin  
   → Sub-G → [Ôam. ba. hin]

The second member of the geminate is rendered word internal through affixation of a possessive suffix. In the a-examples, this suffix is vocalic. As indicated by the output of word-level syllabification, this makes it possible to syllabify the second member of the geminate as an onset of the following syllable. In the b-examples and the c-examples, on the other hand, the possessive suffix is

---

5 This sub-grammar of Hamar is similar to UCSA and Shurkiiya, where the second member of the geminate is repaired through Cv epenthesis word-internally but is deleted word-finally.
consonant initial. Thus, word-level syllabification yields a word-internal unsyllabified segment. As indicated by the corresponding surface form, this segment is either deleted or, in the case of the sub-grammar, repaired through epenthesis. Before I address the question of the level at which deletion and epenthesis occur, I examine cases where the second member of the geminate occurs word-finally.

In section 2.1.3.4.1 I demonstrated that the word-final second member of the geminate in UCSA is retained up to the P-Phrase level where it is deleted if it cannot be properly syllabified. In section 3.1.4.1, I showed that it is retained up to the I-Phrase level in Shukriiya. I provide evidence below that this type of unsyllabified segment in Hamar is never retained beyond the word level. As it turns out, the word-final second member of the geminate is deleted even in the sub-grammar of Hamar that utilizes epenthesis word-internally. This is illustrated by the example in (17) below.

(17) a. as-sirr iŋ-kaʃaf → as. sir. iŋ. ka. ŋaf → as. si. riŋ. ka. ŋaf
   the-secret Pass.uncovered Sub-G → as. si. riŋ. ka. ŋaf
   'The secret was uncovered.'

   b. ʃaŋb əm. ahmad → ʃam. b. ah. mad → ʃa. mah. mad
   near Ahmed Sub-G → ʃa. mah. mad
   'near Ahmed'

In both examples, the second word begins with a vowel. The second member of the geminate cannot be properly syllabified by word-level syllabification. If it is retained up to the phrase level, we expect it to be syllabified as an onset of the initial syllable of the second word. However, the corresponding surface forms do not contain geminates and, as is evident from (17.b), it is the first member of the geminate that is syllabified as an onset of the initial syllable of the following word. This is conclusive evidence that the word-final second member of the
geminate is deleted at the word level. Accordingly, we conclude that this segment is also deleted at the word level when it is rendered word internal through affixation.

4.2.3 Conclusion

In the preceding sections, I examined two types of unsyllabified segments in Hamar. I have demonstrated that an unsyllabified segment arising from affixation is consistently deleted at the word level in both word-final and word-internal contexts. I have also shown that a word-final unsyllabified segment arising from roots ending in geminates is consistently deleted at the word level. When this segment occurs word-internally, it is predominantly deleted except in a sub-grammar of Hamar where it is repaired also at the word level but through epenthesis. In the next section, I consider the significance of these findings in relation to the degree of restriction that Hamar places on syllabification.

4.3 Syllabification in Hamar: A first look

The generalization that emerges from the preceding discussion is that word-internal as well as word-final unsyllabified segments are consistently repaired at the word level. Given this statement, we are in position to identify the degree of restriction this dialect places on initial syllabification: initial syllabification in Hamar is exhaustive. That is, all segments must be properly syllabified at the word level and extrasyllabic segments are disallowed. Given that the domain of syncope in Hamar is the I-Phrase, I have concluded that resyllabification remains freely in progress up to the I-Phrase level but at this level syllabification is fixed and alterations to syllable structure are disallowed.
4.4 Conclusion

Examination of the processes of syncope, consonant deletion, and epenthesis reveals some interesting similarities and differences between Hamar, on the one hand, and UCSA and Shukriiya, on the other. While initial syllabification is more constrained in Hamar than it is in the other two dialects, resyllabification is as constrained in Hamar as it is in Shukriiya. In the next chapter, I address this issue of dialectal variation in more detail.
Chapter 5: Syllabification in UCSA, Shukriiya, and Hamar

5.0 Introduction

In this chapter I propose a formal analysis of syllabification in the three dialects. For each dialect, the analysis identifies the degree of restriction placed on initial syllabification as well as subsequent syllabification and resyllabification. This is achieved by identifying the following aspects of syllabification: 1) the degree to which initial syllabification is exhaustive; 2) the type of segments, if any, that may be marked extrasyllabic and the conditions regulating their extrasyllabic status; 3) the phrasal level at which these segments must be properly syllabified; and 4) the level at which syllabification is fixed and further alteration to syllable structure is disallowed. In establishing the degree to which syllabification and resyllabification are restricted in these dialects, the analysis provides a principled account for the levels of repairing unsyllabified segments as well as the domains of syncope.

I begin with a summary of the levels and strategies of repairing of unsyllabified segments in the three dialects followed by a summary of syncope. In section 5.3, I discuss the assumptions underlying the analysis of syllabification and in section 5.4 I present the analysis.

5.1 Repairing unsyllabified segments in the three dialects

Unsyllabified segments arise in all three dialects from two contexts. The first one involves affixation of the homophonous first person singular and second person masculine singular subject suffixes to a stem ending in a consonant. The second context arises from roots ending in a two-consonant cluster. In all three dialects this cluster may consist of a full or partial geminate, and in Shukriiya it may also
Consist of heterorganic consonants. This section is a brief summary of the strategies utilized to repair these segments and their respective levels in the three dialects.

As the discussion in the previous chapters revealed, although the three dialects exhibit some similarities with respect to the levels at which unsyllabified segments are repaired and the strategies utilized to repair them, they exhibit some significant differences. These are summarized in (1) below. In this table, “Affix” refers to an unsyllabified segment arising from affixation and “Root” to one arising from a root ending in a two-consonant cluster.¹

1 Levels and strategies of repairing unsyllabified segments in the three dialects

<table>
<thead>
<tr>
<th></th>
<th>Word-internal unsyllabified segments</th>
<th>Word-final unsyllabified segments</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Affix</td>
<td>Root</td>
</tr>
<tr>
<td>Hamar</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Level</td>
<td>Word</td>
<td>Word</td>
</tr>
<tr>
<td>Strategy</td>
<td>C-Deletion</td>
<td>C-Deletion</td>
</tr>
<tr>
<td>UCSA</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Level</td>
<td>Word</td>
<td>Word</td>
</tr>
<tr>
<td>Strategy</td>
<td>Epenthesis</td>
<td>Epenthesis</td>
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<tr>
<td>Shukriiya</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Level</td>
<td>Word</td>
<td>Word</td>
</tr>
<tr>
<td>Strategy</td>
<td>C-Deletion</td>
<td>Epenthesis</td>
</tr>
</tbody>
</table>

¹ It is important to note that the affix-root distinction in this context is a purely descriptive one. It is not intended to imply that the morphological identity of the segment is a factor with respect to syllabification.
In all three dialects, both types of unsyllabified segments are repaired at the word level when they are word internal. In contrast, the dialects exhibit considerable divergence with respect to the level at which the segments are repaired word-finally. In Hamar, both types of segments are also repaired at the word level. In UCSA, an unsyllabified segment that is part of an affix is repaired at the word level but one that is part of a root is repaired at the P-Phrase level. In Shukriiya, both types of segments are repaired at the I-Phrase. The generalization that emerges is that, with the exception of word-final segments in Shukriiya and a word-final segment that is part of a root in UCSA, all unsyllabified segments are repaired at the word level. We also observe that the dialects vary considerably with respect to the strategies of repair and that there is no correlation between the strategy utilized and the type of unsyllabified segment. Perhaps the exception to the latter statement is Shukriiya, where unsyllabified segments arising from affixation are consistently deleted and the second member of a root-final cluster is repaired through epenthesis word-internally. In word-final position, it is also repaired through epenthesis if the cluster consists of heterorganic consonants and through deletion if it consists of geminates.2

2 It is not my goal to explain why a given segment is repaired through one strategy but not another. Indeed, even when a correspondence between the type of segment and choice of strategy is observed, it cannot be consistently explained. The Shukriiya facts might be used to make the case for repair strategy that requires morpheme realization. A well known morphological property of Semitic languages is that the core meaning of a root is signaled by consonantal material. Accordingly, one might argue that repairing root-segments through epenthesis is motivated by the need to realize morphemes phonetically. Such an argument would not necessarily be weakened by the fact that the second member of the geminate and the subject suffix are deleted because both are recoverable from the location of stress on surface forms (cf. /mahall/ > [mahál] ‘place’ vs. /mahal/ > [máhal] ‘drought’ and /ʔakal-t/ > [ʔakál] ‘I/You ate.’ vs. /ʔakal/ > [ʔákal] ‘He ate.’). However, the argument cannot be extended to the other two dialects. In UCSA, affix segments are consistently repaired through epenthesis while root segments are deleted word-finally. In Hamar, both types of unsyllabified segments are repaired through deletion.
Before discussing the significance of the levels of repair with respect to syllabification, I briefly review the cross-dialectal variation with respect to syncope.

5.2 The phrasal levels of syncope in the three dialects

I demonstrated in the previous chapters that the three dialects exhibit the same pattern of word-level syncope. At the phrase level, however, they display variation with respect to the domain of syncope. This is summarized in (2) below.

(2) Domains of phrasal syncope in the three dialects

<table>
<thead>
<tr>
<th></th>
<th>Domain of RHS</th>
<th>Domain of LHS</th>
</tr>
</thead>
<tbody>
<tr>
<td>UCSA</td>
<td>I-Phrase</td>
<td>P-Phrase</td>
</tr>
<tr>
<td>Shukriiya</td>
<td>I-Phrase</td>
<td>I-Phrase</td>
</tr>
<tr>
<td>Hamar</td>
<td>I-Phrase</td>
<td>I-Phrase</td>
</tr>
</tbody>
</table>

In all three dialects, RHS applies up to the I-Phrase level and is blocked above it. LHS exhibits the same pattern in Shukriiya and Hamar but not in UCSA, where it is blocked beyond the P-Phrase level. I argued in sections 2.1.3.6 and 3.1.5 that the apparent restriction on the domain of syncope in any given dialect is a reflex of the restriction that the dialect imposes on resyllabification. I revisit this issue in section 5.4.2.2. In the next section, I begin the task of developing a formal analysis of syllabification in the three dialects.
5.3 Syllabification: Theoretical background and assumptions

In this section, I spell out and motivate the assumptions underlying my proposed analysis of syllabification. I also outline the framework within which it is situated.

5.3.1 Iterative syllabification

Throughout my discussion in the previous chapters, I have assumed that syllabification is iterative in all three dialects. In this section, I motivate this assumption. Given the levels of repair of unsyllabified segments summarized in (1) above, I argue that the syllabification algorithm applies at the word and phrase levels and that initial syllabification need not be exhaustive. At both levels, it assigns unsyllabified segments to syllable positions in accordance with the syllable template of a given dialect. In addition, phrase-level syllabification alters the structure of a syllable by reassigning a segment already syllabified at the word level to a new syllable position.

We observed in section 5.1 that, with the exception of word-final segments in Shukriiya and a word-final segment that is part of a root in UCSA, all unsyllabified segments are repaired at the word level. Given the condition that segments must be properly syllabified at the word level or be deleted, we conclude that syllabification applies at the word level.³ We also have evidence to conclude that the degree to which syllabification is exhaustive varies across the three dialects. In Hamar, where segments that are not properly syllabified are stray-erased at the word level, we must assume that syllabification is exhaustive.

³ Independent evidence in support of this conclusion comes from stress. In the following section, I demonstrate that the input to the stress-assigning algorithm in all three dialects must be the output of word-level syllabification and not phrase-level syllabification.
In UCSA, the second consonant in a root-final cluster is repaired at the P-Phrase level when occurring at the end of the word. Similarly, the second member of a word-final cluster in Shukriiya is consistently repaired at the I-Phrase level.

The literature on Arabic dialects provides various analyses for the final consonant in a CVXC sequence.\footnote{Beyond the phonology of Arabic dialects, the status of word-final consonants has been the subject of much debate. For a thorough review of competing theories, the reader is referred to Côté (2011).} Perhaps the earliest account is McCarthy (1979), in which the consonant is adjoined to the preceding heavy syllable. In McCarthy and Prince (1990) the consonant is dominated by a final extrametrical syllable node. In a few accounts varying with respect to some technical details, the consonant is considered to be part of a degenerate or empty-headed syllable (Selkirk 1981b, Angoujard 1990, Piggott 1999). Al-Mohanna (2004) assumes that the consonant is directly associated with the prosodic word. In Kiparsky (2003), the consonant is a semi-syllable represented as a mora that is associated with the prosodic word. In Broselow (1992), Broselow et al. (1995), and Watson (2007), the consonant is associated with the preceding mora. In my proposed analysis, I adopt Hayes’s (1995: 126) assumption that the final consonant in a CVCC sequence escapes initial syllabification.\footnote{As I noted in section 2.3.2.2, I assume that the final consonant in a CVVC sequence is affiliated with the preceding syllable.}

Segments that remain unsyllabified beyond the word level in UCSA and Shukriiya are repaired, where possible, through syllabification. Alternatively, they are stray-erased or, as in the case of the second member of a root-final heterorganic cluster in Shukriiya, repaired through phrasal epenthesis. These facts are schematically represented in (3) and (4), below.
The underlined consonants in (3) and (4) cannot be properly syllabified at the word level. As indicated in the a-examples, they are repaired through syllabification at the P-Phrase level in UCSA and the I-Phrase level in Shukriiya. In both dialects, the segment is syllabified as an onset of the initial syllable of the following word. Because syllabification in this way is not possible in the b-examples, the unsyllabified segment is deleted in UCSA. In Shukriiya, it is either deleted or is repaired through phrase-level epenthesis. The manner in which these unsyllabified segments are syllabified clearly indicates that syllabification applies at the phrase level.6

In order to account for the behaviour of unsyllabified segments described above, I assume that syllabification is iterative applying at the word and phrase levels and that initial syllabification need not be exhaustive. Following the standard view that extrasyllabicity is like extrametricality at the syllabification level, I assume that segments may be marked extrasyllabic at one edge of the domain of syllabification (Hayes 1981, 1985, 1987, 1995). I further assume that extrasyllabic segments at the word level become visible to phrase-level syllabification.

---

6 It would be highly unmotivated to assume that a rule or mechanism other than the syllabification algorithm is responsible for syllabifying these segments at the phrase level. Obviously, this other mechanism would be performing the function of the syllabification algorithm; namely, assigning unsyllabified segments to syllable positions in accordance with the syllable template.
The view of syllabification described above is well motivated in UCSA and Shukriiya but not in Hamar. Recall that in Hamar segments must be properly syllabified at the word level or stray-erased. Thus, unlike the situation in UCSA and Shukriiya, iterative syllabification in Hamar cannot be motivated based on the level of repair of unsyllabified segments. However, a closer examination of the effect of phrasal syllabification reveals that it is attested in Hamar as well. I discuss this point in the following section.

### 5.3.2 Structure-Changing syllabification

Although both word-level and phrase-level syllabification are structure building, only the latter may also be structure changing. The segmental context of this effect arises when a word that ends in a consonant precedes one that begins with a vowel. To satisfy the obligatory onset requirement, phrase-level syllabification may alter the syllable structure by reassigning a segment already syllabified as a coda at the word level to the onset position of the following syllable. Indeed, we have already seen this effect of syllabification in our discussion of syncope in all three dialects. This is illustrated with the Shukriiya example reintroduced in (5) below.

(5) \( \text{ríkb \ an-náaga} \rightarrow \text{ríkb annáaga} \)
\( \text{röde(3.m.sg.) \ the-camel} \)
‘He rode on the camel.’

For the potentially weak vowel in the first word to undergo syncope, it must be in an open syllable. This context can only arise at the phrase level as a result of the structure-changing syllabification. After the coda of the high vowel is resyllabified as an onset of the following syllable, it is deleted.
In this section, I show that the effect of phrasal resyllabification renders opaque the placement of stress. I begin by demonstrating this fact in UCSA and, then, show that the same effect is attested in Hamar. In anticipation of its relevance to the discussion in the following sections, I reintroduce the algorithm responsible for assigning stress in the three dialects in (87) below.

(6)  
\begin{align*}
\text{a. Mora Extrametricality:} & \quad \mu \rightarrow <\mu> \//_{\text{word}} \\
\text{b. Foot Construction:} & \quad \text{From left to right, parse the word into moraic trochees.} \\
& \quad \text{Degenerate feet are forbidden absolutely.} \\
\text{c. Word Layer Construction:} & \quad \text{End Rule Right}
\end{align*}

5.3.2.1 Structure-Changing syllabification in UCSA

As noted above, the segmental context that triggers the structure-changing syllabification arises when a word beginning with a vowel is preceded by one ending in a consonant. To demonstrate the interaction between this resyllabification and stress in UCSA, I consider cases where the preceding word ends in an unsyllabified segment that is deleted before phrase-level syllabification. The significance of this context is that the structure-changing effect will, then, target a segment whose syllabification as a coda at the word level is crucial for predicting the placement of stress. I, then, compare this context to cases where the preceding word ends in a segment that is properly syllabified at the word level.

Consider the examples in (7) and (8), where the second word begins with a vowel.

(7)  
\[
\text{the-place} \quad \text{Ref.-filled} \quad \rightarrow \quad (\text{?al. ma. hál. }\lambda)_{w}\gamma \quad \text{\textquoteleft The place was overcrowded.\textquoteright}
\]

(8)  
\[
\text{the-place} \quad \text{Ref.-filled} \quad \rightarrow \quad (\text{?al. ma. há. }\text{lit. }\text{zám. }\text{ham})_{w}\gamma
\]
The segmental difference to note between the first word in (7) and that in (8) is that the former ends in a geminate while the latter ends in a single consonant. The two words in the former are parsed within separate P-Phrases while those in the latter are parsed within the same P-Phrase.\(^7\) As we have seen in section 2.1.3.4.1, the second member of the geminate in this context does not appear in the surface form and the first member of the geminate appears in the onset position of the following syllable. The same syllabification is observed with respect to the initial word in (8); the coda of the final syllable in this word surfaces as an onset of the initial syllable of the second word. Thus, the surface form of the initial word in (7) differs from that of the initial word in (8) only with respect to the location of stress. In the former, stress falls on the final syllable even though it is now light while, in the latter, it falls predictably on the penultimate. To demonstrate the structure-changing effect of phrase-level syllabification and its interaction with stress, I compare the derivations of these examples below.

Let us begin with the derivation of (7) given in (9) below.

\[\begin{align*}
(7) & \quad [[\text{al-mahal}]_{N} \quad [\text{al-ša’ab}]_{AP}]_{NP} \rightarrow ([?\text{al. má. hal})_{W} (\text{aš. šá. ſa’ab})_{W} , \\
\text{the-drought} & \quad \text{the-harsh} \rightarrow [?\text{al. má. ha. laš. šá. ſa’ab}]
\end{align*}\]

\(\text{‘The harsh drought’}\)

\[\begin{align*}
(9) & \quad \text{i. } /\text{al-mahall}/ \\
\text{ii. } & /\text{it-zaham}/
\end{align*}\]

**Word-level phonology**

\[\begin{align*}
a. & \quad \text{Syllabification:} \\
& \quad (\text{al. ma. hal.)}_{W} \quad (\text{it. za. ham})_{W}
\end{align*}\]

---

\(^7\) The phrasing of (8) is irrelevant to the purposes of the present discussion but is given for completeness.
b. Stress Assignment:

\[
\begin{align*}
( & \quad \mu \quad \mu \quad \mu \quad \mu \quad \mu \\
( & \quad (a \quad l \quad m \quad a \quad h \quad a \quad l)_{\text{w}})
\end{align*}
\]

\[
\begin{align*}
( & \quad \mu \quad \mu \quad \mu \quad \mu \quad <\mu> \\
( & \quad (i \quad t \quad z \quad a \quad h \quad a \quad m)_{\text{w}})
\end{align*}
\]

Word Layer Construction: ERR
Foot Construction: L to R
Mora Extrametricality: Blocked
\[\rightarrow \text{al.ma.hål.l} \quad \text{‘the place’}\]

\[
\begin{align*}
( & \quad \mu \quad \mu \quad \mu \quad \mu \quad \mu \\
( & \quad (i \quad t \quad z \quad a \quad h \quad a \quad m)_{\text{w}})
\end{align*}
\]

Word Layer Construction: ERR
Foot Construction: L to R
Mora Extrametricality
\[\rightarrow \text{it.zá.ham} \quad \text{‘filled up’}\]

Phrase-level phonology

c. P-Phrase Formation:
\[\left( (\text{al. ma. hál. l})_{\text{w}} \right)_{p}\]
d. Stray Erasure:
\[\left( (\text{al. ma. hál. } \emptyset)_{p} \right)_{w}\]
e. Resyllabification into Onset:
\[\left( (\text{al. ma. há. l})_{p}, (\text{it. zá. ham})_{w} \ldots \right)_{l}\]

As indicated in (9a), the output of word-level syllabification of the first word consists of a word-final unsyllabified segment. This segment has the effect of blocking Mora Extrametricality because it separates the final mora from the right edge of the word. The stress-assigning algorithm predictably places the main accent on the final syllable. At the phrase level, the first word is parsed into a P-Phrase. Recall that in UCSA segments that are not properly syllabified are stray-erased at this level. As indicated in (9d), the second member of the geminate cannot be syllabified within the same P-Phrase and is deleted. When the second word becomes visible to phrase level phonology, the first member of the geminate, which at the word level occupies the coda position of the final syllable of the first word, is resyllabified as an onset of the initial syllable of the second word. Evidently, this is a case of phrase-level syllabification reassigning a segment already syllabified at the word level to a new syllable position to satisfy the obligatory onset requirement.
Let us now examine the derivation of (8) given in (10) below.

(10) i. /al-maḥal/ ii. /al-ṣaʿab/

**Word-level phonology**

a. Syllabification:

\[(\text{al. ma. hal})_w\quad (\text{aš. ša. ʿab})_w\]

b. Stress Assignment:

\[
\begin{array}{cccc}
\text{x} & \text{x} & \text{x} & <\mu>\\
\mu & \mu & \mu & \mu
\end{array}
\]

Word Layer Construction: ERR

Foot Construction: L to R

Mora Extrametricality

\[(a \ l \ m \ a \ h \ a \ l)_w\quad \rightarrow\quad \text{al-ма.ḥal } \text{‘the drought’}\]

\[
\begin{array}{cccc}
\text{x} & \text{x} & \text{x} & <\mu>\\
\mu & \mu & \mu & \mu
\end{array}
\]

Word Layer Construction: ERR

Foot Construction: L to R

Mora Extrametricality

\[(a \ s \ s \ a \ ʿ a \ b)_w\quad \rightarrow\quad \text{aš-ṣa.ʿab } \text{‘the harsh’}\]

\[(\text{al. má. hal})_w\quad (\text{aš. šá. ʿab})_w\]

**Phrase-level phonology**

c. Resyllabification into Onset: \(((\text{al. má. ha. l})_w (\text{aš. šá. ʿab})_w \ldots)_p\)

The output of word-level syllabification consists entirely of properly syllabified segments and main stress is predictably assigned. In (10c), the coda of the final syllable of the first word is resyllabified at the phrase level as an onset of the initial syllable of the following word.

The derivations in (9) and (10) clearly illustrate the structure-changing effect in UCSA. Crucially, the location of stress on the initial word in (7) is predictable only if the output of word-level syllabification is the input to the stress-assigning algorithm. If the input to the latter is the output of phrase-level syllabification, the main accent is inaccurately predicted to fall on the penultimate. Thus, the initial word in (7) and that in (8) are predicted to have the same stress. The relevant parts of these derivations are given in (11) below.
In the output of phrase-level syllabification, the final consonant of the first word is an onset of the following word. Extrametricality is blocked because the final mora is not at the right edge of its domain. Foot Construction builds two feet and the End Rule assigns main stress to the right hand foot. Evidently, the output of phrase-level syllabification cannot be the input to the stress-assigning algorithm.

In summary, the examples discussed above provide conclusive evidence that the structure-changing effect of phrase-level syllabification is attested in UCSA. In some cases, it involves segments whose syllabification at the word level is crucial for the purposes of stress assignment. In effect, it renders opaque the location of stress. In the next section I show that this same effect is attested in Hamar.
5.3.2.2 Structure-Changing syllabification in Hamar

As I noted earlier, iterative syllabification in Hamar cannot be motivated in terms of the level of repair of unsyllabified segments because in this dialect all segments are repaired at the word level. In this section I provide evidence for phrase-level syllabification in this dialect by showing that the same structure-changing effect observed in UCSA is attested in Hamar and conclude, accordingly, that syllabification is iterative in this dialect as well.

I demonstrate the interaction between the structure-changing effect of phrasal syllabification and stress in Hamar with reference to the same contexts described in the previous section. That is, I compare a case where the first word ends in an unsyllabified segment that is deleted before phrase-level syllabification to one where the first word ends in a single segment that is properly syllabified at the word level. Consider the examples in (12) and (13) below.

(12) /kallam-t/ /abuu-ha/ → (kal. lám. t)ₚ (a. búu. ha)ₚ ...ₚ 
    told-1.sg. father-3.f.sg. → [kal. lá. ma. búu. ha]
    ‘I told her father.’

(13) /kallam/ /abuu-ha/ → (kál. lam)ₚ (a. búu. ha)ₚ ...ₚ 
    told(3.m.sg.) father-3.f.sg. → [kál. la. ma. búu. ha]
    ‘He told her father.’

In (12), affixation of the subject suffix results in a word-final segment that cannot be properly syllabified at the word level. This segment is not present in the corresponding surface form and the segment that precedes it in the underlying form appears in the onset position of the initial syllable of the second word. The same syllabification pattern is observed in (13), where the initial word ends in a segment that is properly syllabified at the word level. As we have seen in the previous section, the effect of this syllabification is that the surface form of the
initial word in (12) differs from that of the initial word in (13) only with respect
to the location of stress. In the former it falls on the final light syllable while in
the latter it falls predictably on the penultimate.

To demonstrate the interaction between the structure-changing effect of
phrase-level syllabification and the placement of stress in Hamar, let us first
consider the derivation of (12) given in (14) below.

(14)  i. /kallam-t/  ii. /abuu-ha/

**Word-level phonology**

a. Syllabification:
   (kal. lam. t)\(_w\)  (a. buu. ha)\(_w\)

b. Stress Assignment:
   ( x )  ( x )  Word Layer Construction: ERR
   ( x )  ( x )  Foot Construction: L to R
   \( \mu \mu \mu \mu \)  Mora Extrametricality: Blocked
   (k a l l a m t)\(_w\)  \( \rightarrow \)  kal.lám.t ‘I told’

   ( x )  Word Layer Construction: ERR
   ( x )  Foot Construction: L to R
   \( \mu \mu \mu <\mu> \)  Mora Extrametricality
   (a b u u h a)\(_w\)  \( \rightarrow \)  a.búu.ha ‘her father’

   (kal. lám. t)\(_w\)  (a. búu. ha)\(_w\)

c. Stray-erasure:
   (kal. lám. Ø)\(_w\)  N/A

**Phrase-level phonology**

d. Resyllabification into Onset:  ((kal. lá. m)\(_w\) (a. búu. ha)\(_w\) ...)_\(i\)

In (14a), the output of word-level syllabification of the initial word consists of a
string that ends with a word-final unsyllabified segment. Mora Extrametricality
is blocked because the final mora is not at the right edge of the word. Two feet
are constructed and main stress is predictably assigned to the final syllable.
Because all segments must be properly syllabified at the word level in Hamar,
the stray consonant is subsequently deleted. In (14d), the coda of the final
syllable of the first word is resyllabified at the phrase level as an onset of the
initial syllable of the following word. Similar to the situation in UCSA, this is a
clear instance of phrase-level syllabification altering syllable structure by
reassigning a segment already syllabified at the word level to a new syllable
position.

Let us now consider the derivation (13) given in (15) below.

(15)  i. /kallam/  ii. /abuu-ha/

**Word-level phonology**

a. Syllabification:
   \[(\text{kallam})_W \quad (\text{abuu. ha})_W\]

b. Stress Assignment:
   \[
   \begin{array}{c}
   (x) \\
   (x) \\
   \mu \mu \mu <\mu>
   \end{array}
   \quad \text{Foot Construction: L to R}
   \begin{array}{c}
   (k a l l a m)_W \\
   \mu \mu \mu <\mu>
   \end{array}
   \quad \Rightarrow \text{kallam} \text{ ‘he told’}

   \[
   \begin{array}{c}
   (x) \\
   (x) \\
   \mu \mu \mu <\mu>
   \end{array}
   \quad \text{Foot Construction: L to R}
   \begin{array}{c}
   (a b u u h a)_W \\
   \mu \mu \mu <\mu>
   \end{array}
   \quad \Rightarrow \text{abuu. ha} \text{ ‘her father’}

   \[
   \begin{array}{c}
   (k \text{a} \text{ll} \text{a} \text{m})_W \\
   (a \text{b} \text{u} \text{u} \text{h a})_W
   \end{array}
   \quad \Rightarrow \text{abuu. ha} \text{ ‘her father’}

**Phrase-level phonology**

c. Resyllabification into Onset:
   \[((\text{kallam})_W (\text{abuu. ha})_W ...)_I\]

In (15a), the output of word-level syllabification consists entirely of properly
syllabified segments. Mora Extrametricality applies and stress is predictably
assigned to the penultimate. As we observed in the previous example, the coda
of the final syllable of the first word is resyllabified in (15c) as an onset of the
initial syllable of the following word.

The derivations in (14) and (15) demonstrate that the same interaction
between the effect of structure-changing phrasal syllabification and stress
observed in UCSA is also attested in Hamar. The location of stress on the initial word in (14) is predictable only if the output of word-level syllabification is the input to stress assignment. If the input to stress-assigning is the output of phrase-level syllabification, the main accent is inaccurately predicated to fall on the penult. Once again, the initial word in (14) and the initial word in (15) are predicted to have the same stress. This is illustrated in (16) below.

\[(16) \quad \begin{align*}
&i. \quad \text{(kal. lam)}_w (a. \text{buu. ha})_w \\
&\quad \text{‘I told her father.’} \\
&ii. \quad \text{(kal. lam)}_w (a.\text{buu. ha})_w \\
&\quad \text{‘He told her father.’}
\end{align*}\]

**Phrase-level phonology**

a. syllabification:

\[(\text{((kal. la. m)}_w (a. \text{buu. ha})_w...)_l) \quad \text{((kal. la. m)}_w (a. \text{buu. ha})_w...)_l)\]

b. Stress Assignment:

\[
\begin{align*}
&\text{Word Layer Construction: ERR} \\
&(x) \quad \text{Foot Construction: L to R} \\
&\mu \mu \mu \text{ Mora Extrametricality: Blocked} \\
&(k. a 1 1 a m)_W \quad \text{→ ‘kål.lam ‘I told’}
\end{align*}
\]

In the input to the stress-assigning algorithm, the final consonant of the first word is an onset of the initial syllable of the following word. Only one foot is constructed and the heavy penultimate is assigned stress. Evidently, the output of phrase-level syllabification cannot be the input to the stress-assigning algorithm in Hamar.

In conclusion, the structure-changing effect of phrase-level syllabification observed in UCSA in the previous section is also attested in Hamar. This is conclusive evidence that syllabification is iterative in this dialect as well. In the
next section, I examine the structure-changing effect of phrasal syllabification in Shukriiya.

5.3.2.3 Structure-Changing syllabification in Shukriiya

As we have seen in (5) above, the structure-changing effect of phrase-level syllabification is visible in Shukriiya based on its interaction with syncope. Unlike in UCSA and Hamar, this effect does not interact with stress in Shukriiya. Recall that the context required for this interaction involves a word-final unsyllabified segment that is deleted before phrase-level syllabification. In this context, resyllabification targets a segment whose coda status is crucial for the placement of stress at the word level. However, unsyllabified segments in Shukriiya are retained up to the I-Phrase level. This is also the level at which syllabification is fixed and alteration to syllable structure is disallowed. Thus, the context where an unsyllabified segment is deleted before phrase-level syllabification does not arise in Shukriiya. Nonetheless, there is evidence from this dialect also that the input to the stress-assigning algorithm is word-level syllabification.

Consider the example used to establish the domain of consonant deletion in section 3.3, reintroduced here in (17).

(17)  
\[\text{da}’\text{iin in bajjat-t axatir } \text{falee beet } \text{famm-ak} \]
now if spent the night-you go to house uncle-your
‘This time if you spend the night there, visit your uncle’s family.’

a. Normal rate: 
\[((\text{da}’\text{iin in bajjat-t axatir } \text{falee beet } \text{famm-ak}))_U\]

b. Narrative rate: 
\[(((\text{da}’\text{iin in bajjat-t)}_1 (\text{axatir } \text{falee beet } \text{famm-ak}))_U\]
The verb /bajjat-/ ‘you spent the night’ consists of a word-final unsyllabified segment, which is repaired through syllabification within the I-Phrase in (17a). In (17b), this syllabification is not possible across the I-Phrase and the segment is deleted. The relevant point to our discussion is that stress can only be predictably assigned to this word before the unsyllabified segment is deleted.

This is illustrated in (18) below.

(18) a. \( (x), \ (x) \) \( \mu \mu \mu \mu \) \( (b\ a\ j\ j\ a\ t\ t)\_w \) → bajjat.t ‘you spent the night’

b. \( (x) \) \( \mu \mu \mu <\mu> \) \( (b\ a\ j\ j\ a\ t)\_w \) → *bajjat ‘you spent the night’

As indicated in (18a), the presence of the unsyllabified segment has the effect of blocking Mora Extrametricality. The final syllable is, then, footed and assigned main stress. In contrast, only one foot can be constructed in (18b) inaccurately predicting stress on the penultimate. Evidently, the surface form in (18b) cannot be the input to the stress-assigning algorithm.

To conclude this section, the structure-changing effect of phrase-level syllabification is attested in all three dialects. In UCSA and Hamar, it renders opaque the placement of stress. Before proceeding to the analysis of syllabification in the three dialects, I examine one potential argument against the view of syllabification presented thus far.
5.3.3 Iterative syllabification vs. final empty nuclei

The conclusion that syllabification is iterative rests in part on the assumption that the second consonant in a word-final CC cluster is not syllabified at the word level. Instead, it is retained unsyllabified up to the P-Phrase level in UCSA and the I-Phrase level in Shukriiya. Given the appropriate context, phrase-level syllabification assigns this segment to the onset position of the following syllable. Otherwise, the segment is repaired through epenthesis or stray-erased.

An alternative view of the prosodic status of this type of segment at the word level is espoused by Government Phonology (GP) (Kaye 1990a and 1990b; Kaye, Lowenstamm, and Vergnaud 1990; Charette 1991; and Piggott 1991). Under this view, the word-final consonant is considered to be an onset of a final empty nucleus (FEN). This is represented in (19) below.

(19)

\[
\sigma \quad \sigma \\
\begin{array}{c}
O \\
(C \quad V \quad C \quad C) \quad e_w
\end{array}
\quad O \\
\begin{array}{c}
N \\
\end{array}
\quad Co \\
\begin{array}{c}
O
\end{array}
\quad N
\quad e = \text{empty}
\]

Indeed, Piggott (1999) proposes an analysis invoking FEN to account for Palestinian Arabic final consonants in words ending in CVVC and CVCC sequences. If it turns out that the representation in (19) could be extended to UCSA and Shukriiya, the conclusion that syllabification is iterative could conceivably be weakened. I argue below, however, that such an extension would be unmotivated.

As a starting point, let us identify the context in which FEN might be invoked in the dialects under consideration. This context cannot be the final consonant in a CVVC sequence. Indeed, based on their patterns of distribution,
the final consonants in this sequence must be analyzed as part of the preceding
syllable regardless of the position of the sequence in the word. This is because
none of the dialects imposes restrictions on the distribution of this sequence. All
three dialects have forms such as those in (20) below.

(20)  a. šaar.geel ‘worm’
      b. ʕaaj.meeq ‘robe’
      c. ʕa.naag.riib ‘beds’
      d. beet.kań ‘your house’
      e. mar.juud.ha ‘her beloved’
      f. šaah.baat.na ‘our friends’
      g. baab.keer ‘Babker ‘a male’s name’’
      h. al.kaam.liin ‘El-Kamlin ‘name of a town’’
      i. ʕaaf.ʕaat ‘girls’
      j. šaaq.ʕa ‘lightning strike’
      k. ša.baah ‘morning’

Obviously, there is restriction on neither the distribution of the CVVC sequence
nor on the type of consonant that may occur at the end of the sequence. Such a
consonant may be a nasal, a liquid, or an obstruent. Therefore, it is reasonable to
assume that the final consonant in a CVVC sequence is affiliated with the
preceding syllable. In contrast, the sequence CVCC has a highly limited
distribution in all three dialects, occurring only word-finally at the underlying
level. To account for the distribution pattern of the final consonant in a CVCC
sequence, one might invoke a FEN analysis similar to that in (19) above. Let us
now consider how a FEN account would explain the syllabification of word-final
segments in UCSA and Shukriiya.

Assuming a FEN analysis, the fact that word-final segments are retained
up to the phrase level where they appear in the onset position of a following
syllable would be accounted for as in (21) below.
At the word level, the final consonant in the first word occupies the onset position of a phonetically-null nucleus. At the phrase level, the onset of the deleted empty nucleus is associated with the following syllable node. Although this analysis would be descriptively as adequate as the iterative syllabification approach discussed in section 5.3.1, it is unmotivated. Recall that the final consonant in a word ending in a CVCC sequence appears in surface forms only when it is properly syllabified at the phrase level. It either appears in the onset position of a following word or, in the case of the second member of a heterorganic root cluster in Shukriiya, in the coda position of an epenthetic vowel. Otherwise, it is deleted. Evidently, in order for this consonant to appear in the surface, it must be prosodically licensed (in the sense of Itô 1986 and Goldsmith 1990). That is, it must be parsed within and licensed by a syllable. This being the case, a FEN account of the final consonant in this sequence is unmotivated. I explain this point below.

There are two potential motivations for invoking FEN. First, although it cannot function as a licenser, the empty-headed syllable plays an essential role in the licensing of the word-final consonant. Within the theory of prosodic licensing proposed by Piggott (1999), for instance, the presence of the final empty-headed syllable makes it possible for the final consonant to be licensed by the prosodic word. This is illustrated in (22) below.
The final empty-headed syllable allows for the expression of what Piggott terms the remote licensing (R-Licensing) relation between the prosodic word and the final consonant. In this type of licensing relationship, the licenser (the prosodic word) indirectly dominates the licensee (the final consonant). This licensing would not be possible without the empty-headed syllable node. The second motivation for FEN is that by allowing for the representation of word-final consonants as onsets, it captures the fact that they do not fit the coda profile. That is, it does not form a complex syllable margin with the preceding consonant. However, neither of these motivations is relevant in the contexts of UCSA and Shukriiya. The fact that the word-final consonant in a CVCC sequence never appears in surface forms unless it is licensed by a syllable in the way described above renders the final empty-headed syllable superfluous. Clearly, the presence of such a syllable is not a relevant factor for the purposes of licensing this segment.

To conclude, then, a FEN analysis of UCSA and Shukriiya facts is descriptively as adequate as the iterative syllabification approach. However, such an analysis is unmotivated in these dialects.
5.3.4 Summary and conclusions

Before I introduce the syllabification analysis, it is helpful to summarize the assumptions underlying the view of syllabification argued for in the previous sections.

Syllabification is iterative in all three dialects, applying at the word and phrase levels. Word-level syllabification need not be exhaustive; segments at the right edge of the word may be marked extrasyllabic. However, segments marked extrasyllabic at the word level are visible to phrase-level syllabification. At both levels, syllabification assigns unsyllabified segments to syllable positions in accordance with the syllable template of the dialect. In order to satisfy the obligatory onset requirement in the three dialects, phrase-level syllabification may also reassign a segment already syllabified as a coda at the word level to the onset position of the following syllable. Adopting this view, I address the task of developing the analysis of syllabification in each of the three dialects.

5.4 An Analysis of syllabification in the three dialects

The analysis proposed in this section assumes a rule-based approach to syllabification similar to that of Steriade (1982). I begin with word-level syllabification in the three dialects. I argue that in identifying the degree of restriction each dialect places on initial syllabification we are able to provide a principled explanation for repairing unsyllabified segments at the word level. Then, I examine phrase-level syllabification and argue that in identifying the domains of structure-building phrasal syllabification, we are able to provide a principled explanation for the repairing of unsyllabified segments at the phrase level. Similarly, in identifying the degree to which structure-changing phrasal
syllabification is restricted in each dialect, we are able to provide a principled explanation for the domain of syncope.

5.4.1 Word-level syllabification

In section 5.1, we have observed that while word-internal unsyllabified segments are repaired at the word level in all three dialects, the level of repair of word-final unsyllabified segments varies across dialects. Indeed, in the case of UCSA, it varies within the same dialect depending on the type of word-final segment. In order to identify the degree of restriction each dialect places on word-level syllabification, we must determine whether or not initial syllabification is exhaustive. If it is not exhaustive, the syllabification account must identify the type of segments that may be marked as extrasyllabic.

Recall that the three dialects share the same syllable inventory, which consists of the forms CV, CVV, CVC, and CVVC. As a starting point, assume that all three dialects have the word-level syllabification algorithm informally stated in (23) below.

(23) Word-level syllabification: Consistent with the syllable template, parse a word into syllables.

Following Steriade (1982), I assume that the procedure according to which this algorithm builds syllables consists of a set of ordered rules that assign segmental elements to syllable positions. Although these rules may be formally expressed in a number of ways, any instantiation encompassing the three rules in (24) below is sufficient for our purposes.

(24) \[ \begin{align*}
\text{N} & \quad \text{O} & \quad \text{Co} \\
\text{a. V} & \rightarrow & \text{V} & \quad \text{b. C} & \rightarrow & \text{C} / \_ \text{V} & \quad \text{c. C} & \rightarrow & \text{C} / \text{V} \_ \\
\end{align*} \]
The rule in (24a) assigns a vowel segment to a nucleus node while (24b) assigns a prevocalic consonant to an onset node and (24c) assigns a post-vocalic consonant to a coda node. To ensure that an intervocalic consonant is always syllabified as an onset, (24b) is ordered before (24c). Further rules are responsible for assigning the nucleus and the coda to a rhyme node and the onset and rhyme to a syllable node. Henceforth, I use the statement of the algorithm in (24) to collectively refer to the entire set of syllabification rules.

The next step is to determine whether or not this syllabification algorithm is exhaustive in each of the three dialects. In cases where it is not exhaustive, the syllabification analysis must identify the type of segments that may be marked extrasyllabic, the relevant edge of the syllabification domain, and any further conditions regulating their extrasyllabic status. Starting with Hamar, I address these questions below.

5.4.1.1 Word-level syllabification in Hamar

Recall that all unsyllabified segments in Hamar are repaired at the word level. To account for this fact, I propose the algorithm of word-level syllabification in (25) below.

(25) Word-level syllabification in Hamar:

Syllabification: Consistent with the syllable template, parse a word into syllables.
Extra syllabic segments are disallowed.

Thus stated, word-level syllabification in Hamar must be exhaustive. According to (25), extrasyllabic segments are banned in this dialect. Consequently, segments that are not properly syllabified after word-level syllabification must be repaired at the word level. Thus formulated, the syllabification rule provides
a principled explanation for the fact that unsyllabified segments, whether they are word-internal or word-final, are repaired at the word level in this dialect. I illustrate this point with the derivation of (26a) and (26b) given in (27i) and (27ii), respectively.⁸

(26) a. /si-mi-t-ni/ → [si. mi ni]  
    heard-2.m.sg.-1.sg.  
    ‘You heard me.’  

   b. /kallam-t/ → [kal. lam]  
    told-2.m.sg.  
    ‘you told’

(27) i. /si-mi-t-ni/  

   ii. /kallam-t/  

**Word-level phonology**

a. Syllabification

```
s i m i \(\uparrow\) n i
σ σ σ
\(w\)
```

b. Stray Erasure:

```
s i m i \(\uparrow\) Ø n i
σ σ
\(w\)
```

```
s i m i \(\uparrow\) n i
σ σ
\(w\)
```

The output of word-level syllabification in (27a) contains a word-internal unsyllabified segment in the first form and a word-final unsyllabified segment in the second. According to the algorithm in (25), however, extrasyllabic segments are prohibited in the surface output of word-level syllabification in Hamar. Consequently, both unsyllabified segments are stray-erased at the word level. I now consider initial syllabification in UCSA.

**5.4.1.2 Word-level syllabification in UCSA**

We have already established that initial syllabification is not exhaustive in UCSA. Recall that in this dialect a word-final unsyllabified segment arising from

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⁸ Henceforth, the derivations include syllabification rules only.
affixation is repaired at the word level while a word-final unsyllabified segment arising from a root-final cluster is repaired at the P-Phrase level. Evidently, the syllabification algorithm treats the latter as extrasyllabic but not the former. To account for this fact, we need to provide a principled explanation for the different prosodic status of the two segments. At a first glance, one might assume a correlation between the morphological identity of the segment and the level of repair. That is, a segment that is part of an affix is repaired at the word level while one that is part of a root is repaired at the phrase level. However, a closer examination reveals that the relevant difference between the two segments is phonological in nature.

Recall that, in UCSA, the root-final cluster may consist of either a full or a partial geminate. The unsyllabified segment that is part of an affix arises from suffixation of the homophonous first person singular and second person masculine singular subject suffixes to a stem ending in a consonant. To illustrate the difference between the two, consider the representations of the root segments in (28) and the affix segment in (29) below.

(28)  a. /mahall/ ‘place’

```
  C V C V C C
(m a h a)
```

b. /¿ind/ ‘at’

```
  C V C C
(¿ i n d)
```

(29)  /nahat-t/ ‘I/you carved’

```
  C V C V C C
(n a h a t t)
```

```
Cor Cor
```
We observe that the root final segments are anchored at some level in the representation. In (28a), the second C slot is anchored to the same segmental position as the preceding C. Similarly, the final C slot in (28b) is anchored to the same place node as the preceding nasal. In contrast, the final C slot in (29) is not anchored at any level of the representation. Note that the two final consonants in the latter are both coronal but because they are in different morphemes, the anchoring observed in (28b) is not present in (29). Evidently, extrasyllabic segments are licensed in UCSA at the right edge of the word provided that they are anchored at some level of the representation.

To account for these facts, I propose the word-level syllabification algorithm stated in (30) below.

\[(30) \text{Word-level syllabification in UCSA:}\]

\(a.\) Extrasyllabicity: \(\text{C} \rightarrow \langle \text{C} \rangle / \text{C} \downarrow_{\text{word}}\) An anchored consonant at the right edge of the word is extrasyllabic.

\(b.\) Syllabification: Consistent with the syllable template, parse a word into syllables.

Thus stated, word-level syllabification in UCSA need not be exhaustive. Given (33a), an anchored segment at the right edge of the word escapes word-level syllabification. Accordingly, we are able to explain the fact that word-internal unsyllabified segments are repaired at the word level in UCSA. Since these are not licensed extrasyllabic segments, they must be properly syllabified at the word level. To illustrate this point consider the derivation of (31) given in (32) below.

\[(31) \ \text{/gaa-bal-t-kun/} \rightarrow \text{gaa. bal. t. kun} \rightarrow \text{[gaa. bal. ta. kun]} \ \\
\text{met-1.sg.-3.pl.} \quad \text{‘I met you.’}\]
(32) **Word-level phonology**

a. Extrasyllabicity:  
N/A

b. Syllabification:

```
σ     σ     σ
(g aa b a l t k u m)_w
```

c. Epenthesis and syllabification:  

```
σ     σ     σ     σ
(g aa b a l t a k u m)_w
```

Extrasyllabicity is not applicable because its structural description is not met. As a result, the output of syllabification in (35b) contains a word-internal unsyllabified segment. As shown in (32c), this segment is repaired at the word level.

The algorithm in (30) also provides a principled phonological explanation for the asymmetry in the level of repair of word-final unsyllabified segments in UCSA. To illustrate this point, first consider the examples in (33) below.

(33) a. /sakkat-t/ /amaal/ → sak. kat. t a. maal → sak. kat. taa. maal  
silenced-1.sg. Amaal  
′I silenced Amaal.′

    cf. *sak. kat. ta. maal

b. /bitt/ /amaal/ → bit. t a. maal → bit. ta. maal  
girl Amaal  
′Amaal′s daughter′

    cf. *bit. taa. maal

The word-final unsyllabified segment in (33a), which is part of an affix, is repaired at the word level through epenthesis. In contrast, the second member of the geminate in (33b) is retained up to the phrase level where it is syllabified as an onset of the initial vowel of the following word. According to the algorithm in (30), only the latter is a licensed extrasyllabic segment and, accordingly, may

---

Note that under the present analysis epenthesis is not part of the syllabification algorithm but it feeds it.
escape initial syllabification. This is illustrated by the derivation of the two relevant words in (33a) and (33b) given in (34i) and (34ii), respectively.

(34) i. /sakkat-t/ ii. /bitt/

**Word-level syllabification**

a. Extrasyllabicity: 
   
   |σ|σ|σ|σ|
   |s|a|k|k|a|t|t|w
   BLOCKED (b|t|t)<|t>|w

b. Syllabification:

|σ|σ|σ|σ|
|s|a|k|k|a|t|t|a|w

Unfilled | (b|i|t)<|t>|w

|σ|σ|σ|σ|

Unfilled | (b|i|t)<|t>|w

Unlike the final segment in (34i), the second member of the word-final geminate in (34ii) satisfies the licensing condition for Extrasyllabicity; it is anchored to the same segmental node as the preceding consonant. This is why Extrasyllabicity applies to the latter and not the former. As a result, the output of syllabification in (34i) contains a word-final unlicensed segment. Subsequently, this segment is repaired at the word level through epenthesis. Because the final segment in in (34ii) is extrasyllabic it escapes word-level syllabification.

To summarize, then, word-level syllabification in UCSA is not exhaustive. The algorithm in (30) captures this fact by allowing licensed extrasyllabic segments at the right edge of the word. I now examine the initial syllabification algorithm in Shukriiya.
5.4.1.3 Word-level syllabification in Shukriiya

Recall that word-final unsyllabified segments in Shukriiya are repaired at the I-Phrase level irrespective of whether they arise from affixation or from a root ending in a two-consonant cluster. Recall also that in this dialect the root-final cluster may consist of a full geminate, a partial geminate, or heterorganic consonants. Unlike UCSA, then, Shukriiya does not require special licensing of unsyllabified segments at the right edge of the word. Rather, the second member in any type of a word-final cluster may escape initial syllabification. To account for these facts, I propose the algorithm of word-level syllabification in (35) below.

(35) Word-level syllabification in Shukriiya:
   a. Extrasyllabicity: C → <C> / C _word The second consonant in a CC cluster at the right edge of the word is extrasyllabic.
   b. Syllabification: Consistent with the syllable template, parse a word into syllables.

According to (35a), only the second consonant in a word-final cluster is marked extrasyllablic and may escape word-level syllabification. Thus, we explain the fact that all word-internal unsyllabified segments are repaired at the word level while word-final unsyllabified segments are allowed to escape word-level syllabification.

I first demonstrate how the algorithm accounts for the level of repair of word-internal unsyllabified segments. Consider the examples in (36) below.

(36) a. /xabbar-t-kan/ told-1.sg.-2.f.pl. → xab. b. kan → [xab. ba. kan]
    'I told you.'

    b. /darb-kan/ path-2.f.pl. → dar. b. kan → [dar. ba. kan]
    'your path'
The word-internal unsyllabified segment in (36a) is part of an affix while that in (36b) is part of a root. The derivations of these forms are given in (37i) and (37ii), respectively.

(37)   i. /xabbâr-t-kan/  
      ii. /darb-kan/

**Word-level syllabification**

a. Extrasyllabicity:
   N/A  
   N/A

b. Syllabification:
   \[
   (x \overbrace{a b b a r} \tilde{t} k a n)_{w}
   \quad \text{and} \quad
   (d a r b k a n)_{w}
   \]

c. Stray Erasure/Epenthesis and syllabification:
   \[
   (x \overbrace{a b b a r} \tilde{t} k a n)_{w}
   \quad \text{and} \quad
   (d a r b k a n)_{w}
   \]

The structural description of Extrasyllabicity is not met in either form. As a result the output of word-level syllabification consists of a word-internal unsyllabified segment in both. This segment is stray-erased in (37i) and is repaired through epenthesis in (37ii).

Now, let us examine word-final unsyllabified segments. Consider the examples in (38) below.

(38)   a. /darb/ /ahmad/  →  dar. b ah. mad  →  [dar. bah. mad]
   (path Ahmed) ‘Ahmed’s path’

   b. /ra‘aṣ-t/ /amis/  →  ra. ḥaṣ. t. a. mis  →  [ra. ḥaṣ. ta. mis]
   (returned-1.sg. yesterday) ‘I returned yesterday.’

The word-final unsyllabified segment in (38a) is part of a root while that in (38b) is part of an affix. In both cases, the segment escapes word-level syllabification and is syllabified at the phrase level an onset of the initial syllable of the
following word. This is illustrated by their respective derivations in (39i) and (39ii).

(39)   i. /darb/  

Word-level syllabification:

a. Extrasyllabicity:
   (dar<\textit{b}>)_w  
   (ra\textit{a}-t)_w

b. Syllabification:
   \begin{align*}
   \sigma \\
   (d \text{ a} \text{ r} <\textit{b}>)_w \\
   (r \text{ a} \text{j} \text{ a} \text{ t})_w
   \end{align*}

c. Stray Erasure:
   BLOCKED  

According to (35), the second consonant in any type of a word-final CC cluster is marked extrasyllabic. Extrasyllabicity applies in both forms and the word-final consonants escape word-level syllabification.

To conclude this section, the analysis of syllabification presented thus far identifies the degree of restriction each dialect places on word-level syllabification. That is, the analysis identifies the degree to which initial syllabification is exhaustive. In dialects where it is not, the analysis identifies the type of segments that may be marked extrasyllabic, their positions, and any further conditions regulating their extrasyllabic status. In doing so, the analysis provides a principled explanation for repairing unsyllabified segments at the word level. In the next section, I address phrase-level syllabification in the three dialects.
5.4.2 Phrase-level syllabification

I have established that phrase-level syllabification has two effects. The first one is structure building and is observed only in Shukriiya and UCSA. In these dialects, phrase-level syllabification assigns any segment that remains unsyllabified above the word level to a syllable position in accordance with the syllable template of the dialects. This effect is not attested in Hamar because in this dialect segments that cannot be properly syllabified by initial syllabification are repaired at the word level. The second effect of phrasal syllabification is structure changing, which is present in all three dialects. I have demonstrated in section 5.3.2 that phrasal syllabification may alter the structure of a syllable by reassigning a segment syllabified as a coda at the word level to the onset position of a following syllable.

To account for these facts, the analysis of syllabification must include explicit statements of the rules responsible for the observed effects of phrasal syllabification. It must also identify the domains of these rules in their respective dialects. In accounting for the structure building effect of phrasal syllabification, we are able to offer a principled explanation for the levels of repair of unsyllabified segments. Similarly, in accounting for the structure-changing effect, we are able to offer a principled explanation for the domain of syncope. Starting with its structure-building effect, I extend the syllabification analysis to account for phrasal syllabification.

5.4.2.1 Structure-building phrase-level syllabification

We have seen in the previous sections that UCSA and Shukriiya allow extrasyllabic segments at the right edge of the word. The segments are retained
up to the P-Phrase level in the former and the I-Phrase level in the latter. This is schematically represented in (40) and (41), respectively.

(40) Extrasyllabic segments at the P-Phrase level in UCSA
   a. \((\text{CVC. }<\text{C}>)_w (\text{VC. CV})_w \rightarrow (\text{(CVC. C)}_w (\text{VC. CV})_w)_p\)
   b. \((\text{CVC. }<\text{C}>)_w (\text{CVC. CV})_w \rightarrow (\text{(CVC. }\emptyset)_w (\text{CVC. CV})_w)_p\)

(41) Extrasyllabic segments at the I-Phrase level in Shukriiya
   a. \((\text{CVC. }<\text{C}>)_w (\text{VC. CV})_w \rightarrow (\text{(CVC. C)}_w (\text{VC. CV})_w)_i\)
   b. \((\text{CVC. }<\text{C}>)_w (\text{CVC. CV})_w \rightarrow (\text{(CVC. }\emptyset)_w (\text{CVC. CV})_w)_i\)
   OR \((\text{CV. C}/\text{C.})_w (\text{CVC. CV})_w)_i\)

As indicated in (40a) and (41a), the segment marked extrasyllabic at the word level is visible to phrase-level syllabification which assigns it to the onset position of the initial syllable of the following word. Apart from the relevant domain, then, the structure-changing effect of phrasal syllabification in the two dialects is identical. Obviously, this is an instance of iterative application of the same rule responsible for assigning a prevocalic consonant to an onset node at the word level. I call this Syllabification into Onset. If the onset position of the following syllable is already occupied, as in (40b) and (41b), Syllabification into Onset does not apply because its structural description is not met. In this context, the extrasyllabic segment is deleted or, in the case of the second member of a heterorganic cluster in Shukriiya, repaired through epenthesis. Evidently, UCSA and Shukriiya require that segments must be properly syllabified or deleted at the P-Phrase level and the I-Phrase level, respectively.

In order to account for these facts, our analysis of syllabification must include a statement of the rule responsible for the structure-building effect of phrasal syllabification in each dialect together with a statement banning extrasyllabic segments at the relevant domain. This is given in (42) and (43) below.
(42) Phrase-level syllabification in UCSA

\[
\begin{array}{c}
\sigma \\
\uparrow \\
[C \ V\ldots]_p
\end{array}
\]

Syllabification into Onset: $[C \ V\ldots]_p$

Extrasyllabic segments are disallowed.

(43) Phrase-level syllabification in Shukriiya

\[
\begin{array}{c}
\sigma \\
\uparrow \\
[C \ V\ldots]_l
\end{array}
\]

Syllabification into Onset: $[C \ V\ldots]_l$

Extrasyllabic segments are disallowed.

Syllabification into Onset is iterative applying freely up to the P-Phrase level in UCSA and the I-Phrase level in Shukriiya. It applies first at the word level assigning all prevocalic consonants to onset positions. It applies again at the phrase level as soon as new phonological material enters the derivation. At this level, it assigns any word-final unsyllabified segment to the onset position of the initial syllable of the following word. It is blocked if the onset position of the following syllable is already filled or if the following syllable is outside its domain of application. Because extrasyllabic segments are disallowed at the phrase level, the unsyllabified segment is repaired through epenthesis or deleted. I demonstrate below how these rules account for the phrasal level of repair of unsyllabified segments in UCSA and Shukriiya.

According to (42), Syllabification into Onset applies up to the P-Phrase level in UCSA and that at this level Extrasyllabicity is disallowed. This explains the fact that if segments cannot be properly syllabified within the P-Phrase in UCSA, they are stray-erased. I illustrate this point with reference to examples (44) and (45) below.

(44) /bit\ t ahmad/  \rightarrow \ bit. t. ah. mad \rightarrow [bit. taḥ. mad]
girl ̃ Ahmed ́ Ahmed’s daughter’
The extrasyllabic segment at the end of the first word is retained up to the P-Phrase in both examples. However, it is syllabified as an onset of the initial vowel of the second word in (44) but is deleted in (45). In the corresponding surface form of the latter, the first member of the geminate is now syllabified as an onset of the initial syllable of the second word and a glottal stop appears in the onset position of the initial syllable of the first word. To illustrate how the analysis of syllabification in UCSA explains these facts, consider the derivations of (44) and (45) given in (46i) and (46ii), respectively.

(46)  

i. /bitt/ /ahmad/  

ii. /al-bitt/ /akal-at/

Word-level phonology

Word-level syllabification:

a. Extrasyllabicity:

(b<.) \[\text{BLOCKED}\] \(\text{W}\)  

(albit<.) \[\text{BLOCKED}\] \(\text{W}\)

b. Syllabification:

\[
\begin{array}{cccc}
\sigma & \sigma & \sigma & \\
(b \ i \ t<.) \text{W} & (a \ h \ m \ a \ d) \text{W}
\end{array}
\]

\[
\begin{array}{cccc}
\sigma & \sigma & \sigma & \\
(a \ l \ b \ i \ t <.) \text{W} & (a \ k \ a \ l \ a \ t) \text{W}
\end{array}
\]

Phrase-level Phonology

Input to P-Phrase Formation:

\[
\begin{array}{c}
[[\text{bit.<.}\text{N}] \text{[ah.mad]}, \text{N-}\text{NP}] \\
[[\text{al.bit.<.}\text{N}] \text{NP} \ [\text{a.ka.lat}, \text{V}, \text{VP}]]
\end{array}
\]

c. P-Phrase Formation:

\[
\begin{array}{cccc}
\sigma & \sigma & \sigma & \\
((b \ i \ t) \text{W} & (a \ h \ m \ a \ d) \text{W}) \text{P}
\end{array}
\]

\[
\begin{array}{cccc}
\sigma & \sigma & \sigma & \\
((a \ l \ b \ i \ t \ t) \text{P} & ((a \ k \ a \ l \ a \ t) \text{P})
\end{array}
\]

d. Syllabification into Onset:

\[
\begin{array}{cccc}
\sigma & \sigma & \sigma & \\
((b \ i \ t \ t) \text{W} & (a \ h \ m \ a \ d) \text{W}) \text{P}
\end{array}
\]

\[
\begin{array}{cccc}
\sigma & \sigma & \sigma & \\
((a \ l \ b \ i \ t) \text{P} & ((a \ k \ a \ l \ a \ t) \text{P})
\end{array}
\]

e. Stray Erasure:

\[
\begin{array}{cccc}
\sigma & \sigma & \sigma & \\
((a \ l \ b \ i \ t) \text{P} & ((a \ k \ a \ l \ a \ t) \text{P})
\end{array}
\]

\[\text{N/A}\]
f. Resyllabification into Onset:

\[ \text{N/A} \]

\[ (((a \\text{b i} \text{t})_w)_p, ((a \\text{k a l a t})_w)_p) \]

\[ \text{[bit.ta˛.mad]} \]

At the word level, Extrasyllabicity applies in the same manner described in section 5.4.1.2. As a result, the output of word-level syllabification contains an extrasyllabic segment at the right edge of the first word in both (46i) and (46ii).

At the phrase level, P-Phrase Formation parses the former into one P-Phrase and the latter into two. The two segments marked extrasyllabic at the word level become visible to phrase-level syllabification. Since the domain of syllabification occurs entirely within the same P-Phrase in (46i), Syllabification into Onset applies to this form assigning the segment to the onset position of the initial syllable of the second word. In contrast, the rule is blocked in (46ii) because its segmental context spans two separate P-Phrases. Since extrasyllabic segments are banned at the P-Phrase level, the unsyllabified segment is subsequently deleted. Recall that all three dialects impose a total ban on onsetless syllables. In (46f), this triggers the resyllabification of the first member of the geminate across the P-Phrase as an onset of the following syllable. The rule responsible for this structure-changing effect is Resyllabification into Onset, which will be discussed in the next section. At this point, it is relevant to note that the domain of this rule is larger than the domain of structure-building Syllabification into Onset.

Similarly, the onset requirement triggers the glottal stop insertion in (46g).
In summary, the statement of Syllabification into Onset in (42) accounts for the fact that the extrasyllabic segment in (46i) is properly syllabified at the P-Phrase level while that in (46ii) is deleted. I now demonstrate the effect of Syllabification into Onset in Shukriiya.

According to (43), the domain of Syllabification into Onset in Shukriiya is the I-Phrase and at this level Extrasyllabicity is disallowed. Accordingly, we have a principled account of the fact that segments are stray-erased if they cannot be properly syllabified within the I-Phrase in Shukriiya. To illustrate this point, consider the example in (47) below.

(47) daḥiin in ṣind-ak ʃak ʾasal ʿarafāt-ak doolak now if have-you doubt ask-imp. company-your those ‘Now, if you have any doubts (about what I told you), ask your own companions.’

   a. Normal rate:  ((daḥiin in ṣind-ak ʃak ʾasal ʿarafāt-ak doolak),)_{U}
   b. Narrative rate:  ((daḥiin in ṣind-ak ʃak),)_{I}((ʾasal ʿarafāt-ak doolak),)_{I}

In the above example, the underlined second member of the geminate is syllabified within the same I-Phrase as an onset of the following syllable in (47a). In (47b), where the word containing the segment and the word containing the onsetless syllable are in separate I-Phrases, the second member of the geminate is deleted. Note that, unlike the situation in UCSA, the first member of the geminate is not resyllabified as an onset of the following syllable. Instead, a default glottal stop appears in the onset position of the following syllable. To demonstrate how the analysis of syllabification accounts for these facts, consider the derivation of the relevant two words in (47a) and (47b) given in (48i) and (48ii), respectively.
Again, Extrasyllabicity applies at the word level in the same manner described in section 5.4.1.3. The output of word-level syllabification contains an extrasyllabic segment at the right edge of the first word in both (48i) and (48ii). At the phrase level, the two words in the former are parsed within one I-Phrase while those in
the latter are parsed in separate I-Phrases. Syllabification into Onset applies in (48i) because the domain of syllabification is entirely within the same I-Phrase and is blocked in (48ii) because its segmental context spans the boundary of the I-Phrase. Since extrasyllabic segments are banned at this level, the unsyllabified segment is subsequently deleted. I demonstrate in the next section that the domain of the structure-changing rule of Resyllabification into Onset is the I-Phrase. This is why it is blocked in (48f) and an epenthetic glottal stop is syllabified as an onset of the initial syllable of the second word in (48g).

To conclude, then, given the statement of Syllabification into Onset in (43), we are able to provide a principled account for the fact that the extrasyllabic segment in (48i) is properly syllabified at the I-Phrase level while that in (48ii) is stray-erased.

In summary, the structure-building effect of phrasal syllabification is a function of iterative application of Syllabification into Onset. This rule targets prevocalic consonants syllabifying them into onsets. It applies up to the P-Phrase in UCSA and up to the I-Phrase in Shukriiya. The dialectal variation with respect to the phrasal domain within which unsyllabified segments must be repaired follows directly from the variation with respect to the domain of application of this rule. In the next section, I examine the second effect of phrase-level syllabification.

5.4.2.2 Structure-changing phrase-level syllabification

The two rules responsible for the structure-changing effect of syllabification in the three dialects are Resyllabification into Onset and Onset Defection, which I
have first discussed in my account of syncope in sections 2.1.3.6 and 3.1.5. Based on the interaction between these rules and syncope, I have argued that alteration to syllable structure is permitted up to the I-Phrase level in all three dialects. Moreover, resyllabification is more restricted in UCSA than in the other two dialects, applying freely only up to the P-Phrase level. Above this level, a structure-changing rule may apply within the I-Phrase but only if its context includes a derived environment. In this section, I review this argument and propose formal statements of the structure-changing rules in the three dialects.

I begin with a brief review of the interaction between the two resyllabification rules and syncope. The three rules are reintroduced in (33)-(51) below for ease of reference.

(49) Resyllabification into Onset

\[
\begin{array}{c}
\sigma \\
\vdots \\
\sigma \\
(\ldots C V C)_w (V\ldots)_w
\end{array}
\]

(50) Onset Defection

\[
\begin{array}{c}
\sigma \\
\vdots \\
\sigma \\
\sigma \\
C V C v C V
\end{array}
\quad \text{“where v is weak”}
\]

(51) Syncope

\[
\begin{array}{c}
\sigma \\
\vdots \\
\sigma \\
\sigma \\
C V C v C V
\end{array}
\]

In (49), the final consonant in the first word is syllabified at the word level as a coda. To satisfy the obligatory onset requirement, Resyllabification into Onset reassigns this consonant at the phrase level to the onset position of the initial vowel of the following word.\(^\text{10}\) As we have seen in section 5.3.2, the effect of

\(^{10}\) Recall that the word-final consonant targeted by this rule cannot be considered extrasyllabic at the word level. In section 5.3.2, I presented cases in which the coda status of the target of Resyllabification into Onset is crucial for the assignment of stress. We have seen that the effect of
Resyllabification into Onset is not limited to syllables containing potentially syncopated vowels. Still, the rule interacts with LHS in a significant way. I have argued in sections 2.1.3.6 and 3.1.5 that Resyllabification into Onset feeds Onset Defection, which in turn feeds syncope. Recall that in LHS the closed syllable containing the potentially syncopated vowel occurs word-finally. At the phrase level, its coda is syllabified as an onset of the following word rendering the target of syncope in an open syllable. This triggers Onset Defection, which resyllabifies the onset of the weak vowel as a coda of the preceding syllable and the vowel is subsequently deleted. Given this interaction between resyllabification and syncope, a restriction on the domain of resyllabification is, in effect, a restriction on the domain of syncope.

By including statements of the resyllabification rules, together with their respective domains in the three dialects, our analysis is able to account for the structure-changing effect of resyllabification. This will also allow us to provide a principled explanation for the domain of syncope in each of the three dialects. I now review the interaction of each of the resyllabification rules with syncope in order to identify their respective domains.

Based on its interaction with LHS in Shukriiya and Hamar, we can establish that Resyllabification into Onset applies up to the I-Phrase but is blocked above it in these dialects. Recall that LHS is blocked above the I-Phrase level in these dialects because the closed syllable containing the potentially weak vowel occurs at the right edge of the I-Phrase. In this context, its coda cannot be...
resyllabified as an onset of the following syllable. This is represented schematically in (52) below.

(52) Resyllabification into Onset blocked above I

\[ \begin{array}{c}
\sigma \\
C \\
v \\
C_l \text{ (V...)} \\
\end{array} \rightarrow \begin{array}{c}
\sigma \\
C \\
v \\
C_l \text{ (? V...)} \\
\end{array} \]

For syncope to apply, the coda of the potentially weak vowel must be resyllabified at the phrase level as an onset of the following syllable. However, Resyllabification into Onset is blocked from applying across the I-Phrase boundary, effectively blocking LHS in Shukriiya and Hamar.\(^{11}\) In contrast, the domain of this rule cannot be identified based on its interaction with syncope in UCSA. Recall that LHS applies only up to the P-Phrase level in this dialect. As we have already established based on the derivation of (46ii) above, the domain of Resyllabification into Onset is larger than the P-Phrase, which is the domain of structure-building Syllabification into Onset in UCSA. Indeed, the example in (53) below shows that the domain of Resyllabification into Onset is also the I-Phrase in this dialect.

(53) law kun-ta kallam-ta hasan akiid kaan if were-2.m.sg. told-2.m.sg. Hassan surely was(3.m.sg.) ha-ji-ji Fut-3.m.sg.-come ‘If you had told Hassan, he most certainly would have come.’

a. Fast rate: \((\text{law kaan kallamta ha. sa. na. kiid kaan hajiiji})_U\)
b. Normal rate: \((\text{law kaan kallamta ha. san. (?akiid kaan hajiiji)})_U\)

The final consonant in [hasan] ‘Hassan’ is syllabified as a coda at the word level.

In (53a), where the utterance is parsed into one I-Phrase, it is resyllabified as an onset of the following syllable. In (53b), where the utterance is parsed into two I-Phrases, this resyllabification is blocked across the I-Phrase boundary. Instead, a

\(^{11}\) See the discussion of the relevant examples in sections 3.1.5 and 4.1.3.
glottal stop appears in the onset position of the initial syllable in the second I-Phrase. Accordingly, we conclude that, similar to the situation in Shukriiya and Hamar, Resyllabification into Onset applies up to the I-Phrase level in UCSA.

To account for these facts, I propose the formal statement of Resyllabification into Onset given in (54) below.

(54) Phrase-level syllabification: All dialects

\[
\text{Resyllabification into Onset} \quad \sigma \quad [V \ C \ V \ldots]_1
\]

Resyllabification into Onset has the same effect and domain in all three dialects. It applies up to the I-Phrase level repairing an otherwise ill-formed syllable by reassigning a consonant occupying the coda position of a syllable to the onset position of the syllable immediately following it. We have already seen an instance of this in the derivation of the UCSA example in (46f) above. The effect of this rule is visible in resyllabifying the first member of the geminate across the P-Phrase boundary as an onset of the initial syllable of the following word. We have also seen an instance of Resyllabification into Onset being blocked above the I-Phrase level in the derivation of the Shukriiya form in (48f). In the latter case, the illicit syllable receives a glottal stop onset. The above statement of the rule accounts for the fact that LHS is blocked above the I-Phrase in Shukriiya and Hamar.

Let us now review the evidence for the domain of Onset Defection. Recall that this rule has the effect of blocking RHS above the I-Phrase level in all three dialects. In addition, it has the effect of blocking LHS above the P-Phrase level in UCSA. I first review its interaction with RHS and propose a statement of Onset
Defection in Shukriiya and Hamar. Then, I review its interaction with LHS in UCSA and modify the statement of the rule in this dialect accordingly.

Given its interaction with RHS, we can establish that Onset Defection is blocked above the I-Phrase level in all dialects. Recall that RHS is blocked above the I-Phrase level because the syllable containing the potentially weak vowel occurs at the left edge of the I-Phrase. In this context, the onset of the weak vowel cannot be syllabified as a coda of the preceding syllable. The context relevant to this blocking effect is represented schematically in (55) below.

(55) Onset Defection blocked above I

\[ (\ldots C V)_I (C v C V\ldots)_I \]

For syncope to apply, the onset of the potentially weak vowel must be resyllabified at the phrase level as a coda of the preceding syllable. However, Onset Defection fails to apply across the I-Phrase boundary effectively blocking RHS in all three dialects.\(^{12}\) This is the only detectable interaction between Onset Defection and syncope in Shukriiya and Hamar. Evidently, the rule is blocked above the I-Phrase level in these dialects. Accordingly, Onset Defection can be formally stated as in (56) below.

(56) Phrase-level syllabification: Shukriiya and Hamar

\[ [V C v \ldots]_I \text{ “where } v \text{ is weak”} \]

Onset Defection applies up to the I-Phrase level and is blocked above it. This explains the fact that RHS applies up to the I-Phrase level in all three dialects.

\(^{12}\) See the discussion of the relevant examples in sections 2.1.3.6, 3.1.5, and 4.1.3.
However, the above statement of Onset Defection needs to be modified to account for its interaction with LHS in UCSA.

Recall that LHS is blocked above the P-Phrase in UCSA. I have argued in section 2.1.3.6 that this effect is a reflex of the restriction that this dialect places on resyllabification. Specifically, resyllabification rules apply freely up to the P-Phrase. Above this level, resyllabification is allowed within the I-Phrase only if its context includes a derived environment. The latter is defined as an environment that becomes visible to phrase-level phonology only after the P-Phrase level. Accordingly, a resyllabification rule is blocked above the P-Phrase level if its context is entirely contained within an already formed P-Phrase. To review the evidence for this argument, let us first consider the application of resyllabification rules within the P-Phrase. This is represented schematically in (57) below.

(57) Resyllabification within P:
   a. RHS: Onset Defection
      \[ ((\ldots C V)_{w} (C V C V \ldots)_{w} \ldots)_{p} \]

   b. LHS:
      i. Resyllabification into Onset
      \[ ((C V C v C V \ldots)_{w} \ldots)_{p} \rightarrow ((C V C v C V \ldots)_{w} \ldots)_{p} \]
      ii. Onset Defection

   In (57a), Onset Defection applies across the word boundary and the weak vowel in the right-hand word is subsequently deleted. Similarly, in (57b), Resyllabification into Onset applies across the word boundary rendering the weak vowel in an open syllable. Onset Defection then applies followed by
syncope. Evidently, no restriction is placed on resyllabification within the P-Phrase.

Now, let us consider the application of resyllabification rules above the P-phrase level. Again, this is represented schematically in (58) below.

(58) Resyllabification within I:
   a. RHS: Onset Defection
      \((\ldots\overset{\sigma}{C}\overset{\sigma}{V})_p\overset{\sigma}{(C\overset{\sigma}{v}\overset{\sigma}{C}\overset{\sigma}{V}\ldots)_p\ldots})_l\)
   
   b. LHS:
      i. Resyllabification into Onset  
         ii. Onset Defection: BLOCKED
      \((\overset{\sigma}{C}\overset{\sigma}{V}\overset{\sigma}{C}\overset{\sigma}{v}\overset{\sigma}{(V\ldots)_p}\ldots)_l\) \rightarrow \((\overset{\sigma}{C}\overset{\sigma}{V}\overset{\sigma}{C}\overset{\sigma}{v}\overset{\sigma}{C}_p\overset{\sigma}{(V\ldots)_p}\ldots)_l\)

In (58a), Onset Defection applies across the P-Phrase boundary triggering the deletion of the weak vowel. Note that the context of the rule includes a derived environment. The word containing the defecting onset enters the derivation after the first P-Phrase is formed. Similarly, the context of Resyllabification into Onset in (58b) includes a derived environment. It applies across the P-Phrase boundary, rendering the potentially syncopated vowel in an open syllable. Nonetheless, Onset Defection fails to apply. This is because its context is contained entirely within an already formed P-Phrase. As a result, resyllabification is blocked effectively blocking syncope.

In summary, structure-changing rules apply freely up to the P-Phrase level in UCSA. Above the P-Phrase, a resyllabification rule is blocked if its context falls entirely within an already formed P-Phrase. The rule may apply only if its context includes the environment to the right of the P-Phrase boundary. This is the environment that exists only after the boundary is formed.
This is why Resyllabification into Onset applies freely up to the I-Phrase level. Since this rule resyllabifies segments rightwards, its domain will always include the context to the right of a P-Phrase boundary. In contrast, Onset Defection, which resyllabifies segments leftwards, applies freely up to the P-Phrase. Above the P-Phrase, this rule may apply only if it is resyllabifying a segment to the right of a P-Phrase boundary. It is blocked from resyllabifying segments to the left of a P-Phrase boundary since this would render its entire domain within an already formed P-Phrase. The asymmetry in the domain of syncope is a reflex of these restrictions, which must be expressed in the statement of Onset Defection in UCSA. This is given in (59) below.

(59) Phrase-level syllabification: UCSA

\[
\text{Onset Defection} \quad [[\ldots \ C \ V]_{\text{p}} \ C \ v \ldots]\_i \quad \text{“where v is weak”}
\]

Thus stated, Onset Defection may apply above the P-Phrase level only if it is resyllabifying a segment to the right of a P-Phrase boundary. Accordingly, we are able to explain the asymmetry in the domain of application of syncope. Above the P-Phrase level, only the onset of the right hand weak vowel may defect. This is why only RHS applies up to the I-Phrase level while LHS applies up to the P-Phrase level.

To conclude this section, all three dialects permit alteration to syllable structure up to the I-Phrase level but not beyond. However, resyllabification is more restricted in UCSA than it is in Shukriiya and Hamar. In the latter two dialects, no restriction is placed on resyllabification rules up to the I-Phrase level. In UCSA, on the other hand, rules apply freely up to the P-Phrase level. Above
this level, they may apply within the I-Phrase but only if their respective contexts include derived environments. Our analysis of syllabification is able to account for these facts by including a statement of the resyllabification rules together with their respective domains in each dialect. Moreover, in identifying the degree to which resyllabification is restricted, the analysis provides a principled explanation for the domain of syncope in these dialects.

5.4.3 Summary

In the previous sections I developed an analysis of syllabification in the three dialects. For each dialect, the analysis identifies the degree to which initial syllabification is exhaustive. If the dialect allows extrasyllabic segments, the analysis identifies the type of segments that may be marked extrasyllabic, their positions, and any further conditions regulating their extrasyllabic status. In addition, the analysis identifies the phrasal level at which these segments must be properly syllabified. Finally, the analysis identifies the level at which syllabification is fixed and further alteration to syllable structure is disallowed. In identifying the degrees of restriction individual dialects place on syllabification and resyllabification, the analysis provides a principled explanation for the levels of repair of unsyllabified segments as well as the domains of syncope in these dialects.
5.5 Conclusion

The syllabification in UCSA, Shukriiya, and Hamar is summarized in (60) below.

(60) Syllabification in the three dialects

<table>
<thead>
<tr>
<th>Dialect</th>
<th>Word-level syllabification</th>
<th>Phrase-level syllabification</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hamar</td>
<td>Exhaustive</td>
<td>Structure-changing: Resyllabification rules apply freely up to the I-Phrase level.</td>
</tr>
<tr>
<td></td>
<td>Extrasyllabic segments are disallowed.</td>
<td></td>
</tr>
<tr>
<td>UCSA</td>
<td>Non-exhaustive</td>
<td>Extrasyllabic segments are disallowed.</td>
</tr>
<tr>
<td></td>
<td>An anchored consonant at the right edge of the word is extrasyllabic.</td>
<td>a. Structure building: Segments unsyllabified at the word level must be properly syllabified at the P-Phrase level.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>b. Structure changing: Resyllabification rules apply freely up to the P-Phrase level. Within the I-Phrase, resyllabification is allowed only if its context includes a derived environment.</td>
</tr>
<tr>
<td>Shukriiya</td>
<td>Non-exhaustive</td>
<td>Extrasyllabic segments are disallowed.</td>
</tr>
<tr>
<td></td>
<td>The second consonant in a CC cluster at the right edge of the word is extrasyllabic.</td>
<td>a. Structure building: Segments unsyllabified at the word level must be properly syllabified at the I-Phrase level.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>b. Structure changing: Resyllabification rules apply freely up to the I-Phrase level.</td>
</tr>
</tbody>
</table>

The three dialects form a continuum with respect to the degree of restriction they place on word-level syllabification. The most restrictive dialect is Hamar where the algorithm is exhaustive and no extrasyllabic segments are allowed. As a result, all unsyllabified segments are repaired at the word level in this dialect. The second most restrictive dialect is UCSA, where word-level syllabification is
not exhaustive, but there is a licensing condition on extrasyllabic segments at the right edge of the word. Accordingly, all other segments that are not properly syllabified after initial syllabification are repaired at the word level. The least restrictive dialect is Shukriiya. Similar to UCSA, word-level syllabification is not exhaustive in this dialect. However, Shukriiya does not require a special licensing condition for extrasyllabicity. Instead, the second consonant in any type of a word-final CC cluster is marked extrasyllabic. Thus, only word-internal unsyllabified segments are repaired at the word level.

With respect to the structure-building effect of phrase-level syllabification, UCSA is more restrictive than Shukriiya. Segments that escape word-level syllabification are repaired at the P-Phrase level in the former but at the I-Phrase level in the latter. With respect to the structure-changing effect of phrase-level syllabification, Hamar and Shukriiya pattern together, allowing resyllabification to apply freely up to the I-Phrase level. In contrast, resyllabification in UCSA is free only up to the P-Phrase level. Above this level, it is allowed only if its context includes a derived environment.

The account of syllabification allows for the interesting fact that how a dialect is restrictive at one level has no implication on how restrictive it can be on another. With respect to word-level syllabification, Hamar is the most restrictive dialect and Shukriiya is the least restrictive one. Yet, they impose the same degree of restriction on resyllabification.
Chapter 6: Future Research

In this chapter, I briefly outline three areas of future research that arise out of the current study. The first one involves extending the approach developed in the current study to other dialects of Arabic in Sudan and elsewhere. The second one has to do with investigating the findings of the study in the context of current research on Arabic dialect typology. The third area of research explores syllabification from a historical perspective.

The phonological phenomena discussed in this thesis in the context of UCSA, Shukriiya, and Hamar are prevalent in other dialects of Arabic. A logical direction of enquiry is one that explores the possibility of extending the prosodic approach developed in the current study to patterns attested in other dialects of Arabic. As a starting point, I plan to examine more dialects of Sudanese Arabic. Of particular interest to me are the dialects of Ja‘aliyya, Rubaataab, and Shaaygiyya which, at a cursory glance, seem to diverge from the three dialects discussed here in interesting ways.¹ Such research has the potential of revealing interesting patterns, which would then be investigated in the context of current research on the typology of Arabic dialects. I elaborate on this point below.

Work on syllable-based typology has come to represent a significant area of research on Arabic dialectal phonology. As I mentioned in section 2.2, the most basic typological distinction established between dialects is based on the

¹ These dialects are spoken in a region north of Khartoum extending along the River Nile from around Greater Shendi in the south to Greater Merowe in the north. Based on my own observation, the Rubaataab and Shaaygiyya seem to have audibly distinct phrasing patterns. They also impose a ban on closed syllables at the end of the Intonational phrase, a phenomenon not attested in other dialects I am familiar with.
pattern of epenthesis utilized to repair unsyllabified consonants. Some of the
more recent studies attempt to correlate the patterns of epenthesis with the
presence or absence of other phonological phenomena as well as with the
application or blocking of phonological rules (Kiparsky 2003, Watson 2007, and
Farwaneh 2009). The findings of the current study raise interesting questions for
research in this area. I briefly outline some of these below.

Kiparsky (2003) proposes a two-way typological distinction between
Arabic dialects. The first type comprises one group labelled Cv dialects in which
epenthesis occurs to the right of the unsyllabified consonant (CCC > C.Cv.C).
The second type consists of two sub-groups: vC dialects in which epenthesis
occurs to the left of the consonant (CCC > C.vC.C) and C dialects in which the
unsyllabified consonant is retained (CCC > C.C.C). Kiparsky (2003: 149-150)
posits syllable-related properties that correlate with each dialect type. The
following three properties are expected to be found in Cv dialects: 1) phrase-final
CC clusters, 2) shortening of non-final CVVC (e.g., Cairene /baab-ha/ > babha
‘her door’), and 3) desonorization of word-final -VCR, and -VVR. Among the
three dialects discussed in this study, UCSA is a true Cv dialect based on the
pattern of epenthesis. Intriguingly, not only does it lack all three features of the
Cv dialects, it also displays one feature of the vC dialects, namely, the opaque
interaction between stress and epenthesis. The same observation is true with
respect to Shukriiya in which both Cv and vC patterns are attested. Moreover,

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2 See for example Selkirk (1981b), Broselow (1992), Farwaneh (1995) and (2009), Kiparsky (2003),
Watson (2007), and Bamakhramah (2009).
3 This dialectal difference is argued to follow from the licensing of the unsyllabified consonant as
a semisyllable, which is represented as a mora associated with the prosodic word. Specifically,
while Cv dialects do not license unsyllabified consonants as semisyllables, vC and C dialects do.
The difference between the latter two is that vC dialects licence symisyllables at the lexical level
only while C dialects licence them at the lexical and postlexical levels.
Shukriiya exhibits a second feature of vC dialects: metathesis of medial high vowel -CCuC- > -CuCC- (e.g., nádxulu > nadúxlu ‘we enter it’).

Watson (2007: 241) excludes Central Urban Sudanese and Shukriiya from her analysis, describing them as defying classification because they exhibit both C\text{v} and vC patterns of epenthesis.\textsuperscript{4} Citing Dickens (personal communication), she maintains that Central Sudanese exhibits the following alternation /kalb-na/ > [kálbana] ~ [kalíbna] ‘our dog’. Citing Reichmuth (1983), she gives the same forms to illustrate the two patterns of epenthesis in Shukriiya, noting that the vC pattern [kalíbna] is less common in this dialect. However, this is an inaccurate characterization of the patterns attested in these dialects. With respect to UCSA, the alternation pattern described is simply not attested. In fact the underlying form of the nominal stem in this dialect is /kalib/ ‘dog’ not/kalb/.\textsuperscript{5} This is consistent with the fact that the only form found in this dialect is /kalib-na/ > [kalíbna] which does not involve epenthesis. As I demonstrated in section 2.2, the only pattern of epenthesis attested in UCSA is the C\text{v} pattern, which is utilized to repair unsyllabified segments arising from affixation as well as segments arising from root-final geminates. With respect to Shukriiya, the situation is a bit more complex. Indeed, this dialect exhibits both C\text{v} and vC patterns of epenthesis. However, the context of the latter is not accurately characterized by Reichmuth (1983). As I demonstrated in section 3.2, forms like [kalíbna] that are attested in the Western Shukriiya variety do not involve

\textsuperscript{4} Watson (2007) identifies more dialects that do not conform to the C\text{v}/vC distinction. She accounts for some of the so-called deviant dialects by proposing a mora-sharing analysis that extends Kiparsky’s analysis to a three-way distinction.

\textsuperscript{5} Recall that all tri-radical stems ending in heterorganic clusters in CA were reanalyzed into CVCVC in UCSA. Recall also that many, but not all, of these stems underwent the same reanalysis in the Western Shukriiya variety (See section 3.2.2.2).
epenthesis. Instead, the \( vC \) pattern applies at the I-Phrase level to repair the second member of a root-final heterorganic cluster. An example of this is /dar\( \text{b} \)\( /\text{\`a} \text{li}/ > [\text{da}\text{.rib}, \text{\`a} \text{li}] \) ‘Ali’s path’ (cf. /dar\( \text{b} \)-na/ > [d\( \text{\`a} \text{\`a} \text{b} \)ana] ‘our path’). I also demonstrated that the \( Cv \) pattern applies at the word level to repair unsyllabified segments rendered word internal through affixation. An example of this may indeed be a form like [k\( \text{\`a} \text{l} \text{b} \)ana]. Obviously, the fact that both \( Cv \) and \( vC \) patterns are attested in Shukriiya is not without implications for the status of epenthesis as a diagnostic tool.

This brief discussion highlights some of the interesting questions that UCSA and Shukriiya raise in the context of the research on Arabic dialectal phonology described above. Investigating the findings of the current study in the context of this research has the potential of revealing typological tendencies with respect to prosodic domains of syllabification and levels of repair of unsyllabified segments.

The third area of future research involves examining syllabification from a historical perspective. It is an interesting fact that the two contexts that give rise to unsyllabified segments in UCSA, Shukriiya, and Hamar have resulted from historical reanalysis or loss of morphemes.\(^6\) The first context arose due to the reanalysis of the Classical Arabic first person singular subject suffix \(-tu\) and second person masculine singular suffix \(-ta\). Both suffixes were reanalyzed as \(-t\) in these dialects. As we have seen in the previous chapters, affixation of this form to a stem ending in a consonant yields an unsyllabified segment. Also, like all modern spoken dialects of Arabic, the three dialects lost the case system of

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\(^6\) Recall that unsyllabified segments arise in all three dialects from two contexts. The first one involves affixation of the homophonous first person singular and second person masculine singular subject suffixes. The second context arises from roots ending in a two-consonant cluster.
Classical Arabic. This gave rise to the second context of unsyllabified segments. I briefly sketch the emergence of this context below.

The case endings in Classical Arabic are vocalic on definite nouns and vowel initial on indefinite and proper nouns. This meant that the final consonant in nominal stems of the form CVCC could always be properly syllabified at the word level. This is shown in (1) below.

\[
\begin{array}{l|l|l|l}
\text{Noun} & \text{Nominative} & \text{Accusative} & \text{Genitive} \\
\hline
\text{a.} \ /\text{al-}\text{}\text{umr/} & \text{al-}\text{}\text{umr-u} & \text{al-}\text{}\text{umr-a} & \text{al-}\text{}\text{umr-i} \\
\text{the-age} & \text{[al.}\text{}\text{um.ru]} & \text{[al.}\text{}\text{um.ra]} & \text{[al.}\text{}\text{um.ri]} \\
\text{‘the age} & \\
\text{b.} \ /\text{}\text{umr/} & \text{}\text{umr-un} & \text{}\text{umr-an} & \text{}\text{umr-in} \\
\text{age} & \text{[}\text{}\text{um.run]} & \text{[}\text{}\text{um.ran]} & \text{[}\text{}\text{um.rin]} \\
\text{‘an age} & \\
\end{array}
\]

The loss of case endings in modern dialects of Arabic meant that the final consonant could not be properly syllabified at the word level. Versteegh (1997a: 41) reports that the final cluster in stems similar to that in (1) above was separated by an epenthetic vowel in Western Pre-Islamic dialects. He illustrates this pattern with reference to the forms in (2) below.

\[
\begin{align*}
\text{a.} \ /\text{}\text{husn/} & \rightarrow \ [\text{husun}] & \text{“beauty”} \\
\text{b.} \ /\text{}\text{faxd/} & \rightarrow \ [\text{}\text{faxi}] & \text{“thigh”}
\end{align*}
\]

It is conceivable that this vC pattern of epenthesis signals earlier stages of the loss of case endings. With epenthesis, the case endings no longer had to be called on to perform the phonological role of ensuring proper syllabification of the final consonant. What is evident is that at some point the epenthetic vowels were reinterpreted as underlying. As I mentioned in previous chapters, this process affected all tri-radical stems of the form CVCC, which were reanalyzed into CVCVC in UCSA and Hamar. The only stems that escaped this reanalysis were

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7 These are dialects spoken in the western region of the Arabian Peninsula.
those consisting of a final geminate. In Shukriiya, a few forms in which the cluster consisted of heterorganic consonants also escaped the reanalysis process. Indeed these are the only forms that exhibit the $vC$ pattern of epenthesis in this dialect.$^8$

A closer examination of the historical aspect of syllabification promises to be revealing of new insights with respect to the various patterns attested in the grammars of these dialects.

In closing, the current study is a careful examination of different dialects with respect to areas that are crucial to the understanding of Arabic. It underscores the need for meticulous synchronic work that opens the door to many further studies.

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$^8$ See sections 2.2.1 and 2.5 for the relevant discussion in UCSA, section 3.2.2.2 for Shukriiya, and section 4.2.2 for Hamar.
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