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### **Alignment and weight in the Tigrinya verb stem**

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In the Type A Imperfective paradigm of Tigrinya (Ethio-Semitic), unsuffixed verbs have a geminate medial consonant ( $y\dot{i}\text{-}s\Lambda b b\dot{i}r$ ), while verbs with a subject or object suffix do not have gemination ( $y\dot{i}\text{-}s\Lambda b r\text{-}u$ ). This alternation has been analyzed from various points of view. A fundamental question is whether the more basic stem-form has gemination (Berhane 1991, Rose 1993) or not (Harris 1987, Denais 1990). Another important question is why the ungeminated form occurs with suffixes, rather than the other way around: Hayward (1987) stipulates that gemination occurs in unsuffixed forms, while Berhane (1991) posits special floating suffixes used in the Imperfective. Using the constraint-based framework of Optimality Theory (Prince and Smolensky 1993), I argue that the ungeminated form ( $y\dot{i}\text{-}s\Lambda b r\text{-}u$ ) is more basic, but that the best analysis does not make explicit reference to suffixes at all. Rather, with appropriate constraints on the overall shape of the Imperfective verb stem, the gemination alternation is an automatic consequence of the absence of a suffix.

In §1 I present the basic data and the generalizations that need to be accounted for. In §2 I begin the analysis with the Passive prefix, which is constrained such that it must be followed by a syllable boundary. In §3 I discuss the variation in the number of syllables in the stem, and in §4 the related question of gemination. In §5 I briefly discuss the question of where the stem vowel occurs. A conclusion is given in §6.

**1. The Data**

As indicated above, the “Type A” Imperfective shows a stem alternation depending on whether a suffix is present. This is the default verb type; for the other trilateral types B and C, which do not exhibit any alternation, see below. The Imperfective always includes an inflectional prefix.

(1) a. <i>No suffix</i>	$\text{ʔi-s}\Delta\text{bbi}r$ $\text{ti-s}\Delta\text{bbi}r$ $\text{yi-s}\Delta\text{bbi}r$	‘I break’ ‘you (m.sg.) break’ ‘he breaks’
b. <i>Subject suffix</i>	$\text{ti-s}\Delta\text{br-i}$ $\text{yi-s}\Delta\text{br-a}$ $\text{yi-s}\Delta\text{br-u}$	‘you (f.sg.) break’ ‘they (f.pl.) break’ ‘they (m.pl.) break’
c. <i>Object suffix</i>	$\text{ʔi-s}\Delta\text{br-o}$ $\text{yi-s}\Delta\text{br-om}$ $\text{yi-s}\Delta\text{br-u-ww-o}$	‘I break it’ ‘he breaks them’ ‘they (m.pl.) break it’

It can be seen that the medial consonant is geminated when no suffix is present (1a), with epenthetic [i] to permit syllabification; but it is ungeminated when a subject or object suffix occurs after the stem (1b,c). Hereafter I use the third-person masc. sing. as the illustrative unsuffixed form, *yi-sΔbbi*r, and the corresponding plural as the suffixed form, *yi-sΔbr-u*.

A similar alternation occurs in the Causative Imperfective, but none is found in the Passive.

(2) *Simple Imperfective* (=1)

a. <i>suffixed</i>	<b>-CΔCC-</b>	$\text{yi-s}\Delta\text{br-u}$
b. <i>unsuffixed</i>	<b>-CΔCC<i>i</i>C</b>	$\text{yi-s}\Delta\text{bbi}r$

(3) *Causative Imperfective*: similar alternation

a. <i>suffixed</i>	<b>-Δ-CC<i>i</i>C-</b>	$\text{y-}\Delta\text{-sb}i\text{r-u}$
b. <i>unsuffixed</i>	<b>-Δ-C<i>i</i>CC<i>i</i>C</b>	$\text{y-}\Delta\text{-s}i\text{bbi}r$

(4) *Passive Imperfective*: no alternation

a. <i>suffixed</i>	<b>-C<i>i</i>CCΔC-</b>	$\text{yi-s}i\text{bb}\Delta\text{r-u}$	$*\text{yi-sb}\Delta\text{r-u}$
b. <i>unsuffixed</i>	<b>-C<i>i</i>CCΔC</b>	$\text{yi-s}i\text{bb}\Delta\text{r}$	

This paper addresses the following questions:

- (5) a. Why does the presence of a suffix affect the stem?
- b. Why is the Causative stem (CCVC) different from the Simple CVCC?
- c. Why does the Passive fail to participate in this alternation?

I explore an analysis in which the shapes follow from general conditions on the shape of the verb, without specific statements for categories such as “suffixed

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imperfective” or “passive imperfective”. While I assume the framework of Optimality Theory (Prince and Smolensky 1993), I avoid here excessive attention to the more formal aspects of the analysis, focusing instead on the central concepts.

### 2. The Passive

The lack of a stem alternation in the Passive Imperfective is part of a general pattern in the Passive, one I have not seen discussed previously. The Passive prefix  $t_{\Delta}$ - never syllabifies with the following consonant (which belongs to the root), unlike the Causative  $ʔa$ - (derived from / $\Delta$ / by Glottal-Stop Insertion and Guttural Lowering).

(6) *Perfective stems* (always suffixed)

a. <i>Simple</i>	$s_{\Delta}b_{\Delta}r-$	
b. <i>Causative</i>	$ʔa-sb_{\Delta}r-$	
c. <i>Passive</i>	$t_{\Delta}-s_{\Delta}b(\Delta)r-$	$*t_{\Delta}-sb_{\Delta}r-$

(7) *Gerundive stems* (always suffixed)

a. <i>Simple</i>	$s_{\Delta}bir-$	
b. <i>Causative</i>	$ʔa-sbir-$	
c. <i>Passive</i>	$t_{\Delta}-s_{\Delta}bir-$	$*t_{\Delta}-sbir-$

(8) *Imperative stems* (suffixed in all but masc. sing.)

a. <i>Simple</i>	$sib_{\Delta}r-$	
b. <i>Causative</i>	$ʔa-sb_{\Delta}ir-$	
c. <i>Passive</i>	$t_{\Delta}-s_{\Delta}b_{\Delta}r-$	$*t_{\Delta}-sb_{\Delta}r-$

The generalization from these data is that in the Causative, the first root consonant can join in the same syllable as the prefix; but the Passive must be followed by a new syllable.

(9) *Syllabification of the Perfective*

a. <i>Causative</i>	$ʔ_{\underline{a}}s.b_{\Delta}r...$	
b. <i>Passive</i>	$t_{\underline{\Delta}}.s_{\Delta}.b_{\Delta}r...$	$*t_{\underline{\Delta}}s.b_{\Delta}r...$

The same difference holds for the Gerundive and the Imperative.

Another allomorph of the Passive occurs when an inflectional prefix precedes it, as in the Jussive: this is a C-slot that assimilates to the following consonant. It too is followed by a syllable boundary.

(10) *Jussive stems*

a. <i>Simple</i>	$y_{\dot{i}}-sb_{\Delta}r$
b. <i>Causative</i>	$y_{\dot{i}}-\Delta-sb_{\dot{i}}r$
c. <i>Passive</i>	$y_{\dot{i}}-s-s_{\Delta}b_{\Delta}r$

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(11) *Syllabification of the Jussive*

- |                     |                      |                            |
|---------------------|----------------------|----------------------------|
| a. <i>Causative</i> | y <sub>Δ</sub> s.bɪr |                            |
| b. <i>Passive</i>   | yɪs.sΔ.bΔr           | (*yɪ.s <sub>Δ</sub> s.bΔr) |

The Jussive suffixes are the same as for the Imperfective, but there is no gemination of the medial consonant (see §4).

For the Imperfective stems in (2) to (4), I assume a third allomorph — phonetically null — which occupies the normal position between the inflectional prefix (here, /y/) and the root. It does not syllabify, but is positioned relative to syllabified segments.

(12) *Imperfective stems* (suffixed form)

- |                     |            |
|---------------------|------------|
| a. <i>Simple</i>    | yɪ-sΔbr-   |
| b. <i>Causative</i> | y-Δ-sbɪr-  |
| c. <i>Passive</i>   | yɪ-sɪbbΔr- |

(13) *Syllabification of the Imperfective*

- |                     |                      |            |
|---------------------|----------------------|------------|
| a. <i>Causative</i> | y <sub>Δ</sub> s.bɪr |            |
| b. <i>Passive</i>   | yɪ∅ .sΔ.bΔr          | *yɪ∅ s.bΔr |

Notice that in ill-formed \*yɪ∅s.bΔr the zero passive prefix is not followed by a syllable boundary, since the following /s/ is in the coda.

In Tigrinya, then, the right edge of any Passive prefix (even if it is zero) aligns with the left edge of some syllable. I formulate this notion, and many below, using Alignment; see McCarthy and Prince (1993b) for discussion of the general format *Align(Category1, Edge1; Category2, Edge2)*.<sup>1</sup>

(14) *Passive Prefix Alignment Constraint*

ALIGNPASS                      Align (Passive Prefix, R; Syllable, L)

<sup>1</sup> A possible exception is found in quinquiliteral stems, but the best analysis is elusive. Tigrinya has a small set of verb stems containing five consonants (often partly reduplicated), which always occur with a Causative or Passive prefix, such as *tANkʌtkʌt*- ‘shiver’ (cf. Berhane 1991: 359). Here the prefix *tʌ*- syllabifies with the following /n/, but this sequence represents a complex prefix *tʌ-n*- (cf. also Leslau 1941: 108), and it may be this unit which is subject to syllable alignment. The same is true of the complex prefixes *tʌs*- and *tʌš*- (cf. Leslau 1941: 106f). For a very small number of quinquiliterals occurring in the Passive, the first consonant is not plausibly part of a prefix, e.g. *tʌ-kʌzbʌz*- ‘turn head in curiosity’ (Bassano 1918: 370); this syllabification groups /k/ with the Passive, in defiance of the stated generalization. It may be that an upper limit of two syllables in the stem prevents the alternative \**tʌ-kʌzbʌz*- (cf. §3). Note, however, that Leslau (1941: 99) gives one verb (‘to sparkle’) with variation in this regard: the Perfect *tʌ-nʌbʌlbʌl*- shows proper alignment but three syllables, while Imperative *tʌ-nʌbʌlbʌl*- shows improper alignment and two syllables. There may be variation in ranking of constraints according to dialect and even according to inflection, but the data are far too sparse to draw firm conclusions. More such verbs are attested in the Causative, e.g. *?a-ʕtʌmʌm*- ‘resent’ (Berhane 1991: 359), but these tell us nothing about Passive alignment.

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This constraint by itself prevents all the stem alternations of the type found in the Simple and Causative; here | indicates the right edge of the Passive prefix.

### (15) *Alignment of the Passive Prefix*

a. <i>Perfective (etc.)</i>	t <sub>Δ</sub>   .s <sub>Δ</sub> .b <sub>Δ</sub> r...	*t <sub>Δ</sub>   s.b <sub>Δ</sub> r...
b. <i>Jussive</i>	y <sub>ɪ</sub> s   .s <sub>Δ</sub> .b <sub>Δ</sub> r	*y <sub>ɪ</sub> .s   <sub>Δ</sub> s.b <sub>Δ</sub> r
c. <i>Imperfective</i>	y <sub>ɪ</sub>   .s <sub>Δ</sub> .b <sub>Δ</sub> r	*y <sub>ɪ</sub>   s.b <sub>Δ</sub> r

In each attested form, the required alignment is satisfied (|.); in the unattested alternative candidates shown in the last column, the alignment is not satisfied and the form is rejected.

### 3. Stem Alternations: Syllable Count

Recall the alternate stems in the Simple and Causative Imperfective, repeated here in (16).

### (16) *Imperfective stems*

	<i>Simple</i>	<i>Causative</i>
a. <i>suffixed</i>	-C <sub>Δ</sub> CC-	- <sub>Δ</sub> -CC <sub>ɪ</sub> C-
b. <i>unsuffixed</i>	-C <sub>Δ</sub> CC <sub>ɪ</sub> C	- <sub>Δ</sub> -C <sub>ɪ</sub> CC <sub>ɪ</sub> C

In both patterns, the unsuffixed form has an extra syllable (from epenthesis) and a geminate consonant. While gemination could be considered primary and epenthesis a secondary effect (cf. Hayward 1988), there is no means of creating that gemination by itself without stipulation.<sup>2</sup> Instead, I pursue the two matters separately, and begin with the number of syllables.

It is well known that templatic morphological systems often impose syllabic sizes on stems; for example, there is a maximum of two syllables in Arabic (McCarthy and Prince 1990). In Tigrinya some stems are a minimum (or exact) size of two syllables. This is true throughout the Type C paradigm, for example, as illustrated in (17) for the root /brk/ ‘bless’.

	<u>Type A</u>	<u>Type C</u>
(17) a. <i>Perfective</i>	s <sub>Δ</sub> b <sub>Δ</sub> r-	bar <sub>Δ</sub> k-
b. <i>Gerundive</i>	s <sub>Δ</sub> b <sub>ɪ</sub> r-	bar <sub>ɪ</sub> k-
c. <i>Imperfective</i>	y <sub>ɪ</sub> -s <sub>Δ</sub> bb <sub>ɪ</sub> r	y <sub>ɪ</sub> -bar <sub>ɪ</sub> k
	y <sub>ɪ</sub> -s <sub>Δ</sub> br-u	y <sub>ɪ</sub> -bar <sub>ɪ</sub> k-u
d. <i>Jussive</i>	y <sub>ɪ</sub> -sb <sub>Δ</sub> r	y <sub>ɪ</sub> -bar <sub>ɪ</sub> k
	y <sub>ɪ</sub> -sb <sub>Δ</sub> r-u	y <sub>ɪ</sub> -bar <sub>ɪ</sub> k-u

We know this minimum size exists because while some Type A stems are less than two syllables (Imperfective -s<sub>Δ</sub>br-, Jussive -sb<sub>Δ</sub>r), in Type C all stems are two syllables. As a result, an epenthetic vowel can be found even when it is unnecessary for simple syllabification (e.g. y<sub>ɪ</sub>-bar<sub>ɪ</sub>k-u, \*y<sub>ɪ</sub>-bark-u).

<sup>2</sup> Such an approach would also face complications for the Passive forms: the gemination rule would have to apply there not only in the absence of a suffix but also in the presence of one.

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This pattern indicates that in Type C verbs, a disyllabic stem size (i.e. a disyllabic foot) is imposed. This is a parsing foot (cf. McCarthy and Prince 1986, Hammond 1989) and does not encode stress.

### (18) *Disyllabicity Constraint*

STEM=FT

Type C Verb Stem = Foot

FTBIN

A foot is binary, i.e. consists of two syllables.

Candidates are evaluated by creating a foot (marked with parentheses) to correspond to the beginning and end of the root. For heuristic purposes, this foot is considered to be binary if it contains two syllable heads (=vowels). Prefix and suffix vowels are not counted, nor is a final epenthetic vowel: they all lie outside the Stem constituent and therefore outside the foot defined in (18). A foot which includes one of these vowels might satisfy FTBIN but does not satisfy STEM=FT. The Stem constituent is underlined for ease of reference.

### (19) *Evaluation of a suffixed Type C verb (Imperfective/Jussive)*

/y-brk, a-u/	STEM=FT	FTBIN
a.    yḯ( <u>bark</u> )u		*!
b.    yḯ( <u>barḯk</u> )u		
c.    yḯ( <u>barku</u> )	*!	

As suggested by the formulation in (18), the constraint STEM=FT is morphologically marked to apply to Type C as a class.<sup>3</sup> It essentially requires that both the left and right edges of the Verb Stem be aligned with a foot (cf. McCarthy and Prince 1993a: 139).

I suggest that a different sort of minimality constraint holds of Imperfective stems as a class: the left edge of the stem must align with the left edge of a foot. In this instance, unlike in (18), the right edge of the stem has no requirements imposed on it.

### (20) *Imperfective Alignment Constraint*

ALIGN-IMPF


Align (Imperfective Stem, L; Foot, L)

Because ALIGN-IMPF refers only to the left edge of the Stem, suffixal material can be included in the foot. And since epenthesis is disfavored by DEP (McCarthy and Prince 1995), inclusion of the suffix is preferred over addition of a new vowel. Since /sbr/ in (21) is not a Type C root, STEM=FT is irrelevant.

<sup>3</sup> It is also relevant to other categories, e.g. all Perfect stems, but that fact is not pursued here.

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### (21) *Evaluation of a suffixed Imperfective (Type A)*

/y-sbr, Δ-u/	ALIGN-IMPF	FTBIN	DEP
a. yɪ(sΔbr)u		*!	*
b.  yɪ(sΔbru)			*
c. yɪ(sΔbbɪr)u			*!*

This approach is similar to incorporation of “floating” suffixes into the template as proposed for Tigrinya by Berhane (1991) and Rose (1993), but in the analysis given here no special status for Imperfective suffixes is necessary. Appropriately, it is a requirement on the Stem itself which incidentally interacts with the presence of a suffix.

When no suffix is present, epenthesis is unavoidable: ALIGN-IMPF prevents inclusion of prefixal material. Low-ranked DEP is then violated by the optimal form.

### (22) *Evaluation of an unsuffixed Imperfective (Type A)*

/y-sbr, Δ/	ALIGN-IMPF	FTBIN	DEP
a. yɪ(sΔbr)		*!	*
b. (yɪsΔbr)i	*!		**
c.  yɪ(sΔbbɪr)			**

Candidate (22a) violates Tigrinya syllable structure, but is included for the sake of illustration; see (31). By regular process, final [ɪ] is fronted to [i] (cf. Buckley 1997).

A final provision has to be made to ensure that epenthesis occurs within the root rather than word-finally. It is a general fact about Tigrinya that a verb cannot end in epenthetic material, as expressed by the following constraint.<sup>4</sup>

### (23) *Verb Alignment Constraint*

ALIGN-VERB      Align(Verb, R; PrWd, R)

In other words, the morphological category Verb (|) must right-align with the prosodic word (ɿ).

### (24) *Morpho-prosodic alignment*


- a. yɪsΔbr|ɿ]      (*does not satisfy (23)*)
- b. yɪsΔbbɪr|ɿ]      (*satisfies (23)*)

<sup>4</sup> The constraint in (23) refers only to Verbs. In other parts of speech, word-final epenthesis is the norm, e.g. /kΔlb/ → kΔlbɪ ‘dog’.

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Since epenthetic material does not have a morphological affiliation, a final inserted vowel is not part of the Verb: it intervenes between the two edges and creates a violation.

(25) *Location of epenthesis*

/y-sbr, Δ/	ALIGN-IMPF	FTBIN	ALIGN-VERB
a. yᵢ(sΔbr)		*!	
b. yᵢ(sΔbri)			*!
c.  yᵢ(sΔbbir)			

The same insight accounts for the lack of consonantal epenthesis word-initially in Axininca Campa (McCarthy and Prince 1993a).

4. Stem Alternations: Gemination

An important aspect of the winning candidate *yᵢ-sΔbbir* not yet explained is the presence of gemination. The alternative *\*yᵢ-sΔbir* satisfies all the constraints in (25), so another factor must rule it out. That factor is the subject of this section.

It is clear that gemination is, like size, sometimes a required property of templates. For example, medial gemination is the major distinguishing characteristic of Tigrinya Type B verbs. The root /bdl/ ‘offend’ illustrates this.

(26)		<u>Type A</u>	<u>Type B</u>
a. <i>Perfective</i>		sΔbr-	bΔddΔl-
b. <i>Gerundive</i>		sΔbir-	bΔddil-
c. <i>Imperfective</i>		yᵢ-sΔbr-u	yᵢ-bᵢddil-u
d. <i>Jussive</i>		yᵢ-sbΔr-u	yᵢ-bΔddil-u


The most natural account of this pattern in prosodic morphology (McCarthy and Prince 1986) is syllable weight: the first syllable of a Type B stem must be heavy.

(27) *Heavy Syllable Alignment Constraint*

ALIGN-□□□      Align (Verb Stem, L; Heavy Syllable, L)

This constraint has various morphological triggers: a root belonging to Type B (as in (26)) and the Type A Imperfective, as seen in *yᵢ-sΔbbir*. In the tableaux below the left edge of the Verb Stem is indicated by l.

(28) *Gemination in unsuffixed Type A Imperfective*


/y-sbr, Δ/	ALIGN-□□□	DEP
a. yᵢ.l   sΔ.bir	*!	
b.  yᵢ.l   sΔb.bir		*

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The ranking DEP » WT-IDENT (cf. McCarthy 1995) ensures gemination rather than epenthesis (e.g. \*y<sub>i</sub>.s<sub>Λ</sub>?b<sub>i</sub>r).

The prosodic morphology approach has an important consequence. Because the constraint refers to a heavy syllable rather than gemination per se, it is satisfied in the suffixed form as the direct result of syllabification.<sup>5</sup> Tigrinya syllables are CV(C), with no long vowels (Buckley 1997).

### (29) Heavy syllable in suffixed Type A Imperfective

/y-sbr,Λ-u/	ALIGN-□□	DEP
a.  y <sub>i</sub> .   s <sub>Λ</sub> b.ru		
b. y <sub>i</sub> .   s <sub>Λ</sub> .b <sub>i</sub> .ru	*!	*
c. y <sub>i</sub> .   s <sub>Λ</sub> b.b <sub>i</sub> .ru		*!


Not only is this a simpler approach than one which refers to the presence of a suffix, but empirically this is an important result as well. In the Passive we find gemination with or without a suffix, showing that the relevant constraint cannot be arbitrarily restricted to unsuffixed verbs (see (4)).

ALIGN-□□ also crucially generates gemination in biliteral verbs, even when suffixed. The root is /sd/ ‘send’.

(30)	Type A Biliteral
a. <i>Perfective</i>	s <sub>Λ</sub> d <sub>Λ</sub> d-
b. <i>Gerundive</i>	s <sub>Λ</sub> d <sub>i</sub> d-
c. <i>Imperfective</i>	y <sub>i</sub> -s <sub>Λ</sub> dd <sub>i</sub> d, y <sub>i</sub> -s <sub>Λ</sub> dd-u

It is precisely ALIGN-□□ which forces gemination of the /d/ in the Imperfective.

### (31) Gemination in biliteral Imperfective (suffixed example)

/y-sd,Λ-u/	ALIGN-□□	DEP
a. y <sub>i</sub> .   s <sub>Λ</sub> .du	*!	
b.  y <sub>i</sub> .   s <sub>Λ</sub> d.du		
c. y <sub>i</sub> .   s <sub>Λ</sub> d.d <sub>i</sub> .du		*!

Gemination, then, is caused by a requirement for a heavy syllable initially in the template; when the syllable is closed by a simple consonant, no gemination is necessary.<sup>6</sup>

<sup>5</sup> From this perspective the quadriliteral verbs (e.g. *maskar*- ‘witness’) can be viewed as Type B verbs which have no need of gemination to satisfy the heavy-syllable requirement. This point of view is confirmed by the fact that the templates for Type B and the quadrilaterals are otherwise identical.

<sup>6</sup> A further issue is why the Causative Imperfective is *y-Λ-sbir-u* rather than \**y-Λ-sibr-u*, analogous to the Simple *y<sub>i</sub>-sabr-u* with an obvious heavy syllable. One analysis is to treat the “Verb Stem” itself as a contingent category: it must coincide with the beginning of a (heavy)

## 5. Vowel Position

A final matter is the location of the stem vowel among the root consonants. First, consider stems with no distinctive vowel, i.e. only [i] which is assumed to be epenthetic. I take these “templates” to be the result of simple syllabification interacting with constraints on stem size and weight (cf. McCarthy 1993 on Chaha).

- (32) a. *Causative Imperfective*       $y-\Delta-s\dot{i}bb\dot{i}r$   
 b. (*suffixed*)                       $y-\Delta-sb\dot{i}r-u$   
 c. *Causative Jussive*               $y-\Delta-sb\dot{i}r(-u)$

Notice that we don’t find e.g.  $*y-\Delta-s\dot{i}br-u$ . This suggests that the ‘default’ location for a vowel is between the second and third root consonants, attributable to general syllabification.<sup>7</sup>

Now consider the two types of cases with an underlying stem vowel. In some cases the vowel occurs in the ‘default’ location as in (32).

- (33) a. *Causative Perfective*               $ʔa-sb\Delta r-$   
 b. *Causative Gerundive*               $ʔa-sb\dot{i}r-$   
 c. *Simple Jussive*                       $y\dot{i}-sb\Delta r(-u)$

These forms do not require any special statement: the vowel (/Δ/ or /i/) will automatically occur in the same default location as in (32).

In the following case, however, the vowel does not occur in the default location seen in (32) and (33).

- (34) a. *Simple Imperfective*               $y\dot{i}-s\Delta bb\dot{i}r$   
 b. (*suffixed*)                       $y\dot{i}-s\Delta br-u$

Since the location of the vowel after the first root consonant cannot result from same basic syllabification responsible for (33), a specific constraint is necessary. Just as the Perfect prefix must be followed by a syllable boundary, so the stem for the Simple Imperfective must be preceded by one, as formulated in (35).<sup>8</sup>

### (35) *Simple Imperfective Alignment Constraint*

ALIGN-IMPF              Align (Simple Imperfective Stem, L; Syllable, L)

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syllable, and in this case it includes the prefixal material, i.e.  $/y\Delta s.b\dot{i}.ru$ , so the first syllable is heavy. This approach extends also to the consonant copying found in the biliteral Simple Jussive  $y\dot{i}sd\Delta du$ , which would be parsed as  $/y\dot{i}s.d\Delta.du$  with a heavy first syllable, lacking in  $*y\dot{i}.s\Delta.du$  without copying. The candidate  $*y\dot{i}s.s\Delta.du$  is ruled out by independent constraints forcing the effect of rightward spreading, well-known in Semitic (cf. Sharvit 1994 for Hebrew).

<sup>7</sup> The same holds for the Gerundive  $s\Delta bir-$ : it results from simple syllabification, but since it has two stem vowels the Stem has to consist of two syllables.

<sup>8</sup> Thanks to David Odden for suggesting this formulation.

## ALIGNMENT AND WEIGHT IN THE TIGRINYA VERB STEM

### (36) *Syllable alignment in the Type A Imperfective*

/y-sbr, ʌ-u/	ALIGN-IMPF
a.     yᵢ   s.bʌ.ru	*!
b.     yᵢ .   sʌb.ru	
c.     y   ʌs.bᵢ.ru	*!

I assume that the effect of directional syllabification places the /ʌ/ in the first syllable in unsuffixed forms like *yᵢ-sʌbbir* (25c). It may also be necessary to posit some type of right-alignment constraint for the /ʌ/ in the Passive Imperfective *yᵢ-sᵢbbar*, though another possibility is to assume the underlying vocalism /ɨ ʌ/ which forces two syllables in the appropriate order. Normally, however, it seems unnecessary to give underlying /ɨ/ in Tigrinya. I leave the matter unresolved here.

### 6. Conclusion

I have presented an analysis of a significant portion of the Tigrinya verb system which generates the alternations in the Type A Imperfective stem by means of constraints which make no specific reference to suffixes, and which are motivated by patterns that go beyond the forms that show stem alternations. Their generality and greater naturalness make this analysis preferable to previous approaches that stipulate the behavior of suffixes, or the behavior of stems in the specific presence absence of suffixes.

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