

## Against the Consonantal Root in Tashlhit \*

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*Le présent article avance des arguments contre la racine consonantique en tachelhit tout en proposant une approche morphologique qui s'appuie sur des mots phonologiquement possibles comme bases de dérivation. Des phénomènes sensibles aux voyelles appellent à l'inclusion de celles-ci dans les bases de dérivation et, partant, nous distinguons fondamentalement entre bases à consonne finale et celles à voyelle finale. Cette distinction prescrit une nouvelle conception des bases de dérivation que soutiennent diverses applications à la morphologie du tachelhit. Ces applications montrent que notre conception permet un meilleur traitement des procédés morphologiques ayant jusqu'ici résisté à une analyse unifiante et appropriée.*

### 1. Roots in Tashlhit: General background

#### 1.1. Root-and-template morphology: In the search of a base

The morphology of Semitic languages, and that of Hamitic ones for that matter, is commonly cited as being prototypical of root-and-pattern (template) morphology. Cantineau (1950) proposes a system of roots (racines) and one of templates (schèmes) to account for the intricacies of such a morphology. The Arabic word

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*ʔabjad* ‘white’, for instance, is construed as combining the root *bjd*, expressing the general meaning ‘white’, and the pattern *afʔal*, forming masc. sg. adjectives of color (p.193).<sup>1</sup> Drawing a distinction between the two concepts, Zemánek (2009:93) writes: “Root as an abstract unit (morpheme)... is defined as an ordered set of consonants; vowels play a different role in the word derivation. Another role is played by the pattern, which represents the structure of the word itself (this structure is then filled by the root and vocalization).” The two constructs play a major role in derivation as well as lexical organization. Appearing only at the deep level, the root is an abstract unit whose surface manifestation can only be worked indirectly through co-occurrence restrictions and mental representations. The author also comments that: “One could say that the root plays the role of the lexical morpheme, while the vocalization and affixes take part in the morphological derivation from the semantic basis.”<sup>2</sup>

Within the Generative school, the theory of Non-Concatenative Morphology (NCM) (McCarthy, 1979, 1981), for instance, captures this type of morphology through separating root consonants from other morphological material, including vowels, and representing each on a separate tier. The interaction between different tiers is ensured by a template, consisting of C(onsonant) and V(owel) elements.<sup>3</sup> A mechanism known as tier conflation involves a linearization of these elements, so to speak, and results in the word as we know it. Applying this insight to Classical Arabic shows how the consonantal root *ktb* ‘write’ can express active or passive voice by the inter-digitation of the vowel melodies (*a...a*) or (*u...i*), respectively, between the consonants, yielding the forms *katab* and *kutib*.

Quite recently, the assumption that the morphology of Semitic is root-based has been questioned (Bat-El, 1994, 2003a-b; Benmamoun, 1999; Ratcliffe, 2003; Ussishkin, 1999; see Prunet, 2006 and Ussishkin, 2006 for reviews). Benmamoun (1999) argues for deriving (causative) verbal forms from the imperfective form,

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<sup>1</sup> The number of root consonants is between one and six; however, triconsonantalism is the predominating tendency (see for example Moscati et al., 1980; Zaborski, 2006; Zemánek, 2009).

<sup>2</sup> Although common, the assumption that roots are exclusively consonantal does not seem to be accepted by all scholars (see Moscati et al., 1980:72 for a brief review). Zaborski (2011:313) also seems to acknowledge the possibility of root vowels when he comments that “since vowels are subject to morpho-phonemic changes, it is difficult to say precisely which ones are root vowels.”

<sup>3</sup> The following abbreviations are used: Act.=action; Ag.=agentive; Ag.T=Agadir Tashlhit; Aor.=aorist; C=consonant; Caus.=causative; Conj.=conjunction; Dem.=demonstrative; Der.=derived; Fr.=French; G=glide; Gr=group; HV=high vowel; Instr.=instrument; Int.=intensive; IO.T=Ida Ougnidif Tashlhit; Loc.=location; masc.=masculine; N.=noun; NCM=Non-concatenative morphology; Neg.=negative; p.=person; Pass.=passive; Pl.=plural; Pret.=preterite; Sg.=singular; V=vowel; Vb.=verb.

contra the commonplace assumption of the perfective as a base of derivation. Unifying the behavior of verbal and nominal forms, the analysis proves the word-based approach to be superior to the root-based one. Bat-El (1994) and Ussishkin (1999) both claim that a better analysis of Modern Hebrew denominal verbs is possible if the word, rather than the C-root, is taken as a base of derivation. Considering Modern Hebrew denominatives like *tilgref*, Bat-El (1994), for example, states that one can claim that the derivation (i) extracts the consonantal root *tlgrf* from the base *télegraf* and (ii) maps it onto a template *CiCCeC*. However, the derivation of *priklet* ‘to practice law’ and *sindler* ‘to make shoes’, from *praklit* ‘lawyer’ and *sandlar* ‘shoe-maker’, respectively, involves a transfer of cluster information, hence the ungrammaticality of *\*pirklet*. This shows that what is accessed is not the C-root, but rather a stem from which cluster information is retrievable. Bat-El concludes that the C-root can be eliminated from the grammar, as does Ussishkin. In her later work, Bat-El (2003a-b) brings in evidence from historical change and a(n Optimality Theoretic-internal) learnability argument against the C-root, as well as a comparison with various non-Semitic languages showing Semitic morphology not to be as exotic as is widely held, a point also made in Ratcliffe (2003) and Schluter (2013).

Gafos (2009) defends a stem-based approach to Arabic morphology, as does Heath (1987) concerning Moroccan Arabic. Gafos claims that its significant contributions to nominal morphology (e.g. sg./pl. morphology) can be quite successfully extended to verbal morphology, more particularly in deriving the allomorphs of doubled (geminated) verbs, such as [madad] from *madd* ‘stretch’, instead of the opposite widely held direction. The conclusion Gafos draws is that the input to the morphology is richer than the bare C-roots, especially regarding vocalism and vowel length. Assuming a (possible phonological) word as a base, Ratcliffe (2003) shows that some aspects of Arabic morphology do not call for a root-and-pattern approach, while in others the word-based and root-based approaches compete.

If there are any arguments for the C-root as a unit of lexical organization, these are of an external nature and come, for instance, from work in psycholinguistics (Boudelaa, 2013, 2014 and references therein; see Prunet, 2006 and Ratcliffe, 2013 for reviews). Boudelaa (2013) cites psycholinguistic studies focusing on the cognitive and neurocognitive processing and representation of morphology. Addressing the issue of roots and patterns as morphemes having independent lexical representations, these studies conducted priming experiments the results of which are taken as strong evidence for the fundamental role of Arabic roots in lexical processing and representation. This assertion is reiterated in Boudelaa (2014), which additionally states that this kind of data is challenging to the stem-based approach, as is other behavioral data, such as slips of the tongue, and novel word acceptability judgments.

However, in similar work on Moroccan Arabic, Schluter (2013) has reached mixed results. A set of six experiments leads the author to the conclusion that “there is not a root representation that is accessed directly from phonological input” and that

“words are recognized as words and then their morphemes are recognized- but not the synthesis or interdigitation of root and pattern.” On the basis of this, the author takes the word, rather than the root, as the primary unit of speech perception in Moroccan Arabic (p. 117). The author, in his general conclusion, states that: “Taken as a whole, the results ... suggest that the subliminal speech priming technique can reveal the organization of the lexicon, and the organization it reveals is one of etymologically defined morphological relationships, but not root representations” (p. 157).

## 1.2. Base materials in Amazigh: A very controversial issue

Since the early periods of Amazigh linguistics, the issue of which elements to include in the forms that serve as a basis for the derivation of different morphological categories has been of paramount importance.

Basset (1929, 1952), as in the quote below, states that a clear-cut line is drawn between radical and morphological material, with consonants pertaining to the root and vowels playing only a morphological role.

Un groupement exclusif de consonnes constitue le radical et, partant, l'armature sémantique du mot. Ces consonnes sont généralement au nombre de trois, mais il peut y en avoir de une à quatre. Dans une racine donnée, elles sont immuables en nature, en nombre et en position... Le jeu vocalique a toujours une valeur morphologique, jamais sémantique...

Sur le plan radical et morphologique, il y a une opposition fondamentale entre voyelle et consonne. La voyelle n'intervient jamais sur le plan radical, stricte domaine de la consonne. La consonne intervient par contre à la fois sur les plans radical et morphologique. (Basset, 1952 : 11-12).

A number of other scholars followed suit, which is the case specifically of most scholars working in the European structuralist tradition, for example Galand (1964/2002:289) (a more detailed presentation is in Galand (2010: 83-91)), and more recently Boumalk (1996) and Taifi (1990).<sup>4</sup> For Galand, the preterite form of the verb *ak<sup>v</sup>r* ‘steal’ consists of the radical *-ukr-*, which combines with the person pronouns (indices) as in the forms *ukr-ɣ* ‘I stole’, *t-ukr-t* ‘you stole’, and *j-ukr* ‘he stole’. The radical itself consists of a (consonantal) root and a template, as in (1):<sup>5</sup>

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<sup>4</sup> An exception to the widely held assumptions on C-roots in Amazigh by structuralists is in Cohen (1993). On the basis of an examination of the practices in Amazigh dictionary-making, the author points out the necessity of including vowels in roots, claiming that the C-root may not be a satisfactory option.

<sup>5</sup> The tenets of this die-hard approach have been extended to work outside morphology per se: The C-root plays a major role in organizing dictionary entries (e.g. Taifi, 1991), and it

$$(1) \quad \text{Stem (radical)} = \text{-ukr-} \begin{cases} KR & = \text{Root (racine)} \\ -uC^1C^2- & = \text{Template (schème)} \end{cases}$$

A quite different theoretical approach, but most probably similar in essence, was adopted to account for Tashlhit/Amazigh morphological facts- NCM. An application of NCM to the facts of Tashlhit would yield the representations in (2), corresponding to the vowel-initial verb *aḍn* ‘ache’, the vowel medial *mun* ‘accompany’ and the vowel-final *kru* ‘rent’.<sup>6</sup>

(2)	a- aḍn	b- mun	c- kru
<i>Affixal tier:</i>	$\mu$   a	$\mu$   u	$\mu$   u
<i>Skeletal tier:</i>	VCC     d n	CVC     m n	CCV     k r
<i>Root tier:</i>	$\mu$ ∨ $\mu$	$\mu$ ∨ $\mu$	$\mu$ ∨ $\mu$

The insight is that consonants bear the semantic core of the word, while vowels rather play a morphological role. In *aḍn* and *kru* (but not *mun*) in (2), the vowel of the aor(ist) changes in the pret(erite), and the verbs accordingly have *uḍn* and *k<sup>w</sup>rila* as correspondents.<sup>7</sup> The constant consonantal core is then assumed to be the root, while the changing vowels play only a morphological role and should accordingly not be included in the root per se. Such is the approach adopted, for instance, in a thorough analysis of Tashlhit passive verb formation (Moktadir, 1989). An appropriate representation of the passive form *ttjamaḥ* from *amḥ* ‘catch’, would assign the consonantal root *mḥ* to one tier, the vowel *a* to another tier, and the assumed discontinuous passive affix {*ttj...a*} to yet another tier.

The rigid separation of the consonants and vowels of the language respectively into root and non-root (morphological) elements has been argued against, and later scholars proved that Amazigh bases of derivation contain consonants and vowels

has also been assumed in standardization work relating to Moroccan Amazigh (Boukhris et al., 2008; Laabdelaoui et al., 2012).

<sup>6</sup> We use IPA transcription except for the dot underneath segments indicating emphatics. Gemination is transcribed by doubling the consonant.

<sup>7</sup> Tashlhit typically distinguishes three verb stems: the Aor., the Int.Aor., and the Pret. These express respectively (i) an order, an intention, a wish, or a future; (ii) an action taking place currently or one that is continuous or repetitive; and (iii) a completed action. Some Tashlhit dialects have an additional Neg.Pret. (see Bensoukas, 2007, 2009, 2013, 2015 and references therein).

alike. The contention is held that some vowels will remain with no morphological affiliation if bases are considered to be exclusively consonantal in nature (Bensoukas, 1994, 2001a; Iazzi, 1991, 1995; Jebbour, 1996, among others). More than that, Tashlhit morphology is replete with irregularity that can only be explained on the assumption that some of the vowels involved belong to underlying structure (we will have more to say about this in § 2 below). A verbal base other than the consonantal root is then adopted as the base of the derivation (Bensoukas, 1994, 2001a; Dell and Elmedlaoui, 1991; Iazzi, 1991, 1995). No unanimity has been achieved in this respect, either, however.<sup>8</sup>

### 1.3. Renaissance of the issue

New arguments for the C-root in Tashlhit are based on the morphology of two Tashlhit secret languages used by women, Taqjmit (Lahrouchi and Ségéral, 2009, 2010a-b) and Tagnawt (Douchaïna, 1998) (see also Lahrouchi, this volume).

Lahrouchi (this volume) provides the examples in (3), and comments that the users of these secret languages extract a consonantal root (R), a morpheme on its own, to the exclusion of affixal material, and derive secret forms on the basis of the templates [ti R<sub>1</sub>R<sub>1</sub> a R<sub>2</sub>R<sub>3</sub> ju R<sub>2</sub>R<sub>3</sub>] (Taqjmit) and [aj R<sub>1</sub>R<sub>1</sub> a R<sub>2</sub>R<sub>3</sub> wa R<sub>2</sub>R<sub>3</sub>] (Tagnawt). The processes used are (i) prefixing *ti-* in Taqjmit and *aj-* in Tagnawt, (ii) geminating the first root consonant (R<sub>1</sub>), (iii) inserting [a] after the geminated R<sub>1</sub>, (iv) infixing *-ju-* in Taqjmit and *-wa-* in Tagnawt after R<sub>3</sub>, and (v) reduplicating R<sub>2</sub> et R<sub>3</sub> at the right edge.

(3)

<p><i>a. Tashlhit → Taqjmit</i>  <i>Template: [ti R<sub>1</sub>R<sub>1</sub> a R<sub>2</sub> R<sub>3</sub> ju R<sub>2</sub> R<sub>3</sub>]</i></p> <table border="0"> <tr><td>krf</td><td>tikkarfjurf</td><td>‘tie!’</td></tr> <tr><td>i-ksuḍ</td><td>tikkasḍjusḍ</td><td>‘be afraid’</td></tr> <tr><td>l-axbar</td><td>tixxabrjubr</td><td>‘news’</td></tr> <tr><td>m-bark</td><td>tibbarkjurk</td><td>‘pr. name’</td></tr> <tr><td>t-amyar-t</td><td>timmayrjuyr</td><td>‘woman’</td></tr> <tr><td>t-afrux-t</td><td>tiffarxjurx</td><td>‘girl’</td></tr> </table>	krf	tikkarfjurf	‘tie!’	i-ksuḍ	tikkasḍjusḍ	‘be afraid’	l-axbar	tixxabrjubr	‘news’	m-bark	tibbarkjurk	‘pr. name’	t-amyar-t	timmayrjuyr	‘woman’	t-afrux-t	tiffarxjurx	‘girl’	<p><i>b. Tashlhit → Tagnawt</i>  <i>Template: [ti R<sub>1</sub>R<sub>1</sub> a R<sub>2</sub> R<sub>3</sub> ju R<sub>2</sub> R<sub>3</sub>]</i></p> <table border="0"> <tr><td>skr</td><td>ajssakrwakr</td><td>‘do’</td></tr> <tr><td>i-ksuḍ</td><td>ajkkasḍwasḍ</td><td>‘be afraid’</td></tr> <tr><td>l-ḥml</td><td>ajḥḥamlwaml</td><td>‘load’</td></tr> <tr><td>n-ṣbr</td><td>ajṣṣabrwabr</td><td>‘we endure’</td></tr> <tr><td>t-aknari-t</td><td>ajkkanrwanr</td><td>‘cactus pear’</td></tr> <tr><td>t-afrux-t</td><td>ajffarxwarx</td><td>‘girl’</td></tr> </table>	skr	ajssakrwakr	‘do’	i-ksuḍ	ajkkasḍwasḍ	‘be afraid’	l-ḥml	ajḥḥamlwaml	‘load’	n-ṣbr	ajṣṣabrwabr	‘we endure’	t-aknari-t	ajkkanrwanr	‘cactus pear’	t-afrux-t	ajffarxwarx	‘girl’
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The data and analyses of Taqjmit and Tagnawt do in fact show a strict root-and-template morphology put to use by the users of these secret languages.

Psycholinguistic evidence for the C-root in Tashlhit is not available yet. El Hamdi (in preparation) is using subliminal priming to find out, inter alia, whether the lexicon of Tashlhit is organized around C-roots as morphemic units, in a similar fashion to the way the lexicon of Semitic languages is claimed to be organized. The

<sup>8</sup> See Bensoukas (2006) for a detailed review of the various frameworks adopted to deal with Amazigh morphology as well as a discussion of the issues raised in the works surveyed.

broader aim is to determine whether Tashlhit morphology is root-based and whether it conforms to root-and-pattern typology. Another experiment uses different items in that they are assumed to have vocalic roots. The objective of this experiment is to test whether the lexicon of Tashlhit is also organized around roots with vowels. No conclusive evidence has been established yet, though.

## 1.4. Structure of the paper

Arguing against the C-root in Tashlhit, we present in § 2 the first half of the argument in this paper, providing ample evidence in support of the fact that verbal bases consist of vowels along with consonants, ranging over transderivational vowel maintenance/transfer, vowel position and quality within bases, vowel-dependent allomorphy and morpho-phonology. § 3 presents the second part of the argument. After proposing a different grouping of verb forms, we state our proposal: the basic C-final vs. V-final subdivision of verb bases. This paves the ground for a new conception of bases of derivation, which are shown to be in the overwhelming majority of cases possible phonological words. § 4 provides applications of our proposal to various components of verb and noun morphology, bringing the argument full circle. Then we conclude.

## 2. Base of derivation in Tashlhit

Arguments are available for the position that the base of derivation in Tashlhit is not the C-root. Four types of evidence will be adduced in this section: (i) transderivational vowel transfer, (ii) position and quality of vowels within bases, (iii) predictability of morphological processes, and (iv) instigation of morpho-phonological processes.

### 2.1. Transderivational vowel transfer

The items in (4) show that verbal bases contain vowel elements maintained in related morphological classes, a transderivational vowel transfer:

(4) a-

<i>Aor.</i>	<b>aḍn</b> ‘ache’	<b>ags</b> ‘injure’	<b>ara</b> ‘write’
<i>Der.Vb</i>	<b>ssaḍn</b> (Caus.)	<b>ttjagas</b> (Pass.)	<b>ssara</b> (Caus.)
<i>Act.N</i>	<b>tamaḍunt</b>	<b>aggas</b>	<b>arra</b>
<i>Ag.N</i>	<b>amaḍun</b>	<b>amagus</b>	<b>amara</b>

b-

<i>Aor.</i>	<b>mun</b> ‘accompany’	<b>rar</b> ‘vomit’
<i>Der.Vb</i>	<b>smun</b> (Caus.)	<b>srar</b> (Caus.)
<i>Act.N</i>	<b>tamunt</b>	<b>iraran</b> (Pl.)
<i>Ag.N</i>	<b>asmun</b>	

Although in (4a), the initial vowel changes to *u* in the Pret. (cf. *uḍn*), the medial vowels in (4b) are constant, especially that in the verb *mun*. One might argue that

the vowel in *mun* vacuously changes in the Pret. However, a verb like *sis* ‘boil’ shows that the vowel is rather maintained.

This transderivational vowel transfer is blurred in a set of verb bases the Aor. forms of which are geminate initial, as in the items in (5). In derived forms, be they verbal or nominal, a vowel (in bold), generally *u*, appears in a constant position, i.e. instead of the first half of the initial geminate.

(5)	<i>Aor.</i>		<i>Caus.</i>	<i>Noun</i>
	ff <sub>y</sub>	‘go out’	ssufy	<b>uf</b> y
	gg <sup>w</sup> z	‘descend’	zzugz	<b>ug</b> uz
	ddr	‘live’	ssudr	t- <b>ud</b> r-t
	kk	‘pass’	sak	t-a-s- <b>uk</b> -t

This type of evidence led some scholars to posit a more abstract nature for these verbal bases, *uC(C)* (Bensoukas, 2001a; Iazzi, 1991; Jebbour, 1993). An initial vocalic segment is argued for, which historically yielded its place to the following consonant through a spreading creating the initial geminate. On this assumption, the initial vowel *u* that appears in the causatives and nominal forms associated with these verbs is no longer a mystery. If this analysis is extended to the mono-consonantal Aor. *g* ‘be’, the mysterious combination of the mutually exclusive gemination and tt-prefixation in its Int.Aor., *ttgga*, is elucidated. This combination, the geminate pronunciation, *gg*, in other dialects, and the correspondent noun *ta-m-agi-t* converge on treating *g* on a par with the bases in (5). The final vowel is akin to that in Group D below. In this view, all that needs to be explained is why *g* is degeminated in the Aor. form, which probably involves some historical change.<sup>9</sup>

On the basis of items such as those in (4), and more forcefully those in (5), the provenance of the vowels will remain mysterious were a C-root conception of the base of the derivation to be adopted. Ensuing phonological behavior, such as the vowel copying in *ufuy* (which we will come back to in 2.4), will remain just as recalcitrant.

## 2.2. Vowel position and quality within bases

The second argument for the fact that verb bases contain vowels comes from the position of vowels within bases as well as their quality. In (6a), the first item is a biconsonantal verb with the consonants (*g*, *r*). The remaining verbs have in

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<sup>9</sup> Lahrouchi (2008:44) gives an alternative view of the Int.Aor. of the verb *g*. According to the author, this verb is too short to satisfy the templatic requirement of four CV units ([CVCVCVCV]) that Int.Aor. verbs observe. To satisfy this prosodic requirement, *g* uses all the operations made possible by In.Aor. morphology, i.e. gemination, vowel insertion and prefixation.

addition a vowel each, with a difference in terms of position (as well as quality). (6b) lists similar verbs with a geminate.

(6) a-	gr	‘throw (seeds)’		
	ag <sup>w</sup> r	‘be bigger/older than’		
	gar	‘assemble (flies)’		
	gru	‘pick up’		
b-	gg <sup>w</sup>	‘wash clothes’	agg <sup>w</sup>	‘have a look’
	uff	‘swell’	ffu	‘become day’

Examples using categories other than verbs can be multiplied (e.g. *lli* ‘that (conj.)’/ *ill* ‘sea’; *ann* ‘that, dem.’/ *nna* ‘which, conj.’)

It is not only the position of the vowel that is difficult to predict; just equally unpredictable is its quality. Along with two consonants, a geminate, or only one consonant, the items in (7) have vowels that occur in the same position but have a different quality.

(7)	kri	‘tighten’	kru	‘rent’
	zri	‘pass’	zru	‘delouse’
	k <sup>w</sup> li	‘soot’	klu	‘paint’
	ʒʒi	‘heal’	ʒʒu	‘smell good’
	ara	‘write’	aru	‘give birth’

Verbs with a final vowel *a* in the Aor., like *ara*, are very rare in Tashlhit, but we can compare the first pair of verbs with the noun *kra* ‘something’.

If we assume a root-and-template morphology, the association of a C-root, a fixed sequence of consonants, with a template which would contribute the vowel elements would require a special template for every verb or at least verb group. This would require a huge amount of lexical, idiosyncratic information carried by the templates, in addition to that already encoded in the C-root. A simpler conception would be to consider both the position and quality of these vowels as a property of their underlying representations.

### 2.3. Vowel-dependent allomorphy

The third argument is the predictability of morphological processes, in this context the allomorphic realization of the Int.Aor. as internal gemination or tt-prefixation (see Bensoukas (2001a) for a full treatment).

A class of Int.Aor. forms (8a) is obtained by geminating a base consonant. It is a homogeneous class in that its members (i) consist of three or fewer segments, (ii) do not contain a geminate, (iii) do not contain an initial/medial vowel, and (iv) are in the overwhelming majority native forms (Bensoukas, 2001a; Dell and

Elmedlaoui, 1991; Iazzi, 1991; Jebbour, 1996; Lahrouchi, 2008, 2010 among others). The members of this class further bifurcate into those that geminate the initial consonant (8a-i) and those that geminate the second (8a-ii).

The other major process is the prefixation of a form *tt-* to the base, which can be accompanied, when stem-augmentation is required, by the epenthesis of a prefinal vowel. On a par with gemination, *tt-*prefixation has its own preferences concerning the choice of the bases subject to it. The classes in (8b) consist of (i) vowel initial bases, (ii) geminate initial bases, (iii) trisegmental bases with a medial vowel, (iv) long bases, irrespective of whether vowel initial or geminate initial, and (v) loanwords. The bisegmental and trisegmental bases subject to *tt-*prefixation distinguish themselves from those undergoing gemination on the basis of the former having an initial or medial vowel or an initial (or final) geminate.

(8) a- *Geminating trisegmental bases:*

<i>i- 1<sup>st</sup> base element geminated</i>			<i>ii- 2<sup>nd</sup> base element geminated</i>		
krz	kkrz	‘plow’	kla	klla	‘spend the day’
frd	ffrd	‘graze’	g <sup>w</sup> nu	gnnu	‘sew’
krf	kkrf	‘tie’	mgr	mgrgr	‘harvest’
ħrg	ħħrg	‘burn’	fsj	fssi	‘unfasten’

*b- Intensive aorists with a tt-prefix:*

i-			ii-		
ddu	ttddu	‘go’	af	ttaf	‘be better than’
ffj	ttffi	‘pour’	ak <sup>w</sup> r	ttak <sup>w</sup> r	‘steal’
ggr	ttggr	‘touch’	ili	ttili	‘be’
iii-			iv-		
mun	ttmun	‘accompany’	knkr	ttknkr	‘pick a bone’
rar	ttrar	‘return’	rfufn	ttrfufun	‘experience hardships’
ful	ttful	‘disturb/worry’	azzl	ttazzal	‘run’
			attuj	ttattuj	‘be high’
v-					
şbr	tt-şbar	‘endure’			
fdr	ttfđar	‘have breakfast’			
kksiri	ttksiri	‘accelerate’			
kalifi	ttkalifi	‘qualify’			

Also, apparently similar biconsonantal Aor. forms have different patterns of internal gemination. In the Int.Aor., set (9a) geminates the first consonant and appears with a prefinal vowel while set (9b) geminates the second and appears with a final vowel.

(9) a-			b-		
ml	‘show’	mmal	kl	‘spend the day’	klla
fl	‘leave’	ffal	ks	‘sheperd’	kssa
gn	‘sleep’	ggan	ls	‘wear’	lssa

ɖr ‘fall’      tɛtar                      ry ‘warm up’                      rɣqa

Two remarks are in order at this point. First, verb bases with initial and medial vowels do not geminate in their Int.Aor. forms but rather take tt-prefixation, as in *arm/ttarm* ‘try’ and *mun/ttmun* ‘accompany’. In case these bases are vowel final, the initial consonant is most likely to be a geminate; and some members of this class are actually similar to the ones in (5), which are better analyzed as vowel-initial underlyingly, e.g. /udu/ ‘go’: *ddu* (Aor.), *ssudu* (Caus.), and *tawada* ‘walking’. Second, standard accounts of Int.Aor. gemination assume syllable structure (Dell and Elmedlaoui, 1985, 1991; Jebbour, 1996). Basically, gemination targets the onset of the syllable. For example, monosyllabic *krz* ‘plow’ geminates its initial segment- the onset (Int.Aor. *kkrz*); and disyllabic *m.gr* ‘harvest’ (the dot indicating syllabic division) also geminates the onset, even though the result is different (*mggr*). In verbs with a final vowel, *kla* ‘spend the day’ or *gnu* ‘sew’, the segment in the onset position (immediately preceding the nucleus if these verbs are assumed to be monosyllabic) is geminated.

The data above seems to highlight the fact that if a verb is vowel initial or vowel medial, tt-prefixation is favored over gemination, and gemination selects bi- or tri-segmental bases that are consonant only or that have a final vowel. It is our conviction that the regularities above will be missed totally on an exclusively C-root conception of the base of derivation.

## 2.4. Vowel-dependent morpho-phonology

The fourth argument is based on the instigation of morpho-phonological processes involving vowel segments or blocking them. An example of the latter is the vowel augmentation process illustrated by all the forms in (10) below, a general process not confined to verb morphology (e.g. the nouns in (5) above). The prefinal vowel is called for by stem-augmentation to satisfy a prosodic requirement (for details, see Bensoukas, 1994, 2001a, 2012a; Jebbour, 1996). Significantly, a verb base with a prefinal or a final vowel is never augmented, a clear indication of hiatus avoidance, as in *mun* ‘accompany’ (Int.Aor. *ttmun*/\**ttmuan*; \**ttmwan*).

In the remainder of this section, we will examine the vowel copy process of Tashlhit applying in tandem with stem-augmentation (see Bensoukas, 2001a-b, 2004, 2014 for detailed descriptions and analyses). (10a) illustrates default vowel augmentation, recognized mainly through the quality of epenthetic [a], the least marked vowel of the language. In (10b), the epenthetic vowel is a replica of the basic vowel, especially in the [i...i] and [u...u] patterns. (The case of the [a..a] pattern might be argued to involve vacuous vowel copying).<sup>10</sup>

<sup>10</sup> Evidence exists that shows that the [a...a] domain is a copying domain. A round-velar consonant in passive verbs, for example, loses its rounding when flanked by two unround

(10) a- *Default vowel augmentation*

gn	ggan	‘sleep’
fḍr	tḍfḍar	‘have breakfast’
knkr	tknkar	‘pick a bone’

b- *Vowel copy augmentation*

i- [a...a] pattern:

gabł	ttgabal	‘take care of’
bbaqqj	ttbaqqaj	‘explode’
yawl	ttyawal	‘be in a hurry’

ii- [i...i] pattern:

mizzg	ttmizzig	‘stretch’
lkikḍ	ttlkikiḍ	‘be loose’
ssird	ssird	‘be washed’

iii- [u...u] pattern:

ddukkl	ttdukkul	‘make friends’
ḥtutł	ttḥtutul	‘walk on four’
ssus	ssus	‘shake’

(10b) is very informative in that the vowel is a copy of the base vowel, a situation that is very common in vowel harmony cases in general. Under the approach defended in this paper, the epenthetic vowel, itself inhibited by the presence of a prefinal or final vowel, copies the features of an already existing one. In a C-root approach, however, the vowel copy process will have to await the vowel to be inserted and to copy it. This makes the process, to say the least, very difficult to account for.

To summarize, various facts militate for the position that the bases of derivation in Tashlhit contain consonants and vowels alike, challenging by the same token the C-root. In the remainder of this paper, focus will not be on the initial or medial transferable vowels, but rather on final vowels, or presumed vowels, which present challenges of a different nature. While dealing with the details, we will provide ample evidence that the base of derivation is a possible phonological word, developing for that matter the second half of the basic argument in this paper.

### 3. A new conception: C-final vs. V-final verb bases in Tashlhit

Having argued against the C-root as a base of derivation and shown that vowels should also be considered base materials, we will show in this section that the overwhelming majority of bases of derivation correspond to possible phonological

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vowels, as in *ag<sup>w</sup>l* ‘hang’/ *tjagal*/\**tjag<sup>w</sup>al*; *ak<sup>w</sup>r* ‘steal’/ *tjakar*/\**tjak<sup>w</sup>ar* (see Bensoukas, 2001a, 2014 for detailed analyses).

words. (We exclude very special cases like the quite abstract underlying form of Aor. *g* ‘be’, which is assumed to contain in addition to the consonant an initial and a final vowel). Along the way, we will deal with two very problematic issues in the characterization of base material, both involving ‘vocalic’ elements. First, the alternation between final high vowels (HV) and corresponding glides (G) poses the problem of just what the underlying segment is (group B below). Second, lacking a vowel in the Aor., verbs in group D below display an intriguing behavior, suggesting that its members are C-final but behaving in all remaining morphological classes as V-final. We start by proposing a different subdivision of Tashlhit verbs based on the behavior of the members of each group.<sup>11</sup> Building on that, we state our proposal relating to the C-final and V-final verb base distinction, various applications of which will be presented in § 4.

### 3.1. Verb forms: Different groupings

#### 3.1.1 Group A

The predominantly trisegmental, consonant-only verbs of Amazigh (Basset 1929, 1952) by far present the most straightforward cases; accordingly, we take them as a starting point for our presentation (I=Aor., II=Int.Aor., III=Pre., IV=Pass., V=Act.N., VI=Ag.N., VII=Instr./Loc.N.):

(11) *Group A: Bisegmental and trisegmental verbs*

a- Bisegmental verbs:<sup>12</sup>

<i>Verb Morphology</i>			<i>Noun Morphology</i>		
I	II	III	V	VI	
dl	ddal	dl	taduli	amddal	‘cover’
ḍr	ṭṭar	ḍr	taḍuri	-----	‘fall’
gn	ggan	gn	taguni	(t)amggan(t)	‘sleep’

b- Trisegmental verbs:

I	II	III	IV	V	VI	VII	
frn	ffrn	frn	ttufrn	afrn	anfrn	-----	‘sort’
krf	kkrf	krf	ttukraf	akrraf	ankraf	askrf	‘tie’

<sup>11</sup> A special class of verbs called “quality” verbs are not included in our groups. Examples are Aor. *imlul* ‘become white’, *izg<sup>w</sup>iy* ‘become red’, and *iwriy* ‘become yellow’, to which correspond the Pret. forms *mlul*, *zgg<sup>w</sup>ay* and *wrry*. Although these verbs display vowel patterns relevant to our discussion, their morphological patterns are quite singular and require a special treatment that goes beyond the scope of this paper.

<sup>12</sup> Why no passives are included in the data in (11a) is a matter of mere coincidence. Most of the items just do not have a corresponding passive form that we are aware of. Those that are potentially passivizable are expected to show just the same regularities as the items in (11b) with which they form a homogeneous class.

mɔl mɔtɔl mɔl ttumɔal | amɔtɔal ----- asmɔl ‘bury’

Different affixes are attached depending on morphological category, yet the nature, number as well as relative order of base consonants remain unchanged (Basset, 1952). Not all bases are so well behaved, though.

### 3.1.2 Group B

Next is a class of verbs whose final base element alternates, across different morphological classes, between a HV and a corresponding G:

(12) *Group B: Verbs with alternating final vowel*

I	II	III	IV	V	
ttu	tt-ttu	ttu			‘forget’
aru	ttaru	uru		arraw	‘give birth’
asi	ttasi	usi	ttjasaj	assaj	‘carry’
fsi	fssi	fsi	ttufsaj	afssaj	‘unfasten’

The standard account of bases with final surface HV/G alternation posits, contra Basset’s assertion that vowels have only a morphological status, an underlying vocalic archisegment (Boukous, 1987; Moktadir, 1989; Iazzi, 1991; Anasse, 1994; Bensoukas, 1994; Dell and Elmedlaoui, 1991; Jebbour, 1996). Phonetic realization as a HV or the corresponding G is a matter of phonotactic consideration: a vowel appears in the nuclear position, whereas the corresponding glide surfaces in the marginal positions, of a syllable (Boukous, 1987; Dell and Elmedlaoui, 1985).

### 3.1.3 Group C

Gr(oup)C verbs have final vowels in classes I and II, suggesting a similarity with GrB. However, GrC distinguishes itself from GrB in the patterning of vowels seen in classes III through VI, and in this it rather resembles GrD below. Consider, for example, the action nouns in class V. Here there is a high vocoid not preceded by *a*, as in GrD, while in GrB (and in part GrA) a vowel *a* precedes the final segment of the base:

(13) Group C: Verbs with a final vowel in all morphological classes:<sup>13</sup>

I	II	III	IV	V	VI	
gru	grru	g <sup>w</sup> ri/a	ttg <sup>w</sup> ra	tigri	imgri	‘pick up’
gnu	ggnu	g <sup>w</sup> ni/a	ttg <sup>w</sup> na	tigni	imgni	‘sew’
kkusu	ttkusu	kkusi/a	ttikkusa	-----	imkkisi	‘inherit’

The *i/a* alternation at the end of the Pret. forms in (13-III) is a special case of vowel ablaut that is sensitive to person: *i* is realized on the 1<sup>st</sup> and 2<sup>nd</sup> p. sg. while *a* is realized with all remaining persons. Moreover, this alternation is specific to the Pret. form, in that other forms such as the Int.Aor. and the passive do not display such variation.

### 3.1.4 Group D

A group that dramatically differs from the more regular ones seen so far distinguishes itself by displaying a wide array of vowel alternations and lacking a final vowel in the Aor. The Aor. forms suggest at first blush that the items in this group should rather pattern with those in GrA, though the V-final patterning in all the other morphological forms belies this:

(14) Group D: Verbs with final vowel not appearing in Aor. form

I	II	III	IV	V	VI	
fk	akka	fki/a	tffka	tikki	-----	‘give’
rʒ	rʒza	rzi/a	-----	tirzi	imrʒi	‘break’
ʒr	aqqra	ʒri/a	ttuʒra	tiʒri	-----	‘read’
ʒr	zrra	ʒri/a	ttuʒra	izri	imʒri	‘see’
ggall	ttgalla	ggull(i/a)	-----	tagallit	imggilli	‘swear’

The similarity between GrC and D in the morphological classes III through VI has constituted the basis for some scholars to lump the items in the two groups into one single class (Iazzi, 1991; Bensoukas, 1994).

It should be stressed that, in comparison with GrD, neither GrA nor GrB shows the appearance in all other morphological forms of a final vowel not present in the Aor. Moreover, the pattern in choice of final vowels available to GrD in the various forms is displayed by neither GrA nor GrB. This makes GrD quite outstanding in this respect.

Before closing this section, let us point out that *i*-final verb bases seem to form a lexical gap in the language. There are two sets of verbs worthy of consideration, one native and the other borrowed. The behavior of the native Aor. verbs *ini* ‘say’

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<sup>13</sup> In some cases, the vowel quality of the action nouns is rather *u*. This is the case of the process nominals (as opposed to instance nominals) (see Anasse, 1994), e.g. sunfu ‘rest’, tsunfu, sunfi/a, asunfu; mmuddu ‘travel’, ttmuddu, mmuddi/a, ammuddu, anmmuddu. The data above however never show up with a final consonant. They systematically remain faithful to their vowel final status.

and *ili* ‘have/be’ is quite strange. While they have final vowels and behave in the morphology like GrC and GrD members do, at least the Act.N associated with *ili*, namely *tillawt*, and the Ag.N associated with *iri*, *amaraj*, suggest that the final segment in each should be treated as a glide, placing them in GrB. Other morphological classes seem to belie this behavior, such as Pret. *nni/a*, *(l)li/(l)la*, *ri/a.*, which would place the verbs in GrC. The other set contains borrowed verbs with a final *i*, such as French infinitives. The Int.Aor. forms of these verbs tend to show alternation between a final vowel *i* and a final glide *j*, as in the Aor. form *srbi* ‘wait on, Fr. *servir*’, whose corresponding Int.Aor. alternates between *ttsrbi* and *ttsrbaj*. The latter form would put the integrated French infinitive verbs in GrB. The former alternant, however, with its non-alternating final vowel, would call for an additional class of verbs, one with a non-alternating final *i*. This behavior, which we do not pursue here, requires an independent study.

### 3.2. The proposal

#### 3.2.1 Gist of the proposal and sample application

The description and classification above reveals that, putting aside the initial and medial vowels, the bases of derivation in Tashlhit can be described as belonging to four different groups. GrA contains consonant-only verb bases, while GrB, C and D contain bases with a vocalic segment in addition. The vocalic segment, however, behaves in different ways in that it alternates with a glide in GrB and remains stable in GrC and D (except in GrD aorists). GrB, whose members contain a final vocoid, is also exceptional in that it behaves in a similar fashion to GrA as far as the details of passive and nominal morphology are concerned. The apparent generalization that emerges from comparing GrA and C is that the C-final or V-final status of the base is maintained throughout the different morphological classes. We will argue that this is a true generalization that also holds for GrB and D.<sup>14</sup>

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<sup>14</sup> It should be noted that a limited number of items exhibit an interesting dual behavior, belonging at times to GrA and at other times to GrD:

I	II(GrA)	III(GrD)	IV(GrD)	V(GrA)	VI(GrA)	
yz	qqaz	yzi/a	ttyza	taɣuzi	-----	‘dig’
zd	zzad	zdi/a	ttzda	izid	-----	‘grind’
sy	ssay	syi/a	ttsya	-----	amssay	‘buy’

These items do not have a clear group membership, nor do they have a consistent underlying structure. What the data at best suggest is that the underlying forms of these verbs have to be V-final so that the corresponding forms in classes III and IV are properly derived, and they have to be C-final so that the forms in classes II, V and VI are accounted for. We have no explanation for this behavior, and probably, these items are learnt on an individual basis.

The alternative, possible insight behind the proposal we will put forward in this paper is based on three ideas. First and foremost, verb bases can be subdivided into two classes only, C-final and V-final. Second, contra proposals in the literature, is the assumption that the base forms in GrB end in a consonantal glide that ‘vocalizes’ in nucleus position. Third is the idea that the aorist in GrD is underlyingly V-final. In our conception, the class of C-final bases accordingly contains GrA and B, while the V-final one contains GrC and D. A further formal distinction between the V-final bases rests on whether the final vowel is underlyingly *a* or *u*.

The table in (15) summarizes the subdivision proposed:

(15) *V-final vs. C-final Tashlhit verbal bases:*

<i>C-final bases</i>			<i>V-final bases</i>		
<i>Group A</i>	/dl/	‘cover’	<i>Group C</i>	/k <sup>w</sup> nu/	‘bend’
	/gn/	‘sleep’		/g <sup>w</sup> ru/	‘pick up’
	/mdl/	‘bury’		/g <sup>w</sup> nu/	‘sew’
	/krf/	‘tie’		/rufu/	‘be thirsty’
<i>Group B</i>	/arw/	‘give birth to’	<i>Group D</i>	/afa/	‘find’
	/ttw/	‘forget’		/fka/	‘give’
	/asj/	‘take/lift’		/kla/	‘spend the day’
	/fsj/	‘melt/loosen’		/rza/	‘break’

We will show that most of the irregularity characterizing Tashlhit morphology hinges on this bipartition. A problematic case is GrB, with its final HV/G alternation, and even more problematic will be the Aor. forms of the items in GrD. We deal with these two issues separately in § 3.2.2 and 3.2.3 below, respectively.

As the sample in (16) reveals, C-final and V-final bases behave distinctly in the various morphological classes of the language, while at the same time showing parallels across either pair of groups (GrA/B and GrC/D). More detailed applications are deferred to § 4 below.

(16) a- C-final bases

	<i>Base</i>	<i>Pass.</i>	<i>Act.N</i>	
<b>GrA</b>	/frn/	ttufra	afrana	‘sort out’
	/krf/	ttukraf	akrraf	‘tie’
<b>GrB</b>	/arw/	-----	arraw	‘give birth’
	/fsj/	ttufsa	afssa	‘loosen’

b- V-final bases

<b>GrC</b>	/g <sup>w</sup> ru/	ttg <sup>w</sup> ra	tigri	‘pick up’
	/k <sup>w</sup> nu/	-----	tikni	‘bend’
<b>GrD</b>	/afa/	ttjafa	tifi	‘find’
	/yra/	ttuyra	tiyri	‘read’

In action noun and passive morphology alike, C-final bases (16a) appear with a prefinal vowel. We have shown elsewhere that this vowel is the result of a general prosodically motivated stem-augmentation (Bensoukas, 1994, 2001a, 2004, 2012a). C-final verb bases, including glide-final ones, behave in the same way with respect to this process of augmentation. Not subject to it, V-final verb bases (16b) rather remain V-final. In other words, a general prosodic augmentation process is blocked in the bases that are V-final. This has a straightforward and quite natural explanation in the approach adopted here: The vowel is not epenthized for the simple reason that the language does not permit sequences of vowels of any kind.

In a nutshell, GrB verbs, whose Aor. is apparently V-final, are underlyingly C-final; and alternately, GrD verbs, with C-final aorists, are underlyingly V-final. This subdivision allows a neat assignment of the verbs in GrA, B, C, and D to two major classes only: C-final and V-final. The fact also emerges that Tashlhit bases consistently remain either C-final or V-final in the different morphological classes, and in this they faithfully correspond to underlying structure. We now turn to the intricate cases of GrB and D.

### 3.2.2 Group B: C-final verb bases

The basic argument in this section is that GrB verbs, whose Aor. forms have one of the HVs *i* or *u*, are underlyingly glide final, contra the account in the literature. Verbs like [awɪ] ‘take’ and [aru] ‘give birth’, in this view, have underlying, final glides (*awj* and *arw*). This brings to the fore a thorny issue, that of the characterization of HV/G alternations in Amazigh. A digression into the literature on glides is necessary at this point.

The relation between HVs and glides has posed problems for phonologists regardless of the framework adopted. One of the major issues relates to whether there exists only one underlying form with two phonetic variants, or whether an underlying contrast should be recognized (Hyman, 1985). For Kaye and Lowenstamm (1984), for example, there is no underlying contrast between the HVs and Gs of French, and only the archisegments I, U or Ū exist underlyingly. Their alternate phonetic realization is a matter of position in syllable structure. Hyman (1985:78), on the contrary, distinguishes glides derived from underlying vowels and those derived from underlying consonants. He further proposes a distinction based on the feature [cons], with the glide being rather [+cons] unless the underlying representation of a surface glide is a vowel. He adds that, although specified underlyingly as [+cons], glides may still alternate with vowels. He gives the example of Tamazight 3<sup>rd</sup> p. masc. sg. prefix *j* alternating with a vowel. Thus, /*j*+*ʃal* ‘he gave’ is realized [*jʃa*] on the surface. A further argument Hyman proposes is the existence of epenthetic glides, like the glide [j] of Amazigh resorted to for hiatus resolution, a role compatible with its [+cons] nature.

The debate has been resuscitated very recently. Levi (2008), for example, draws a distinction between “phonemic” glides- which are different from underlying

vowels, and “derived” glides- syllable-marginal variants of vowels, a distinction for which she provides cross-linguistic evidence. She also claims that the difference between them is encoded in their underlying featural representations: Phonemic glides *j/w* have [coronal] and [labial] designated articulators, respectively, while derived ones have a [dorsal] designated articulator. Nevins and Chitoran (2008:1981) also claim a subsegmental difference between HV and G encoded in the feature [ $\pm$ vocalic]: HV is [-cons, +voc, -son] while G is [-cons, -voc, -son]. In their view, HV/G alternations involve a change from [+voc] to [-voc] dictated by the syllable position constraint, \*[+voc]/in Margin (p. 1987).

Returning to Amazigh HV/G alternations, we discern two trends in the literature and dub them ‘functional’ and ‘lexical’. The former approach makes the strong claim that there is no underlying difference whatsoever between a HV and a G (Applegate, 1970; Boukous, 1987; Dell and Elmedlaoui, 1985; Lahrouchi, 2013, for a more recent approach based on phases). As pointed out above, the standard account of this HV/G alternation in Tashlhit assumes an underlying vocalic archisegment, whose phonetic realization as a HV or the corresponding G hinges on its occupying a nuclear vs. marginal syllable position. Boukous (1987), for example, extensively argues that HVs and Gs are not distinct in underlying representation, but are rather represented as abstract archisegments *U* and *I*, whose feature matrices do not include the feature [syllabic]. As to their phonetic realization, HVs appear in the nucleus position of the syllable whereas Gs occur in marginal positions, a complementary distribution situation. The strong claim made by the functional approach to the HV/G alternation has been so influential that it served as the basis of almost all morphological analyses conducted so far (Anasse, 1994; Bensoukas, 1994; Dell and Elmedlaoui, 1991; Iazzi, 1991; Jebbour, 1996; Moktadir, 1989).

One should bear in mind, however, that Boukous (1987:255) notes that certain cases remain that are better accounted for by maintaining an underlying contrast between HVs and Gs. The clearest example is the phonetic form [rwl] ‘flee’, which if represented underlyingly as /rU/ would yield the incorrect output \*rul, the form predicted by the established syllabification algorithm. We will have more to say about this form and similar ones below.

The lexical approach, on the other hand, claims rather mildly that some cases necessitate an underlying contrast between HVs and Gs. Proponents of this standpoint analyze data from dialects of Amazigh other than Tashlhit. In their view, an underlying vowel always surfaces as a vowel, whereas an underlying glide oscillates between a vowel and a glide (Bynon, 1978; Guerssel, 1986). Having accounted for HV/G alternations in Kabyle, Ait Seghrouchen and Rifian Amazigh based on a wide array of phonological phenomena including consonant epenthesis

and vowel epenthesis, Rosenthal (1994:308-9) claims that a distinction between HVs and Gs is called for.<sup>15</sup>

A pitfall of the functional as well as other approaches to HV/G alternation in Tashlhit is their reliance solely on evidence coming from syllabification. The under-representation of morphological data in the study of the alternation may be one of the reasons for the misconception of facts inherent in the functional approach.

Our claim is that the lexical approach to the HV/G alternations in Tashlhit is more viable, making it all the more possible to consider the surface HVs in the verbs in GrB phonetic correspondents of underlying Gs. We will bring forward evidence that the HV/G alternation in Tashlhit necessitates an underlying contrast between HVs and Gs, the only position consistent with the phonological phenomena displayed by various morphological classes. This makes Tashlhit align with the other dialects of Amazigh as far as this aspect is concerned. Also, just like the other dialects of Amazigh, Tashlhit has ‘protected vowels’, i.e. vowels that always surface as vowels (Guerssel, 1986; Rosenthal, 1994), as is clearly demonstrated by stem-augmentation facts.

The first two types of evidence are the existence of an epenthetic glide [j], resorted to to resolve hiatus at word juncture (see also Hyman, 1985) and the existence of geminate glides, a property associated with consonants. First, in Tashlhit a sequence of a word-final and word-initial vowels triggers j-epenthesis, as in *a-[j]-argaz* ‘hey, man!’ Second, geminate glides are possible in Tashlhit, as well as in other languages (Maddieson, 2008). Words such as *ajjur* ‘moon, month’, *ajjis* ‘horse’, and *tawwukt* ‘owl’, all contain a medial geminate glide. It remains true that the medial geminates in some words in a northern dialect (e.g. Agadir) may correspond to medial dorsal consonants in a southern dialect (e.g. Ida Ougnidif), as in *awwullulaggallu* ‘plow’, *tawwunt/taggunt* ‘stone’, and *tawwuri/tagguri* ‘work’, but this does not deny the consonantal status to the Gs in question.

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<sup>15</sup> Regarding Tashlhit, Rosenthal (1994) concludes his analysis of Amazigh glides on the same note as the functional approach. Comparison with Tashlhit facts leads Rosenthal to state the following, a reflection of the functional approach: “The intriguing behavior of high vocoids in Imdlawn Tashlhiyt is that there are no protected high vowels, but rather high vocoids can surface non-moraically...The fact that high vocoids can surface non-moraically does not alter the outcome of syllabification...since high vocoids, either [-cons] or [+cons], occupy the same position in the sonority scale...” He goes on: “...there are two ways in which Imdlawn Tashlhiyt is different from the other dialects. One difference is the range of possible syllabic segments and the other difference is that Imdlawn Tashlhiyt does not have protected vowels, i.e. vowels must surface as vowels. High vocoids appear adjacent to low vowels...This eliminates the need for an underlying vowel/glide contrast (apart from a handful of exceptions) in Imdlawn Tashlhiyt...”

The third type of evidence comes from synchronic Gs that historically resulted from a lenition process affecting the dorsal consonants *k* and *g*<sup>(w)</sup>. For the items in (17), the patterning of the Gs *j* and *w* with corresponding dorsal consonants (shown in bold) is quite obvious:

(17)	<i>Aor.</i>		<i>Int.Aor.</i>	<i>Act.N.</i>	<i>Ag.N.</i>
	<b>ut</b>	‘hit’	<b>kkat</b>	<b>tajjiti</b>	
	<b>ks</b>	‘shepherd’	<b>kssa</b>	<b>tajssa</b>	<b>amksa</b>
	<b>krs</b>	‘tie’	<b>kkrs</b>	<b>akrras/tajrrist</b>	
	<b>krz</b>	‘plow’	<b>kkrz</b>	<b>tajrza</b>	<b>amkraz</b>
	<b>rwi</b>	‘mix, mess up’	<b>rwwi/rgg<sup>w</sup>i</b>	<b>tarwajt</b> <b>irwwajn/irgg<sup>w</sup>ajn</b>	
	<b>zwi</b>	‘sort out’	<b>zwwi/zgg<sup>w</sup>i</b>	<b>azwaj/izgg<sup>w</sup>ajn</b>	
	<b>rwl/rur</b>	‘flee’	<b>rwwl/rgg<sup>w</sup>l</b>	<b>tarwla/tarula</b>	<b>marur</b>
	<b>izwir/zwur</b>	‘be first’	<b>ttizwir/zgg<sup>w</sup>r</b>	<b>tazwuri</b>	<b>amzwaru</b>

A set of verbs, known as quality verbs, also display an interesting behavior in this respect.

(18)	<i>Aor.</i>		<i>Pret.</i>	<i>N.</i>
	<b>izg<sup>w</sup>iy/izwiy</b>	‘be red’	<b>zgg<sup>w</sup>ay</b>	<b>tazuyi - azgg<sup>w</sup>ay/uzwiy</b>
	<b>ilg<sup>w</sup>iy/ilwiy</b>	‘be soft’	<b>lgg<sup>w</sup>ay</b>	<b>taluyi - ulwiy</b>

As is typical of lenition situations, geminate consonants show resistance to the process, a resistance we find in the forms *rgg<sup>w</sup>ilirgg<sup>w</sup>ajn* corresponding to *rwi*, for example. In the (southern) dialects that still maintain the original contrast *w/gg<sup>w</sup>*, morphological gemination is not quite clear, and maybe native speakers associate these sound correspondences in an idiosyncratic fashion. In northern dialects, however, the forms attested show that the glides are treated as full-fledged synchronic consonants that are capable of geminating, on a par with the remaining consonants: *rwil rwwil irwwajn* ‘mix, mess up’; *rɔll rɔll irɔll* ‘lend’. The appearance of vowels in some words like *ut*, *tarula*, *tazuyi* and *taluyi* will become relevant below.

### 3.2.3 Group D: V-final verb bases

Most controversial have been the verbs in GrD, which lack a final vowel in the Aor., and are apparently C-final, but still behave elsewhere as though they were V-final. The verb */rza/*, with its Aor. *rz*, Int.Aor. *(tt)rzza*, Act.N. *tirzi*, and Ag.N. *imrzi*, is a good example. Different proposals have been made, most of which start from the basic assumption that the bases of derivation in GrD should be V-final. Two trends can be discerned in the literature, differing in whether the base is taken to be a concrete form of the verb (Dell and Elmedlaoui, 1991; Moktadir, 1989) or a form

whose characterization requires a certain amount of abstractness (Iazzi, 1991, 1995; Bensoukas, 1994, 2001a).<sup>16</sup>

We present the abstract verb base analysis first. One attempt is Iazzi (1991, 1995), arguing that an analysis based on empty skeletal positions (e.g. Marlett and Stemberger, 1983) largely simplifies the morphology of the language. Verb lexical entries are assumed to consist of melodic material and skeletal positions, as in the following representations (of ‘sleep’, ‘sew’ and ‘spend the day’), which clearly distinguish bases in GrA, C and D, respectively:

(19)

a- C C	b- C C V	c- C C V
g n	g n u	k l Ø

The surface affinity between *gn* and *kl* is belied by the underlying representations in (19), in which *kl* rather resembles *gnu*. Building on this work and adopting the notion of “ghost” vowels in Zoll (1993), Bensoukas (1994:208) proposes that the lexical entries of the items in GrC and D have a final ghost vowel, a deficient segment lacking a feature geometric root node (see Clements and Hume, 1995). The following examples are given, in which *v* stands for the ghost vowel:

(20)

<i>Base</i>	<i>Aor.</i>	<i>Pret.</i>	<i>Int.Aor.</i>	<i>Pass.</i>	
lsv	ls	lsi/a	lssa	ttlsa	‘wear’
ksv	ks	ksi/a	kssa	tkksa	‘shepherd’
ħdv	ħḍu	ħdi/a	ħḍḍu	tħħda	‘hide’
g <sup>w</sup> rv	gru	g <sup>w</sup> ri/a	grru	ttg <sup>w</sup> ra	‘pick up’

This approach succeeds in bringing together GrC and D, which show affinities in behavior in the various morphological classes. The ghost vowel is given full realization depending on the morphological class in which it occurs.

The empty skeletal position and ghost vowel hypotheses are tested, respectively, against verb morphology or agentive noun morphology alone, and what repercussions they have elsewhere in the morphology of Amazigh are not considered. Also, the issue of dropping the final vowel in the Aor. remains unsettled. As Iazzi (1995) points out, the fact that certain aorists lack a final vowel is either a dialectal innovation, since some dialects do not drop it, or is a residue of some historical change. Neither of the hypotheses is pursued any further, though.

We now present the concrete verb base analysis. For reasons of space, only Dell and Elmedlaoui (1991) is reviewed. The authors take as a base of derivation a

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<sup>16</sup>Jebbour’s (1996:111-114) analysis is also based on the implicit assumption that the underlying representation of the surface form *ls* ‘wear’, for example, is /lsa/, and therefore aligns with Dell and Elmedlaoui’s (1991) analysis.

phonetic verb form: “When studying the formal relationships between the four stems of an ITB [Imdlawn Tashlhiyt Berber] verb it is convenient to take stem I [the preterite] as a starting point. Except when stated otherwise, the negative, aorist and imperfective [intensive aorist] of a given base will be derived from that base’s perfective stem” (p.80). In this approach the underlying structures of verb forms do not contain any abstract material such as empty skeletal positions or ghost vowels. The members of GrC and D are then referred to as bases with a variable *a*, and are further subdivided into two classes, one with a “detachable” *a* and the other with a “mutable” *a*:<sup>17</sup>

- |      |                                  |                |                               |              |
|------|----------------------------------|----------------|-------------------------------|--------------|
| (21) | <i>a</i> - Detachable <i>a</i> : | ls( <i>a</i> ) | b- Regular mutable <i>a</i> : | fd- <i>a</i> |
|      | (GrD)                            | kl( <i>a</i> ) | (GrC)                         | ħd- <i>a</i> |

While the approach succeeds in pinning down the similarities between GrC and D in some verbal morphological classes, again no attempt has been made at determining how the underlying forms posited behave with respect to nominal morphology, for example. A more serious problem raised by Dell and Elmedlaoui’s approach concerns predictability:

It does not seem possible to predict which ones of the variable *a* verbs fall into the detachable *a* class [our GrD], and which ones fall into the mutable *a* class [our GrC]. Assuming all variable *a* verbs to have a final /*a*/ in their underlying representations, the grammar of ITB must contain a rule which drops a final /*a*/ in the aorist and another rule which rewrites final /*a*/ as a high vocoid [*u*] in stems III (aorist) and IV (intensive aorist). The lexical entries of the four classes of variable *a* verbs must therefore be distinguished from one another by diacritic features. (Dell and Elmedlaoui, 1991:82).

This shows a heavy reliance on the lexicon, and even an unstructured view of how lexical entries are organized. A final remark made in Dell and Elmedlaoui (1991) is that “detachable *a*’s do not drop in the imperfective...and an imperfective stem always has the same vowels as the corresponding aorist stem.”

Our proposal concerning GrD is a combination of both the insights in the abstract and concrete analyses. The gist of the idea is to claim that GrD verbs are definitely V-final, and in this they are quite similar to the items in GrC. They differ from them, however, in that the verbs in GrC have a final vowel *u* (e.g. *ftu* ‘go’), whereas those in GrD have a final vowel *a* (e.g. *kla* ‘spend the day’). The final vowels are maintained in the Aor. forms, whether simple or intensive, while they

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<sup>17</sup>The distinction between mutable and detachable *a* is motivated on the basis of the behavior in the morphology of the language of the final underlying *a*. A mutable *a* is subject to change in quality only, whereas a detachable *a* is subject to deletion in the imperative as the examples *kl* and *ħdu* in (21) show, which are derived from apparently similar bases.

both alternate with *i/a* in the Pret., *a* in the passive, and *i* in nominal forms. Except for a handful of cases, the bases of derivation proposed have one characteristic in common, that of being all possible phonological words, thus being compatible with a word-based approach to morphology. Our proposal will be put to use in the following section.

## 4. Applications

### 4.1. Verb morphology

In this and the following sub-sections, we will proceed through the different morphological forms in a step-by-step fashion and show how the C-final/V-final classification succeeds in capturing interesting generalizations.

#### 4.1.1 The aorist

GrA and GrC aorists are straightforward cases of complete correspondence between the base of derivation and the aorist form (GrA: /dl/ [dl] ‘cover’; /mḍl/ [mḍl] ‘bury’; GrC: /k<sup>w</sup>nu/ [knu]). The maintenance of the quality of the final vowel across morphological classes is a transderivational effect (Benua, 1997), just like the ones instantiated by other forms (e.g. negative verb forms (see Bensoukas, 2015)). As things stand, these forms need no further ado.

However, the C-final vs. V-final hypothesis faces two challenges when it comes to Aor. forms. The first challenge concerns underlying glides that apparently surface as vowels in the Aor., as in (12) above:

(22) *Underlying glide realized as a vowel in surface forms:*

<i>Base</i>	<i>Aor.</i>	
/arw/	aru	‘give birth’
/ttw/	ttu	‘forget’
/asj/	asi	‘carry’
/atj/	ati	‘outdo’
/fsj/	fsi	‘loosen’
/ʒʒj/	ʒʒi	‘be fat/recover’
/ittj/	itti	‘move to the side’

The question that needs to be addressed now is: How come that the basic Gs get pronounced as HVs?

Our answer is a simple one: A basic G gets vocalized when it is nuclear. Tashlhit is a language that allows consonantal segments of all sorts, including the voiceless stop *t*, to head syllables (Boukous, 1987; Clements, 1997; Dell and Elmedlaoui, 1985; Pater, 2012; Prince and Smolensky, 1993/2004; Ridouane, 2008). In Dell and Elmedlaoui’s example *txzntnt* ‘she stored them’, syllabification is contingent on sonority so much so that syllable peaks host the most sonorous segment in the

string. *txzntnt*, accordingly, contains three syllables, each headed by a consonantal nucleus (capitalized in (23)):

(23) /t-xzn-tnt/ → [σ<sup>t</sup> X] [σ<sup>z</sup> N] [σ<sup>t</sup> N t]

Applying these precepts to the GrB base /arw/, for example, would yield a disyllabic word with a full vowel syllable and a vowel headed by the glide *w*. The vocalization of the nuclear glide results, phonetically, in the word's having two syllables headed by two vowels:

(24) /arw/ a- Syllabification → [σ<sup>a</sup>] [σ<sup>r</sup> W]  
 b- Glide vocalization → [σ<sup>a</sup>] [σ<sup>r</sup> u] → [aru]

That nuclear glides should be perceived as vowels is probably simply the reverse of Nevins and Chitoran (2008)'s change from [+voc] to [-voc]. It could be the case that the change from a [-voc] G to a [+voc] HV in Tashlhit is due to the fact that the glide is nuclear. This possibility is not open to the other syllabic consonants of the language, given the similarity which Gs, as opposed to the rest of the consonants, have with HV.

Two pieces of evidence can be adduced in favor of this view, one based on synchronic variation and the other on diachronic change. First, comparison of the (Agadir Tashlhit) aorists in (22) with their correspondents in other Tashlhit dialects (e.g. Ida Ougnif Tashlhit) reveals HV/G phonetic variants of the final segment, especially in 3<sup>rd</sup> p. sg.:

(25) *Dialectal variants of glide-final verb bases:*

	<i>Ag. T</i>	<i>IO. T</i>	
/arw/	aru	arw	'give birth'
/ttw/	ttu	ttw	'forget'
/asj/	asi	asj	'carry'
/fsj/	fsi	fsj	'loosen'

We assume that the underlying forms of these and similar forms is the same in the different dialects.

Also relevant in this context are the HV/G alternations resulting from lenition mentioned in (17) above. We repeat the relevant items for the sake of convenience:

(26)

a-	<i>Aor.</i>		<i>Int.Aor.</i>		<i>Act.N.</i>		<i>Ag.N.</i>
	<b>ut</b>	'hit'	<b>kkat</b>		<b>tajjiti</b>		
	<b>rwl/rur</b>	'flee'	<b>rwwl/rgg<sup>w</sup>l</b>		<b>tarwla/tarula</b>		<b>marur</b>

b-	<i>Aor.</i>		<i>Pret.</i>		<i>N.</i>
	izg <sup>w</sup> iɣ/izwiɣ	‘be red’	zgg <sup>w</sup> aɣ		tazuyi - azgg <sup>w</sup> aɣ/uzwiɣ
	ilg <sup>w</sup> iɣ/ilwiɣ	‘be soft’	lgg <sup>w</sup> aɣ		taluyi - ulwiɣ

On the basis of the forms *rwl/rur* and *tarwla/tarula*, we may hypothesize that [ut] is actually a pronunciation of the base form *wt*, itself the attested form in other Amazigh dialects. By analogy, the forms *tazuyi* and *taluyi* can also be hypothesized to be *tazwiɣ* and *talwiɣ*. When syllabified as nuclei, the Gs vocalize into their corresponding HVs:

$$(27) \quad /wt/ \rightarrow [\sigma Wt] \rightarrow [ut]$$

$$/tazwiɣ/ \rightarrow [\sigma ta][\sigma zW][\sigma \gamma i] \rightarrow [tazuyi]$$

We take the synchronic variation and the behavior of forms subject to lenition as evidence in support of our glide vocalization treatment.

The second challenge to the C-final/V-final conception of bases regarding Aor. forms relates to the final vowel *a* not appearing on surface Aor. in GrD, examples of which are given in (28b). This behavior necessitates explanation, especially since the vowel in V-final verbs generally surfaces, as revealed by GrC verbs in (28a):

(28) a- *Group C: V-final verbs not dropping their final vowel*

<i>Base</i>	<i>Aor.</i>	
/g <sup>w</sup> ru/	gru	‘pick up’
/k <sup>w</sup> ɖu/	kɖu	‘smell’
/ɥbu/	ɥbu	‘hide’
/ɥsu/	ɥsu	‘learn by rote’

b- *Group D: V-final verbs dropping their final vowel*

<i>Base</i>	<i>Aor.</i>	
/afa/	af	‘find’
/kla/	kl	‘spend the day’
/lsa/	ls	‘wear’
/nsa/	ns	‘stay overnight’
/ggalla/	ggall	‘swear’

The account we provide for this state of affairs is again a very simple one. Very few verbs in Tashlhit have a final vowel *a* in the aorist form, a constraint that does not weigh on *u*-final verbs, whose final *u* surfaces.<sup>18</sup> In short, the expectation is for

<sup>18</sup> The only exception that we are aware of, loan-words not included, is the isolated case of the Aor. form *ara* ‘write’. However, in other dialects (Tamazight of Khemissat for

V-final verb bases to contain a final vowel in all morphological classes. This is borne out largely, the only exception being the non-realization of final vowels *a* in the Aor.

A certain set of facts might be brought in to explain what is happening in this class of verbs. Some Tashlhit dialects have a truncation process that affects final vowels, be they in names (29a), kinship terms (29b) or even verb forms (29c):

(29)	a-	faṭima xadiṣa ʕiṣa zajna lajla	faṭim xadiṣ ʕiṣ zajn lajl	
	b-	baba immi ʕmmti xalti	bab imm ʕmmt xalt	‘father’ ‘mother’ ‘aunt (paternal)’ ‘aunt (maternal)’
	c-	i-ga i-lla ur-d t-uṣka	i <sup>2</sup> -g i-ll ur-d t-uṣk	‘he is’ ‘he is (available)’ ‘she didn’t come’

We suggest the possibility of truncation as an account for the absence of final *a* in Aor. forms, a formal account of which we do not pursue in the present context. Again, the possibility of there being a historical change involved still needs to be carefully checked.

Our views about GrB glides and their vocalization as well as the final vowels of GrD can in tandem make possible a better explanation of the very intriguing, and oft-considered exceptional, behavior of another set of verbs. The Aor. verbs *nu* ‘cook’ and *su* ‘drink’ in (30a) are apparently bisegmental, V-final verbs. However, their Int.Aor. forms suggest that they must be treated as V-final GrD verbs, as indicated in the bases in (30a-b).

(30)		<i>Base</i>	<i>Aor.</i>	<i>Int.Aor.</i>	<i>Pret.</i>
	a-	/nwa/ ‘cook’ /swa/ ‘drink’	nu su	nwwa ssa	nwi/a swi/swa
	b-	/ss-nwa/ /ss-swa/	ssnu ssu	ssnwa sswa	ssnwi/a sswi/a
	c-	/ssu/ ‘lay’	ss <sup>2</sup> u	tt-ssu	ssi/a

This explains their behavior in the Int.Aor. as well as the Pret. (the case of *ssa* is somewhat more complex). The fact that there is a medial geminate in *nwwa* and a medial glide in *ssnwa* indicates that the glide is initially a consonant. A quick

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example), this verb has the phonetic realization *aru*, indicating that this might be an innovation in the dialect of Tashlhit.

comparison with /kla/’s ‘spend the day’ Aor. *kl*, Int.Aor. *klla*, and Caus.Int.Aor. *sskla* reveals the parallelism. The argument based on this is that the Aor. verbs *nu* and *su* have a final vocalized G, just like the initial vocalized G of *ut*.

More evidence comes from a comparison of the causative *ssu* (30b) and the simple verb *ssu* (30c). Although their Aor. forms are homophonous, their other forms reveal behavior that reflects differences in their bases of derivation. The initial geminate *ss* is partly the causative morpheme in (30b) as opposed to a segment of the base in (30c), which accounts for their different Int.Aor. patterns, i.e. the *tt*-prefix and the zero allomorph (see Bensoukas, 2012b). The final vowel *u* in the Aor. forms of either verb is also revealing. While it is a vocalized *w* in (30b), the final *u* is actually a vowel in (30c), just like the one in GrC verbs such as *ddu* ‘go’ (Pret. *ddila*) and *bḏu* ‘divide’ (Pret. *bḏila*).

#### 4.1.2 The intensive aorist

We start this section with the remark made in Dell and Elmedlaoui (1991:84) that “detachable *a*’s do not drop in the imperfective [Int.Aor.]...and an imperfective stem always has the same vowels as the corresponding aorist stem.” In our approach, the vowel of V-final verbs as in (31) always surfaces in the Int.Aor. and is a replica of the underlying vowel:

(31) *Final vowel of Int.Aor. forms: underlying vowel*

		<i>Base</i>	<i>Int.Aor.</i>	
a-	<b>GrC</b>	/g <sup>w</sup> nu/	gnnu	‘sew’
		/ḥbu/	ḥbbu	‘hide’
		/zru/	zrru	‘delouse’
b-	<b>GrD</b>	/afa/	ttafa	‘find’
		/kla/	klla	‘spend the day’
		/zra/	zrra	‘see’
		/ggalla/	ttgalla	‘swear’

The predictability problem encountered by Dell and Elmedlaoui’s analysis is overcome since there is nothing to predict in the first place. There is exact correspondence between the final vowel of the base and that realized phonetically on the Int.Aor. form of the verb.

Under this conception of facts, vowel final verbs in the Int.Aor. turn out to be no different from the more regular verbs that are C-final, with the only exception that some of the C-final verbs allow a vowel to be epenthesized prefinaly in the intensive aorist, as in (32), while all of the former prove to strongly resist it:

(32) *Consonant final verb bases*

<i>Base</i>	<i>Int.Aor.</i>	
/krz/	kkrz	‘plow’
/mgr/	mgr	‘harvest’
/azz/	ttazzal	‘run’
/knkr/	ttknkar	‘pick a bone’

It therefore becomes clear that the hypothesis defended herein captures the generalizations about the facts of the language while at the same time it permits a simpler analysis. At least insofar as the final consonant or vowel of the base are concerned, the Int.Aor. turns out to be a very regular component of the morphology of Tashlhit, with strict correspondence holding between underlying and surface material.

A minor problem is related to the maintenance in other forms of the Aor. vowel resulting from basic glides. One way out is to assume transderivational identity (Benua, 1997), additional examples of which can be provided easily. In the analysis of negative verb stems in Amazigh, Bensoukas (2015) provides ample evidence for phonological characteristics transferred over from affirmative verb stems to negative ones. One such case is the transfer of *a/u* vowel ablaut as in /aɖn/ ‘ache’, Pret. *uɖn* and Neg.Pret. *uɖin*. A similar pattern of phonological transfer is that of Tarifiyt Int.Aor. morphology to the corresponding negative form: Aor. *ɖr* ‘cover’, Int.Aor. *ddar*, Neg. Int.Aor. *ddir*.

### 4.1.3 The preterite

The Pret. form of verbs in Tashlhit can also be characterized in a neat way in the light of the hypothesis defended in this paper. In V-final verbs as in (33b), Pret. formation consists in a vowel ablaut operation affecting the final vowel.<sup>19</sup> In C-final verbs (33a), there is no change (note the lack of alternation in the consonantal glide-final forms):

(33)

	<i>Base</i>	<i>Pret.</i>	
a- <b>GrA</b>	/mgr/	mgr	‘harvest’
	/krf/	krf	‘tie’

---

<sup>19</sup> In addition to final vowel ablaut, Pret. verb formation relies heavily on an ablauting operation that affects initial and medial *a* vowels, which turn into *u*, as in the examples /rar/- *rur* ‘return’ and /amz/- *umz* ‘catch’.

	<b>GrB</b>	/bbj/	bbi	‘cut’
		/zrj/	zri	‘pass’
b-	<b>GrC</b>	/ħbu/	ħbi/a	‘hide’
		/g <sup>w</sup> nu/	g <sup>w</sup> ni/a	‘sew’
	<b>GrD</b>	/lsa/	lsi/a	‘wear’
		/nya/	nyi/a	‘kill’

Recall that the *i/a* alternation at the end of the Pret. forms in (33b) is a special case of vowel ablaut that is specific to the Pret. form and that is sensitive to person (*i* for 1<sup>st</sup> and 2<sup>nd</sup> p. sg. and *a* for all remaining persons).

Facts of Tashlhit Pret. formation thus yield additional support for our hypothesis that verb bases in Tashlhit can be subdivided into C-final and V-final ones. On the surface, only V-final verbs exhibit a variant final vowel that depends on person. In case there is a final vowel that does not vary, the vowel in question is merely a phonetic realization of an underlying glide.

#### 4.1.4 The passive

Consistent behavior of C-final versus V-final verb bases is also revealed by the morphology of the passive form in Tashlhit. Just as has been mentioned earlier on, V-final bases resist an otherwise general prefinal epenthesis process, seen in GrA and B cases in (34a), and a final vowel appears in the passive only in case the base is V-final, as the items in (34b) show:

(34)

		<i>Base</i>	<i>Pass.</i>	
a-	<b>GrA</b>	/amz/	ttjamaz	‘catch’
		/mgr/	ttumgar	‘harvest’
	<b>GrB</b>	/asj/	ttjasaj	‘carry’
		/slj/	ttuslaj	‘touch’
b-	<b>GrC</b>	/k <sup>w</sup> ru/	ttk <sup>w</sup> ra	‘hide’
		/g <sup>w</sup> nu/	ttg <sup>w</sup> na	‘sew’
	<b>GrD</b>	/zra/	ttuzra	‘see’
		/yra/	ttuyra	‘read’

The quality of the final vowel in the passive is a uniform *a* irrespective of whether the base is *a*-final or *u*-final. We take this to be a specificity of the passive component: all final vowels in passive forms are spelt out as *a*. Taking into consideration Jebbour’s (1996:220) constraint to the effect that when a base

contains a HV, the vowel systematically changes to *a* when the passive formatives *ttj-* or *ttu-* are attached, we can simply say that passive forms in Tashlhit demand that base vowels be realized as *a* whatever the input vowel quality.

## 4.2. Noun morphology

Now we will proceed to the extension of the proposal made so far to nominal forms. Basically, deverbal noun formation is sensitive to the bifurcation of bases into C-final and V-final ones.

### 4.2.1 Action nouns

Action nouns show the same sensitivity to the C-final versus V-final subdivision of verb bases, a fact revealed by some of the processes involved in action noun formation. Again, verb bases having a final consonant (35a) and those having a final vowel (35b) have corresponding action nouns ending with a consonant and a vowel, respectively:<sup>20</sup>

(35)

		<i>Base</i>	<i>Act.N</i>	
a-	<b>GrA</b>	/frn/	afran	‘sort out’
		/rɖl/	artɖal	‘lend’
	<b>GrB</b>	/krj/	akrraj	‘tighten’
		/arw/	arraw	‘give birth to’
b-	<b>GrC</b>	/g <sup>w</sup> ru/	tigri	‘pick up’
		/g <sup>w</sup> nu/	tigni	‘sew’
		/k <sup>w</sup> nu/	tikni	‘bend’
		/rufu/	irifi	‘be thirsty’
	<b>GrD</b>	/rɖa/	tirɖi	‘break’
		/rya/	tiryi	‘heat’
		/ɣra/	tiɣri	‘read’
		/zra/	izri	‘see’

A quick glance at the data reveals that the action nouns with a final vowel not only keep their final vowel status but also resist prefinal vowel epenthesis. This again

<sup>20</sup> There exist, however, some templatically derived action nouns that have a final vowel even though their corresponding verb bases are C-final. Examples are *ɖrltaɖuri* ‘fall’, *gnltaguni* ‘sleep’ and *yzl tayuzi* ‘dig’. The templatic character is displayed by the array of non-basic vowels these nouns have. Also, the position of these vowels turns out to be rather fixed.

amounts to saying that vowel epenthesis in the Tashlhit stems we have seen so far is always blocked in vowel final stems.

Another point of interest is the quality of the final vowel in the nominal stems above. It is consistently realized as *i* irrespective of the quality of the base vowel. This reminds us of the case of passives in which the final vowel is always realized as *a*. Taking this fact into consideration, we will simply assume that the final vowel of bases alternates according to morphological class. This alternation not being predictable as far as we can see, we will contend with saying that the quality of the final vowel is a property of the morphological class in which it finds itself. Ultimately, what will need to be expressed is how the quality of the vowel, but not its presence or absence, is a consequence of the morphological form in which the base is embedded.

#### 4.2.2 Agentive nouns

Facts of agentive noun formation look more or less like those of action noun formation. C-final bases in (36a) have corresponding stems with a prefinal epenthesized vowel, whereas V-final bases in (36b) have nominal stems that resist epenthesis and that remain faithful to their underlying vowel final status:

(36)

		<i>Base</i>	<i>Ag.N</i>	
a-	<b>GrA</b>	/mgr/	anmgar	‘harvest’
		/krz/	amkraz	‘plow’
	<b>GrB</b>	/awj/	amawaj	‘take’
		/asj/	amasaj	‘carry’
b-	<b>GrC</b>	/g <sup>w</sup> ru/	imgri	‘pick up’
		/g <sup>w</sup> nu/	imgni	‘sew’
		/k <sup>w</sup> nu/	imkni	‘bend’
	<b>GrD</b>	/kla/	imkli	‘spend the day’
		/lsa/	(t)imlsi(t)	‘wear’
		/nsa/	imnsi	‘stay overnight’

The quality of the final vowel of the V-final items as in (36b), consistently *i*, lends credence to the assumption that vowel quality is class-specific, in that it is a property of the nominal component of the morphology in which the base is realized.

## 5. Conclusion

This paper is a contribution to the theoretical debate relating to the validity of the C-root as a base of derivation and the characterization of the so called root-and-template morphology. Proposed herein is a conception of Tashlhit bases of derivation that allows better insights into the morphological phenomena of the language that have hitherto escaped proper analysis.

We have tried to achieve a two-fold goal. First, we have argued against the C-root in Tashlhit and proposed instead a base of derivation that consists of consonants and vowels alike. The arguments we have adduced in support of this conception range over transderivational vowel maintenance/transfer, vowel position and quality within bases, vowel-dependent allomorphy and morpho-phonology. These phenomena are a serious challenge to the C-root approach, and a more viable, unifying analysis is claimed to be possible under the approach defended in this paper.

Second, we have attempted to present an account of what it is exactly that these bases contain, an account we completed by proposing the basic C-final vs. V-final subdivision of verb bases in Tashlhit. This subdivision rests on a different grouping of verb forms and examination of the issues pertaining to the characterization of base materials. We ended up with bases that are, in the overwhelming majority of cases, possible phonological words. This conception makes our approach more consistent with a word-based approach to the morphology of Tashlhit than a root-based one. Further support for the approach defended herein comes from applications of our proposed subdivision of bases to various components of verb and noun morphology. We have actually shown that a neater, more unifying analysis of various morphological classes is possible in this perspective.

The recent analyses of secret languages reported on above provide clear evidence for the reliance on the C-root. More evidence coming mainly from experimental, psycholinguistic work will be available in the near future. If the C-root is established as a unit of lexical organization, a whole-sale revision of the analyses presented in this paper may become necessary. Another alternative to pursue would be the investigation of whether the morphology of Tashlhit resorts to both root-based morphology and word-based morphology depending on morphological class. As things stand, the issue seems far from being settled.

## References

- Anasse, K. (1994), *A Study of Deverbal Nominals in Ayt Mzal Tashelhiyt Berber (A Non-concatenative Approach)*, D.E.S. thesis, Mohammed V University, Faculty of Letters, Rabat.
- Applegate, J. R. (1970), « The Berber Languages », In Sebeok, T. (ed.), *Current Trends in Linguistics. Vol. 6: Linguistics in South West Asia and North Africa*, p. 586-661, The Hague, Mouton.
- Basset, A. (1929), *La Langue Berbère. Morphologie. Le Verbe- Etude de Thèmes*, Paris, Librairie Ernest Leroux.
- Basset, A. (1952), *La Langue Berbère*, First published for the International African Institute; reprinted in 1969 by Dawsons of Pall Mall, London.
- Bat-El, O. (1994), « Stem Modification and Cluster Transfer in Modern Hebrew », *Natural Language and Linguistic Theory*, N° 12, p. 571-596.
- Bat-El, O. (2003a), « The Fate of the Consonantal Root and the Binyan in Optimality Theory », *Recherches Linguistiques de Vincennes*, N° 32, p. 31-60.
- Bat-El, O. (2003b), « Semitic Verb Structure within a Universal Perspective », In Shimron, J. (ed.), *Language Processing and Acquisition in Languages of Semitic, Root-based, Morphology*, p. 29-59, Amsterdam, John Benjamins.
- Benmamoun, E. (1999), « Arabic Morphology: The Central Role of the Imperfective », *Lingua*, N° 108, p. 175-201.
- Bensoukas, K. (1994), *Tashlhit Agentive Nouns- An Optimality-Theoretic Approach*, D.E.S. thesis, Mohammed V University, Faculty of Letters, Rabat.
- Bensoukas, K. (2001a), *Stem Forms in the Non-templatic Morphology of Berber*, Doctorat d'Etat thesis, Mohammed V University, Faculty of Letters, Rabat.
- Bensoukas, K. (2001b), « Markedness and Epenthetic Quality in Tashlhit Imperfective Verbs: An OT Approach », *Linguistic Research*, N° 6(1), p. 81-123.
- Bensoukas, K. (2004), « On the Unity of the Morphology of Moroccan Amazighe: Aspects of the Imperfective Form of the Verb », In Ameer, M. and A. Boumalk (eds.), *Standardisation de l'Amazighe*, p. 198-224, Rabat, IRCAM Publications.
- Bensoukas, K. (2006), « Amazighe Morphology Studies: Assessment and Recommendations », In Ameer, M. and A. Boumalk (eds.), *Structures Morphologiques de l'Amazighe*, p. 18-38, Rabat, IRCAM Publications.
- Bensoukas, K. (2007), « Quelques Réflexions sur la Standardisation des Thèmes Verbaux en Amazighe », In Ennaji, M. (ed.), *La Culture Amazighe et le Développement Humain, Défis d'Avenir*, p. 75-87, Fès, Editeurs L&L.
- Bensoukas, K. (2009), « The Loss of Negative Verb Morphology in Tashlhit: a Variation Approach », *Asinag*, N° 2, p. 89-110.
- Bensoukas, K. (2012a), « The Morphophonology of Tashlhit Agentive Nouns », *Langues et Littératures*, N° 22, p. 103-136.

- Bensoukas, K. (2012b), « Morphological Haplology in Amazigh », *Asinag*, N° 7, p. 151-171.
- Bensoukas, K. (2013), « The Morphology and Syntax of Negation in Amazigh: Synchronic Variation and Diachronic Change », In Boumalk, A. and R. Laabdelaoui (eds.), *Faits de Syntaxe Amazighe*, p. 37-53, Rabat, IRCAM Publications.
- Bensoukas, K. (2014), *Featural Dissimilation in Tashlhit- Avoiding the Repetition of [labial] and [round]*, Rabat, Publications of FLSH-Rabat.
- Bensoukas, K. (2015), « Negative Verb Morphology- How Far does the Variation Go? », *Brill's Journal of Afro-Asiatic Languages and Linguistics*, N° 7.2, p. 211-278.
- Benua, L. (1997), *Transderivational Identity: Phonological Relations between Words*, Ph.D. dissertation, University of Massachusetts, Amherst.
- Boudelaa, S. (2013), « Psycholinguistics », In Owens, J. (ed.), *The Oxford Handbook of Arabic Linguistics*, Oxford, Oxford University Press, DOI: 10.1093/oxfordhb/9780199764136.013.0016
- Boudelaa, S. (2014), « Is the Arabic Mental Lexicon Morpheme-Based or Stem-Based? Implications for Spoken and Written Word Recognition », In Saiegh-Haddad, E. and R. M. Joshi (eds.), *Handbook of Arabic Literacy*, Literacy Studies 9, p. 31-54, Dordrecht, Springer.
- Boukhris, F. et al. (2008), *La Nouvelle Grammaire de l'Amazighe*, Rabat, IRCAM Publications.
- Boukous, A. (1987), *Phonotactique et Domaines Prosodiques en Berbère*, Doctorat d'Etat thesis, Université Paris VIII, Vincennes-Saint-Denis.
- Boumalk, A. (1996), *Morphogénèse et Dynamique Lexicale en Berbère (Tachelhit du Sud-Ouest Marocain)*, Doctorat thesis, INALCO, Paris.
- Bynon, J. (1978), « The Internal Reconstruction of Berber Vowels and Semivowels », In *Atti Del Secondo Congresso di Linguistica Camito-Semitica*, p. 293-298. Università di Firenze.
- Cantineau, J. (1950), « Racines et Schèmes », In *Mélanges William Marçais*, p. 119-124, Paris, G.-P. Maisonneuve.
- Clements, G. N. (1997), « Berber Syllabification: Derivations or Constraints? », In Roca, I. (ed.), *Constraints and Derivations in Phonology*, p. 289-330, Oxford, Clarendon Press.
- Clements, G. N. and E. V. Hume (1995), « The internal Organization of Speech Sounds », In Goldsmith, J. (ed.), *The Handbook of Phonological Theory*, p. 245-306, Cambridge, MA, Blackwell.
- Cohen, D. (1993), « Racines », In Drouin, J. and A. Roth (eds.), *A la Croisée des Etudes Libyco-Berbères- Mélanges Offerts à Paulette Galand-Pernet et Lionel Galand*, p. 161-175, Paris, Geuthner.

- Dell, F. and M. Elmedlaoui (1985), « Syllabic Consonants and Syllabification in Imdlawn Tashlhiyt Berber », *Journal of African Languages and Linguistics*, N° 7, p. 105-130.
- Dell, F. and M. Elmedlaoui (1991), « Clitic Ordering, Morphology and Phonology in the Verbal Complex of Imdlawn Tashlhiyt Berber (Part II) », *Langues Orientales Anciennes- Philologie et Linguistique*, N° 3, p. 77-104.
- Douchaïna, R. (1998), « La Morphologie du Verbe en Tagnawt », *Etudes et Documents Berbères*, N° 15/16, p. 197-209.
- El Hamdi, F. (in preparation), *Tashlhit Root Structure and its Implications for the Organization of the Lexicon*, Doctoral dissertation, Mohammed V University in Rabat, FLHS.
- Gafos, A. (2009), « Stem », In Versteegh, K. et al. (eds.), *Encyclopedia of Arabic Language and Linguistics*, Vol. 4, p. 338-344, Leiden/Boston, Brill.
- Galand, L. (1964/2002), « L'Enoncé Verbal en Berbère: Etude de Fonctions », *Cahiers Ferdinand de Saussure*, N° 21, p. 33-53. Reprinted in Galand, L. (2002), *Etudes de Linguistique Berbère*, 287-307, Paris-Leuven, Peeters.
- Galand, L. (2010), *Regards sur le Berbère*, Milano, Centro Studi Camito-Semitici.
- Guerssel, M. (1986), « Glides in Berber and Syllabicity », *Linguistic Inquiry*, N° 17, p. 1-12.
- Heath, J. (1987), *Ablaut and Ambiguity: Phonology of a Moroccan Arabic Dialect*, Albany, State University of New York Press.
- Hyman, L. (1985), *A Theory of Phonological Weight*, Dordrecht, Foris.
- Iazzi, E. (1991), *Morphologie du Verbe en Tamazight- (Parler des Ait Attab, Haut Atlas Central)- Approche Prosodique*, D.E.S. thesis, Mohammed V University, Faculty of Letters, Rabat.
- Iazzi, E. (1995), « Les Voyelles Fantômes en Amazighe Marocain », *Langues et Littératures*, N° 13, p. 45-63.
- Jebbour, A. (1993), « A Note on “Blind” Verbs in Berber », *Linguistica Communicatio*, N° 5/1-2, p. 211-224.
- Jebbour, A. (1996), *Morphologie et Contraintes Prosodiques en Berbère (Tachelhit de Tiznit)- Analyse Linguistique et Traitement Automatique*, Doctorat d'Etat thesis, Mohammed V University, Faculty of Letters, Rabat.
- Kaye, J. and J. Lowenstamm (1984), « De la Syllabicit   », In Dell, F., Hirst, D. R. and J. R. Vergnaud (eds.), *Formes Sonores du Langage*, p. 123-160, Paris, Hermann.
- Laabdelaoui, R. et al. (2012), *Manuel de Conjugaison Amazighe*, Rabat, IRCAM Publications.
- Lahrouchi, M. (2008), « A Templatic Approach to Gemination in the Imperfective Stem of Tashlhiyt Berber », *Studies in African Linguistics*, N° 37, p. 21-60.

- Lahrouchi, M. (2010), « On the Internal Structure of Tashlhiyt Berber Triconsonantal Roots », *Linguistic Inquiry*, N° 41, p. 255-285.
- Lahrouchi, M. (2013), « A propos de I et de U en Berbère : de la Phonologie, de la Morphologie et des Phases », In Tifrit, A. (ed.), *Phonologie, Morphologie et Syntaxe*, 21-30, Rennes, Presses Universitaires de Rennes.
- Lahrouchi, M. (this volume), « La Racine consonantique en amazighe: construit théorique ou réalité psychologique? »
- Lahrouchi, M. and P. Ségéral (2009), « Morphologie gabaritique et apophonie dans un langage secret féminin en berbère Tachelhit », *Revue Canadienne de Linguistique*, N° 54.2, p. 291-316.
- Lahrouchi, M. and P. Ségéral (2010a), « La Racine consonantique: Evidence dans deux langages secrets en berbère Tachelhit », *Recherches Linguistiques de Vincennes*, N° 39, p. 11-30.
- Lahrouchi, M. and P. Ségéral (2010b), « Peripheral Vowels in Tashlhiyt Berber are Phonologically Long: Evidence from Tagnawt, a Secret Language Used by Women », *Brill's Annual of Afroasiatic Languages and Linguistics*, N° 2, p. 202-212.
- Levi, S. V. (2008), « Phonemic vs. Derived Glides », *Lingua*, N° 118, p. 1956-1978.
- Maddieson, I. (2008), « Glides and Gemination », *Lingua*, N° 118, p. 1926-1936.
- Marlett, S. R. and J. P. Stemberger (1983), « Empty Consonants in Seri », *Linguistic Inquiry*, N°14, p. 617-639.
- McCarthy, J. J. (1979), *Formal Problems in Semitic Phonology and Morphology*, Ph.D. dissertation, MIT, Cambridge, MA..
- McCarthy, J. J. (1981), « A Prosodic Theory of Nonconcatenative Morphology », *Linguistic Inquiry*, N° 12, p. 373-418.
- Moktadir, K. (1989), *The Passive Form in Tashlhiyt Berber- A Prosodic Approach*, D.E.S. thesis, Mohammed V University, Faculty of Letters, Rabat.
- Moscatti, S. et al. (1980), *An Introduction to the Comparative Grammar of the Semitic Languages- Phonology and Morphology*, Wiesbaden, Otto Harrassowitz.
- Nevins, A. and I. Chitoran (2008), « Phonological Representations and the Variable Patterning of Glides », *Lingua*, N° 118, p. 1979-1997.
- Pater, J. (2012), « Serial Harmonic Grammar and Berber Syllabification », In Borowsky, T. et al. (eds.), *Prosody Matters: Essays in Honor of Elisabeth Selkirk*, p. 43-72, London, Equinox.
- Prince, A. and P. Smolensky (1993/2004), *Optimality Theory: Constraint Interaction in Generative Grammar*, Malden, MA, and Oxford, UK, Blackwell. (Revision of 1993 technical report, Rutgers University Center for Cognitive Science. ROA#537.)
- Prunet, J-F. (2006), « External Evidence and the Semitic Root », *Morphology*, N° 16, p. 41-67.

- Ratcliffe, R. (2003), « Toward a Universal Theory of Shape-invariant (Templatic) Morphology: Classical Arabic Re-considered », In Singh, R. and S. Starosta (eds.), *Explorations in Seamless Morphology*, p. 212-269, New Delhi, Sage Publications India.
- Ratcliffe, R. R. (2013), « Morphology », In Owens, J. (ed.), *The Oxford Handbook of Arabic Linguistics*, Oxford, Oxford University Press, DOI: 10.1093/oxfordhb/9780199764136.013.0004
- Ridouane, R. (2008), « Syllables without Vowels: Phonetic and Phonological Evidence from Tashlhiyt Berber », *Phonology*, N° 25, p. 1-39.
- Rosenthal, S. (1994), *Vowel/Glide Alternation in a Theory of Constraint Interaction*, Ph.D. dissertation, University of Massachusetts, Amherst.
- Schluter, K. T. (2013), *Hearing Words without Structure: Subliminal Speech Priming and the Organization of the Moroccan Arabic Lexicon*, Ph.D. dissertation, The University of Arizona.
- Taifi, M. (1990), « Pour une Théorie des Schèmes en Berbère », *Etudes et Documents Berbères*, N° 7, p. 92-110.
- Taifi M. (1991), *Dictionnaire Tamazight-Français (Parlers du Maroc Central)*, Paris, L'Harmattan-Awal.
- Ussishkin, A. (1999), « The Inadequacy of the Consonantal Root: Modern Hebrew Denominal Verbs and Output-output Correspondence », *Phonology*, N° 16, p. 401-442.
- Ussishkin, A. (2006), « Semitic Morphology: Root-based or Word-based? », *Morphology*, N° 16, p. 37-40.
- Zaborski, A. (2006), « Biradicalism », In Versteegh, K. et al. (eds.), *Encyclopedia of Arabic Language and Linguistics*, Vol. 1, p. 313-316, Leiden/Boston, Brill.
- Zemánek, P. (2009), « Root », In Versteegh, K. et al. (eds.) *Encyclopedia of Arabic Language and Linguistics*, Vol. 4, p. 93-98, Leiden/Boston, Brill.
- Zoll, C. (1993), « Ghost Segments and Optimality », *West Coast Conference on Formal Linguistics*, N°12, p. 183-199.