

Ablaut in Classical Arabic Measure I Active Verbal Forms

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1 Introduction

In this paper we tackle an old problem of Classical Arabic morphophonology, the vocalization of the verbal forms known as Measure I.¹ We take the facts of (1), 3rd masculine singular active forms, to be representative of the data under discussion.

(1)	a.	b.	c.	d.
	✓	Gloss	Perfective	Imperfective
	<i>lbs</i>	“dress”	<i>labis+a</i>	<i>ya+lbas+u</i>
	<i>ktb</i>	“write”	<i>katab+a</i>	<i>ya+ktub+u</i>
	<i>drb</i>	“hit”	<i>darab+a</i>	<i>ya+drib+u</i>
	<i>kbr</i>	“be great”	<i>kabur+a</i>	<i>ya+kbur+u</i>

Verbs from the roots of (1a) are vocalized as shown in (1c, d). Some aspects of their vocalization are variable, others are constant. The latter features will be of no concern to us. Thus, the system of 3rd person masculine singular agreement markers displayed in all the forms of (1c, d), *+a* in the Perfective, and *ya+...+u* in the Imperfective, falls beyond the scope of this paper. As well, the *a* uniformly vocalizing C_1 in Perfective forms, and the absence of any vowel between C_1 and C_2 in Imperfective forms, will be of marginal relevance to the main topic of this paper.²

¹ This report is part of a much larger study on the phonology of the verbal system of Classical Arabic, Guerssel & Lowenstamm (forthcoming).

² As the details of morphological analysis just alluded to will be of no relevance for the remainder of this paper, all Perfective forms will be quoted without their final *a*, all Imperfective forms without their final *u*, and the boundary marking the attachment of *ya* will be omitted, thus *labis* instead of *labis+a*, *yaktub* instead of *ya+ktub+u*, etc.

Of interest to us, is the distinctive vocalization of C_2 (underscored in 1c, d). Specifically, we want to know whether the alternations in (1) are organized in terms of a comprehensive network of sound correspondences or whether each class of alternation has to be stated fully and independently of every other, in the form of a lexical stipulation. It has long been noted that the classes of verbs defined by the vocalization of C_2 appear to match identifiable syntactic and semantic properties of verbs. For instance, verbs of the *i-a* class, such as *labis/yalbas* are reputed to denote, for the most part, accidental or transient conditions or states, whereas verbs of the *u-u* class such as *kabur/yakbur* denote permanent states or conditions, as well as being intransitive³. We will not have anything to add to the abundant literature on this topic. We merely note that the success, indeed the credibility of a program purporting to establish a link between generalizations regarding the argument structure of verbs and the extant classes of vowel alternations crucially depends on an adequate characterization of the facts of vocalization. Such a characterization is what we propose to offer in this study.

With the notable exception of Kuryłowicz (1957–58, 1961) most modern students of Classical Arabic view the state of affairs illustrated in (1) as pertaining to the lexicon. Thus, the position expressed in Schramm (1962) is not untypical:

“The correspondence between the active patterns in the past and future, however, is only partially predictable.”

We take a radically different stance, arguing that the role of the lexicon in the vocalization of the root medial consonant is much more reduced than has hitherto been assumed. We argue, indeed, that the vocalic alternations exhibited in (1) are part of a genuine apophonic system serving in synchronically active fashion as the vehicle of derivation of aspect and voice⁴.

In section 2, we motivate our bias towards downplaying the role of the lexicon. In section 3, 4, and 5, we review various properties of the set of facts at hand and conclude that a novel outlook on the evidence is called for. In section 6, we offer our solution. Our results are summed up in a brief section of concluding remarks.

2 *The alleged arbitrariness of the vocalization of C_2*

Taken individually, the sets in (1c) and (1d) are unremarkable: they simply reveal that all three short vowels of Classical Arabic, *a*, *i*, *u*, can appear following C_2 . On the other hand, joint consideration of both sets evidences a

³ See, for instance, Bohas & Guillaume (1984) and Wright (1896) on Arabic, and Aro (1964), Brockelmann (1908) and Dillmann (1907) on other branches of Semitic.

⁴ Aspect only will be dealt with in this paper. See Guerssel & Lowenstamm (forthcoming) for a full discussion of all aspects of vocalization in the verbal system of Classical Arabic.

much more tightly constrained state of affairs. That is, if a verb displays *i* in the Perfective, then it displays *a* in the Imperfective; if a verb displays *u* in the Imperfective, then it displays *u*, or *a* in the Perfective, etc. Thus, the four classes in (2a), with illustrative examples in (2b), can be isolated.

(2)		a.	b.
	Perfective	Imperfective	
	<i>i</i>	<i>a</i>	<i>lab<u>i</u>s/yal<u>b</u>as</i>
	<i>a</i>	<i>u</i>	<i>kat<u>a</u>b/yakt<u>u</u>b</i>
	<i>a</i>	<i>i</i>	<i>ḡar<u>a</u>b/yaḡr<u>i</u>b</i>
	<i>u</i>	<i>u</i>	<i>ka<u>b</u>ur/ya<u>k</u>bur</i>

Of course, the remarkable feature of the set of attested alternations of (2) is its restrictiveness. Why are logically possible correspondence classes such as those in (3) so conspicuously absent from the record ?

(3)	Perfective	Imperfective
	* <i>u</i>	<i>i</i>
	* <i>u</i>	<i>a</i>
	* <i>i</i>	<i>u</i>
	* <i>i</i>	<i>i</i> ⁵
	* <i>a</i>	<i>a</i> ⁶

We submit that a gap of such magnitude as in (3) is not accidental, rather calls for an explanation.

3 Unnaturalness

The regular sound correspondences in (2) can be overridden by phonological factors. One such case will be briefly discussed in 3.1. Against the background of this phonologically natural albeit special case, the unnaturalness of the general pattern will be fully brought out in 3.2.

3.1 The naturalness of a special pattern: interference of gutturals with the expected patterns of vocalization

Consider the data in (4), Active forms of verbs from roots including a guttural in initial position (4a), medial position (4b), final position (4c), and a control set (4d) whose relevance will become clear shortly.

⁵ We are aware that verbs evidencing such alternations can occasionally be found. Such verbs indeed exist, e.g. *watiq/ya(w)tiq* "to rely on", but in such limited number that they must be viewed as exceptions, not as representative classes.

⁶ The *a* – *a* class is not attested independantly of an obvious conditioning factor, the presence of a guttural in C₂ or in C₃ position, a phenomenon briefly dealt with in the next section.

- (4) a. Guttural-initial roots
 $\sqrt{ʔkl}$ *ʔakal/yaʔkul* “eat”
 $\sqrt{ʕmd}$ *ʕamad/yaʕmid* “support”
- b. Guttural-medial roots
 $\sqrt{sʔl}$ *saʔal/yasʔal* “ask”
 $\sqrt{nḥr}$ *naḥar/yanḥar* “slaughter”

- c. Guttural-final roots
 √qrʔ qaraʔ/yaqraʔ “read”
 √qlʕ qalaʕ/yaqlaʕ “rip”
- d. Control set
 fariḥ/yafrāḥ “rejoice”
 taʕīb/yatʕāb “get tired”

Verbs from guttural-initial roots allow the full range of options for Imperfective vocalization. Thus, *ʔakal/yaʔkul* patterns like *katab/yaktub*, whereas *ʕamad/yaʕmid* patterns like *darab/yadrib*. On the other hand, if the root includes a guttural in second or third position, *a* only can appear in the Imperfective, hence in (4b): *yanḥar* (not **yanḥir*, or **yanḥur*), and in (4c): *yaqlaʕ* (not **yaqliʕ*, or **yaqluʕ*). This is a clear departure from the general pattern since, as we saw, Perfective *a* is regularly matched by a high vowel, *i* or *u*, in the Imperfective. While we do not wish to engage in a full discussion of these data, three things are clear: a) the conditions under which Imperfective *a* appears are well defined in terms of the consonantal makeup of the root, b) there is a possible phonetic rationale for the phenomenon in terms of a lowering imposed by a guttural on an adjacent vowel within the stem, c) the forms in which this putative lowering is enforced, the Imperfectives, all display a cluster in stem-initial position, $C_1C_2 \dots$. This prosodic property distinguishes them from forms in which a high vowel is allowed to survive in the vicinity of a guttural such as the Perfectives of (4d).

Clearly, these data bear the hallmark of a possible phonological phenomenon in the sense that a synchronic sound change occurs in systematic correlation with definable properties of the environment.

3.2 The unnaturalness of the general pattern

In the absence of the vigorous interference of a phonological factor such as described above, it is clear that the environment plays no role in the selection of a particular vowel. This is illustrated by the vocalization of the Imperfectives (underscored) in (5d), where *u*, *a*, and *i* are equally welcome in very similar consonantal and prosodic environments.

(5)	a.	b.	c.	d.
	√	Gloss	Perfective	Imperfective
	<i>krb</i>	“come near”	<i>karab</i>	<i>yakr<u>u</u>b</i>
	<i>xrb</i>	“devastate”	<i>xarab</i>	<i>yaxr<u>i</u>b</i>
	<i>drb</i>	“be experienced”	<i>darib</i>	<i>yadr<u>a</u>b</i>

The only sensible observation would take the form of a statement such as (6).

- (6) *a* is the vocalization of *yadrab* “because” *i* is the vocalization of *darib*, etc.

Indeed, nothing in the environment of *yadrab* itself seems to favor the choice of *a* over *i*, or *u*. A similar observation can be made about the vocalization (underscored) of the Perfectives of (7c).

(7)	a.	b.	c.	d.
	✓	Gloss	Perfective	Imperfective
	<i>qrb</i>	“be close to”	<i>qar<u>a</u>b</i>	<i>yaqrub</i>
	<i>šrb</i>	“drink”	<i>šar<u>i</u>b</i>	<i>yašrab</i>
	<i>hrb</i>	“flee”	<i>har<u>a</u>b</i>	<i>yahrub</i>

Again, all three vowels are equally suitable in comparable environments. Again, the only meaningful generalization about the vocalization of the Perfectives in (7c) concerns their membership in recognized ablaut classes with respect to their Imperfectives (7d).

Clearly, the sound changes, or correspondences under discussion are unnatural in the sense that they take place in the absence of any phonetic conditioning. Another characteristic feature of these facts is the fair measure of opacity they involve, a topic to which we turn next.

4 Opacity

Surface opacity in the case at hand is inevitable given the existence of our four classes of vocalic alternations, repeated in (8) for convenience, and the three vowels of the system.

(8)	a.	b.
	Perfective	Imperfective
	<i>i</i> <i>a</i>	<i>lab<u>i</u>s/yalb<u>a</u>s</i>
	<i>a</i> <i>u</i>	<i>katab/yakt<u>u</u>b</i>
	<i>a</i> <i>i</i>	<i>ḍar<u>a</u>b/yadr<u>i</u>b</i>
	<i>u</i> <i>u</i>	<i>kab<u>u</u>r/yakb<u>u</u>r</i>

Since we are not, yet, in a position to assess directionality, that is whether the Perfective vowel is ablauted from the Imperfective vowel, or vice versa, we display the situation obtaining under both possibilities.

The state of affairs under the former hypothesis is represented in (9a). That is, the vowel appearing in the Imperfective is assumed to be ablauted into the vowel appearing in the Perfective. For ease of reference, each line connecting a candidate input vowel, / /, to its output, [], is labelled according to the verb type representative of its class (9b). Thus, connecting line 3 in (9a) describes the {Imperf. *i* → Perf. *a*} class, the representative of which is item 3 in (9b), etc.

		a.					b.
(9)	Input:	/u/	/i/	/a/			
	Imperfective	1	2	3	4		
	Output:						
	Perfective	[u]	[a]	[i]			

	1.	<i>yakbur</i>	/	<i>kabur</i>			
	2.	<i>yaktub</i>	/	<i>katab</i>			
	3.	<i>yaḍrib</i>	/	<i>ḍarab</i>			
	4.	<i>yalbas</i>	/	<i>labis</i>			

The alternative hypothesis whereby the Imperfective vowel is derived from the Perfective vowel appears in (10a), with familiar representative examples of each class in (10b).

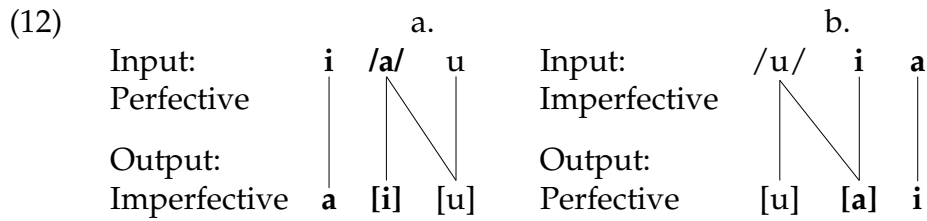
		a.					b.
(10)	Input:	/i/	/a/	/u/			
	Perfective	1	2	3	4		
	Output:						
	Imperfective	[a]	[i]	[u]			

	1.	<i>labis</i>	/	<i>yalbas</i>			
	2.	<i>ḍarab</i>	/	<i>yaḍrib</i>			
	3.	<i>katab</i>	/	<i>yaktub</i>			
	4.	<i>kabur</i>	/	<i>yakbur</i>			

Opacity stems from the fact that two *a*'s appear in the set of Perfective forms, *ḍarab* and *katab*, and two *u*'s in the set of Imperfective forms, *yaktub* and *yakbur*. As expected, the picture of neutralization varies depending on the assumed directionality. Thus, in one case *a* is the source of opacity (10a), whereas *u* is, in the other case represented in (9a). We do not wish to impose *a priori* limitations on the amount of opacity beyond which a system ceases to be viable. We merely assume that the learnability of a system, hence its diachronic stability, directly relates to its transparency. Thus, we do not rule out the possibility that a grammar can sustain a measure of opacity due to neutralization, possibly including absolute neutralization. We are equally unprejudiced with respect to non-phonetically conditioned processes, a feature of the facts brought out in the preceding section. Still, the facts at hand seem to exemplify the most unfavorable situation, mutual neutralization of context-free processes. But the worse is still to come . . .

5 Partial Polarity

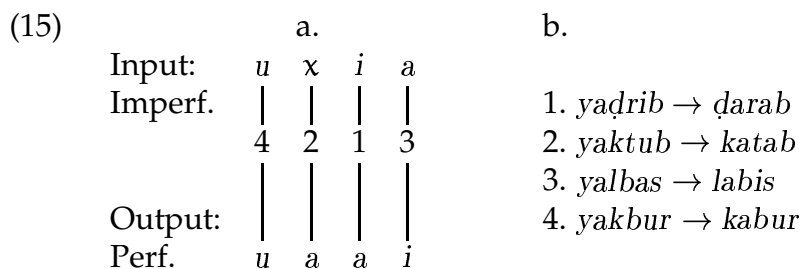
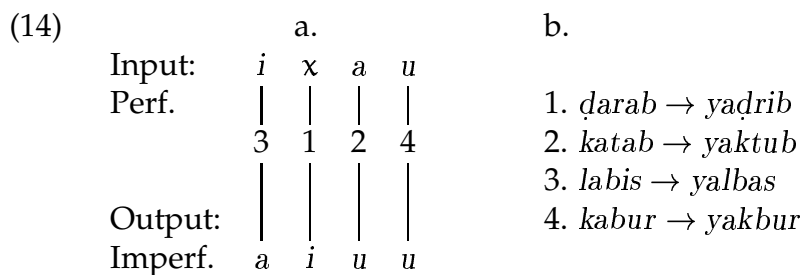
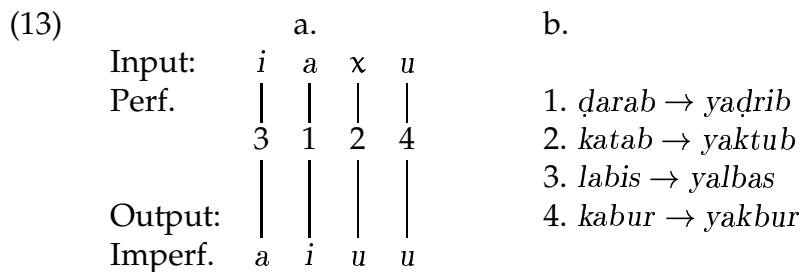
Consider a subset of the data just discussed, pairs such as *labis*/*yalbas* and *ḍarab*/*yaḍrib*. Whether one assumes the Perfective, or the Imperfective vowel to be basic, *either version of directionality* will include *both* a statement to the effect that $i \rightarrow a$, and another statement to the effect that $a \rightarrow i$. This can be seen more clearly in the chart below, (11), where both directionalities are represented.



Under (12a), /a/, involved in both *ḍarab* and *katab*, is opaque, being manifested as either [i] or [u] (*yadrīb* and *yaktub*, respectively). Under (12b), /u/, involved in *yaktub* and *yakbur* is opaque being manifested as either [u] or [a] (*kabur* and *katab*, respectively).

Suppose for a moment that the conundrum pictured in (12) results from our failure to have detected a fourth vocalic element, in addition to our three vowels, *a*, *i*, *u*. Let us call such an object *x*, for the time being. There are four possibilities as to the place *x* could occupy in a system free of ambiguity, two for each version of directionality.

In (13, 14, 15, and 16), we have represented the four possibilities of disambiguation afforded by the introduction of *x*: (13) and (14) for Perfective → Imperfective directionality, and (15) and (16) for the alternative reverse directionality. As a result, within each of our four alternation classes every input segment is distinct from any other. In each case, the relevant verb types can be straightforwardly identified and are indicated by means of their usual token representatives to the right of the chart.



(16)		a.				b.
	Input:	x	u	i	a	
	Imperf.					1. <i>yadrib</i> → <i>darab</i>
		4	2	1	3	2. <i>yaktub</i> → <i>katab</i>
	Output:					3. <i>yalbas</i> → <i>labis</i>
	Perf.	u	a	a	i	4. <i>yakbur</i> → <i>kabur</i>

Clearly, a sufficiently convincing case will have to be made for the phonological identity of x . On the other hand, there can be no doubt that a more favorable picture is now available under any of the four above possibilities. A measure of ambiguity still subsists inasmuch as two different input segments may apophonize into the same surface segment, an inescapable consequence of the discrepancy between our four ablaut classes and our three surface vowels, but it is no longer the case that two different output segments proceed from the same input.

Before selecting one of the options of (13, 14, 15, and 16), we want to point out that any such decision will have a double consequence.

First, it will commit us to the specific directionality embodied in each of the four hypotheses under consideration. Thus, choosing, say, (14) implies endorsing Perfective → Imperfective directionality, whereas the choice of (16) means opting for Imperfective → Perfective directionality, etc.

Second, it will lead to the identification of the verb type “carrying” x . Thus, selecting, say, (16) implies endorsing that the representation of the *yakbur* → *kabur* class “is”, at a deeper level, *yakbxr* → *kabur*.

While several properties of the four systems just described would warrant comment, one feature of (14) clearly recommends it over the other three possibilities: (14) happens to be the only configuration free of the undesirable “partial polarity” effect. Indeed, under (14), it is no longer the case that both $a \rightarrow i$ and $i \rightarrow a$. For that reason, we choose to further explore the implications of (14) and to disregard the alternatives.

As already pointed out, (14) embodies two substantial claims. We spell them out in (17).

- (17) a. apophony maps the Perfective melody into that of the Imperfective.
 b. *darab/yadrib* is the verb type “bearing” x .

Thus, *darab* and *katab* with apparently identical vocalism differ, we claim, as follows: *katab* involves genuine a and manifests the $a \rightarrow u$ apophonic class, whereas *darab* (underlyingly *darxb*) involves x , manifesting, as such, the $x \rightarrow i$ apophonic class.

We now proceed to show how the detection of the identity of x requires no additional machinery.

6.2 The identity of x

The first observation will be that the surface vocalization of / $\dot{d}arxb$ / resembles that of / $katab$ /. In other words, the posited underlying contrast in (18a) seems to be neutralized as in (18b).

(18)	a.	b.
	underlying contrast	surface neutralization
	$katab$	$katab$
	$\dot{d}arxb$	$\dot{d}arab$

An underlying contrast of comparable magnitude opposes $\dot{d}arxb$ and $katab$ on the one hand, and $\dot{d}arxb$ and $labis$, on the other. Is it an accident that no neutralization such as in (19) takes place whereby / $\dot{d}arxb$ / would end up resembling / $labis$ / rather than / $katab$ / ?

(19)	a.	b.
	underlying contrast	surface neutralization
	$labis$	$labis$
	$\dot{d}arxb$	* $\dot{d}arib$

The second observation has to do with the vocalization of C_1 in the Perfective paradigm. Whereas C_2 can be vocalized in a variety of ways, the topic of this paper, C_1 is uniformly followed by \underline{a} : $katab$, $labis$, etc.

Is it accidental that x should surface as \underline{a} in a paradigm where \underline{a} regularly occurs in the preceding nuclear position ?

Our solution answers both questions: x , the true underlying vocalization of surface $\dot{d}arab$ is the null element \emptyset . As vacuous vocalization of C_2 is not tolerated in the Perfective, spreading eventually ensues, as shown below in (20a)⁸.

(20)	a.	b.
	$\begin{array}{ccccccc} & d & & r & & b & \\ & / & & & & \backslash & \\ C & V & & C & & V & C & V \\ & & & & & & & \\ & a & \longrightarrow & & & \emptyset & & \end{array}$	$\begin{array}{ccccccc} & k & & t & & b & \\ & / & & & & \backslash & \\ C & V & & C & & V & C & V \\ & & & & & & & \\ & a & & & & a & & \end{array}$
	$[\dot{d}arab] < / \dot{d}ar\emptyset b /$	$[katab] < / katab /$

⁸ The solution just offered calls for a comment. In early generative work, the distinction between the a of $\dot{d}arab$ and the a of $katab$, resp. the one that apophonizes into i and apophonizing into u , might have been captured by postulating two kinds of a 's, say / a_1 / and / a_2 /, later undergoing neutralization into [a]. We are proposing nothing of the kind. Rather, the phonetic interpretation of a null melodic element by rightward propagation from a neighboring position falls well within the inventory of legitimate descriptive devices of autosegmental theory. It is amply documented in an outside of noncatenative morphological systems, as well as in tonal phonology

The important point for our purpose is the emergence of the four clearcut vowel alternation classes in (21a), with matching examples in (21b).

(21)	a.	b.
	1. $\emptyset \rightarrow i$	ḍar <u>ḥ</u> b ya <u>ḍ</u> ri <u>b</u> └──────────┘
	2. $i \rightarrow a$	la <u>b</u> i <u>s</u> ya <u>l</u> ba <u>s</u> └──────────┘
	3. $a \rightarrow u$	ka <u>t</u> a <u>b</u> ya <u>k</u> t <u>u</u> b └──────────┘
	4. $u \rightarrow u$	ka <u>b</u> u <u>r</u> ya <u>k</u> bu <u>r</u> └──────────┘

7 Results and concluding remarks

We are now in a position to answer some of the questions raised earlier in this paper. We started by noting a puzzling gap whereby four vowel alternation classes only were attested, out of nine logical possibilities. We can now rationalize such a gap in terms of a deeper regularity. That is, classes are not lexically recorded *as such* as had earlier been held⁹. Rather, each root is lexically associated with one of our four vocalic objects, \emptyset , a , i , u as shown in (22). From such a vantage point, “classes” of vowel correspondences are a mere by-product of the operation of the ablaut function.

(22)	√	lexical vocalization
	ḍrb	↔=====↔ \emptyset
	lbs	↔=====↔ i
	ktb	↔=====↔ a
	kbr	↔=====↔ u

Based on strictly morphophonological considerations, exactly four types of verbs are recognized. We expect that this unambiguous typology arrived at on independent grounds may be viewed as an anchoring point by scholars attempting to relate vocalization and clusters of syntactic and semantic properties of verbs.

The careful reader will have noticed a striking formal property of the individual apophonic statements in (21a), viz. each output vowel of an apophony is the input to another. Thus, the discrete statements of (21a) can be linearized into a path, as in (23).

$$(23) \quad \emptyset \rightarrow i \rightarrow a \rightarrow u \rightarrow u$$

As much more space would be required for full discussion, two points will only be mentioned in connection with the scope of (23).

⁹ Cf. McCarthy (1981) p. 403 “It is obvious that we can give only a lexical account of assignment of any given root to an ablaut class”.

First, as we have argued elsewhere (Guerssel & Lowenstamm, forthcoming), the formula in (23) can be extended to account for all facets of vocalization of the Arabic verb, allowing for the derivation of the vowel melodies of the four classes determined by Aspect and Voice in each derived conjugation.

Second, there is very good indication that (23) is not limited to Arabic or Semitic, indeed might be universal. Thus, (23) has been argued to be operative in Ge'ez (Ségéral 1995), Kabyle Berber (Bendjaballah 1995). In addition, recent work (Ségéral & Scheer 1995, and Ségéral 1995) has shown the entire system of strong verbs of Modern German, 43 different vowel patterns altogether, to be a mere instantiation of (23).

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