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Word Final Phonology in Lardil: Implications of an Expanded Data Set*

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The word final phonology of Lardil was brought to the attention of linguists by Ken Hale in the 1960s and since then certain properties of the data have led it to occupy a privileged position, in a canon of data sets against which new theoretical proposals are frequently tested. Several seminal arguments for new and high-profile phonological theories are now based at least in part upon analyses of Hale's data set. After reviewing what is of such interest in Lardil, a body of data is assembled which alters our understanding of the empirical facts and theoretical implications of Lardil phonology. Hale's process of Laminalization is reanalyzed as Apicalization; constrained lexical exceptions are found with respect to Apocope, Apicalization and Truncation; and a process of Raising is identified. A discussion of the systematicity of these new data, and of their demonstrable antiquity leads to the conclusion that future formal analyses of the language must account not only for already well-known properties of the data, but for the existence of multiple, active patterns that apply selectively throughout the lexicon.

Keywords: Lardil; phonology; exceptions; regularity; productivity

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1. Lardil and its Place in Phonological Theory

The word final phonology of Lardil was first brought to the attention of linguists by Ken Hale in the 1960s. Since that time certain properties of the Lardil data have led it to acquire something of a privileged position, in a canon of data sets against which new theoretical proposals are frequently tested. The founding treatise on Optimality Theory (Prince & Smolensky 2004 [1993]) for example provides a considered account of a subset of the Lardil data, as does Goldsmith's (1993) proposal for Harmonic Phonology, Lakoff's (1993) for Cognitive Phonology, Kurisu's (2001) for Realization Morphology Theory, two of McCarthy's (2003, 2007) significant revisions of Optimality Theory and a recent refinement of one of those by Kavitskaya and Staroverov (2010). In this paper I review what is so special about Lardil and introduce an extension to the classic data set of Hale (1973), one which will alter our understanding of the empirical facts and theoretical implications of Lardil, which have been of so much interest, to so many, for so long.

Lardil is the sole occupant of the Northern branch of the non-Pama Nyungan, Tangkic language family of northern Australia,[1] and in its traditional form is no longer spoken. Its closest well-documented relatives are the Southern Tangkic languages Ganggalida, also known as Yukulta (Keen 1972, 1983; also extinct) and Kayardild (Evans 1995, Round 2009; critically endangered). Like many Australian languages Lardil distinguishes few vowel qualities, but six places of consonant articulation, of which two group into the apical class (produced with the tongue tip) and two into the laminal class (produced with the tongue blade). One series of stops and one series of nasals are represented at all six places, in addition to three liquids and two glides, as shown in Figure 1.

The Lardil data set which has been most widely reproduced and analyzed in the phonological literature was first published by Hale (1973). Although many subsequent publications also cite Klokeid's (1976) MIT PhD thesis and the Lardil Dictionary published in 1996 by Ngakulmungan Kangka Leman (henceforth, NKL

coronal				non-coronal	
apical		laminal			
alveolar	post-alveolar	dental	palato-alveolar	dorsal velar	labial

stop	t	ʈ	t̪	c	k	p
nasal	n	ɳ	n̪	ɲ	ŋ	m
liquid	r, l	ɻ				
glide				j		w

i, i:	u, u:
e,e:[1]	a, a:

Figure 1 Lardil phonemic inventory

[1]*Note*: Phonetically the quality of these vowels is low, front [æ]. Here I follow the established convention of writing them as /e/.

[1] The Tangkic family was previously considered Pama Nyungan on typological grounds, but this hypothesis has since been rejected (Blake 1988; Evans 1995).

1996), extensive use is rarely made of the additional material which appeared after Hale's original, seminal paper. The main source of data for this paper is NKL 1996.

NKL 1996 is a substantial dictionary of approximately 1,700 headwords, built primarily upon a compilation of Hale's extensive Lardil fieldnotes, and supplemented with certain later materials. Entries in the dictionary cite surface forms, and many also cite underlying stem forms. In cases where the underlying stem is not explicitly cited, the introduction to the dictionary states that the underlying and surface forms are identical (NKL 1996: 31). In fact, this appears not to be true in the general case. We can be confident that for entries which trace back to Hale's own compilation [to be found in a dictionary draft (Hale 1981)], this is true, but it is almost certain that some later entries were added without the underlying form being ascertained. All lexemes cited in this paper are ones whose underlying forms we can be confident of, either because we have direct evidence for underlying stems in attested, inflected forms or because the lexeme appears in Hale (1981). An Appendix at the end of the paper provides evidence for underlying forms in cases where it is not supplied already in the main text.

Lardil has played such a prominent role in recent phonological discussion primarily because of a specific tension it manifests between two phenomena that have occupied much of theorists' attention since the 1970s. The first of these is that, like many other languages, Lardil exhibits a host of phonological processes that can be elegantly explained as follows: the phonology of a language places certain demands[2] on the surface forms of words, and since underlying forms often fail to meet those demands on their own, phonological processes apply to them *in order that those demands are met*. For example, in example (1), the phonology states that surface words must not end in a consonant, and so something must be *done to* an underlying form, such as hypothetical /bibap/, in order for that requirement to be met.

(1) *Surface-driven phonology*
e.g. Requirement: words may not end in a consonant; so, from underlying /bibap/:
(a) delete final /p/;
(b) epenthesize final /V/;
(c) metathesize /ap/; etc.

Typically there are many processes that could apply in order to meet a given surface demand. A ban on consonant final words for instance could be met by deleting a final consonant, by epenthesizing a vowel, or even by metathesizing segments. Significantly, although these are each very different phonological processes, they are united through their shared function, in that they all lead to the meeting of the same demand on surface forms. Within in a given language, disparate processes can often be insightfully related to one another through this mode of reasoning. However, the re-write rules of early generative phonology, as in example (2), failed to give expression to this kind of

[2] Throughout the paper I use the term 'demand' rather than 'constraint' in order to avoid any theory-specific connotations that the latter might carry.

functional unity of processes, and thus since the 1970s theoreticians have devoted much effort to introducing some analogue of 'surface demands' into phonological theory.

(2) *Classic generative rules*
A → B/X__Y

To theorize convincingly one needs data, and here Lardil has proven valuable for a specific set of reasons. That is, although most of the phonological processes in Lardil can be motivated in terms of the satisfaction of demands on surface forms, there are just a few that cannot. For theories which propose fundamentally to account for phonological processes in terms of the satisfaction of surface demands, Lardil offers a quantum of staunch resistance. One strategy which phonologists have found effective then, when arguing for the robustness of a new theory, is to furnish a viable and satisfying analysis of Lardil. As a consequence, there are now several seminal arguments for new phonological theories that are based in part on an analysis of Hale's classic Lardil data set. The main concern in the remainder of this paper will not be to review those theoretical arguments, but to present new data in an organized fashion, and to discuss its general implications. We begin with a review of the classic Lardil data set in Section 2; Section 3 then argues for a revision to the analysis of Laminalization, after which Section 4 introduces the main body of new data. Discussion follows in Sections 5 and 6, and conclusions in provided in Section 7.

2. Hale's Classic Lardil Data Set[3]

Hale's classic data set revolves around six phonological processes which will be introduced below in turn: Augmentation, Lowering, Apocope, Cluster reduction, Non-apical truncation and Laminalization.

The data in example (3) contain underlying stems which are just one mora in length—where a short vowel is monomoraic, a long vowel bimoraic, and consonants non-moraic in all positions. As in all of the data sets to follow, underlying representations are set between slashes[4] and appear in a column titled 'UR'. Differences between underlying and surface forms are highlighted by placing differing segments in bold.

[3] All surface forms presented here abstract away from two late processes:

Attrition:	n,ɳ,ɭ,r	→Ø	/___ #	(only in certain suffixes; optional)
Sonorization:	t,ʈ	→r,ɽ	/___ #	(obligatory)

I currently know of no evidence which would determine any ordering between Sonorization and Attrition. The suffixes I have identified as ending in, or (after other processes have applied) coming to end in, /t/ or /ʈ/ undergo Sonorization and escape Attrition. While this might be due to a relatively later ordering of Sonorization, it could also be because those suffixes are marked as exceptions to Attrition. Further research may clarify the issue.

[4] Note that the forms between slashes correspond to morphophonemic rather than phonemic representations. Forms in the 'surface' column are phonemic.

Augmentation (Hale 1973: 427, 438; NKL 1996: 35):
Satisfies the surface demand for minimally bimoraic words:

		UR	Surface			UR	Surface	
(3)	a.	/ʈer/	ʈer**a**	'thigh'	f.	/jak/	jak**a**	'fish'
	b.	/ɻil/	ɻil**ta**	'neck'	g.	/ɻelk/	ɻelk**a**	'head'
	c.	/maɻ/	maɻʈ**a**	'hand'	h.	/ʈurk/	ʈurk**a**	'black'
	d.	/wun/	wun**ta**	'rain'	i.	/kaŋ/	kaŋ**ka**	'speech'
	e.	/kaɳ/	kaɳʈ**a**	'grass'	j.	/ɻu/	ɻu**wa**	'fat'

As example (3) shows, monomoraic forms in Lardil undergo a process of Augmentation. Augmentation adds segments to the underlying form and has the function of making the surface form bimoraic. It could be argued then, that the application of Augmentation is motivated by the cross-linguistically common demand that surface words be minimally bimoraic.

The second process, Lowering, appears in examples (4a)–(4d). Lowering applies to underlying forms which are bimoraic and which end in a high vowel. High front /i/ lowers to low front /e/ and high back /u/ lowers to low back /a/. In examples (4e) and (4f) we see that Lowering has no effect on vowels which are already low, and in examples (4g) and (4h) that Lowering does not apply to disyllables ending in long vowels, as their underlying forms are trimoraic, not bimoraic (the phonology of trimoraic forms ending in short vowels is discussed next).

Lowering (Hale 1973: 421–422):
Not motivated by any apparent demand on surface forms:

		UR	Surface	
(4)	a.	/penk**i**/	penk**e**	'lagoon'
	b.	/cimp**i**/	cimp**e**	'tail'
	c.	/ŋuk**u**/	ŋuk**a**	'water'
	d.	/kaʈ**u**/	kaʈ**a**	'child (of woman)'

Low vowels don't change:

		UR	Surface	
	e.	/kela/	kela	'beach'
	f.	/cempe/	cempe	'mother's father'

Final long vowels don't change:

	UR	Surface	
g.	/penki-i/	penkiː	'beach-LOCATIVE'
h.	/ŋuku-u/	ŋukuː	'water-LOCATIVE'

Apocope is illustrated in example (5). The underlying forms to which Apocope applies are trimoraic or longer. From those underlying forms, a final underlying, short vowel is deleted. As seen in examples (5a)–(5d), and then in examples (5e) and (5f), Apocope makes no distinction between uninflected and inflected word forms: it deletes final vowels from both.

Apocope (Hale 1973: 424):
Applies only if doing so does not contravene the surface demand that words be minimally bimoraic, cf. examples (4a)–(4f):

(5)

	UR (bare root)	Surface	
a.	/kaŋkaɻ**i**/	kaŋkaɻ	'father's father'
b.	/jalul**u**/	jalul	'fire'
c.	/majar**a**/	majar	'rainbow'
d.	/wiʈewiʈ**e**/	wiʈewiʈ	'open sea'

Also applies to inflected URs:

	UR (inflected)	Surface	
e.	/ŋuku-ɻ**u**/	ŋukuɻ	'water-FUTURE'
f.	/ŋuku-wer**i**/	ŋukuwer	'water-PRIVATIVE'

Note that Apocope does not apply to the underlyingly bimoraic forms in example (4). Were it to apply in those cases, it would reduce the surface form down to just a single mora, and by doing so would violate the demand that surface words be minimally bimoraic.

Wilkinson (1988) points out that the Augmentation of monomoraic forms, and the lack of Apocope from bimoraic forms, are both motivated by a demand on the surface moraicity of words. Nevertheless, this is not to say that all of Lardil phonology will find a motivation in terms of demands on surface forms. Surface demands may motivate the *absence* of Apocope from bimoraic words, but no such surface demand motivates the *application* of Apocope in longer words. As we will see in example (7) below, Lardil is perfectly tolerant of long, surface words that end in vowels. Likewise, there is no surface demand that motivates Lowering in example (4), since Lardil freely permits bimoraic surface words to end in high vowels.

Cluster reduction is shown in example (6). Any cluster which would otherwise stand at the end of the word is reduced down to its first member, thereby satisfying

a demand on the surface form of Lardil words, that they not end in a complex coda. In examples (6d)–(6h) we see that cluster reduction is fed by Apocope: whatever Apocope produces is also subject to the surface constraint against word final clusters.

Cluster Reduction (Hale 1973: 424; NKL 1996: 133):
Satisfies the surface demand that words not end in a complex coda:

		UR	Surface	
(6)	a.	/waŋal**k**/	waŋal	'boomerang'
	b.	/cilwir**k**/	cilwir	'wet'
	c.	/makar**k**/	makar	'anthill'

Cluster reduction is fed by Apocope, thus satisfying the surface demand that words not end in a complex coda

	UR	Surface	
d.	/jukar**pa**/	jukar	'husband'
e.	/karwakar**wa**/	karwakar	'tree sp.'
f.	/kantukan**tu**/	kantukan	'red'
g.	/kiruɻʈ**a**/	kiruɻ	'bird sp.'
h.	/ŋuku-ŋar**pa**/	ŋukuŋar	'water-NONFUT'

Non-apical truncation appears in example (7). Non-apical truncation deletes the would-be final, non-apical consonant from a word. Examples (7a)–(7d) show Non-apical truncation applying in a simple fashion;[5] examples (7e)–(7h) show it being fed by Apocope, and examples (7i) and (7j) show multiple non-apical consonants being truncated.

Non-apical Truncation (Klokeid 1976: 47, 49; NKL 1996: 206):
Satisfies the surface demand that words not end in a non-apical consonant:

		UR	Surface	
(7)	a.	/kurkaŋ/	kurka	'corm sp.'
	b.	/ʈaŋkuŋ/	ʈaŋku	'oyster sp.'
	c.	/ɲiriɻiŋ/	ɲiriɻi	'downwards'
	d.	/ŋalu**k**/	ŋalu	'story'

[5] See examples (10d) and (10e) below for examples of simple Non-apical truncation applying to laminal final stems.

Non-apical truncation is fed by Apocope, thus satisfying the surface demand that words not end in non-apical C

	UR	Surface	
e.	/murrkuni**ma**/	murrkuni	'nulla-nulla'
f.	/ʈulɲu**ka**/	ʈulɲu	'fish sp.'
g.	/waɻama**ŋi**/	waɻama	'2nd degree initiate'
h.	/t̪arawa**t̪a**/	t̪arawa	'trousers' < English

Multiple non-apicals can be deleted, thus satisfying the surface demand that words not end in non-apical C

	UR	Surface	
i.	/muŋkumu**ŋku**/	muŋkumu	'wooden axe'
j.	/cumpucu**mpu**/	cumpucu	'dragonfly'

Our final process, Laminalization, is shown in example (8). Laminalization converts a stem final apical stop /t/ into a laminal—but only if that /t/ is *non*-final in the word. Which laminal appears on the surface (either /t̪/ or /c/) is determined contextually: a dental if the next segment is a back vowel and a palatal otherwise. Laminalization does not appear to be motivated by surface demands, since /t/ does appear word internally otherwise, as for example in surface /kucitaɻ/ (UR /kucitaɻu/) 'gift of food'. (An alternative analysis of the Laminalization data will be offered below.)

Laminalization of stem final /t/, when followed by a suffix:
Not motivated by any apparent requirement on surface forms:

		UR	Surface		
(8)	a.	/ŋawit/	ŋawit	'stomach'	NOMINATIVE
	b.	/ŋawi**t**-uɻ**u**/	ŋawit̪uɻ		FUTURE
	c.	/ŋawi**t**-ar**pa**/	ŋawit̪ar		NON-FUTURE
	d.	/ŋawi**t**-iŋun/	ŋawi**c**iŋun		COMITATIVE
	e.	/jaɻput/	jaɻput	'animal'	NOMINATIVE
	f.	/jaɻpu**t**-uɻ**u**/	jaɻput̪uɻ		FUTURE
	g.	/jaɻpu**t**-ar**pa**/	jaɻput̪ar		NON-FUTURE
	h.	/jaɻpu**t**-iŋun/	jaɻpu**c**iŋun		COMITATIVE

This completes our review of the classic Lardil data set. In summary, Augmentation adds segments to a monomoraic underlying form and its application is consistent with a surface demand for minimally bimoraic words. Lowering applies solely to bimoraic underlying forms and lowers a final high vowel to a low vowel; no surface demand motivates it. Apocope deletes the final vowel of underlying forms which are

at least trimoraic; its application is unmotivated by any surface demand, but its non-application to shorter forms adheres to the demand for minimal bimoraicity. Cluster reduction simplifies any would-be final clusters down to one segment and is motivated by a surface demand against word final, complex codas. Non-apical truncation is likewise motivated by a surface demand on word final consonants, this time against word final non-apicals; it deletes any would-be word final non-apical consonant. Laminalization converts a stem final, but word internal apical stop /t/ into a laminal stop, /t̪/ or /c/ as determined by context. It has no motivation in terms of surface demands.

3. An Apicalization Analysis is Preferable to Laminalization

Amongst the six processes introduced above, Laminalization is rather mismatched. In a language where so much phonology applies at the ends of words, we have one process which applies specifically to segments which are not at the ends of words, yet which are at the ends of stems. An alternative analysis is that the process at stake is running in the opposite direction: the underlying consonant is laminal, and is converted into an apical at the end of a word. This alternative, Apicalization,[6] is shown in example (9).

Apicalization of word final laminal /C̪/:
Satisfies the surface requirement that words not end in a non-apical consonant

		UR	Surface		
(9)	a.	/ŋawi**c**[7]/	ŋawi**t**	'stomach'	NOMINATIVE
	b.	/ŋawic-u-ɭ**u**/	ŋawit̪u-ɭ		FUTURE
	c.	/ŋawic-ar**pa**/	ŋawit̪ar		NON-FUTURE
	d.	/ŋawic-iŋun/	ŋawiciŋun		COMITATIVE
	e.	/jaɭpu**c**/	jaɭpu**t**	'animal'	NOMINATIVE
	f.	/jaɭpuc-u-ɭ**u**/	jaɭput̪u-ɭ		FUTURE
	g.	/jaɭpuc-ar**pa**/	jaɭput̪ar		NON-FUTURE
	h.	/jaɭpuc-iŋun/	jaɭpuciŋun		COMITATIVE

[6] A historically related process in Kayardild is referred to by Evans (1995) as 'Delaminalization'. Here I prefer the label 'Apicalization' as it conveys that the process results in an apical segment. In a sense, both Apicalization and Laminal Truncation are species of Delaminalization.

[7] At the end of stems the contrast between laminal palatal /c/ and laminal dental /t̪/ is suspended, so the choice to posit underlying /c/ in these forms rather than /t̪/ is purely arbitrary (in Trubetskoyan terms, the segment is an archiphoneme). Elsewhere the contrast between /c/ and /t̪/ is maintained, e.g. /caɭan/ 'grass sp.NOM' versus /t̪aɭan/ 'coolamon.NOM', /malca/ 'school of dugong' versus /malt̪a/ 'absent.NOM'.

Apicalization is fed by Apocope and Cluster Simplification [in example (9i)].

	UR	Surface		
i.	/maɳara**n̪t̪a**/	/maɳara**n**/	'tree sp.'	NOMINATIVE
j.	/maɳaran̪t̪a-ɻ**u**/	/maɳaran̪t̪aɻ/	'tree sp.'	FUTURE

The basic data in examples (9a)–(9h) is equally consistent with both a Laminalization or an Apicalization analysis, but there are other data which provide positive support for Apicalization. In examples (9i) and (9j) we see two forms of the word for 'swamp wattle', a tree species. Note that in the surface forms, there is an alternation between word final apical /n/ and a word internal, laminal cluster /n̪t̪/. The Apicalization analysis of Lardil derives this alternation without a problem: in example (9i), Apocope deletes the final vowel from underlying /maɳaran̪t̪a/, Cluster reduction deletes the preceding /t̪/ and Apicalization converts laminal /n̪/ to /n/. In contrast, Laminalization is of no help: the segment which exhibits the alternation is not stem final, but Laminalization is defined to laminalize only stem *final*, word internal segments. Nor will redefining Laminalization to apply to stem *internal* segments provide a workable solution. A version of Laminalization along such lines would be too powerful, falsely generating medial laminals in surface forms such as */kuci̪t̪aɻ/ from underlying /kucita-ɻu/ 'gift of food'. In short, Apicalization is empirically adequate, but Laminalization cannot be. Furthermore, it will also be recalled that Laminalization was unmotivated by any surface demand in Lardil. In contrast, Apicalization relates naturally to a surface demand which was identified above in connection with Non-apical truncation—that surface words must not end in a non-apical consonant.[8] This observation in turn sheds light on a key point of complexity in Lardil. If Lardil words are prohibited from ending with a laminal, and there are two processes—Non-apical truncation and Apicalization—which both provide a means to that end, which is used? At this point, let us introduce more data.

In examples (10a) and (10d) we see that some nominals undergo Apicalization and some undergo Non-apical truncation. Which process applies is lexically determined. Meanwhile, in example (10g) I concur with Klokeid (1976), that all verbs stems end in an underlying laminal stop, which in uninflected (aka 'plain') verb forms gets truncated.[9]

[8] A reviewer observes that the Apicalization of /t̪/ to /t/ does not immediately produce a legal surface word in Lardil, due to the late process of Sonorization (fn.3) which changes apical /t/ apical to [r]. Nevertheless, is it consistent with the data to claim that Apicalization itself is motivated by a demand that words not end in a non-apical consonant.

[9] The data in examples (10g)–(10i) offer a partial motivation for the laminal-final analysis of verb stems. Two other sources of evidence can be identified. First, in reduplicated verb stems a final laminal surfaces in the first copy of the stem in examples like (a), in which the following copy begins with a labial. Since Lardil phonotactics prohibit initial laminals in any other heterorganic clusters, we don't expect to see the underlying, stem final laminal surfacing in cases like (b); however note that in (c) the presence of the underlying laminal is detectable in the de-retroflexion of initial, underlying /ɳ/ of the second copy. [As in the reduplication of any monomoraic verb stem in Lardil, the first copy in (c) undergoes vowel lengthening.]

(a)	/peric-peric/	→	pericperi	(b)	/kelic-kelic/	→	kelikeli
	'crawl-crawl'		'crawl around'		'hop'		'hop around'

In examples (10j) and (10k) we see that the objective suffix can also Apicalize *or* Truncate, depending on the function that it fulfils.

Apicalization and *Non-apical truncation* of would-be word final laminals:
Both satisfy the surface requirement that words not end in a non-apical consonant, which applies and is lexically determined for nominal stems in examples (10a) and (10d).
Verb stems, analyzable as laminal-final, always undergo Truncation [example (10g)].

		UR	Surface			
(10)	a.	/ŋawi**c**/	ŋawi**t**	'stomach'	NOMINATIVE	; Apicalization
	b.	/ŋawic-u̪**u**/	ŋawi̪u̪		FUTURE	
	c.	/ŋawic-ar**pa**/	ŋawi̪ar		NON-FUTURE	
	d.	/malki**c**/	malki	'scorpion'	NOMINATIVE	; Truncation
	e.	/malkic-u̪**u**/	malki̪u̪		FUTURE	
	f.	/malkic-ar**pa**/	malki̪ar		NON-FUTURE	
	g.	/puti**c**/	puti	'fall (v.)'	PLAIN FORM	; Truncation
	h.	/putic-u̪**u**/	puti̪u̪		FUTURE	
	i.	/putic-ar**pa**/	puti̪ar		NON-FUTURE	

Determined by function* for the OBJECTIVE suffix [*i.e. whether marking accusative case (j), or clausal subordination (k)]:

	UR	Surface		
j.	/t̪upun-i**n̪t̪a**/	t̪upuni**n**	'pestle-OBJECTIVE'	; Apicalization
k.	/t̪apuci-kun-i**n̪t̪a**/	t̪apucikuni	'brother- GENITIVE-OBJV'	; Truncation

Lardil has two processes that can be called upon to eliminate word final laminals, and both of them are used.

4. Expanding the Data Set

In this section we turn to some Lardil data, which to those who are well familiar with Hale's classic data set may contain some surprises. As discussed above, both Apicalization and Non-apical truncation can be related to a demand on surface words in Lardil, that they not end in non-apical consonants. In example (11)

(b) /ɳec-ɳec/ → ɳeːne
'strike-strike' 'strike lightly'
Second, inflected and causativized verbs either contain the underlying, stem final laminal on the surface as in examples (10h) and (10i) and (d) or lack it precisely because the following suffix begins with a non-labial consonant, such as in (e), where once again the underlying stem-final laminal is detectable in the de-retroflexion of the following, underlying /ɳ/.
(d) /putic-penŋec/ → puticpenŋe (e) /putic-ɳeŋ/ → putine
'fall-causative' 'drop (v.t.)' 'fall-negative.imperative'

however, we find that Lardil does in fact possess precisely such words: words ending in laminals. The forms in example (11) undergo Apocope, and in one case Cluster reduction, but in all of them, both Apicalization and Non-apical truncation fail to apply.[10]

Apicalization & Non-apical truncation both fail.
In misc. /CV/-final stems we find that Lardil words ***can*** end with a laminal

		UR	Surface	
(11)	a.	/kakawuɲ**a**/	kakawuɲ	'bird sp.'
	b.	/puɳʈuɲ**ca**/	puɳʈuɲ	'tree sp.'
	c.	/paɲapaɲ**a**/	paɲapaɲ	'blossom'
	d.	/kulkic**i** ~ kulkic**a**/	kulkic	'shark sp.'
	e.	/piɳʈaɲ**i**/	piɳʈaɲ	'upper arc of double-rainbow'
	f.	/paljariɲ**i**/	paljariɲ	subsection name
	g.	/paŋaɻiɲ**i**/	paŋaɻiɲ	subsection name
	h.	/palaaɲ**a**/	palaaɲ	'fish sp.'

Next, in example (12) we find a large number of word final front vowels which fail to undergo Apocope. As can be seen in examples (12a)–(12d), locatives are always exceptions to Apocope. Another substantial set of words that resist Apocope are forms such as examples (12e)–(12i) that were locatives or ergatives historically.[11] Verbal negatives also escape Apocope, shown in examples (12j) and (12k). There is then a sizeable set of miscellaneous stems examples (12l)–(12s), most, but not all, of which are recent loans (we return to the topic of loans and productivity in Section 6).

[10] A reviewer asks whether it is significant that of the eight penultimate laminals here, all bar two are nasals. This is an interesting question to which I have no definitive answer, however it may be relevant that in the reconstructed proto Tangkic lexicon (Round & Evans in preparation), intervocalic laminal nasals are exceedingly rare, and that the only form in example (11) reconstructable to proto Tangkic is example (11d), whose penultimate is an oral stop. It may be that on the basis of the rarity of intervocalic laminal nasals, the words in examples (11a)–(11c) and (11e)–(11h) were treated as phonologically 'foreign' when they entered the pre-Lardil lexicon and thus, for whatever reason, were exempted from Apicalization.

[11] The reconstruction of ergative pronouns in older Tangkic is a new suggestion. Historical reconstruction is always subject to some uncertainly but here I find the evidence compelling, as follows. Proto Tangkic is reconstructed as a morphologically ergative language (Evans 1995). In modern Ganggalida, which is still ergative, the ergative and locative suffixes are homophonous and have a distinctive allomorphy, appearing as /-i/ after liquids and /-ki/ after the nasals /n ɳ ŋ/ (Keen 1983). This is precisely the allomorphy found on the modern Lardil nominative pronouns in examples (12g) and (12h) and (14a)–(14c). I reconstruct that before it became nominative, pre-Lardil had at least some ergative subject pronouns, and that these are retained now as nominatives. It should be noted that the pronouns of modern, (split-)ergative Ganggalida have a nominative–accusative morphological alignment, so that there are no ergative pronouns. Nevertheless, Tangkic pronouns on the whole have a simple, agglutinative structure [examples (12g) and (12h) and (14a)–(14c) are representative examples], meaning that the innovation of new forms would always have been relatively straightforward, and thus it would be quite unremarkable for either Lardil or Ganggalida to have historically gained or lost an ergative–absolutive component of their pronoun systems. I find no reason not to reconstruct ergative pronouns in pre-Lardil.

Apocope fails—front vowels;
in LOCATIVES (NKL 1996: 39, 66, 86):

(12)

		UR =	Surface	
a.	/t̪uŋal-**e**/	t̪uŋal**e**	'thing-LOC'
b.	/ket̪ar-**e**/	ket̪ar**e**	'river-LOC'
c.	/waŋalk-**e**/	waŋalk**e**	'boomerang-LOC'
d.	/ʈawun-**ɲe**/	ʈawunɲ**e**	'town-LOC'

in many historical LOCATIVE/ERGATIVES

	UR =	Surface		etymology	
e.	/ʟaŋuŋaɲc**i**/	ʟaŋuŋaɲc**i**	'Sydney Id.'	<*ɭa-ɲurŋaɲ-ci	'south-SIDE-LOC'
f.	/ʟiŋuŋaɲc**i**/	ʟiŋuŋaɲc**i**	'Wallaby Id.'	<*ɭi-ɲurŋaɲ-ci	'east-side-LOC'
g.	/ŋakur**i**/	ŋakur**i**	12.du. NOM	<*ŋa-ku-r-i	'1-incl-du-ERG'
h.	/ŋakul**i**/	ŋakul**i**	12.pl. NOM	<*ŋa-ku-r-i	'1-incl-du-ERG'
i.	/ʈicir**e**/	ʈicir**e**	'salty pool'	<*ʈicir-e	'salt pan-LOC'

in verbal NEGATIVES

	UR =	Surface	
j.	/putic-er**i**/	putic**ari**	'fall-NEGATIVE'
k.	/weʟec-er**i**/	weʟec**ari**	'throw-NEGATIVE'

in miscellaneous /i/-final stems

	UR =	Surface		etymology
l.	/maan**i**/	maan**i**	'money'	Recent loan (<English)
m.	/macic**i**/	macic**i**	'matches'	Recent loan (<English)
n.	/kamaraŋ**i**/	kamaraŋ**i**	subsection	Recent loan (<mainland)
o.	/puraʟaŋ**i**/	puraʟaŋ**i**	subsection	Recent loan (<mainland)
p.	/ʈumpajik**i**/	ʈumpajik**i**	'tobacco'	Recent loan (<mainland)
q.	/ŋuʟiŋuʟ**i**/	ŋuʟiŋuʟ**i**	'girls'	<*ŋuʟiwa-ŋuʟiwa
r.	/maalimaal**i**/	maalimaal**i**	'water beetles'	<*maalija-maalija
s.	/waɳ̪talŋ**i**/	waɳ̪talŋ**i**	'fish sp.'	proto Tangkic *waɳ̪talŋi(ʔi)

Stems ending in back vowels which fail to undergo Apocope are shown in examples (13).

Apocope fails—back vowels;
in miscellaneous /a/-final stems

		UR & Surface		etymology
(13)	a.	/pulak**a**/	'bullock'	Recent loan (< English)
	b.	/caat**a**/	'shirt'	Recent loan (< English)
	c.	/kucik**a**/	'initiation songs'	Recent loan (< mainland)
	d.	/ci-ɻak**a**/	'tree sp.'	not known
	e.	/kurij**a**/	'fish sp.'	not known
	f.	/murwaŋk**a**/	'gills'	not known
	g.	/ɲulaŋk**a**/	'bush sp.'	proto Tangkic
	h.	/culwak**a**/	'fish sp.'	proto Tangkic

in miscellaneous /u/-final stems

	UR & Surface		etymology
i.	/kalik**u**/	'calico, tarpaulin'	Recent loan (< English)
j.	/ku-ɻuṯ**u**/	'woman's dress'	Recent loan (< English 'clothes')
k.	/muruk**u**/	'spear thrower'	In proto Tangkic, may be re-borrowed[12]

In example (14) we see a set of bimoraic forms which fail to undergo Lowering. Again, these word forms were historically locative/ergatives. It should be emphasized though that they [as well as the forms in examples (12e)–(12h) above] are inconsistent with a synchronic analysis as locatives. The Lardil locative has altered its shape in the course of history, so that in modern Lardil a locative will always terminate either with /e/ or with a long vowel.

Lowering fails in several historical LOCATIVE/ERGATIVES:

		UR =	Surface		etymology	
(14)	a.	/ɲiŋk**i**/	ɲiŋk**i**	2 sg.NOM	< *ɲiŋ-ki	'2sg-ERG'
	b.	/pir**i**/	pir**i**	2 du.NOM	< *pi-r-i	'2nonsg-du-ERG'
	c.	/kil**i**/	kil**i**	3 pl.NOM	< *ki-l-i	'3nonsg-pl-ERG'
	d.	/wark**u**/	wark**u**	'in the daytime'	< *warku-u	'day-LOC'

In example (15) the final low vowel of a stem not only escapes Apocope, but also undergoes Raising from /a/ to /u/. In example (16) one lone stem, which is trimoraic, escapes Apocope and undergoes Lowering.

[12] That is, it may be a proto Tangkic word recently borrowed into Lardil from its Southern Tangkic neighbour, Yangkaal.

Raising of miscellaneous /a/-final stems.

		UR	Surface	
(15)	a.	/ɻuɻuk**a**/	ɻuɻuk**u**	'1st degree initiate'
	b.	/keṯuk**a**/	keṯuk**u**	'bird sp.'
	c.	/pulṯuuk**a**/	pulṯuuk**u**	'bird sp.'
	d.	/kuɳtuŋ**a**/	kuɳtuŋ**u**	'tree sp.'
	e.	/ṯuruŋk**a**/	ṯuruŋ**u**[13]	'cold'
	f.	/ɻulṯup**a**/	ɻulṯup**u**	'bird sp.'
	g.	/maɻkup**a**/	maɻkup**u**	'careful'
	h.	/ɻelkup**a**/	ɻelkup**u**	'smart'
	i.	/meralkup**a**/	meralkup**u**	'obedient'
	j.	/kaɽurp**a**/	kaɽurp**u**	'fish hook'
	k.	/juriṯuw**a**/	juriṯuw**u**	'stingray sp.'
	l.	/piiwu ~ piiw**a**/	piiw**u**	'hornet sp.'
	m.	/ŋiruku ~ ŋiruk**a**/	ŋiruk**u**	'necklace'
	n.	/kinuuwa ~ kinuw**a**/	kinuw**u**	'canoe'
	o.	/paɳkuw**a**/	paɳku ~ paɳkuw**u**	'snake sp.'
	p.	/pawuw**a**/	pawu ~ pawuw**u**	'pelican'

Lowering of one long, /u/-final stem:

		UR	Surface	
(16)	a.	/ʈanak**u**/	/ʈanak**a**/	'shell sp.'

In sum, although Hale's classic data set captures much of what is interesting about Lardil word final phonology, the full picture as presented here is more varied. There are laminals which appear finally in surface words, and there are stems which escape the effects of Apocope, and of Lowering. There are stems ending in /a/ which escape Apocope and instead undergo Raising, and one stem ending in /u/ which escapes Apocope but undergoes Lowering of a final vowel in a *tri*-moraic form.

5. Implications of the Revised Picture of Lardil's Word Final Phonology

The aim of this section is to consider the principal implications of the expanded Lardil data set introduced above. While it is beyond the scope of this paper to discuss implications for specific theoretical frameworks or individual analyses, important matters of theory will enter into the discussion.

Some readers will have noticed a similarity between the present paper and a paper by Blevins (2004), which called attention to previously overlooked data from Yokuts. Like Lardil, the Yakuts varieties are widely analyzed and cited in the phonological literature, and a central finding by Blevins is that the additional data removes the

[13] This form exhibits a sporadic change in Lardil of *ŋk > ŋ. For another example of the same change, see example (21e).

motivation for regarding key alternations in the language as phonological; rather they are best viewed as part of a complex morphological paradigm. As Blevins states, the Yokuts data

> highlight one of the most important questions for modern phonological theory. The question is not whether synchronic alternations are best captured in terms of rules or constraints but, rather, which synchronic alternations reflect pure knowledge of sound patterns and which are better expressed as learned relationships between stems or words (Blevins 2004: 50).

A crucial question here is whether the Lardil data presented above are of the same kind. Should the regularities established in Sections 2–4 be regarded as regularities of the sound pattern of Lardil (i.e. its phonology) or as regularities of its stems and words (i.e. its morphology)? Or, as one reviewer suggests, might they lie entirely outside a speaker's knowledge? A related question is, should we assume that Lardil's surface forms are listed, or are they generated online? We can begin most effectively with the last of these questions.

Whatever the answer to the first three questions, there is no reason to reject the possibility that Lardil's underlying forms and surface forms (inflected and uninflected) are all listed, and in fact there is good reason to suppose that they are. This does not entail, however, that their systematicity is not also represented in the phonology or morphology.

Recent research suggests that human language users memorize very large volumes of so-called exemplars of linguistic forms (Goldinger 1996; Johnson 1997). If this is the case, then a speaker would certainly have the memory capacity to retain all of Lardil's underlying and surface forms. Although we are familiar with the notion from early generative theory of underlying forms and generative rules obviating the need to store surface forms, it is important to remain clear that the goal of phonological theory is not to obviate the need for lists, but to insightfully express and relate sound patterns of natural languages. Indeed, during the past two decades, so-called declarative theories of phonology have gained prominence (classic Optimality Theory among them). In a declarative theory, earlier generative phonological derivations from /A/ to /B/ to [C] are recast as static correspondences that hold between different representations, {/A/, /B/, [C]} (Scobbie 1993; Mohanan 1995), and all of these representations may well be memorized [for arguments to this effect see Pierrehumbert (2003) regarding adult phonological behaviour, Ramus *et al.* (2010) regarding L1 acquisition and Round (2011) regarding diachronic change].

We can next ask whether the regularities in Sections 2–4 were part of speakers' knowledge at all. The evidence is clear that they were. The two lexemes in example (17) were borrowed into Lardil in the twentieth century, and both submitted to the kinds of alternations we saw above. Even though example (17b) receives two treatments (Apocope/Truncation in b.i. and Raising in b.ii), both are taken from the

suite of alternations in Sections 2–4. Were those alternations entirely beyond speakers' knowledge, this would not have happened.

			UR	Surface			
(17)	a.		/t̪arawat̪a/	t̪arawa	'trousers'	< English	[tɹawzəz]
	b.	i.	/kinuuwa/ }	kinuwu [kinuːwu]	'canoe'	< English	[kənuːw]
		ii.	/kinuwa/ }				

Given that the regularities in Sections 2–4 were part of speakers' knowledge, we can next ask whether they were part of the phonology. If they were not, then Lardil would have possessed a high number of morphological classes in which different correspondences held between uninflected surface forms and the bases to which inflections attach (i.e. what was referred to above as the underlying stem), a point argued at some length by Hale (1973). A small fraction of these classes, or conjugations, is shown in example (18).

A small sample of 'conjugations' under a morphological analysis

		Uninflected surface	Base for inflection		Uninflected surface	Base for inflection
(18)	a.	X	Xka	h.	Yka	Yka
	b.	X	Xku	i.	Yka	Yku
	c.	X	Xki	j.	Yke	Yki
	d.	X	Xŋka	k.	Yŋka	Yŋka
	e.	X	Xŋku	l.	Yŋka	Yŋku
	f.	X	Xŋki	m.	Yŋke	Yŋki

For X, a polymoraic string; Y a monomoraic string

For some theorists, the sheer number of conjugations required for a morphological analysis would make it an unfavourable option given the availability of a phonological alternative, but better evidence than numbers can be mustered in favour of the phonological analysis. One point to note regarding the conjugations in example (18) is that in examples (18a)–(18f) the string 'X' is necessarily polymoraic, while in examples (18h)–(18m) string 'Y' is monomoraic, and this is not merely an inert pattern in the data, for the loanword examples in (17) above both involve cases of words being assigned to an alternation which is appropriate to the stem's moraicity. Thus any descriptively adequate morphological analysis of Lardil will need to incorporate phonological information about moraicity. There is nothing inherently problematic with this, since we know that cross-linguistically, many morphological classes are subject to phonological restrictions, rather the concern is with just how detailed a phonological characterization each conjugation class will require, in order that we can account for the data. The more phonologically complete the characterization, the closer the morphological analysis comes to an analysis which in reality is phonological. To address this issue, consider again the loan 'canoe' [example (17b.ii)] repeated below as example (19a), which is incorporated into the Lardil lexicon as a stem which exhibits the Raising alternation. For speakers to have

assigned 'canoe' to this alternation, they will need to have paid attention not only to the moraicity of the stem but also to the quality of its final surface vowel, given that Raising involves a very restricted alternation, between surface /u/ and underlying /a/. Thus we must list moraicity and final vowel quality as phonological properties which any morphological analysis will need to be augmented with.

		UR	surface			
(19)	a.	/kinuwa/	kinuwu	'canoe'	< English	[kənʉː]
	b.	/t̪arawat̪a/	t̪arawa	'trousers'	< English	[tɹawzəz]
	c.	/wacpela/	wacpel	'white man'	< English	[wajt fɛla]
	d.	/waɬamaŋ**i**/	waɬama	'2nd degree initiate'	< Mainland	[waɭamaŋi]

Looking further, we see that for speakers to have assigned 'trousers' in example (19b) to an Apocope/Truncation alternation, they will need to have paid attention to the non-apicality of the penultimate segment, whereas to have assigned 'white man' in example (19c) to an Apocope/no-Truncation alternation they will need to have paid attention to the penultimate segment being apical. By this point our morphological analysis requires augmentation with phonological information about the final *two* segments of Lardil stems and their moraicity. The final straw is example (19d).

The cultural term /waɬamaŋi/ '2nd degree initiate' is borrowed from another indigenous language, most likely Ganggalida, possibly via Yangkaal.[14] For present purposes it is instructive because there happens to be no other attested Lardil stem which exhibits precisely the alternation between final /ŋi/ and zero. Assuming that our record of the Lardil lexicon is representative, this has the consequence for our morphological analysis that when speakers nativized example (19d) as they did, they needed to look not only at existing conjugations, but to build a new one, on the basis solely of the phonological properties of existing conjugations. Precisely this kind of productive use of knowledge about sound patterns is what justifies a phonological analysis; for any 'morphological' analysis to possess the properties that we require of it for Lardil, it will need to be augmented by a full-blown, productive phonological analysis anyway.

Having established that the Lardil data do require a phonological analysis, let us now return to the general requirements which any such analysis will need to meet. In much previous research, the processes of Augmentation, Lowering, Apocope, Cluster reduction, Non-apical truncation and Apicalization (or Laminalization) were understood to be general processes of Lardil phonology. In light of the new data presented above, our picture of Augmentation, Lowering (as applicable to bimoraic underlying forms) and Cluster reduction remains unchanged, as does our picture of Non-apical truncation insofar as it applies to velar and labial consonants—we could

[14] The source language was most likely the adjacent mainland language Ganggalida, whose form was [waɭamaŋi] or [walamaŋi] [Keen (1983), with some uncertainty regarding Keen's transcriptions of retroflexion], though the word may have travelled via Yangkaal, in which a corresponding form was very likely present, but was not recorded.

call this Non-coronal truncation, in distinction from Laminal truncation. Likewise, the surface demands on Lardil words, that they not end with complex codas, or with non-coronal consonants remain in force.

What must change is our view of Apocope, Apicalization, and Laminal truncation, and our view of what happens to underlying forms which end in laminal consonants, or to trimoraic and longer underlying forms which end in vowels. We now know that these classes of forms undergo different processes on a lexically idiosyncratic basis. Nevertheless, and despite the idiosyncrasy regarding which pattern a stem will follow, the patterns themselves are tightly constrained, both in number and in form. Vowels only ever apocopate, or undergo a change in height. Underlying final laminals apicalize or truncate, but they never survive at the surface—even if certain, underlyingly *non*-final laminal consonants do surface in word-final positions. Nor is the existence in Lardil of idiosyncrasy regarding which pattern a stem will follow any surprise. A significant volume of evidence has been amassed over the past decades pointing to similar kinds of idiosyncrasy in the sound pattern of languages throughout the world (Booij 2000; Albright 2008). If anything, the evidence now points to it being the norm for a language's phonology to be sensitive to at least some morphological subclasses of forms. A theory of phonology which tolerates only complete regularity is at odds with the typological data. We can therefore view Lardil as a normal language in terms of its possession of a degree of idiosyncrasy in its phonology; what remains unusual and striking is the complexity of the relationships between underlying forms and surface forms, an issue which is orthogonal to idiosyncrasy.

6. Time Depth and Synchronic Activeness of Word Final Processes in Lardil

Some words are warranted regarding the time depth of Lardil's phonological complexities. The pattern of variation, according to which some stem final laminals undergo Apicalization and some undergo Truncation, has significant time depth. Cognate variations turn up in Kayardild and Ganggalida: certain nominal-stem final laminals can be either Apicalized or Truncated [example (20a)], while verb-stem final laminals can be Truncated, but not Apicalized [example (20b)]. The existence, and basic pattern, of Lardil's twin strategy for dealing with stem final laminals can therefore be reconstructed right back to proto Tangkic.

			UR	Surface (Truncation)	Surface (Apicalization[15])
(20)	a.	Kayardild nominal suffixes	ʈaŋka-palaʈ̪ 'man-PLURAL'	ʈaŋkawala	ʈaŋkawalata
			ʈaŋka-karaɲ 'man-GENITIVE'	ʈaŋkakara	ʈaŋkakaranta
	b.	Ganggalida verbs	kuric 'look(INDICATIVE)'	kuri	—
			warac 'go(IMPERATIVE)'	wara	—

[15] In Southern Tangkic languages, augmentation also applies in these cases.

Turning next to Lardil's cases of Raising in example (15), whatever the precise historical origins of this alternation, its seeds had likewise already been sown by the time of proto Tangkic. Although none of the Southern Tangkic languages retain stem final 'raising /a/', a dozen or so cognates can be identified across the modern languages in which Lardil's raising /a/ corresponds to Southern Tangkic /a/ [examples (21a)–(21c)], or to Southern Tangkic /u/ [examples (21d) and (21e)], or in which Lardil's non-raising /a/ corresponds to Southern Tangkic /u/ [example (21f)], or in which Lardil's non-truncating /u/ corresponds to Southern Tangkic /a/ [example (21g)]. Precisely which vowel the 'raising /a/' of proto Tangkic actually rose to is unclear;[16] it is indicated in example (21) by 'U'.

				proto Tangkic	Lardil	Kayardild	Ganggalida
(21)	a.	UR	*keṯuka	'bird sp.'	keṯuka	kaṯuka	
		Surface	*keṯukU		keṯuku	kaṯuka	
	b.	UR	*l̪ul̪uka	'initiate'	l̪ul̪uka		l̪ul̪uka
		Surface	*l̪ul̪ukU		l̪ul̪uku		l̪ul̪uka
	c.	UR	*kantuŋka	'bird sp.'	kantuŋka	kantuŋka	kantuŋka
		Surface	*kantuŋkU		kantuŋu[17]	kantuŋka	kantuŋka
	d.	UR	*pulṯu(ː)ka	'bird sp.'	pulṯuːka	pulṯuku	
		Surface	*pulṯu(ː)kU		pulṯuːku	pulṯuku	
	e.	UR	*kuɳtuŋka	'tree sp.'	kuɳtuŋa[17]	kuɳtuŋku	
		Surface	*kuɳtuŋkU		kuɳtuŋu[17]	kuɳtuŋku	
	f.	UR	*wulunka	'bush sp.'	wulunka	wulunku	
		Surface	*wulunkU		wulun	wulunku	
	g.	UR	*ŋul̪iwa	'girl'	ŋul̪iwu	ŋul̪iwa	
		Surface	*ŋul̪iwU		ŋul̪iwu	ŋul̪iwa	

Finally, proto Tangkic had its own process of Apocope, though the old process of Apocope only applied to the final, low back /a/ vowel (Round 2010). As in Lardil, it probably never applied to bimoraic words. In pre-Lardil we know that most word final /u/ vowels became /a/; we see this reflected in the Lowering data in example (4), and in the lone case of example (16). In longer words, it is almost certainly the case that this newly lowered /a/ ($<$ */u/) then succumbed to Apocope too. It is also probably the case that underlying final /i/ vowels in Lardil only succumbed to Apocope at some later stage, since no sound change ever lowered them to /a/.[18] Connected to this, it appears that certain suffixed forms ending in /i/, most notably locative/ergatives, simply never joined the Apocope alternation.

If the complexities of Lardil do possess a time depth the order of which the evidence strongly points to, then there are ramifications for our understanding of the

[16] It may for example have been [o], a quality which arose out of an earlier and less pronounced coarticulation with the preceding consonant, which is always velar or labial.

[17] Word form also exhibits a sporadic change in Lardil of *ŋk $>$ ŋ, cf. also example (15e).

[18] Actually there is one small exception. Low front */e/ vowels, some of which had descended from proto Tangkic */i/, backed to /a/ in the context of a preceding laminal consonant in late pre-Lardil. A synchronic reflex of this alternation can be seen in the underlying /e/ $\sim$ surface /a/ vowel of the negative suffix in examples (12j) and (12k).

nature of lexical idiosyncrasy in the language, as discussed above. That is, we must recognize that for the entire history of Lardil's Apocope and Truncation rules, there have been exceptions; these processes have never been exceptionless. It would be wrong for example, to imply that they are exceptional in modern Lardil because they have become 'fossilized' or some such. Rather, these are active processes which were born, and have survived, with exceptions intact. We saw above that the twentieth century borrowing of English 'canoe' received two different phonological treatments; the word 'trousers' /t̪arawat̪a/ was subjected to Apocope and Truncation, and yet English 'clothes' /ku-l̪ul̪u/ [cf. example (13j)] was not. This is unlikely to reflect Lardil's then-impending extinction, but rather the normal state of the language, one characterized by constrained lexical idiosyncrasy which any future formal analysis must grapple with.

7. Conclusions

Lardil is empirically more complex than previously thought. Processes such as Truncation and Apocope exhibit a degree of constrained lexical idiosyncrasy, of a kind which is highly systematic, demonstrably phonological, and which claims a long diachronic pedigree. Any future formal analysis of the language must account not only for processes which both are, and are not, motivated by demands on surface forms, but also for the existence of multiple, active patterns, applying selectively throughout the lexicon.

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Appendix

The list in (22) repeats stems cited above, together with inflected forms which provide evidence for the stems' underlying shape. The sources are NKL 1996 and Hale (1973), with page numbers indicated in the far right column. 'Not available' (n/a) is shown in cases where the underlying stem form is cited in Hale's (1981) unpublished dictionary draft, but neither NKL 1996 nor Hale (1973) provides explicit evidence for it. We can reasonably assume that Hale only listed such forms where evidence was available to him, however the precise whereabouts of that evidence within Hale's several hundred pages of Lardil field notes is not currently known. Page numbers in parentheses are given when Hale (1973) explicitly mentions an underlying form, but does not provide further evidence. Note that in some cases the inflected forms in (22) cited from NKL 1996 exhibit the effects of attrition, which deletes final /n/ from OBJECTIVE suffixes, /r/ from the NONPAST and /ɻ/ from the FUTURE.

	Ex.	Stem UR	Inflected surface form	gloss	NKL 1996/ Hale 1973
(22)	3a.	/ʈer/	ʈer-in	'thigh-OBJECTIVE'	NKL: 32
	3b.	/ɻil/	ɻil-e	'neck-LOCATIVE'	NKL: 157
	3c.	/maɻ/	maɻ-e	'hand-LOCATIVE'	NKL: 167
	3d.	/wun/	wun-kuɻ	'rain-PROPRIETIVE'	NKL: 233
	3e.	/kaɳ/	kaɳ-ŋe	'grass-LOCATIVE'	NKL: 39
	3f.	/jak/	jak-e	'fish-LOCATIVE'	NKL: 39
	3g.	/ɻelk/	ɻelk-e	'head-LOCATIVE'	NKL: 138
	3h.	/ʈurk/	ʈurk-in	'black-OBJECTIVE'	NKL: 76
	3i.	/kaŋ/	kaŋ-in	'speech-OBJECTIVE'	NKL: 119
	3j.	/ɻu/	ɻu-jin	'fat-OBJECTIVE'	NKL: 33
	4a.	/penki/	penki-ŋa	'lagoon-NONPAST'	NKL: 66
	4b.	/cimpi/	cimpi-n	'tail-OBJECTIVE'	NKL: 72
	4c.	/ŋuku/	ŋuku-n	'water-OBJECTIVE'	NKL: 199
	4d.	/kaʈu/	kaʈu-kan	'child-GENITIVE'	NKL: 170
	4e.	/kela/	kela-ɻ	'beach-FUTURE'	NKL: 170
	4f.	/cempe/	cempe-kan	'mother's father-GEN.'	NKL: 41
	5a.	/kaŋkaɻi/	kaŋkaɻi-kan	'father's father-GENITIVE'	NKL: 41
	5b.	/jalulu/	jalulu-n	'fire-OBJECTIVE'	NKL: 32
	5c.	/majara/	majara-	'rainbow-OBJECTIVE'	NKL: 170
	5d.	/wiʈewiʈe/	wiʈewiʈe-	'open sea-FUTURE'	NKL: 232
	6a.	/waŋalk/	waŋalk-in	'boomerang-OBJECTIVE'	NKL: 33
	6b.	/cilwirk/	cilwirk-e	'wet-LOCATIVE'	NKL: 138
	6c.	/makark/	n/a	'anthill'	
	6d.	/jukarpa/	jukarpa-ŋa	'husband-NONPAST'	NKL: 240
	6e.	/karwakarwa/	karwakarwa-n	'tree sp.-OBJECTIVE'	H: 424
	6f.	/kantukantu/	kantukantu-n	'red-OBJECTIVE'	H: 424
	6g.	/kiruɻʈa/	n/a	'bird sp.'	
	7a.	/kurkaŋ/	kurkaŋ-in	'corm sp.-OBJECTIVE'	NKL: 217
	7b.	/ʈaŋkuŋ/	ʈaŋkuŋ-i	'oyster sp.-OBJECTIVE'	NKL: 110
	7c.	/ɲiriɻiŋ/	ɲiriɻiŋ-ku	'downwards-FUTURE'	NKL: 206
	7d.	/ŋaluk/	ŋaluk-in	'story-OBJECTIVE'	NKL: 189
	7e.	/murrkunima/	murrkunima-n	'nulla-nulla-OBJECTIVE'	NKL: 32
	7f.	/ʈulɳuka/	ʈulɳuka-n	'fish sp.-OBJECTIVE'	NKL: 58

7g.	/waɻamaŋi/	waɻamaŋi-ɻi	‘initiate-FACTATIVE’	NKL: 224
7h.	/ʈarawaʈa/	ʈarawaʈa-wer	‘trousers-PRIVATIVE’	NKL: 188
7i.	/muŋkumuŋku/	muŋkumuŋku-	‘axe-PROPRIETIVE’	NKL: 179
7j.	/cumpucumpu/	cumpucumpu-n	‘dragonfly-OBJECTIVE’	H: 425
11a.	/kakawuɲa/	n/a	‘bird sp.’	
11b.	/puɳʈuɲca/	n/a	‘tree sp.’	(H: 439)
11c.	/paɲapaɲa/	paɲapaɲa-n	‘blossom-OBJECTIVE”	NKL: 59
11d.	/kulkic{i ∼ a}/	n/a	‘shark sp.’	
11e.	/piɳʈaɲi/	piɳʈaɲi-	‘rainbow-OBJECTIVE’	NKL: 74
11f.	/paljariɲ{i ∼ a}/	n/a ∼ paljariɲa-	‘subsection-FUTURE’	NKL: 57
11g.	/paŋaɻiɲi/	n/a	subsection name	(H: 435)
11h.	/palaaɲa/	palaaɲa-ɻ	‘fish sp.-FUTURE’	NKL: 55
12e.	/ɻaɲuŋaɲci/	n/a	‘Sydney Id.’	
12f.	/ɻiɲuŋaɲci/	n/a	‘Wallaby Id.’	
12i.	/ʈicire/	n/a	‘salty pool’	
12l.	/maani/	maani-wu	‘money-FUTURE’	NKL: 161
12m.	/macici/	macici-n	‘matches-OBJECTIVE’	NKL: 162
12n.	/kamaraŋi/	n/a	subsection	(H: 435)
12o.	/puraɻaŋi/	n/a	subsection	(H: 435)
12p.	/ʈumpajiki/	ʈumpajiki-n	‘tobacco-OBJECTIVE’	NKL: 95
12q.	/ŋuɻiɲuɻi/	n/a	‘girls’	
12r.	/maalimaali/	n/a	‘water beetles’	
12s.	/waɲʈalŋi/	waɲʈalŋi-n	‘fish sp.-OBJECTIVE’	NKL: 224
13a.	/pulaka/	pulaka-n	‘bullock-OBJECTIVE’	NKL: 187
13b.	/caata/	caata-wer	‘shirt-PRIVATIVE’	NKL: 188
13c.	/kucika/	n/a	‘initiation songs’	
13d.	/ciɻaka/	ciɻaka-n	‘tree sp.-OBJECTIVE’	NKL: 107
13e.	/kurija/	kurija-n	‘fish sp.-OBJECTIVE’	NKL: 145
13f.	/murwaŋka/	murwaŋka-puri	‘gills-INTRANS.ABLATIVE’	NKL: 181
13g.	/ɲulaŋka/	ɲulaŋka-n	‘bush sp.-OBJECTIVE’	NKL: 207
13h.	/culwaka/	culwaka-n	‘fish sp.-OBJECTIVE’	NKL: 110
13i.	/kaliku/	kaliku-ɻ	‘calico-FUTURE’	NKL: 55
13j.	/kuɻuʈu/	kuɻuʈu-wer	‘dress-PRIVATIVE’	NKL: 145
13k.	/muruku/	muruku-	‘spear thrower-FUTURE’	NKL: 132
15a.	/ɭuɻuka/	ɭuɻuka-ɻi	‘initiate-FACTATIVE’	NKL: 158
15b.	/keʈuka/	keʈuka-n	‘bird sp.-OBJECTIVE’	H: 446
15c.	/puɭʈuuka/	puɭʈuuka-n	‘bird sp.-OBJECTIVE’	H: 446
15d.	/kuɳʈuɲa/	kuntuɲa-	‘tree sp.-FUTURE’	NKL: 143
15e.	/ʈuruŋka/	ʈuruŋka-ɻ	‘cold-PROPRIETIVE’	NKL: 217
15f.	/ɻuɭʈupa/	n/a	‘bird sp.’	
15g.	/maɻkupa/	maɻkupa-	‘careful-INCHOATIVE’	NKL: 167
15h.	/ɻelkupa/	ɻelkupa-ɻi	‘smart-FACTATIVE’	NKL: 154
15i.	/meralkupa/	meralkupa-ɻi	‘obedient-FACTATIVE’	NKL: 172
15j.	/kaʈurpa/	kaʈurpa-ŋun	‘fish hook-COMITATIVE’	NKL: 122
15k.	/juriʈuwa/	n/a	‘stingray sp.’	
15l.	/piiw{u ∼ a}/	piiwu-n ∼ NA	‘hornet sp.-OBJECTIVE’	NKL: 67
15m.	/ŋiruku{u ∼ a}/	n/a	‘necklace’	
15n.	/kinu(u)wa/	kinuwa-ɻ	‘canoe-PROPRIETIVE’	NKL: 129
15o.	/paɳkuwa/	n/a	‘snake sp.’	
15p.	/pawuwa/	n/a	‘pelican’	(H: 439)
16a.	/ʈanaku/	ʈanaku-ɻ	‘shell sp.-PROPRIETIVE’	NKL: 85
19c.	/wacpela/	wacpela-kan-wer	‘white man-GENITIVE-PRIVATIVE’	NKL: 91