Language in India www.languageinindia.com ISSN 1930-2940 Vol. 23:11 November 2023

Malayalam Tense Morphology: A Reanalysis Using Distributed Morphology Lens

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Abstract

Malayalam roots undergo two kinds of allomorphy in the context of past and non-past tense morphology: - (i) the inflectional tense affixes, and (ii) the verbal stems that select for said inflections. Contemporary accounts to theorise this distribution yielded little to no parsimony. Adapting Lieber's morpho-lexical rules to Malayalam, Madhavan's lexical model considers all the stems of word formation to be stored in the permanent lexicon, with the affixes subcategorising for their respective stems. Since this stem storage model of the lexicalist framework is not only expensive on the mental grammar but also fails to distinguish between the stem and affix allomorphy, this paper reanalyses the facts of the Malayalam tense under Distributed Morphology (DM).

Two main characteristics of DM motivate the reanalysis of the Malayalam tense: First, unlike Lieber's lexicalist framework, the hierarchical configuration of the word is determined by the syntax and not by the subcategorisation frames of the affixes. This allows for the use of the same phonological form across syntactically different forms. Second, DM makes a clear distinction between the rules that trigger the phonological alteration of the affixes, namely Vocabulary insertion rules, and Readjustment rules. Readjustment rules are phonological in nature but also make reference to both the morpho-syntactic features and the identity of particular roots (Halle & Marantz, 1993). Thus, what was seen as arbitrary increments in the Lexicalist model on the stem could be reanalysed as different phonological changes applying to their respective lists of roots.

1 Facts at Hand: Tense in Malayalam

1.1 Past

Traditional grammarians claimed that the Malayalam past tense has [tu] as its underlying form with 11 other surface forms such as Table (1) below:

Verb (Inf)	Past
nalk.uka	nal**ki**
iraɳ.uka	ira**ŋi**
cutt.uka	cu**tti**
eḍukk.uka	eḍu**ṯṯu**
vilk.uka	vi**t't'u**
peyy.uka	pey**ḏu**
viḍ.uka	vi**ʈʈu**
vekk.uka	ve**ccu**
ali(y).uka	ali**ɲɲu**
koɭ.uka	ko**ɳḍu**
ve:v.uka	ve**ɳḏu**

Table 1: Past in Malayalam

Other traditional analyses have attempted a classification of verbs into verb classes based on the forms of their past tense alternations (Pillai, 1965). However, a lexicalist account of the same proves these claims to be fallacious (Madhavan, 1983). Based on the lexicalist application of morpho-lexical rules (Lieber, 1980), Madhavan makes two notable claims: (i) He argues that the consonant that accompanies [u] in PST is not part of the past tense allomorph; and (ii) He further shows that the formative has a much larger role to play in word-formation in general. The fact that the consonant does not contribute to the expression of past-ness has also been testified in recent studies (Swenson et al., 2017). In her morpho-semantic analysis of the Malayalam verb, Swenson points out that the fact that the same stem is used for even conjunctive participles to give non-past interpretations shows that the change in the stem is semantically vacuous.

Though the notion of extensive alternation of the past tense does not hold water anymore, Pillai's list of 2880 verbs (a list that covers Sanskrit loan verbs, compound verbs and denominals) based on the traditional account of tense are useful in that it identifies a strong correlation in the Malayalam verbs between the nature of their stems and their past tense allomorphs. A sample of the list of verb classes by Pillai is as in Table (2) below:

Root	Gloss	Past	List
ceyə	do	ceyʇ.u	1
uɳ	dine	uɳɖ.u	2
iɖə	put	iʈ̪.u	3
aɖi	hit	aɖiɲɲ.u	4
puɾaɭ	roll	puɾaɳɖ.u	5
akaɹə	widen	akann.u	6
amarə	sit	amann.u	7
etir	oppose	etirʈ̪.u	8
ke:ɭ	listen	ke:ʈ̪.u	9
aɖə	shut	aɖacc.u	10
ɾasə	frolick	ɾasicc.u	11
nilə	stand	nilann.u	12
a:ɖə	sway	a:ɖi.ɸ	13
o:	aim	o:ŋŋi.ɸ	14
tu:	hang	tukki.ɸ	15
kiɖa	lay	kiɖaʈ̪.ɸ	16

Table 2: Pillai's verb classes

Drawing heavily on Lieber's Lexicalist hypothesis that assumes that it is not just the affixes that alternate, but also the stems, Madhavan sets up different classes of stems for various word formation processes. The stem classes are formed with respect to the various word formation processes it derives. The characteristic property of morpho-lexical rules is that they are not category changing but define a pair of lexical items with respect to their shared likeness, therefore belonging to the same class. These morpho-lexical rules only pertain to the 'existing variant forms of lexical items' (Aronoff, 1994).

Madhavan draws up multiple paradigms, each based on a stem form and its respective word formation processes. For instance,in the Table (3) below, Stem-B which comprises of the root and the phonological variants of /t/̪ are said to be listed in the permanent lexicon because he considers them, not as past tense markers, but as stem augments for several word formation processes.

Root	Gloss	Stem-B	Past	Adjective	Perfective
karu	blacken	karu.ʈ̪	karuʈ̪.u	karuʈ̪.a	karuʈ̪.iʈʈə
para	fly	para.n̪n̪	paran̪n̪.u	paran̪n̪.a	paran̪n̪.iʈʈə
ni:l	lengthen	ni:.nʈ	ni:nʈ.u	ni:nʈ.a	ni:nʈ.iʈʈə
taʈi	fatten	taʈi.cc	taʈicc.u	taʈicc.a	taʈicc.iʈʈə

Table 3: Madhavan's Lexicalist model

Madhavan illustrates how there is no systematic selectional criteria for a stem, given a word formation process (Examples 22, 23 in his book). The items in a given stem class are determined by the nature of their derivations. To elaborate, consider Stem-B in Table (3). The stem-B is evidently built on the root and additionally contains formatives that determine inflectional processes such

as the formation of past and derivational processes such as the formation of attributive adjectives. Madhavan emphasises that it is not possible to predict which stem is selected for a given word-formation process and that this information too must be specified in the lexicon. This is illustrated with clarity in Table (4):

Root	**Gloss**	**Stem-B**	**Past**	**Adjective**	**Stem-C**	**Nominal**
kura	less	kuraɲɲ-	kuraɲɲ.u	kuraɲɲ.a	kurak'k'-	kura.wə
aʈaŋ	cool down	aʈaŋŋi-	aʈaŋŋi.ɸ	aʈaŋŋi.a	aʈakk-	atakk.am

Table 4: Arbitrary stem selection in Lexicalist model

This means that the stem classes do not hold a watertight correspondence with the respective word formation processes. Notice how the nominal in the first case in the above example takes the root as its stem while the nominal in the second case takes Stem C. In order to justify this arbitrariness, this lexicalist hypothesis-based subcategorisation proposes a listing of all the stems in the permanent lexicon. By assuming that all the stems that facilitate word formations ought to be recorded in the permanent lexicon, one also ignores the phonological likeness of the root with its subsequent stems. Under this assumption, every root, stem and affix will be stored as equal and independent items in the permanent lexicon.

One of the most glaring problems with the morpho-lexical treatment of roots is that it proposes a system that puts a heavy cognitive load on the mind. That is, lexically listing such a large number of stems not only overlooks the morpho-phonological similarity that some stems share but is also in conflict with the idea of parsimony in mental grammar. Another reason why we found Madhavan's treatment of stem alternation to be unconvincing is the fact that it views each cyclic operation of the same word formation rule (example: tense inflection) as an independent process, each requiring their own stems in the permanent lexicon. This not only throws out the window the principle of economy, but also overlooks the scope for bundling together what is practically the same process. Madhavan's classification is therefore not only descriptively inad- equate but also fails to provide a theoretically sound justification as to how the lexical domainsof stem-B and stem-C are defined, thereby making the system seem further opaque.

Stem storage theories fail to account for several questions about the distribution of the stems and the nature of the relationship of the stems with one another (Embick & Halle, 2005). Madhavan's model is a case in point for this claim. For instance, the idea that all the stems are stored in the lexicon begs the following question: Was stem C derived from Stem A or from Stem B or theroot? Lexicalist theories are yet to approach these issues with clarity.

1.2 Non-past

In Madhavan's lexicalist analysis of the Malayalam verb stems, he crucially takes note of the pe-culiar alternation of verbs between (i) the stems that take a /kk/ augment in order to facilitateinflectional affixation, and (ii) stems that don't take the augment /kk/ prior to inflection. Though the nomenclature of accounts varied, this peculiar alternation was recorded even in early

Malayalam grammars (Gundert, 1868) (Varma, 2006). The verbs that selected /kk/ after its root and the ones that didn't were identified as strong and weak verbs respectively by Gundert. Varma named the same alternation *kaarita* and *akaarita* verbs. Madhavan considers the *kaarita*/ *akaarita* alter- nation to be a property that is realised in the form of a feature metric with binary values ±k forall verbs in Malayalam.

Using /kk/ as a diacritic feature with binary values, Madhavan claims one way to treat this would be to consider that the attachment of /kk/ is detemined by the phonological nature of the suffix that will be attached. According to this, /kk/ occurs only in a case where the root in question is attached to a vowel initial suffix. Example (1) illustrates this:

(1) taɳu.**kk**.um
chill.FUT
(2) taɳu.**kk**.unnu
chill.PRS

However, this contradicts Madhavan's own generalisations that follow later in his work. He concludes that the past tense alternants in Malayalam are [ɸ] and [u] excluding the phonologically conditioned consonants, i.e, the /t̪/ variants. This means that one of the past tense alternantsis vowel initial. However, we never see the presence of /kk/ on stems of either of the past tensealternants.

(3) a. paɖi.ɸ
sing.PST
b. *paɖi**kk**. ɸ
sing.PST
(4) a. van̪n̪u
come.PST
b. *van̪n̪.**kk**u
come.PST

Examples (3)b and (4)b indicate that the /kk/ augment is disallowed with both the alternants of past, namely, [ɸ] and [u] despite one of them satisfying the structural description stated by Madhavan. Thus, these contradictory facts warrant a revision of explanation of the role of ±k feature in Malayalam verbs. Given the above situation which clearly indicates that the ±k feature operates only in the context of the present and future tense and never in the context of past, it may be the case that the morphological behavior of the non-past in Malayalam systematically differs from that of the Past. However, the arguments about the past and non-past distinction still say little about the notion of the ±k feature being an exclusive property of the verbs.

Treating /kk/ as an intrinsic property of some verbs will be a gross misgeneralisation as such an assumption will imply that the ±k feature occurs in the stem of all and only concatenations

of verbs. It seems like this notion too may be problematic as the ±k feature which dispenses the /kk/ augment applies not only to verbs but also to a host of other word formation processes. This is evident from the table below:

Root	Gloss	±K	Present	Future	Infinitive	Imperfective	Gerund
eɖu	pick	+k	eɖu.kk.unnu	eɖu.kk.um	eɖu.kk.uka	eɖu.kk.uka(y)a:ɳə	eɖu.kk.al
a:ɖə	sway	-k	a:ɖ.unnu	a:ɖ.um	a:ɖ.uka	a:ɖ.uka(y)a:ɳə	a:ɖ.al

Table 5: Non-past stems

In other words, not only do the roots show syncretism, but it is also the case that there are two different cases of syncretism at work here: the roots exhibit a different phonological configuration for non-past than that of the past.

2 DM Analysis of the Malayalam Tense

2.1 The Past in DM

In the DM framework, the past tense alternation may be reexamined as context-dependent allomorphs that compete for insertion into morpheme PST as Vocabulary Item, since they are not 'matched' on the basis of their morpho-syntactic feature complexes, but on the basis of their environmental specifications. Under this DM treatment, the rules may be written as follows:

(1) a. T[past] ↔ ɸ/v___[v Є List 13…16]
b. T[past] ↔ u/ v___[elsewhere]

The above rules state that both the Vocabulary Items have the same morpho-syntactic specifications PST, albeit, differing in their environments of application. These environments are defined on the lines of the Pillai's verb classes.

Pillai's classification, though designed strictly for pedagogical purposes, can be used in the lexical listing of roots because the verb classes directly correspond to the different stem extenders selected by the respective roots. The Subset Principle operates in the ordering of the Vocabulary Insertion rules in the examples below as the more specific and restricted application of [ɸ] precedes the broader application of the [u]. The table below repeat some examples from Pillai's classification to exemplify the past tense alternation of the affixes.

Root	Gloss	Past	List
a:ɖə	sway	a:ɖi.ɸ	13
o:	aim	o:ŋŋi.ɸ	14
tu:	hang	tukki.ɸ	15
kiɖa	lay	kiɖatṯ.ɸ	16
ceyə	do	ceyḏ.u	1

uɳ	dine	uɳɖ.u	2
iɖə	put	iʈʈ.u	3
aɖi	hit	aɖiɲɲ.u	4
puɾaɭ	roll	puɾaɳɖ.u	5
akaɹə	widen	akann.u	6
amaɾə	sit	amann.u	7
etir	oppose	etirʈ̪.u	8
ke:ɭ	listen	ke:ʈʈ.u	9
aɖə	shut	aɖacc.u	10
ɾasə	frolick	ɾasicc.u	11
nilə	stand	nilann.u	12

Table 6: Past in Distributed Morphology

Having eliminated the intermediate level of 'stems', any changes that do not belong to thephonological identity of affixes, belong to the lexical morphemes, i.e, roots. The consonant that immediately precedes [u] is not part of the past tense morpheme (henceforth called /t/) but a formative that applies to word formation at large. Therefore, the formative has to do with the phonological identity of the root.

Unlike the Vocabulary Insertion Rules that we find in (5) in which all the alternants are competing for the same morpho-syntactic position, Readjustment rules operate on multiple terminal elements, with their application constrained only by the phonological alteration they cause on the respective root.

Given the distinction of the Vocabulary Insertion rules and Readjustment rules, we can estab lish that the following as Readjustment Rules:

(2) a. /ɸ/ –> /ʈ̪/ / X___Y[past], where X = v, v Є List 1
b. V_ –>/ɳɖ/ / X___Y[past], where X = v, v Є List 2
c. C_–>/ɳɖ/ / X___Y[past], where X= v, v Є List 2
d. /ɖ/–>/ʈʈ/ / X___Y[past], where X = v, v Є List 3
e. /ɸ/–>/ɲɲ/ / X___Y[past], where X = v, v Є List 4
f. /ɭ/–>/ɳɖ/ / X___Y[past], where X = v, v Є List 5
g. /ɹ/–>/ɳɳ/ /X___Y[past], where X = v, v Є List 6
h. /ɾ/–>/ɳɳ/ / X___Y[past], where X = v, v Є List 7
i. /ɸ/–>/tʈ̪/ /X___Y[past], where X = v, v Є List 8
j. /ɭ/–>/t't'/ / X___Y[past], where X = v, v Є List 9
k. /l/–>/ t't'/ / X___Y[past], where X = v, v Є List 9
l. V_–>/cc/ / X___Y[past], where X = v, v Є List 10
m. C_–>/icc/ / X___Y[past], where X = v, v Є List 11
n. /ɸ/–>/ɳɳ/ /X___Y[past], where X = v, v Є List 12
o. /ɸ/–>/i/ / X___Y[past], where X = v, v Є List 13

p. /ɸ/–>/ŋŋi/ / X___Y[past], where X = v, v Є List 14
q. /ɸ/–>/kki/ / X___Y[past], where X = v, v Є List 15
r. /ɸ/–>/tʈi/ /X____Y[past], where X = v, v Є List 16

The roots in the respective lists do not share any natural class despite their phonological similarity. It is also clear that there is no phonological correlation between the nature of the root and the respective past tense affix it selects. Therefore, it may be assumed that Pillai's classification is purely morphologically conditioned. For this reason, we will have to presently overlook this accidental likeness among the formatives.

However, recalling Madhavan's subcategorization of stems for multiple word formation processes, it can be seen that the readjustment rules in (6) apply to morpho-syntactically heterogeneous environments. This point is clearly illustrated in Table (7) below:

Thus, applying a DM analysis to past observations and generalisations, we came to the conclusion that the past tense alternations are, contrary to traditional notions, only two in number. The roots on the other hand, display extensive variation and serve as building blocks for several word formation processes, with past tense being one among them.

From the table above, it is evident that the formatives introduced by the Readjustment Rules operate on not only the morpho-syntactic terminal nodes with the feature complexes of past, but also other word derivations such as participles, adjectives and perfectives, thereby displaying a classic case of syncretism which Readjustment Rules are best designed to handle.

2.2 Non-past in DM

Recalling from the previous section the presence of a *kaarita*/ *akaarita* property (Madhavan, 1983),its realisation in the form of a binary ±k feature on non-past tense inflections, and our observationof how this feature is realised on roots prior to other word formation processes, the readjustment rules proposed are the following:

(1) ɸ/–>/ kk // X___Y[PRS/FUT], where X = v, v Є [List 8…List 12]

What was previously understood as *kaarita* roots are treated here as a readjustment rule that adds the augment /kk/ root finally. Since the *akaarita* roots are basically just roots that do not undergo any changes in their phonological identity, they are the default case and therefore do not require any rule. The table below shows a sample of all the lists and the general configuration of the respective roots in non-past.

Root	Gloss	Present	Future	Imperfective	Infinitive	Gerund	List
ceyyə	do	ceyy.unnu	ceyy.um	ceyy.uka(y)a:ɳə	ceyy.uka	ceyy.al	1

kaːɳ	see	kaːɳ.unnu	kaːɳ.um	kaːɳ.uka(y)aːɳə	kaːɳ.uka	kaːɳ.al	2
iɖə	put	iɖ.unnu	iɖ.um	iɖ.uka(y)aːɳə	iɖ.uka	iɖ.al	3
aʈi	settle	aʈi.unnu	aʈi.um	aʈi.uka(y)aːɳə	aʈi(y).uka	aʈi.al	4
varaɭ	dry	varaɭ.unnu	varaɭ.um	varaɭ.uka(y)aːɳə	varaɭ.uka	varaɭ.al	5
taːɹal	lower	taːɹ.unnu	taːɹ.um	taːɹ.uka(y)aːɳə	taːɹ.uka	taːɹ.al	6
pakaɾə	spread	pakaɾ.unnu	pakaɾ.um	pakaɾ.uka(y)aːɳə	pakaɾ.uka	pakaɾ.al	7
eɖu	pick	eɖu.kk.unnu	eɖu.kk.um	eɖu.kk.uka(y)aːɳə	eɖu.kk.uka	eɖu.kk.al	8
keːɭ	listen	keːɭ.kk.unnu	keːɭ.kk.um	keːɭ.kk.uka(y)aːɳə	keːɭ.kk.uka	keːɭ.kk.al	9
aʈa	shut	aʈa.k'k'.unnu	aʈa.k'k'.um	aʈa.k'k'.uka(y)aːɳə	aʈa.k'k'.uka	aʈa.k'k'.al	10
koːpə	anger	koːp.ik'k'.unnu	koːp.ik'k'.um	koːp.ik'k'.uka(y)aːɳə	koːp.ik'k'.uka	koːp.ik'k'.al	11
tura	open	tura.kk.unnu	tura.kk.um	tura.kk.uka(y)aːɳə	tura.kk.uka	tura.kk.al	12
aːʈə	sway	aːʈ.unnu	aːʈ.um	aːʈ.uka(y)aːɳə	aːʈ.uka	aːʈ.al	13
tuːŋ	hang	tuːŋ.unnu	tuːŋ.um	tuːŋ.uka(y)aːɳə	tuːŋ.uka	tuːŋ.al	14
otukk	settle	otukk.unnu	otukk.um	otukk.uka(y)aːɳə	otukk.uka	otukk.al	15
kiʈakk	lay	kiʈakk.unnu	kiʈakk.um	kiʈakk.uka(y)aːɳə	kiʈakk.uka	kiʈakk.al	16

Table 7: Word Formation in DM

The present and future in Malayalam have been grouped under a single category of non-past based on the identical phonological configuration of the roots in the two cases. However, the Vocabulary Items for the two are different as they match with different morpho-syntactic complexes. Bearing this in mind, the Vocabulary Items may be posited as in (8):

(2) a. T[PRS] ↔ [unnu]/v___
b. T[FUT] ↔ [um]/ v____

The Vocabulary Items of non-past on the other hand are not conditioned on the basis of the environments of their realisation. They are specified for their morpho-syntactic feature complexes. Since the two items have mutually exclusive feature complexes, 8(a) and 8(b) apply to present and future respectively as a case of context-free allomorphy.

3 Conclusion

The paper delineates how a lexical morphology account of the Malayalam tense, while rightly pointing out that it is not just the affixes that alternate but also the stems, runs into several internal contradictions. Furthermore, stem storage models such as Madhavan's also overlook the principle of economy in grammar. The facts of Malayalam tense when reexamined through the lens of Distributed Morphology lends a neater account of the affix and stem allomorphy. The DM account revealed that apart from the affix allomorphy, Malayalam stems can be distinguished between ones that are selected by the past tense inflection and ones that are selected by non-past. However, it is also noted that the stem allomorphy is not an exclusive property of the Malayalam verb, but also extends to other derivational processes. Though this paper focusses solely on how the nature of roots reflects on the inflectional tense morphology of the Malayalam verb, the topic warrants a broader discussion on word formation in Malayalam at large.

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