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MORPHOMES AS A LEVEL OF REPRESENTATION CAPTURE UNITY OF EXPONENCE ACROSS THE INFLECTION–DERIVATION DIVIDE**

The premise of an inferential–realisational theory of inflectional morphology is that given an input consisting of a word's lexical identity (expressible for example by a lexical index, λ) and a set of morphosyntactic properties, σ, provided by the syntax the inflectional morphology generates an output form of the word, $\phi_{WORD(\lambda,\sigma)}$, presumably expressed as an underlying phonological form. This output form $\phi_{WORD(\lambda,\sigma)}$ is typically derived via some set of (morpho)phonological operations, Φ_1, Φ_2 ... Φ_n, performed on a lexical stem form, $\phi_{STEM(\lambda,k)}$, which is one of potentially many such stem forms belonging to lexeme λ (and where the choice of *k* will depend on λ and σ). In sum, the inflectional morphology provides a mapping as in (1).

(1) The inflectional morphology:$[\lambda,\sigma] \rightarrow \phi_{WORD(\lambda,\sigma)} = \Phi_1 \cdot \Phi_2 \cdot \ldots \cdot \Phi_n \cdot \phi_{STEM(\lambda,k)}$

In (1) the composition of the operations Φ_1, Φ_2 ... Φ_n and stem form $\phi_{STEM(\lambda,k)}$ is indicated as '·'. Depending on the framework employed the nature of this composition '·' may vary. In a rule based framework for example '·' will typically translate into the assignment of $\phi_{STEM(\lambda,k)}$ as the argument of the function composition of $\Phi_1 \ldots \Phi_n$, so that (1) is implemented as (2).

(2) The inflectional morphology (rule-based framework):
$[\lambda,\sigma] \rightarrow \phi_{WORD(\lambda,\sigma)} \Phi_1(\Phi_2(\ldots(\Phi_n(\phi_{STEM(\lambda,k)}))\ldots))$

In other frameworks, such as a constraint based optimisation approach like Optimality Theory (Prince/Smolensky 1993/2004), the operation '·' need not be implemented as function composition, but it must be implemented in some way.[1]

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[1] Presumably the function '·' will be non-commutative in any implementation, so that in the general case $\Phi_i \cdot \Phi_j$ does not equal $\Phi_j \cdot \Phi_i$. In a rule-based implementation, this corresponds to the notion that rule ordering matters.

Turning to the nature of inflectional systems themselves, it is an empirical fact that inflectional systems of natural languages abound with cases in which two or more inflected forms of a lexeme are identical, that is, for two morphosyntactic property sets σ and τ, where σ≠τ, it happens that $\phi_{WORD(\lambda,\sigma)} = \phi_{WORD(\lambda,\tau)}$. Multiple instances are apparent in the partial paradigm of *stelan*, a class IV strong verb of Old English shown (3).

(3) Partial paradigm of Old English stelan 'to steal'

		1sg	2sg	3sg	1, 2, 3pl
Indicative	present	stele	stil(e)st	stil(e)þ	stelaþ
	past	stæl	stǣle	stæl	stǣlon
Subjunctive	present	stele	stele	stele	stelen
	past	stǣle	stǣle	stǣle	stǣlen

A central concern of inferential–realisational theories of inflection has been to provide a cogent account of such identities of exponence, and various tools have been developed to that end, more on which below. Notwithstanding achievements within inflection, Beard (1995) stresses the fact that identities of exponence also occur in derivation and more significantly that they can be found spanning the divide between derivation and inflection. An example of the latter can be seen in the wide distribution of the exponent *-ing* in Modern English (4).

(4) Some derivational and inflectional uses of English -ing (after Beard 1995:33)

Derivation:	resultative nominal	He brought his cuttings in.
	subjective adjective	It was a very cutting remark.
Inflection:	progressive aspect	The boy is cutting flowers.

In recent work on the Australian language Kayardild I have argued for a specific kind of analysis to account for a set of distinctive, complex patterns of identity of exponence within the inflectional system (Round 2009, in prep.). In this paper I examine the sharing of exponents in Kayardild across the derivation–inflection divide, and argue that the analysis developed earlier for Kayardild inflection generalises, so as to extend to derivation as well. The paper is organised as follows. Section 1 introduces the treatment of identities of exponence in an inferential–realisation approach to inflectional morphology, including an interpretation of the proposal in Round (2009) to account for certain problems raised by Kayardild. Section 2 examines Kayardild inflection and section 3 expands the discussion to Kayardild derivation. Conclusions are offered in section 4.

1. IDENTITY OF EXPONENCE AND ITS ANALYSIS IN INFLECTION

Identities of exponence can occur at the level of entire words or, when words are morphologically complex, at the level of individual parts of words. For example in (3) above the past indicative 1st and 3rd person singular forms, *stæl*, share a complete word form, while the subjunctive plural forms *stelen* (present) and *stælen* (past) share the inflectional suffix *-en*. Within inferential–realisational morphology there are two primary analytical tools for capturing identities such as these, and both can be applied to both whole-word and part-word identities. For ease of exposition in §1 I will assume a rule-based implementation of the inflectional analysis.[2]

The first technique is underspecification in the definition of the domain of a mapping, so that it relates more than one set of morphosyntactic properties σ to a single stem selection $\phi_{\text{STEM}(\lambda,k)}$ or stem modification Φ_n. This technique will assign an identity of exponence to a NATURAL class of morphosyntactic properties, by virtue of the fact that morphosyntactic properties are typically arranged — on independent, semantic grounds — into values and features which pick out such natural classes. For example the statement (5a) makes no reference to person and number; it is underspecified for both, and hence picks out the natural class of all present subjunctive strong verbs. Similarly, the statement in (5b) is underspecified for person, tense and for the strong/weak verb contrast and hence picks out the natural class of all plural subjunctive verbs.

(5) Statements in the analysis of Old English inflection:
a. Present subjunctive strong verbs take a certain stem (such as *stel-* in (3))
b. Plural subjunctive verbs take the suffix *-en*

A second technique is the Rule of Referral (Zwicky 1985). This is more a powerful technique insofar as it can express identities of exponence across NON-NATURAL classes of morphosyntactic features. As originally formulated, Rules of Referral state for some set σ of morphosyntactic properties, that $\phi_{\text{WORD}(\lambda,\sigma)} =_{\text{def}} \phi_{\text{WORD}(\lambda,\tau)}$, where τ (≠σ) is some other set of morphosyntactic properties. For example, if our analysis already states that the past indicative 1st person singular form of *stelan* is *stæl*, then a Rule of Referral can state that the past indicative 3rd person singular is identical to the past indicative 1st person singular, thereby capturing the fact that the 3rd person singular form is also *stæl*. Significantly, there is nothing in the nature of a Rule of Referral which requires σ and τ to form a natural class.

Rules of Referral can also be relativised to specific parts of the derivation of a word's form (Stump 1993). Casting this notion in general terms, suppose that some part of the derivation is responsible for mapping from σ to just some part of $\phi_{\text{WORD}(\lambda,\sigma)}$ — it might be responsible only for selecting the stem $\phi_{\text{STEM}(\lambda,k)}$, or for assigning one of the modifications Φ_n for example. A Rule of Referral relating the

[2] This can be done without loss of generality, as there is nothing about the techniques which inherently ties them to a rule-based implementation.

realisation of σ to the realisation of τ could then be constrained so as to have an effect only within this part of the derivation. As such, it will not in general force $\phi_{WORD(\lambda,\sigma)}$ and $\phi_{WORD(\lambda,\tau)}$ to be identical, but it will force some part of the realisations of σ to τ to be identical.

The two main tools for capturing identities of exponence introduced so far are underspecification and Rules of Referral. A third alternative for capturing identity of exponence across non-natural classes of morphosyntactic properties was proposed by Aronoff (1994) under the rubric of the 'morphome'. Aronoff (1994) in fact introduces two fundamentally different kinds of morphome. The first, which will be of little interest here is a feature belonging to a lexeme, one which influences how the lexeme and its associated sets of morphosyntactic properties are realised within the inflectional system. A classic example of this first kind of morphome is an inflectional class feature or declension feature. This kind of morphome serves to divide up the LEXICON into various parts whose inflectional pattern shares some significant similarity of form. The second kind of morphome which Aronoff introduces is more a like a non-natural class of morphosyntactic property sets. These morphomes divide up the range of MORPHOSYNTACTIC PROPERTY SETS into groups whose realisation shares some significant similarity of form. In Latin for example the same stem form, termed the 'third stem' is always found across a group of morphosyntactic property sets which defies reduction into a natural class, appearing in the supine, the past participle and the future participle. If a given third stem appears in one of these forms it appears identically in all of them, no matter how irregular it might otherwise be, and should a lexeme be defective and lack one of these forms it will lack them all (see further Aronoff 1994:32–59). The Latin third stem is neither a specific form nor a natural morphosyntactic class, but rather is pattern of IDENTITY of exponence.

The interpretation which I would like to place on this second kind of morphome is that it functions in the inflectional morphology as an intermediate representation, located between the input {λ,σ} and the output $\phi_{WORD(\lambda,\sigma)}$, and moreover that it is a linguistically significant intermediate representation, and not merely a representation which arises as an artefact of a particular implementation of the analysis (such as the partially derived forms that arise as intermediate representations in a serial, rule-based derivations). The idea is that any two representations which are distinct from one another at the morphomic level will be realised as distinct in the output, and conversely that any two word forms $\phi_{WORD(\lambda,\sigma)}$ and $\phi_{WORD(\lambda,\tau)}$ which are (non-accidentally[3]) identical will have identical representations at the morphomic level. Similarly, identical PARTS of words' realisations should be expressed by identity of

[3] Any theory of identity of exponence in inflection will encounter the issue of deciding between instances of identity that are linguistically significant and instances which are accidental. While this is an important issue, its resolution is orthogonal to the concerns in this paper, and the formalism I introduce here does not forces any particular resolution on the analyst. For evidence of the psychological reality of morphomes as evidenced by historical change, see Maiden (2005).

PARTS of the morphomic representation. The morphomic level therefore expresses IDENTITIES of form, without expressing the forms themselves.

The model of inflectional morphology advocated is shown in (6).

(6) The inflectional morphology, with a morphomic level
$[\lambda,\sigma] \rightarrow \mu_{WORD(\lambda,\sigma)} = M_1 \cdot M_2 \cdot \ldots \cdot M_m \cdot \mu_{STEM(\lambda,k)}$
$\rightarrow \phi_{WORD(\lambda,\sigma)} = \Phi_1 \cdot \Phi_2 \cdot \ldots \cdot \Phi_n \cdot \phi_{STEM(\lambda,k)}$

In (6) the input lexeme and morphosyntactic property set $[\lambda,\sigma]$ maps to a morphomic representation $\mu_{WORD(\lambda,\sigma)}$, which in turn maps onto the underlying-phonological output, $\phi_{WORD(\lambda,\sigma)}$. The morphomic representation $\mu_{WORD(\lambda,\sigma)}$ is composed of individual morphomic operations M_1, M_2 ... M_m together with a lexical stem element $\mu_{STEM(\lambda,k)}$ to be discussed further in §3. To be clear, there is no assumption that the morphomic operations M_1, M_2 ... M_m map in a one-to-one fashion onto the phonological operations Φ_1, Φ_2 ... Φ_n (note the different subscripts for M_m and Φ_n). Just what this view of inflection corresponds to in empirical terms will become apparent when we consider the inflectional system of Kayardild.

2. KAYARDILD INFLECTION UNDER A MORPHOMIC ANALYSIS

Kayardild is a Tangkic (non-Pama Nyungan) language of northern Australia with a complex inflectional system characterised by affix stacking and pervasive identities in inflectional exponence. The language is described and analysed in a descriptive grammar by Evans (1995) and in a doctoral dissertation by Round (2009). According to Round (2009), Kayardild has two morphological word classes, nominal and verbal, and an inflectional system organised in terms of six morphosyntactic features which are privative and in general multi-valued, which is to say a word may be unspecified for a feature, or be specified for one of its several values, as listed in (7).

(7)	a. case	23 values
	b. number	2 values
	c. thematic TAM	14 values
	d. athematic TAM	11 values
	e. negation	1 value
	f. complementisation	2 values

The case system includes many semantically rich case values (Evans 1995), leading to a large number of values. The tense/aspect/mood (TAM) system is built on two features (Round 2009), one of which is termed 'modal case' in Evans (1995). Like the case system, the dual TAM system is semantically rich and has a large number of values for each feature.

For the purposes of the present discussion what is particularly interesting about Kayardild is the way in which identities of form are shared. To begin with, identities in exponence get shared across the paradigms of lexemes which have different parts

of speech: nominal case suffixes are often identical to verbal tense/aspect/mood (TAM[4]) suffixes. An example is shown in (8), where the oblique case and hortative TAM are both realised by the suffix /-iɲca/. Kayardild words are shown in their underlying phonological forms in the middle columns and in (surface) orthographic form at the far right.

(8)	gloss	stem	oblique case	hortative TAM	
a.	'animal'	jaɻpuṯ	jaɻpuṯ-iɲca	—	*yarbuthinja*
b.	'one'	waɻŋiːc	waɻŋiːc-iɲca	—	*warngiijinja*
c.	'reed sp.'	kurkaŋ	kurkaŋ-iɲca	—	*kurkanginja*
d.	'to leave'	ʈanaṯ	—	ʈanaṯ-iɲca	*danathinja*
e.	'to go'	warac	—	warac-iɲca	*warrajinja*
f.	'to go-NEG'	waranaŋ	—	waranaŋ-iɲca	*warrananginja*

The derivations of the word forms in (8a–f) are shown respectively in (9a–f), with an explanation to follow.

(9)	input		morphomic level → output level
a.	{YARBUTH,σ}	→	$M_T \cdot M_{OBL} \cdot \mu_{STEM(YARBUTH,1)}$
		→	$\Phi_T \cdot \Phi_{\text{-}inja} \cdot$/jaɻpuṯ/
b.	{WARNGIIJ,σ}	→	$M_T \cdot M_{OBL} \cdot \mu_{STEM(WARNGIIJ,1)}$
		→	$\Phi_T \cdot \Phi_{\text{-}inja} \cdot$/waɻŋiːc/
c.	{KURKANG,σ}	→	$M_T \cdot M_{OBL} \cdot \mu_{STEM(KURKANG,1)}$
		→	$\Phi_T \cdot \Phi_{\text{-}inja} \cdot$/kuɻkaŋ/
d.	{DANATH,τ}	→	$M_T \cdot M_{OBL} \cdot \mu_{STEM(DANATH,1)}$
		→	$\Phi_T \cdot \Phi_{\text{-}inja} \cdot$/ʈanaṯ/
e.	{WARRAJ,τ}	→	$M_T \cdot M_{OBL} \cdot \mu_{STEM(WARRAJ,1)}$
		→	$\Phi_T \cdot \Phi_{\text{-}inja} \cdot$/warac/
f.	{WARRAJ,υ}	→	$M_T \cdot M_{OBL} \cdot M_{NEG} \cdot \mu_{STEM(WARRAJ,1)}$
		→	$\Phi_T \cdot \Phi_{\text{-}inja} \cdot \Phi_{\text{-}rnang} \cdot$/warac/

where:
σ = {case:oblique}
τ = {TAM:hortative}
υ = {TAM:hortative, +negative}

[4] The TAM properties referred to in this section and the next are thematic TAM values. Similar issues arise with respect to the athematic TAM properties and the complementisation feature.

At the morphomic level all of the representations in (9a–f) share two morphomic operations M_T and M_{OBL}[5] and by virtue of that they all share some part of their output form. M_{OBL} is the realisation at the morphomic level of both {case:oblique} and {TAM:hortative}. M_T is an obligatory morphological operation that applies to every word in Kayardild (see Round 2009:150–65). At the phonological level, M_{OBL} is realised as the operation $\Phi_{\textit{-inja}}$ which adds the suffix /-iɲca/ to a stem.[6] M_T is realised as Φ_T, an operation which suffixes /-ţá/, /-ka/ or /-a/ to a stem, or which effects no change, depending on the phonology of the stem. In the case of the stems in (8), all of which end in /a/, Φ_T effects no change and hence the final piece of phonology in all of the forms is the suffix /-iɲca/.

It is significant in (9) that the sharing of exponence between oblique case forms and hortative TAM forms does not rely on it being possible for a given lexeme to inflect for both. That is, lexical nominal stems in Kayardild cannot inflect for hortative TAM and nor can lexical verbal stems inflect for oblique case. As such, the identities in exponence between (8a–c) on the one hand and (8d–f) on the other could not be captured by Rules of Referral such as (10a, b).

(10) Impossible Rules of Referral in Kayardild:

a. * REALISATION-OF[λ,{case:oblique}]
=def REALISATION-OF[λ,[TAM:hortative]]

b. * REALISATION-OF [λ,[TAM:hortative]]
=def REALISATION-OF[λ,{case:oblique}]

This is no accident. A limitation of Rules of Referral is that they cannot be used to express identities in the forms that realise two sets of morphosyntactic properties σ and τ if σ and τ are not compatible with the same lexemes. The empirical evidence from Kayardild indicates that natural language morphologies do not in general face the same restriction. The morphomic approach advocated here has the desirable ability to capture the identities of exponence that are present in cases like (8).

The situation illustrated in (8) is by no means an isolated case. According to Round (2009) the inflectional system of Kayardild overtly realises fifty-three mor-

[5] Following a convention in Round (2009) based in turn on Evans (1995) a morphomic operation is named after any morphosyntactic case feature which it realises. M_{OBL} is labelled after case:oblique, which it realises in (8/9a–c). The morphomic operation M_{NEG} in (9f) never realises a case feature, and so is labelled after another morphosyntactic feature which it does realise, in this instance negative:yes. MT is a 'termination' which is a semantically empty piece of morphology.

[6] In Kayardild there are two major kinds of phonological juncture which can separate morphs, indicated as '-' and '+' in underlying phonological forms, and in general the surface realisation of /a-b/ and /a+b/ will not be the same. The determinants of which junctures appear where in Kayardild are complex but systematic. For reasons of space they will not be considered here, but see Round (2009, forthc.) for discussion. Essentially, an account of the distribution of the two junctures requires an embellishment of morphomic representations which in the end furnishes an additional source of support for the general morphomic approach advocated here.

phosyntacic feature values.[7] Of those, twenty eight have a morphomic realisation consisting of a single morphomic operation, M_{η}, which they share with at least one other feature-value. Some of these cases are illustrated in (11) and (12). (Note that in (11) and (12) M_T has a non-null realisation in the output, because Φ_T adds the suffix /-a/ to a stem ending in /i/.)

(11)	gloss	stem	locative case	immediate TAM	
a.	'animal'	jaɻpuʈ	jaɻpuʈ+ki-a	—	*yarbuthiya*
b.	'one'	waɻŋiːc	waɻŋiːc+ki-a	—	*warngiijiya*
c.	'reed sp.'	kurkaŋ	kurkaŋ+ki-a	—	*kurkangiya*
d.	'to leave'	ʈanaʈ	—	ʈanat+ki-a	*danathiya*
e.	'to go'	warac	—	warac+ki-a	*warrajiya*
f.	'to go-NEG'	waranaŋ	—	waranaŋ+ki-a	*warranangkiya*

(12)	gloss	stem	privative case	actual TAM & +neg	
a.	'animal'	jaɻpuʈ	jaɻpuʈ-wari-a	—	*yarbuyarriya*
b.	'one'	waɻŋiːc	waɻŋiːc-wari-a	—	*warngiiyarriya*
c.	'reed sp.'	kurkaŋ	kurkaŋ-wari-a	—	*kurkawarriya*
d.	'to leave'	ʈanaʈ	—	ʈanat+wari-a	*danatharriya*
e.	'to go'	warac	—	warac+wari-a	*warrajarriya*

Another relevant phenomenon in Kayardild is the realisation of certain morphosyntactic properties by two morphomic operations, M_1 and M_2, both of which serve individually to realise other morphosyntactic properties. Examples are shown in (13) with derivations in (14). In (13/14) the operation Φ_T adds the suffix /- a/ to stems ending in /n/ and /-a/ to stems ending in /i/.

(13)	stem, gloss	properties	output	
a.	ʈanaʈ	{TAM:continuous}	ʈanaʈ-n-ʈa	*dananda*
b.	'to leave'	{TAM:actual, +neg}	ʈanaʈ+wari-a	*danatharriya*
c.		{TAM:nonveridical}	ʈanaʈ-n-wari-a	*dananmarriya*
d.	warac	{TAM:continuous}	warac-n-ʈa	*warranda*
e.	'to go'	{TAM:actual, +neg}	warac+wari-a	*warrajarriya*
f.		{TAM:nonveridical}	warac-n-wari-a	*warranmarriya*

(14)	input		morphomic level → output level
a.	{WARRAJ,σ}	→	$M_T \cdot M_N \cdot \mu_{STEM \cdot WARRAJ,1}$
		→	$\Phi_T \cdot \Phi_{\text{-}n\text{·}}$/warac/
b.	{WARRAJ,τ}	→	$M_T \cdot M_{PRIV} \cdot \mu_{STEM \cdot WARRAJ,1}$
		→	$\Phi_T \cdot \Phi_{\text{-}warri\text{·}}$/warac/
c.	{WARRAJ,υ}	→	$M_T \cdot M_{PRIV} \cdot M_N \cdot \mu_{STEM \cdot WARRAJ,1}$
		→	$\Phi_T \cdot \Phi_{\text{-}warri\text{·}} \cdot \Phi_{\text{-n}\text{·}}$/warac/

[7] These are: 23 case values, 2 number values, 11 'athematic' TAM values, 14 'thematic' TAM values, 2 complementisation values, and neg:yes.

d. {DANATH,σ} → $M_T \cdot M_N \cdot \mu_{STEM \cdot DANATH,1}$
→ $\Phi_T \cdot \Phi_{\text{-}n\text{-}}$/ʈanaʈ̪/
e. {DANATH,τ} → MT·MPRIV·μSTEM·DANATH,1
→ $\Phi_T \cdot \Phi_{\text{-}warri\text{-}}$/ʈanaʈ̪/
f. {DANATH,υ} → $M_T \cdot M_{PRIV} \cdot M_N \cdot \mu_{STEM \cdot DANATH,1}$
→ $\Phi_T \cdot \Phi_{\text{-}warri\text{-}} \cdot \Phi_{\text{-}n\text{-}}$/ʈanaʈ̪/

where:
σ = {TAM:continuous}
τ = {TAM:actual, +negative}
υ = {TAM:nonveridical}

The point of interest here is that the forms (13c,f) show non-accidental identities of form with both (13a,d) and (13b,e). These identities are captured at the morphomic level in terms of (14c,f) sharing M_N with (14a,d) and M_{PRIV} with (14b,e). As was the case earlier, these identities of exponence are not expressible with Rules of Referral. The failure of Rules of Referral in this instance occurs because lexemes inflected in (14) with the morphosyntactic property set υ simultaneously share identities of exponence with the same lexemes inflected with σ AND with the same lexemes inflected with τ. This is true even though no one lexeme in Kayardild will ever be associated simultaneously with both σ and τ. That is to say, a Rule of Referral such as (15) will fail because it attempts to refer on its right hand side to an ill-defined set of morphosyntactic properties (σ ∪ τ).

(15) Impossible Rule of Referral in Kayardild:
* REALISATION-OF{λ,{TAM:nonveridical}}
=def REALISATION-OF{λ,
{TAM:continuous} ∪ {TAM:actual, +neg}}

The pattern illustrated in (13) is also well-attested in Kayardild. Of the fifty-one overtly reaslised morphosyntacic feature values in Kayardild, ten are realised by multiple morphomic operations of which at least one figures in the realisation of a different feature value. An example which is parallel to (13) is shown in (16). In (16) Φ_T adds the suffix /-ʈa/ to stems ending in /n/ and leaves to stems ending in /a/ unaffected.

(16)	stem, gloss	properties	output	
a.	ʈanaʈ̪	{TAM:continuous}	ʈanaʈ̪-n-ʈa	dananda
b.	'to leave'	{TAM:precondition}	ʈanaʈ̪+ŋarpa	danatharrba
c.		{TAM:antecedent}	ʈanaʈ̪-n-ŋarpa	dananngarrba
d.	warac	{TAM:continuous}	warac-n-ʈa	warranda
e.	'to go'	{TAM:precondition}	warac+ŋarpa	warrajarrba
f.		{TAM:antecedent}	warac-n-ŋarpa	warranngarrba

3. DERIVATION AND MORPHOMIC REPRESENTATIONS OF LEXICAL STEMS

We can now examine the nature of the morphomic element $\mu_{STEM(\lambda,k)}$, which is the morphomic representation of a lexical stem. I propose that $\mu_{STEM(\lambda,k)}$ has an internal structure as in (17). That is, $\mu_{STEM(\lambda,k)}$ itself is composed of zero or more morphomic operations plus the phonological form of some root ϕ_{ROOT}.

(17) The internal structure of $\mu_{STEM(\lambda,k)}$, the morphomic representation of a lexical stem
$\mu_{STEM(\lambda,k)} = (M_1 \cdot M_2 \cdot \ldots \cdot M_l)\phi_{ROOT}$; where (...) indicates optionality

By extending the representational device of morphomic operations, M_n, into the stem it will be possible to capture identities of form which span the divide between derivation and inflection. The need to capture such identities is argued for prominently by Beard (1995) and remarked upon by Stump (2001:203–7), while Aronoff (1994:34,126–7) makes explicit reference to morphomes which unite derivational and inflectional categories. Likewise, the extension of essentially the same morphological architecture from inflection to derivation (irrespective of whether this results in shared exponents) has been advocated by Bauer (1997) with respect to paradigmatic arrangements of suffixes, Booij (1997) with respect to stem selection, and Stump (2001:252–60) with respect to fundamental principles of paradigm structure. The representation in (17) thus provides a means of achieving ends which have been identified as appealing in prior research. Let us turn then to the empirical evidence in Kayardild in support of (17).

In the inflectional system of Kayardild the realisation of its fifty-one overtly-marked morphosyntactic feature values requires a inventory of just twenty-eight morphomic operations, M_n. Of those twenty-eight, fifteen figure in the realisation of more than one feature value. Furthermore fifteen — though not exactly the same fifteen — are employed derivationally.[8] Examples of these identities of form across the derivation–inflection divide will follow below. In setting out the examples I will not be concerned with how a morphologically complex stem is derived[9] in the lexicon but rather with how its form is represented, with a particular focus on how that representation captures aspects of shared exponence with inflected words.

The morphomic operation M_{ASSOC} is used in Kayardild as the realisation of the morphosyntactic feature value case:associative. It is in turn realised by the phonological operation $\Phi_{\text{-}rnurru}$ which adds the suffix /-uru/ to its stem. Example (18a)

[8] The distinction in Kayardild between inflectional and derviational morphology is clear cut: an inflectional marker on a nominal stem will appear on all other words in a noun phrase that that nominal occupies, and an inflectional marker on a verbal stem will appear on all other verbal words in the same clause (other than those at a deeper level of clausal embedding); neither of these conditions holds of derivational markers (Evans 1995:88–89).

[9] For argument's sake, we can suppose that a derivationally complex stem form is a realisation of a root index ρ plus some set of derivational properties δ, with a mapping from {ρ,δ} in much the way that inflection maps from {λ,σ}. The forms to which {ρ,δ} map are the concern of this section.

shows the inflectional derivation the lexeme WUMBURUNG ‘spear thrower’ inflected with associative case.

(18a) Input	Morphomic level → output level
a. i. {WUMBURUNG,{case:assoc}]	→ $M_T \cdot M_{ASSOC} \cdot \mu_{STEM(WUMBURUNG,1)}$
ii.	= $M_T \cdot M_{ASSOC} \cdot$/wumpuɻuŋ/
iii.	→ $\Phi_T \cdot \Phi_{\text{-}rnurru} \cdot$/wumpuɻuŋ/
iv.	= wumpuɻuŋ-ɳuru-a
	wumpururnurruwa

In (18a.i) the lexical index WUMBURUNG and morphosyntactic properties {case:associative} map to a morphomic representation, including the morphomic representation of the lexical stem, $\mu_{STEM(WUMBURUNG,1)}$. The operation M_{ASSOC} is the realisation of case:associative and M_T is the usual operation which appears on all Kayardild words. Because the lexical stem of WUMBURUNG is morphologically simple, $\mu_{STEM(WUMBURUNG,1)}$ expands in (a.ii) to a simple root /wumpuɻuŋ/.The representation in (a.ii) then in turn maps to a phonological representation in (a.iii) which expands to (a.iv).

Example (b) shows a derivationally complex lexeme KURNDURNURRU ‘woman with young child’ which is based on the root /kuɳʈuŋ/, where the simple lexeme KURNDUNG means ‘chest’.

(18b)	Input	Morphomic level → output level
i.	{KURNDURNURRU,{Ø}]	→ $M_T \cdot \mu_{STEM(KURNDUNURRU,1)}$
ii.		= $M_T \cdot M_{ASSOC} \cdot$/kuɳʈuŋ/
iii.		→ $\Phi_T \cdot \Phi_{\text{-}rnurru} \cdot$/kuɳʈuŋ/
iv.		= kuɳʈuŋ-ɳuru-a
		kurndurnurruwa

Line (18b.i) maps from the lexeme KURNDURNURRU with its empty set of associated morphosyntactic properties[10] to a morphomic representation. In (18b.i) the only morphomic operation shown is the usual M_T. In (18b.ii) the lexical representation $\mu_{stem(kurndunurru,1)}$ is expanded out. My proposal is that KURNDURNURRU is represented morphomically as $M_{ASSOC} \cdot$/kuɳʈuŋ/. This allows the framework to capture the non-accidental identity of form between (18a.ii) above where M_{ASSOC} realised an inflectional feature and (b.ii) where M_{ASSOC} (and its phonological realisation /-ɳuru/) is part of a morphologically complex lexical stem. Because (18a.ii) and (18b.ii) have parallel representations at the morphomic level (where IDENTITY, but not content, of form is captured) the mappings and expansions in (18a.iii–iv) and (18b.iii–iv) are also entirely parallel.

10 Here as in Round (2009) I treat a lack of case marking as following from the absence of a case value in a word’s morphosyntactic properties.

In (19a) the morphomic operation M_{DU} is the realisation of number:dual, which is realised on the simple lexeme DUN 'husband'. In (19b) the complex lexeme MUNKIYARRNG 'whale' is realised with an empty set of morphosyntactic properties. The simple lexeme MUN means 'buttocks' (whence MUNKIYARRNG alludes to a whale's bifurcated tail). In (19b.ii) the lexical representation $\mu_{STEM(MUNKIYARRNG,1)}$ expands to M_{DU}·/mun/ so that the morphomic representations in (19a.ii) and (19b.ii) are parallel, thereby capturing the identities of form and causing the mappings and expansions in (19a.iii–iv) and (19b.iii–iv) to be commensurate also.

(19)		Input	Morphomic level → output level
a.	i.	{DUN,[number:dual]}	→ M_T·M_{DU}·$\mu_{STEM(DUN,1)}$
	ii.		= M_T·M_{DU}·/ʈun/
	iii.		→ Φ_T·$\Phi_{\text{-}kiyarrng}$·/ʈun/
	iv.		= ʈun+kiarŋ-ka *dunkiyarrngka*
b.	i.	{MUNKIYARRNG,{Ø}}	→ M_T·$\mu_{STEM(MUNKIYARRNG,1)}$
	ii.		= M_T·M_{DU}·/mun/
	iii.		→ Φ_T·$\Phi_{\text{-}kiyarrng}$·/mun/
	iv.		= mun+kiarŋ-ka *munkiyarrngka*

Example (20) is inflectionally more complex than (18) and (19). In (20a) the nominal lexeme WUMBURUNG 'spear thrower' inflects for case:donative, and also for TAM:actual. The TAM feature comes into play because the donative is one of Kayardild's case values, termed 'verbal(ising) case' (Evans 1995, 2003) or 'thematic case' (Round 2009), which lead to a nominal inflecting also for TAM/negation. Thus in (20a.i) we see case:donative mapping to M_{TH}·M_{DON},[11] TAM:actual mapping to M_{ACT}, and of course M_T. In (a.iii) the morphomic operations M_T·M_{ACT} map cumulatively to $\Phi_{\text{-}a}$, which adds the suffix /-a/ to its stem; M_{TH} maps to $\Phi_{\text{-}j}$ and M_{DON} to $\Phi_{\text{-}wu}$.

(20a)	Input	Morphomic level → output level
i.	{WUMBURUNG,[case:donative, TAM:actual]}	→ M_T·M_{ACT}·M_{TH}·M_{DON}·$\mu_{STEM(WUMBURUNG,1)}$
ii.		= M_T·M_{ACT}·M_{TH}·M_{DON}·/wumpuɻuŋ/
iii.		→ $\Phi_{\text{-}a}$·$\Phi_{\text{-}j}$·$\Phi_{\text{-}wu}$·/wumpuɻuŋ/
iv.		= wumpuɻuŋ-wu-c-a *wumburuwuja*

The morphologically complex verb KAWUJ is built on the lexical root KANG 'speech' and means 'to speak to OBJ, where OBJ is a kinsman to whom one is permitted by law to speak'. In (20b) KAWUJ is inflected with{TAM:actual} that is, with a proper subset of the inflectional features involved in (20a). In (20b.i) the input maps to

[11] The subscript th on M_{TH} stands for 'thematic', hence the name 'thematic case' in Round (2009).

M_{ACT} which realises the inflectional features, M_T as per usual, and to the lexical representation $\mu_{STEM(KAWUJ,1)}$ which then expands in (20b.ii) into $M_{TH}{\cdot}M_{DON}{\cdot}$/kaŋ/, which I propose as the morphomic representation of KAWUJ. Consequently the morphomic representations in (20a.ii) and (20b.ii) are parallel, capturing the identities of form involved and leading the mappings and expansions in (20a.iii–iv) and (20b.iii–iv) to be commensurate also.

(20b)	Input	Morphomic level → output level
i.	{KAWUJ,{TAM:actual}}	
		→ $M_T{\cdot}M_{ACT}{\cdot}\mu_{STEM(KAWUJ,1)}$
ii.		= $M_T{\cdot}M_{ACT}{\cdot}M_{TH}{\cdot}M_{DON}{\cdot}$/kaŋ/
iii.		→ $\Phi_{\text{-a}}{\cdot}\Phi_{\text{-j}}{\cdot}\Phi_{\textit{-wu}}{\cdot}$/kaŋ/
iv.		= kaŋ-wu-c-a *kawuja*

4. CONCLUSION

In Round (2009, in prep.) I propose the existence of an intermediate, 'morphomic' level of representation, which plays a significant role in the inferential–realisational analysis of inflection. Specifically it makes possible the formal expression of certain kinds of identities of exponence, common in Kayardild, which involve non-natural classes of morphosynactic properties, but which are not readily expressible by Rules of Referral. In this paper I have shown that rather similar identities of form appear across the derviation–inflection divide in Kayardild, and that the same devices employed in the analysis of Kayardild inflection can be generalised profitably to derivation. Doing so requires recognising that lexical stems have not only a phonological form but a morphomic form too. Once that move is made, the morphomic level of representation assumes the generalised role of expressing patterns of identities of form, without expressing the forms themselves, across inflection and derivation.

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Abstract

MORPHOMES AS A LEVEL OF REPRESENTATION CAPTURE UNITY OF EXPONENCE ACROSS THE INFLECTION–DERIVATION DIVIDE

Inferential–realisational analyses formalise a language's inflectional morphology in terms of a mapping on the one side from a lexical index and set of morphosyntactic properties to on the other side a phonological form. Round (2009) has argued that the Australian language Kayardild requires the postulation of an intermediate level of representation, identified with Aronoff's (1994) notion of a 'morphome'. This morphomic level serves to express patterns of identities of exponence abstracted away from the actual forms of exponents and its use makes possible the expression of certain identities of form which defy expression by means of Rules of Referral (Zwicky 1985, Stump 1993). This paper considers identities of form that span the inflection–derivation divide in Kayardild and shows that they too are coherently captured by assuming that a morphomic level of representation is present. A consequence is that lexical stems must possess a morphomic representation in addition to their representations on other levels.

Povzetek

MORFOMI KOT PREDSTAVITVENA RAVNINA ZAJAMEJO ENOTNOST IZRAZNIH PODOB NE GLEDE NA RAZKOL MED OBLIKOSLOVJEM IN BESEDOTVORJEM

Inferenčno-uresničitvena analiza oblikoslovje določenega jezika fomalizira v obliki preslikav iz seznama leksikalnih enot in množice morfosintaktičnih lastnosti na eni strani v fonološko obliko na drugi strani. V Round (2009) smo zagovarjali trditev, da avstralski jezik kayardild zahteva vpeljavo vmesne predstavitvene ravnine, ki ustreza Aronoffovemu (1994) pojmu »morfoma«. S pomočjo te morfomske ravnine lahko izražamo vzorce izrazne enakosti (ang. *identity of exponence*) neodvisno od dejanskih izraznih oblik (ang. *forms of exponents*), prav tako ta raven omogoča izražanje določenih enakosti oblik, ki jih ni mogoče zajeti s *pravili podajanja* (Zwicky 1985, Stump 1993). Pričujoči članek obravnava enakosti oblik, ki v jeziku kayardild segajo preko ločnice med oblikoslovjem in besedotvorjem, in dokazuje, da je tudi te enakosti moč sistematično zajeti, pod pogojem, da je prisotna morfomska predstavitvena ravnina. Posledica je, da morajo imeti leksikalne podstave tudi morfomsko predstavitev in ne samo predstavitev na drugih ravninah.