The interface of semantic interpretation and morphological realization

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Talk outline

Syntagmatic compositionality

Paradigmatic compositionality

The dual role of cells in paradigm-based theories of morphology

The cell interface model of semantic interpretation

A problem for the cell interface model

The paradigm linkage model

Syntagmatic compositionality

Traditionally, compositionality is a syntagmatic notion:

a complex expression is compositional if its content can be deduced from that of its parts and the manner of their combination.

On this view, a word form is compositional if its content can be deduced from that of its parts and the manner of their combination.

Latin *laudābant* ‘they were praising’

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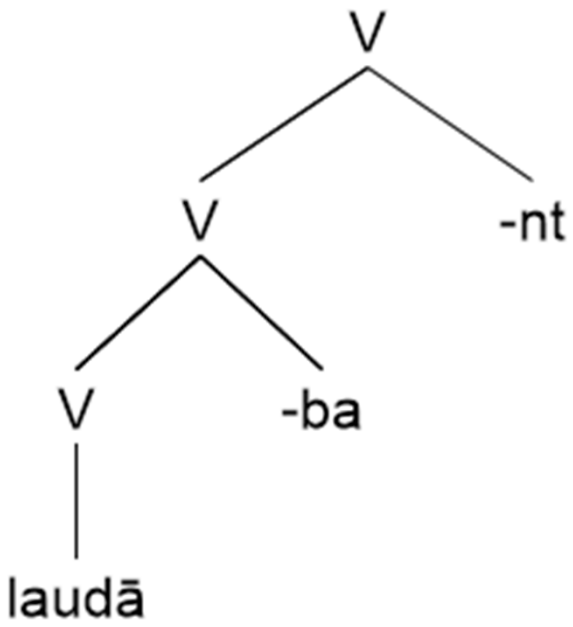

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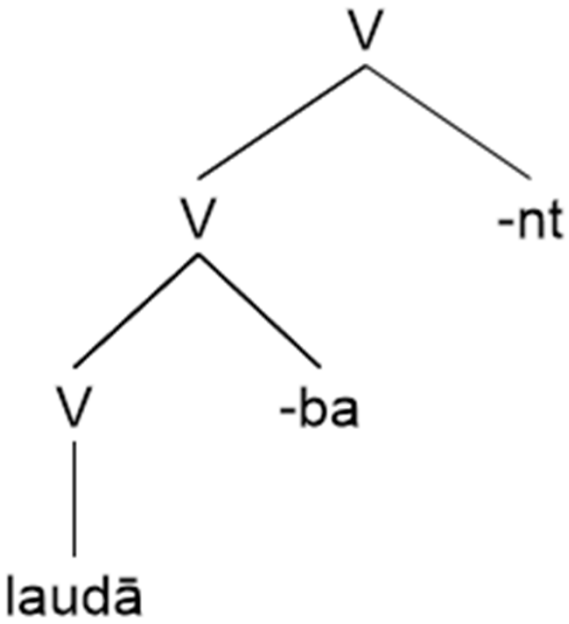
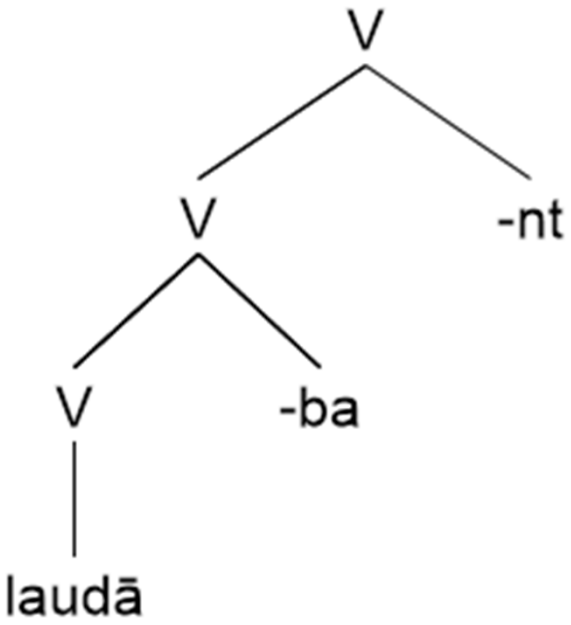


→ λ*y*λ*x*[**praise**'(*x*, *y*)]

Latin *laudābant* ‘they were praising’



→ λ*y*λ*x*[Imperfect(ˆ[**praise**'(*x*, *y*)])]

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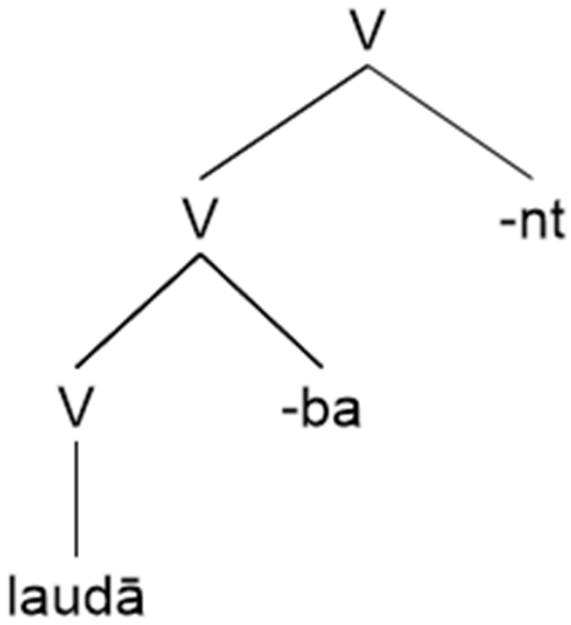


→ λ*y*λZ_3∀*x*[x ∈ Z_3 → Imperfect(ˆ[**praise**'(*x*, *y*)])]

→ λ*y*λ*x*[Imperfect(ˆ[**praise**'(*x*, *y*)])]

→ λ*y*λ*x*[**praise**'(*x*, *y*)]

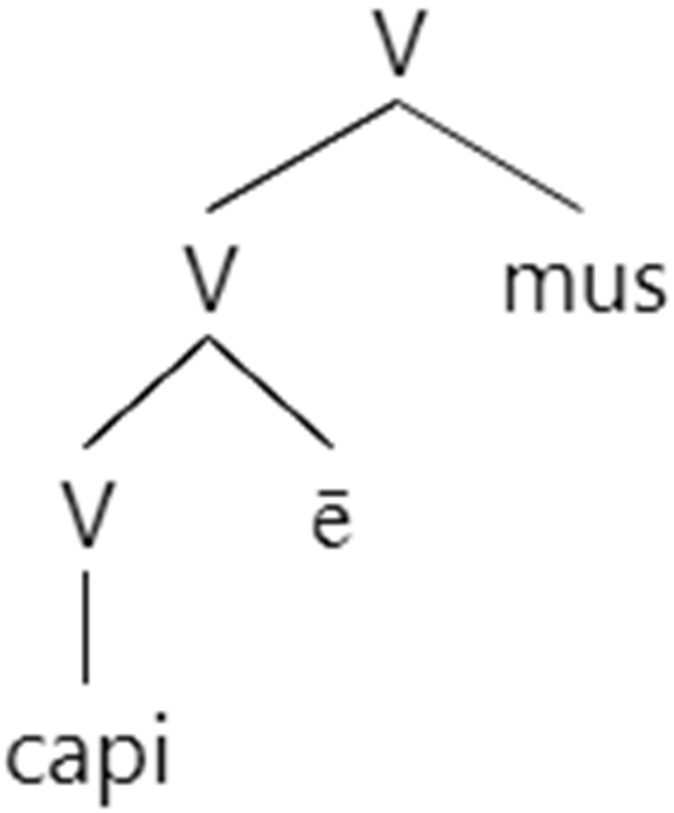
BUT: Inflected word forms are not invariably compositional in the syntagmatic sense.

DATIVE SINGULAR	ABLATIVE SINGULAR
amīc-ō	*amīc-ō*
‘to a friend’	‘from a friend’

DATIVE SINGULAR	ABLATIVE SINGULAR
amīc-ō ‘to a friend’	*amīc-ō* ‘from a friend’
dom-uī ‘for a house’	*dom-ō* ‘from a house’

Latin *capiēmus* ‘we will be taking’

{1 pl imperfective future indicative}



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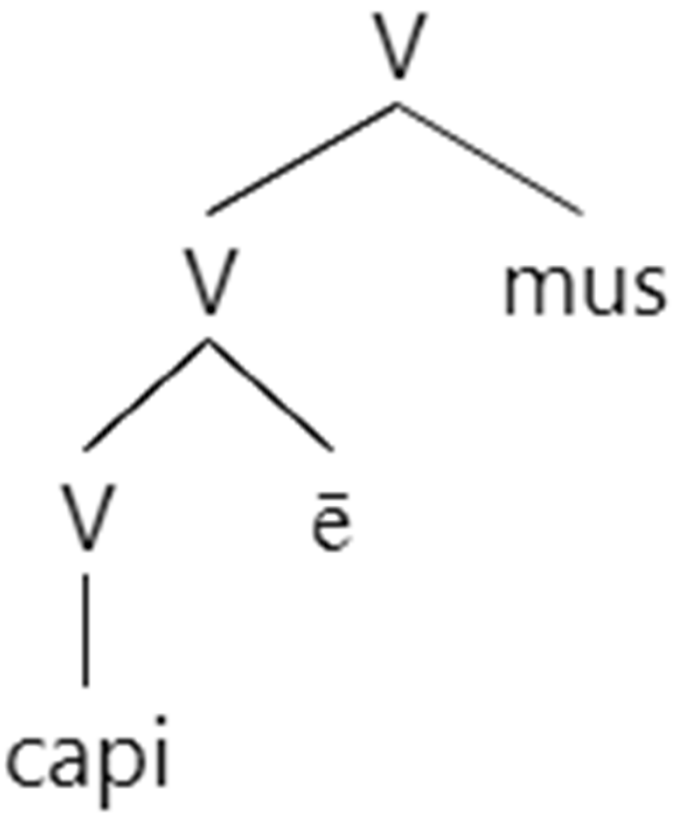

As an expression of first-person plural agreement, -*mus* appears

- in imperfective and perfective,
- in all three tenses,
- in indicative and subjunctive,
- in active and passive .

Latin *capiēmus* ‘we will be taking’

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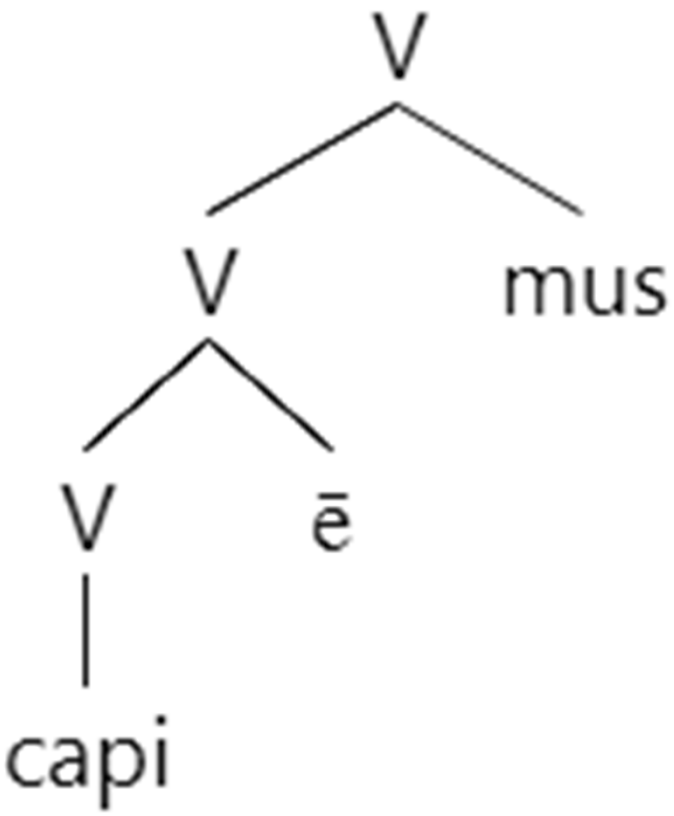

As an expression of first-person plural agreement, -*mus* appears

- in imperfective and perfective,
- in all three tenses,
- in indicative and subjunctive,
- in active and passive .

In the imperfective, -*ē* appears

- in future and preterite,
- in indicative and subjunctive,
- in active and passive.

An alternative:
Paradigmatic compositionality

Paradigm-based approaches to inflectional morphology afford a different, paradigmatic conception of compositionality, according to which a word form is compositional if its content can be deduced from its position in the architecture of a lexeme's paradigm.

On this conception, *laudābant* is compositional because it occupies the third-person plural cell in the imperfect indicative active paradigm of the lexeme LAUDĀRE.

Indicative paradigm of Latin LAUDĀRE ‘praise’							
		Present	Imperfect	Future	Perfect	Pluperfect	Fut. Perf.
ACTIVE	1sg	*laudō*	*laudābam*	*laudābō*	*laudāvī*	*laudāveram*	*laudāverō*
	2sg	*laudās*	*laudābās*	*laudābis*	*laudāvistī*	*laudāverās*	*laudāveris*
	3sg	*laudat*	*laudābat*	*laudābit*	*laudāvit*	*laudāverat*	*laudāverit*
	1pl	*laudāmus*	*laudābāmus*	*laudābimus*	*laudāvimus*	*laudāverāmus*	*laudāverimus*
	2pl	*laudātis*	*laudābātis*	*laudābitis*	*laudāvistis*	*laudāverātis*	*laudāveritis*
	3pl	*laudant*	*laudābant*	*laudābunt*	*laudāvērunt*	*laudāverant*	*laudāverint*
PASSIVE	1sg	*laudor*	*laudābar*	*laudābor*	*laudātus sum*	*laudātus eram*	*laudātus erō*
	2sg	*laudāris*	*laudābāris*	*laudāberis*	*laudātus es*	*laudātus erās*	*laudātus eris*
	3sg	*laudātur*	*laudābātur*	*laudābitur*	*laudātus est*	*laudātus erat*	*laudātus erit*
	1pl	*laudāmur*	*laudābāmur*	*laudābimur*	*laudātī sumus*	*laudātī erāmus*	*laudātī erimus*
	2pl	*laudāminī*	*laudābāminī*	*laudābiminī*	*laudātī estis*	*laudātī erātis*	*laudātī eritis*
	3pl	*laudantur*	*laudābantur*	*laudābuntur*	*laudātī sunt*	*laudātī erant*	*laudātī erunt*

$\lambda y \lambda Z_3 \forall x [\mathrm{x} \in Z_3 \rightarrow \mathrm{Imperfect}(\hat{}[\mathbf{praise}'(x, y)])]$

$\langle$LAUDĀRE, {3 plural imperfect indicative active}$\rangle$

$$\lambda y \lambda Z_3 \forall x [\mathrm{x} \in Z_3 \rightarrow \mathrm{Imperfect}(\hat{}[\textbf{praise}'(x, y)]))]$$

$$\langle \text{LAUDĀRE}, \{\text{3 plural imperfect indicative active}\} \rangle$$

$\lambda y \lambda Z_3 \forall x [x \in Z_3 \rightarrow \text{Imperfect}(\hat{}[\textbf{praise}'(x, y)])]$

$\langle$LAUDĀRE, {3 plural imperfect indicative active}$\rangle$

Even syncretic word forms may be compositional in this sense: the difference in content between dative *amīcō* and ablative *amīcō* is deducible from the distinct positions that they occupy in the paradigm of the lexeme AMĪCUS.

Declensional paradigm of Latin AMĪCUS 'friend'		
	Singular	Plural
Nominative	*amīcus*	*amīcī*
Vocative	*amīce*	*amīcī*
Genitive	*amīcī*	*amīcōrum*
Dative	*amīcō*	*amīcīs*
Accusative	*amīcum*	*amīcōs*
Ablative	*amīcō*	*amīcīs*

λ*x*[**friend**'(*x*) & **beneficiary**'(*x*, *e*)]

⟨AMĪCUS, {dative singular}⟩

λ*x*[**friend**'(*x*) & **source**'(*x*, *e*)]

⟨AMĪCUS, {ablative singular}⟩

λ*x*[**friend**'(*x*) & **beneficiary**'(*x*, *e*)]

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⟨AMĪCUS, {dative singular}⟩

λ*x*[**friend**'(*x*) & **source**'(*x*, *e*)]

⟨AMĪCUS, {ablative singular}⟩

$$\lambda y \lambda X[X \subseteq \text{we}' \rightarrow \text{Future}(\hat{}[\textbf{take}'(X, y)]))]$$

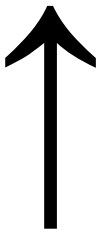
⟨CAPERE, {1 pl imperfective future indicative active}⟩

The dual role of cells in paradigm-based theories of morphology

In paradigm-based theories of inflection, a cell determines the semantic interpretation of the word form that realizes it.

$$\lambda y \lambda Z_3 \forall x [x \in Z_3 \rightarrow \text{Imperfect}(\hat{}[\textbf{praise}'(x, y)])]$$

SEMANTIC INTERPRETATION



⟨LAUDĀRE, {3 plural imperfect indicative active}⟩

Besides determining semantic interpretation, a paradigm cell also determines the morphological form of the word form that realizes it.

⟨LAUDĀRE, {3 plural imperfect indicative active}⟩

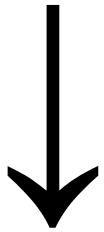
⟨LAUDĀRE, {3 plural imperfect indicative active}⟩

laudābant

⟨LAUDĀRE, {3 plural imperfect indicative active}⟩

laudā -ba -nt

⟨LAUDĀRE, {3 plural imperfect indicative active}⟩



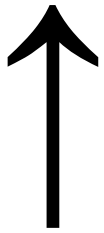
laudā -ba -nt

The **cell interface model** of the interface of semantic interpretation with inflectional morphology:

The cells of a lexeme's paradigm are the basis for both the semantic interpretation and the inflectional realization of its word forms.

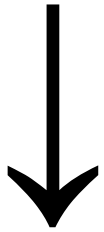
$\lambda y \lambda Z_3 \forall x[x \in Z_3 \rightarrow \text{Imperfect}(\hat{}[\textbf{praise}'(x, y)])]$

SEMANTIC INTERPRETATION



⟨LAUDĀRE, {3 plural imperfect indicative active}⟩

MORPHOLOGICAL REALIZATION



laudā-ba-nt

A problem for the cell interface model

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In some instances, the morphosyntactic property set that determines a word's semantic interpretation is apparently distinct from the set that determines its inflectional exponents.

A problem for the cell interface model

Two examples:

- Latin deponency
- Kashmiri morphomic tense inflection

Imperfective indicative forms of two Latin verbs

		MONĒRE ‘warn’			VERĒRĪ ‘fear’		
		Present	Imperfect	Future	Present	Imperfect	Future
ACTIVE	1sg	*moneō*	*monēbam*	*monēbō*	*vereor*	*verēbar*	*verēbor*
	2sg	*monēs*	*monēbās*	*monēbis*	*verēris*	*verēbāris*	*verēberis*
	3sg	*monet*	*monēbat*	*monēbit*	*verētur*	*verēbātur*	*verēbitur*
	1pl	*monēmus*	*monēbāmus*	*monēbimus*	*verēmur*	*verēbāmur*	*verēbimur*
	2pl	*monētis*	*monēbātis*	*monēbitis*	*verēminī*	*verēbāminī*	*verēbiminī*
	3pl	*monent*	*monēbant*	*monēbunt*	*verentur*	*verēbantur*	*verēbuntur*
PASSIVE	1sg	*moneor*	*monēbar*	*monēbor*			
	2sg	*monēris*	*monēbāris*	*monēberis*			
	3sg	*monētur*	*monēbātur*	*monēbitur*			
	1pl	*monēmur*	*monēbāmur*	*monēbimur*			
	2pl	*monēminī*	*monēbāminī*	*monēbiminī*			
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	2sg	*monēs*	*monēbās*	*monēbis*	*verēris*	*verēbāris*	*verēberis*
	3sg	*monet*	*monēbat*	*monēbit*	*verētur*	*verēbātur*	*verēbitur*
	1pl	*monēmus*	*monēbāmus*	*monēbimus*	*verēmur*	*verēbāmur*	*verēbimur*
	2pl	*monētis*	*monēbātis*	*monēbitis*	*verēminī*	*verēbāminī*	*verēbiminī*
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PASSIVE	1sg	*moneor*	*monēbar*	*monēbor*			
	2sg	*monēris*	*monēbāris*	*monēberis*			
	3sg	*monētur*	*monēbātur*	*monēbitur*			
	1pl	*monēmur*	*monēbāmur*	*monēbimur*			
	2pl	*monēminī*	*monēbāminī*	*monēbiminī*			
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	3sg	*monet*	*monēbat*	*monēbit*			
	1pl	*monēmus*	*monēbāmus*	*monēbimus*			
	2pl	*monētis*	*monēbātis*	*monēbitis*			
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PASSIVE	1sg	*moneor*	*monēbar*	*monēbor*	*vereor*	*verēbar*	*verēbor*
	2sg	*monēris*	*monēbāris*	*monēberis*	*verēris*	*verēbāris*	*verēberis*
	3sg	*monētur*	*monēbātur*	*monēbitur*	*verētur*	*verēbātur*	*verēbitur*
	1pl	*monēmur*	*monēbāmur*	*monēbimur*	*verēmur*	*verēbāmur*	*verēbimur*
	2pl	*monēminī*	*monēbāminī*	*monēbiminī*	*verēminī*	*verēbāminī*	*verēbiminī*
	3pl	*monentur*	*monēbantur*	*monēbuntur*	*verentur*	*verēbantur*	*verēbuntur*

The **paradigm linkage model** of the interface of semantic interpretation with inflectional morphology

The **paradigm linkage model** of the interface of semantic interpretation with inflectional morphology:

A lexeme has two distinct paradigms, one the basis for the semantic interpretation of its word forms, the other the basis for their inflectional realization.

The **paradigm linkage model** of the interface of semantic interpretation with inflectional morphology:

A language's inflectional morphology must therefore define:

- its inflectional exponents
- the relation between the two sorts of paradigm

Two types of paradigm in natural language

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Content paradigm a set of **content cells**, each the pairing of a lexeme L with a morphosyntactic property set with which L may be associated in syntax

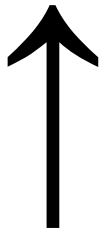
Two types of paradigm in natural language

Content paradigm	a set of **content cells**, each the pairing of a lexeme L with a morphosyntactic property set with which L may be associated in syntax
Form paradigm	a set of **form cells**, each the pairing of a stem with a morphosyntactic property set for which it is inflectable

Content: ⟨LAUDĀRE, {3 plural imperfect indicative active}⟩

$$\lambda y \lambda Z_3 \forall x [x \in Z_3 \rightarrow \text{Imperfect}(\hat{}[\textbf{praise}'(x, y)])]$$

SEMANTIC INTERPRETATION



Content: ⟨LAUDĀRE, {3 plural imperfect indicative active}⟩

Form: ⟨*laudā*, {3 plural imperfect indicative active}⟩

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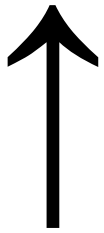
MORPHOLOGICAL REALIZATION

laudā-ba-nt

$\lambda y \lambda Z_3 \forall x [x \in Z_3 \rightarrow \text{Imperfect}(\hat{}[\textbf{praise}'(x, y)])]$

SEMANTIC INTERPRETATION



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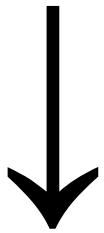
MORPHOLOGICAL REALIZATION



laudā-ba-nt

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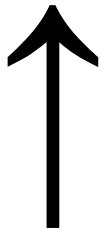
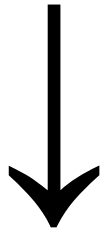
SEMANTIC INTERPRETATION



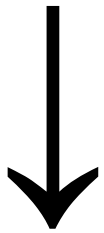
Content: ⟨LAUDĀRE, {3 plural imperfect indicative active}⟩

PARADIGM LINKAGE



Form: ⟨*laudā*, {3 plural imperfect indicative active}⟩

MORPHOLOGICAL REALIZATION



laudā-ba-nt

⟨MONĒRE, {3sg future indic active}⟩

⟨VERĒRĪ, {3sg future indic active}⟩

⟨MONĒRE, {3sg future indic passive}⟩

Content cells

$\lambda y \lambda x_3$[Future(ˆ[**warn**'(x_3, y)])]

↑

⟨MONĒRE, {3sg future indic active}⟩

⟨VERĒRĪ, {3sg future indic active}⟩

$\lambda y_3 \exists x$[Future(ˆ[**warn**'(x, y_3)])]

↑

⟨MONĒRE, {3sg future indic passive}⟩

Content cells

$\lambda y \lambda x_3$[Future(ˆ[**warn**'(x_3, y)])]

⟨MONĒRE, {3sg future indic active}⟩

⟨VERĒRĪ, {3sg future indic active}⟩

$\lambda y_3 \exists x$[Future(ˆ[**warn**'(x, y_3)])]

⟨MONĒRE, {3sg future indic passive}⟩

Content cells

$\lambda y \lambda x_3$[Future(ˆ[**warn**'(x_3, y)])]

⟨MONĒRE, {3sg future indic active}⟩

$\lambda y \lambda x_3$[Future(ˆ[**fear**'(x_3, y)])]

⟨VERĒRĪ, {3sg future indic active}⟩

$\lambda y_3 \exists x$[Future(ˆ[**warn**'(x, y_3)])]

⟨MONĒRE, {3sg future indic passive}⟩

Content cells

⟨MONĒRE, {3sg future indic active}⟩

⟨*monē*, {3sg future indic active}⟩

monēbit

⟨VERĒRĪ, {3sg future indic active}⟩

Form cells

⟨MONĒRE, {3sg future indic passive}⟩

⟨*monē*, {3sg future indic passive}⟩

monēbitur

⟨MONĒRE, {3sg future indic active}⟩

↓

⟨*monē*, {3sg future indic active}⟩

↓

monēbit

⟨VERĒRĪ, {3sg future indic active}⟩

Form cells

⟨MONĒRE, {3sg future indic passive}⟩

↓

⟨*monē*, {3sg future indic passive}⟩

↓

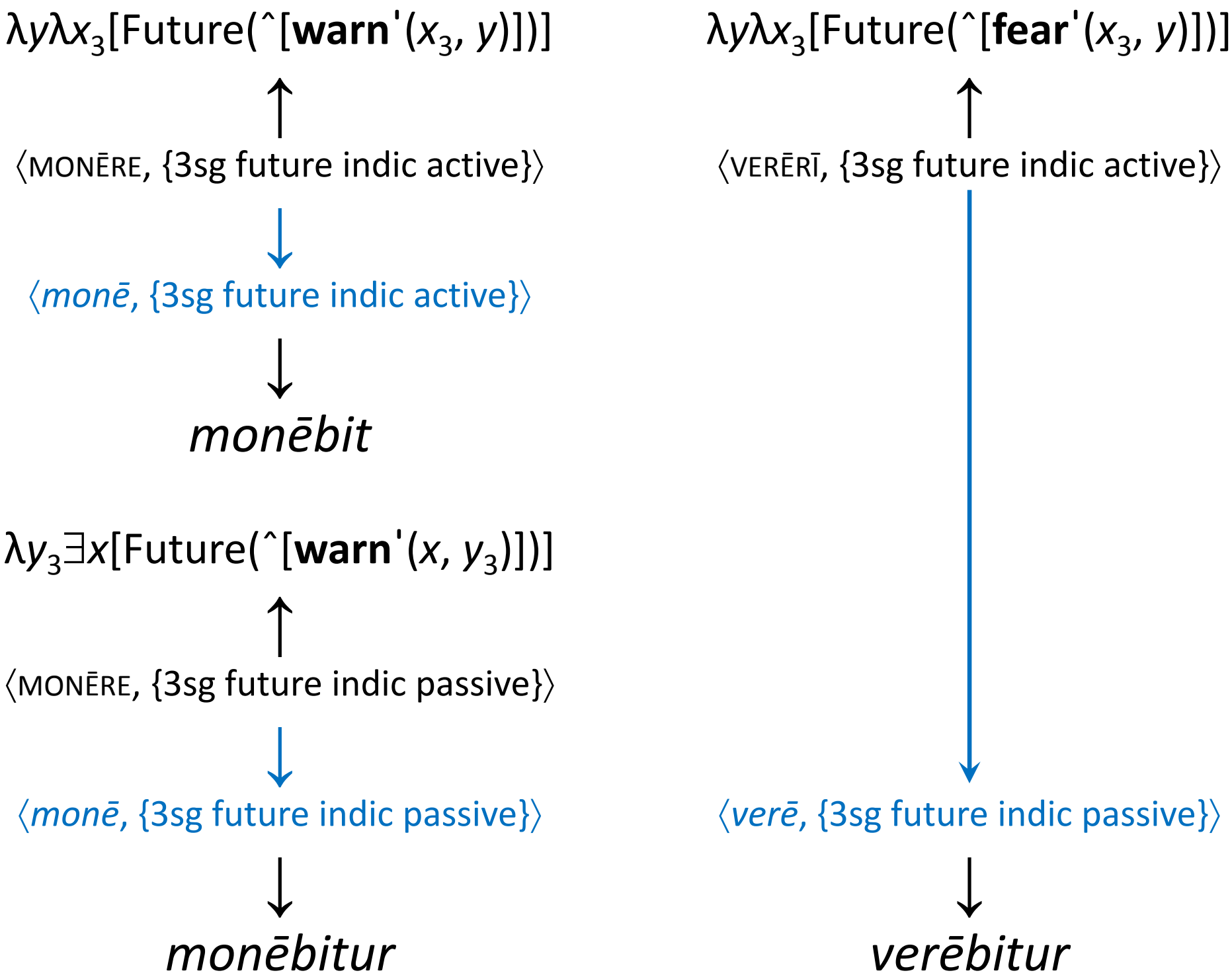
monēbitur

↓

⟨*verē*, {3sg future indic passive}⟩

↓

verēbitur


λyλx3[Future(ˆ[warn'(x3, y)])]
⟨MONĒRE, {3sg future indic active}⟩
⟨monē, {3sg future indic active}⟩
monēbit
λy3∃x[Future(ˆ[warn'(x, y3)])]
⟨MONĒRE, {3sg future indic passive}⟩
⟨monē, {3sg future indic passive}⟩
monēbitur
λyλx3[Future(ˆ[fear'(x3, y)])]
⟨VERĒRĪ, {3sg future indic active}⟩
⟨verē, {3sg future indic passive}⟩
verēbitur

Kashmiri morphomic tense inflection

In Kashmiri, verbs have three past tenses:

- recent past
- indefinite past
- remote past.

A Kashmiri verb: WUP ‘burn inside’, Conj. II

			Masc	Fem
Recent past	Sg	1	*wupus*	*wupÜs*
		2	*wupukh*	*wupÜkh*
		3	*wupU*	*wupÜ*
	Pl	1	*wupl*	*wupɛ*
		2	*wuplwa*	*wupɛwa*
		3	*wupl*	*wupɛ*
Indefinite past	Sg	1	*wupyōs*	*wupyēyɛs*
		2	*wupyōkh*	*wupyēyɛkh*
		3	*wupyōv*	*wupyēyɛ*
	Pl	1	*wupyēy*	*wupyēyɛ*
		2	*wupyēwa*	*wupyēyɛwa*
		3	*wupyēy*	*wupyēyɛ*
Remote past	Sg	1	*wupyās*	*wupyēyɛs*
		2	*wupyākh*	*wupyēyɛkh*
		3	*wupyāv*	*wupyēyɛ*
	Pl	1	*wupyāy*	*wupyēyɛ*
		2	*wupyāwa*	*wupyēyɛwa*
		3	*wupyāy*	*wupyēyɛ*

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		3	*wupU*	*wupÜ*
	Pl	1	*wupl*	*wupɛ*
		2	*wuplwa*	*wupɛwa*
		3	*wupl*	*wupɛ*
Indefinite past	Sg	1	*wupyōs*	*wupyēyɛs*
		2	*wupyōkh*	*wupyēyɛkh*
		3	*wupyōv*	*wupyēyɛ*
	Pl	1	*wupyēy*	*wupyēyɛ*
		2	*wupyēwa*	*wupyēyɛwa*
		3	*wupyēy*	*wupyēyɛ*
Remote past	Sg	1	*wupyās*	*wupyēyɛs*
		2	*wupyākh*	*wupyēyɛkh*
		3	*wupyāv*	*wupyēyɛ*
	Pl	1	*wupyāy*	*wupyēyɛ*
		2	*wupyāwa*	*wupyēyɛwa*
		3	*wupyāy*	*wupyēyɛ*

Two Kashmiri verbs: WUP ‘burn inside’, Conj. II WUPH ‘fly’, Conj. III

			WUP Masc	WUP Fem	WUPH Masc	WUPH Fem
Recent past	Sg	1	*wupus*	*wupÜs*	*wuphyōs*	*wuphyēyɛs*
		2	*wupukh*	*wupÜkh*	*wuphyōkh*	*wuphyēyɛkh*
		3	*wupU*	*wupÜ*	*wuphyōv*	*wuphyēyɛ*
	Pl	1	*wupl*	*wupɛ*	*wuphyēy*	*wuphyēyɛ*
		2	*wuplwa*	*wupɛwa*	*wuphyēwa*	*wuphyēyɛwa*
		3	*wupl*	*wupɛ*	*wuphyēy*	*wuphyēyɛ*
Indefinite past	Sg	1	*wupyōs*	*wupyēyɛs*	*wuphyās*	*wuphyēyɛs*
		2	*wupyōkh*	*wupyēyɛkh*	*wuphyākh*	*wuphyēyɛkh*
		3	*wupyōv*	*wupyēyɛ*	*wuphyāv*	*wuphyēyɛ*
	Pl	1	*wupyēy*	*wupyēyɛ*	*wuphyāy*	*wuphyēyɛ*
		2	*wupyēwa*	*wupyēyɛwa*	*wuphyāwa*	*wuphyēyɛwa*
		3	*wupyēy*	*wupyēyɛ*	*wuphyāy*	*wuphyēyɛ*
Remote past	Sg	1	*wupyās*	*wupyēyɛs*	*wuphiyās*	*wuphiyēyɛs*
		2	*wupyākh*	*wupyēyɛkh*	*wuphiyākh*	*wuphiyēyɛkh*
		3	*wupyāv*	*wupyēyɛ*	*wuphiyāv*	*wuphiyēyɛ*
	Pl	1	*wupyāy*	*wupyēyɛ*	*wuphiyāy*	*wuphiyēyɛ*
		2	*wupyāwa*	*wupyēyɛwa*	*wuphiyāwa*	*wuphiyēyɛwa*
		3	*wupyāy*	*wupyēyɛ*	*wuphiyāy*	*wuphiyēyɛ*

Two Kashmiri conjugations:			Conjugation II		Conjugation III	
			Masc	Fem	Masc	Fem
Recent past	Sg	1	*-us*	*-Üs*	*-yōs*	*-yēyɛs*
		2	*-ukh*	*-Ükh*	*-yōkh*	*-yēyɛkh*
		3	*-U*	*-Ü*	*-yōv*	*-yēyɛ*
	Pl	1	*-I*	*-ɛ*	*-yēy*	*-yēyɛ*
		2	*-Iwa*	*-ɛwa*	*-yēwa*	*-yēyɛwa*
		3	*-I*	*-ɛ*	*-yēy*	*-yēyɛ*
Indefinite past	Sg	1	*-yōs*	*-yēyɛs*	*-yās*	*-yēyɛs*
		2	*-yōkh*	*-yēyɛkh*	*-yākh*	*-yēyɛkh*
		3	*-yōv*	*-yēyɛ*	*-yāv*	*-yēyɛ*
	Pl	1	*-yēy*	*-yēyɛ*	*-yāy*	*-yēyɛ*
		2	*-yēwa*	*-yēyɛwa*	*-yāwa*	*-yēyɛwa*
		3	*-yēy*	*-yēyɛ*	*-yāy*	*-yēyɛ*
Remote past	Sg	1	*-yās*	*-yēyɛs*	*-iyās*	*-iyēyɛs*
		2	*-yākh*	*-yēyɛkh*	*-iyākh*	*-iyēyɛkh*
		3	*-yāv*	*-yēyɛ*	*-iyāv*	*-iyēyɛ*
	Pl	1	*-yāy*	*-yēyɛ*	*-iyāy*	*-iyēyɛ*
		2	*-yāwa*	*-yēyɛwa*	*-iyāwa*	*-iyēyɛwa*
		3	*-yāy*	*-yēyɛ*	*-iyāy*	*-iyēyɛ*

Two Kashmiri conjugations:			Conjugation II		Conjugation III	
			Masc	Fem	Masc	Fem
Recent past	Sg	1	*-us*	*-Üs*	*-yōs*	*-yēyɛs*
		2	*-ukh*	*-Ükh*	*-yōkh*	*-yēyɛkh*
		3	*-U*	*-Ü*	*-yōv*	*-yēyɛ*
	Pl	1	*-I*	*-ɛ*	*-yēy*	*-yēyɛ*
		2	*-Iwa*	*-ɛwa*	*-yēwa*	*-yēyɛwa*
		3	*-I*	*-ɛ*	*-yēy*	*-yēyɛ*
Indefinite past	Sg	1	*-yōs*	*-yēyɛs*	*-yās*	*-yēyɛs*
		2	*-yōkh*	*-yēyɛkh*	*-yākh*	*-yēyɛkh*
		3	*-yōv*	*-yēyɛ*	*-yāv*	*-yēyɛ*
	Pl	1	*-yēy*	*-yēyɛ*	*-yāy*	*-yēyɛ*
		2	*-yēwa*	*-yēyɛwa*	*-yāwa*	*-yēyɛwa*
		3	*-yēy*	*-yēyɛ*	*-yāy*	*-yēyɛ*
Remote past	Sg	1	*-yās*	*-yēyɛs*	*-iyās*	*-iyēyɛs*
		2	*-yākh*	*-yēyɛkh*	*-iyākh*	*-iyēyɛkh*
		3	*-yāv*	*-yēyɛ*	*-iyāv*	*-iyēyɛ*
	Pl	1	*-yāy*	*-yēyɛ*	*-iyāy*	*-iyēyɛ*
		2	*-yāwa*	*-yēyɛwa*	*-iyāwa*	*-iyēyɛwa*
		3	*-yāy*	*-yēyɛ*	*-iyāy*	*-iyēyɛ*

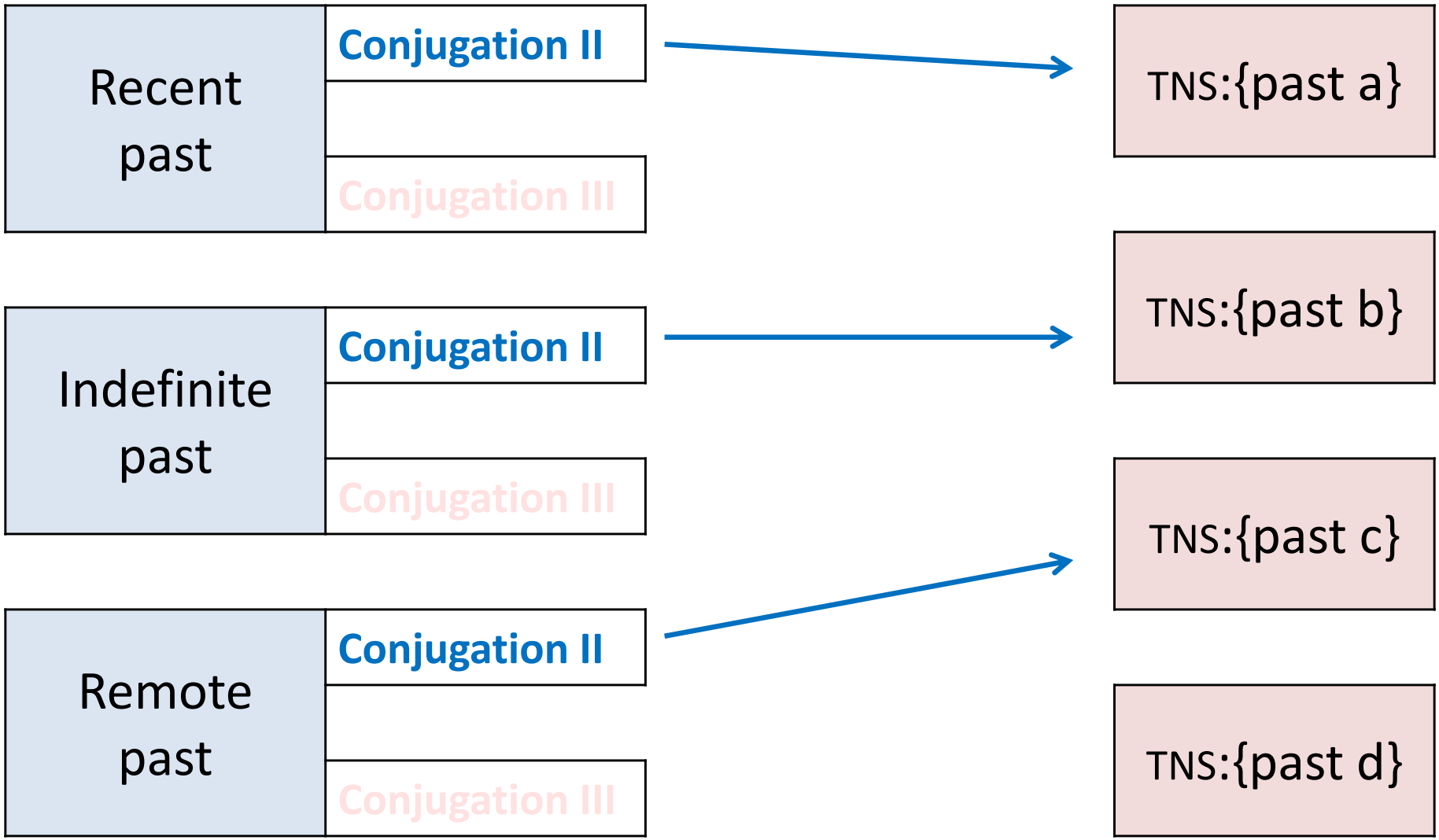
Two Kashmiri conjugations:			Conjugation II		Conjugation III	
			Masc	Fem	Masc	Fem
Recent past	Sg	1	*-us*	*-Üs*	*-yōs*	*-yēyɛs*
		2	*-ukh*	*-Ükh*	*-yōkh*	*-yēyɛkh*
		3	*-U*	*-Ü*	*-yōv*	*-yēyɛ*
	Pl	1	*-I*	*-ɛ*	*-yēy*	*-yēyɛ*
		2	*-Iwa*	*-ɛwa*	*-yēwa*	*-yēyɛwa*
		3	*-I*	*-ɛ*	*-yēy*	*-yēyɛ*
Indefinite past	Sg	1	*-yōs*	*-yēyɛs*	*-yās*	*-yēyɛs*
		2	*-yōkh*	*-yēyɛkh*	*-yākh*	*-yēyɛkh*
		3	*-yōv*	*-yēyɛ*	*-yāv*	*-yēyɛ*
	Pl	1	*-yēy*	*-yēyɛ*	*-yāy*	*-yēyɛ*
		2	*-yēwa*	*-yēyɛwa*	*-yāwa*	*-yēyɛwa*
		3	*-yēy*	*-yēyɛ*	*-yāy*	*-yēyɛ*
Remote past	Sg	1	*-yās*	*-yēyɛs*	*-iyās*	*-iyēyɛs*
		2	*-yākh*	*-yēyɛkh*	*-iyākh*	*-iyēyɛkh*
		3	*-yāv*	*-yēyɛ*	*-iyāv*	*-iyēyɛ*
	Pl	1	*-yāy*	*-yēyɛ*	*-iyāy*	*-iyēyɛ*
		2	*-yāwa*	*-yēyɛwa*	*-iyāwa*	*-iyēyɛwa*
		3	*-yāy*	*-yēyɛ*	*-iyāy*	*-iyēyɛ*

Two Kashmiri conjugations:			Conjugation II		Conjugation III	
			Masc	Fem	Masc	Fem
Recent past	Sg	1	*-us*	*-Üs*	*-yōs*	*-yēyɛs*
		2	*-ukh*	*-Ükh*	*-yōkh*	*-yēyɛkh*
		3	*-U*	*-Ü*	*-yōv*	*-yēyɛ*
	Pl	1	*-I*	*-ɛ*	*-yēy*	*-yēyɛ*
		2	*-Iwa*	*-ɛwa*	*-yēwa*	*-yēyɛwa*
		3	*-I*	*-ɛ*	*-yēy*	*-yēyɛ*
Indefinite past	Sg	1	*-yōs*	*-yēyɛs*	*-yās*	*-yēyɛs*
		2	*-yōkh*	*-yēyɛkh*	*-yākh*	*-yēyɛkh*
		3	*-yōv*	*-yēyɛ*	*-yāv*	*-yēyɛ*
	Pl	1	*-yēy*	*-yēyɛ*	*-yāy*	*-yēyɛ*
		2	*-yēwa*	*-yēyɛwa*	*-yāwa*	*-yēyɛwa*
		3	*-yēy*	*-yēyɛ*	*-yāy*	*-yēyɛ*
Remote past	Sg	1	*-yās*	*-yēyɛs*	*-iyās*	*-iyēyɛs*
		2	*-yākh*	*-yēyɛkh*	*-iyākh*	*-iyēyɛkh*
		3	*-yāv*	*-yēyɛ*	*-iyāv*	*-iyēyɛ*
	Pl	1	*-yāy*	*-yēyɛ*	*-iyāy*	*-iyēyɛ*
		2	*-yāwa*	*-yēyɛwa*	*-iyāwa*	*-iyēyɛwa*
		3	*-yāy*	*-yēyɛ*	*-iyāy*	*-iyēyɛ*

From the point of view of content, there are three past tenses in Kashmiri; but from the point of view of form, there are four.

Recent past	Conjugation II	TNS:{past a}
	Conjugation III	
Indefinite past	Conjugation II	TNS:{past b}
	Conjugation III	TNS:{past c}
Remote past	Conjugation II	
	Conjugation III	TNS:{past d}

From the point of view of content, there are three past tenses in Kashmiri; but from the point of view of form, there are four.



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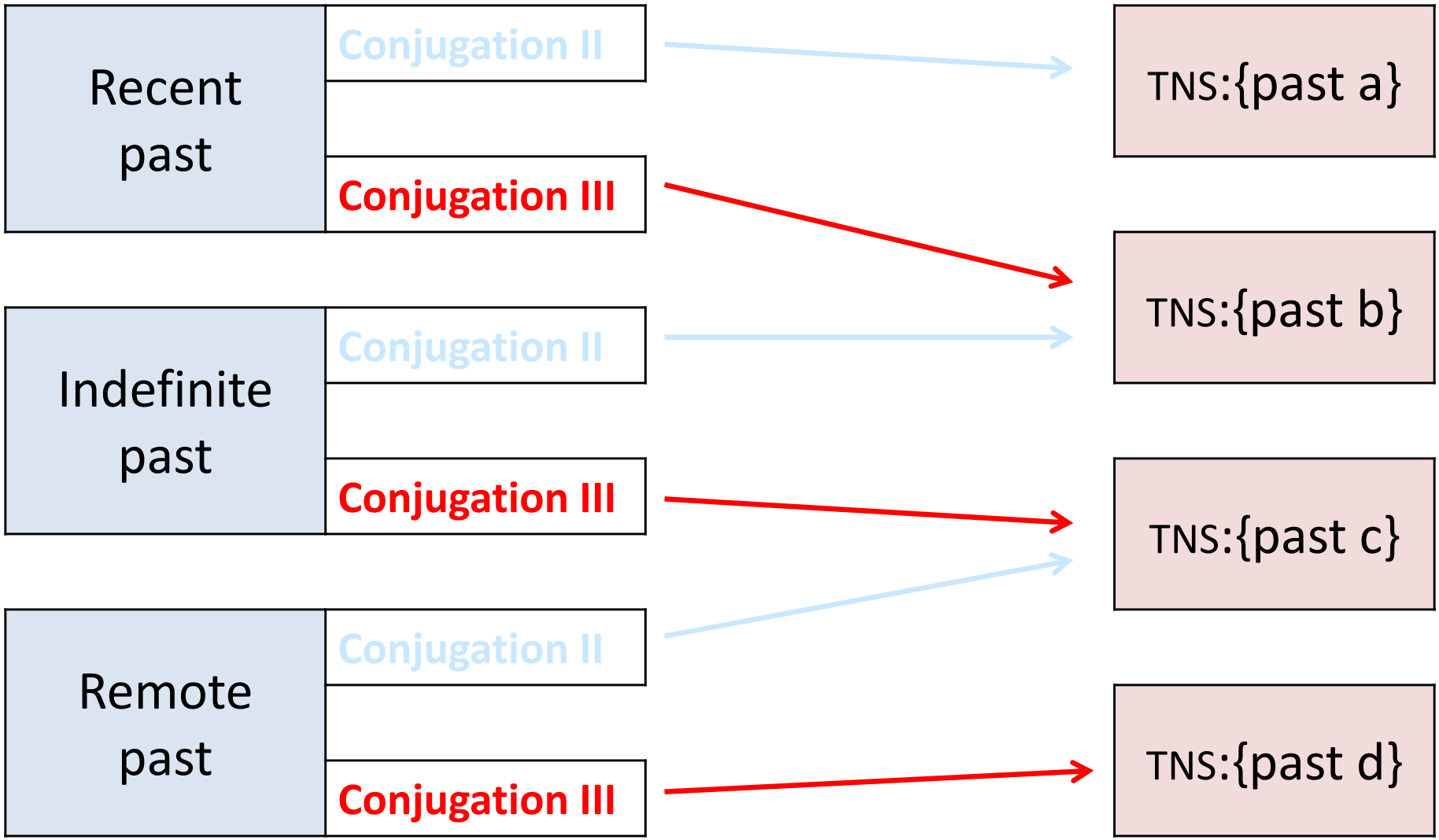

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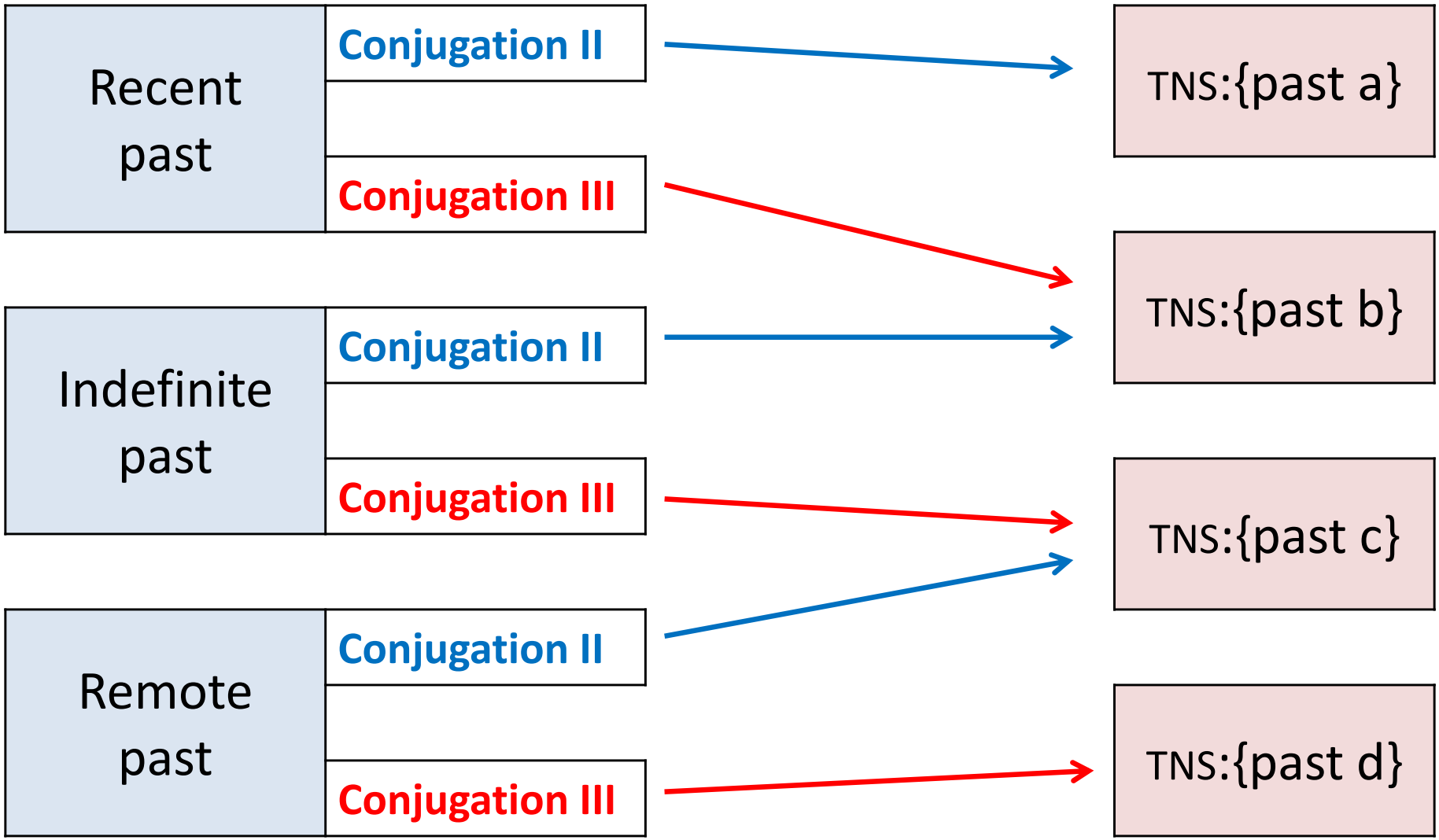


The tense properties ‘a’, ‘b’, ‘c’ and ‘d’ are morphomic (Aronoff 1994). None correlates exactly with any of the three past-tense categories of a Kashmiri verb (recent, indefinite or remote past).

Their function is morphological: each participates in a uniform pattern of inflectional realization.

⟨WUP, {AGR:{3sg masc} TNS:indefPast}⟩

⟨WUPH, {AGR:{3sg masc} TNS:indefPast}⟩

Content cells

⟨WUP, {AGR:{3sg masc} TNS:remPast}⟩

$\lambda x_{[3,masc]}$[IndefPast(^[**burn_inside**'(x)])]

↑

⟨WUP, {AGR:{3sg masc} TNS:indefPast}⟩ ⟨WUPH, {AGR:{3sg masc} TNS:indefPast}⟩

$\lambda x_{[3,masc]}$[RemPast(^[**burn_inside**'(x)])]

↑

⟨WUP, {AGR:{3sg masc} TNS:remPast}⟩

Content cells

$\lambda x_{[3,masc]}$[IndefPast(^[**burn_inside**'(x)])]

↑

⟨WUP, {AGR:{3sg masc} TNS:indefPast}⟩

⟨WUPH, {AGR:{3sg masc} TNS:indefPast}⟩

$\lambda x_{[3,masc]}$[RemPast(^[**burn_inside**'(x)])]

↑

⟨WUP, {AGR:{3sg masc} TNS:remPast}⟩

Content cells

$\lambda x_{[3,masc]}$[IndefPast(^[**burn_inside**'(x)])]

↑

⟨WUP, {AGR:{3sg masc} TNS:indefPast}⟩

$\lambda x_{[3,masc]}$[IndefPast(^[**fly**'(x)])]

↑

⟨WUPH, {AGR:{3sg masc} TNS:indefPast}⟩

$\lambda x_{[3,masc]}$[RemPast(^[**burn_inside**'(x)])]

↑

⟨WUP, {AGR:{3sg masc} TNS:remPast}⟩

Content cells

⟨WUP, {AGR:{3sg masc} TNS:indefPast}⟩

⟨WUPH, {AGR:{3sg masc} TNS:indefPast}⟩

⟨WUP, {AGR:{3sg masc} TNS:remPast}⟩

⟨WUP, {AGR:{3sg masc} TNS:indefPast}⟩

⟨*wup*, {AGR:{3sg masc} TNS:b}⟩

wupyōv

⟨WUPH, {AGR:{3sg masc} TNS:indefPast}⟩

Form cells

⟨WUP, {AGR:{3sg masc} TNS:remPast}⟩

⟨*wup*, {AGR:{3sg masc} TNS:c}⟩

wupyāv

⟨WUP, {AGR:{3sg masc} TNS:indefPast}⟩

↓

⟨*wup*, {AGR:{3sg masc} TNS:b}⟩

↓

wupyōv

⟨WUPH, {AGR:{3sg masc} TNS:indefPast}⟩

↓

⟨*wuph*, {AGR:{3sg masc} TNS:c}⟩

↓

wuphyāv

Form cells

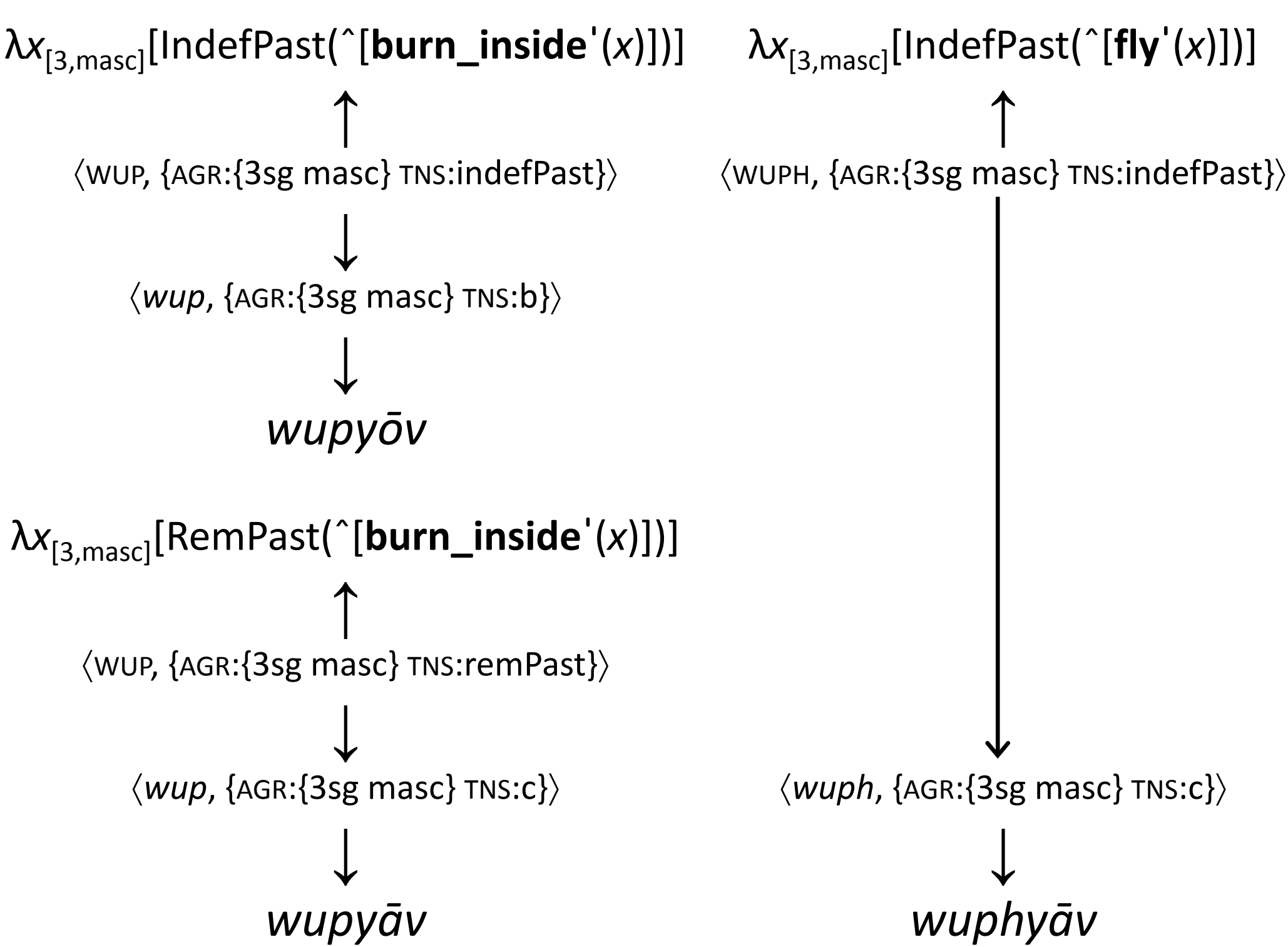
⟨WUP, {AGR:{3sg masc} TNS:remPast}⟩

↓

⟨*wup*, {AGR:{3sg masc} TNS:c}⟩

↓

wupyāv


λx[3,masc][IndefPast(^[burn_inside'(x)])]
⟨WUP, {AGR:{3sg masc} TNS:indefPast}⟩
⟨wup, {AGR:{3sg masc} TNS:b}⟩
wupyōv
λx[3,masc][RemPast(^[burn_inside'(x)])]
⟨WUP, {AGR:{3sg masc} TNS:remPast}⟩
⟨wup, {AGR:{3sg masc} TNS:c}⟩
wupyāv
λx[3,masc][IndefPast(^[fly'(x)])]
⟨WUPH, {AGR:{3sg masc} TNS:indefPast}⟩
⟨wuph, {AGR:{3sg masc} TNS:c}⟩
wuphyāv

In this approach, a language's inflectional morphology must fulfill two tasks. It must naturally define the ***morphological realization*** of a form cell's property set. But in addition, it must define the principles of ***paradigm linkage*** by which content cells are related to form cells.

Morphological realization rules for Kashmiri verbs	**Block i**	i, X [V], σ:{TNS:{past d}} → X*i*
	Block ii	ii, X [V], σ:{TNS:{past a} AGR:{sg masc}} → X*u* ii, X [V], σ:{TNS:{past a} AGR:{3 sg masc}} → X*U* ii, X [V], σ:{TNS:{past a} AGR:{pl masc}} → X*I* ii, X [V], σ:{TNS:{past a} AGR:{sg fem}} → X*Ü* ii, X [V], σ:{TNS:{past a} AGR:{pl fem}} → X*ɛ* ii, X [V], σ:{TNS:{past}} → X*y* ii, X [V], σ:{TNS:{past a}} → X
	Block iii	iii, X [V], σ:{TNS:{past b} AGR:{masc sg}} → X*ō* iii, X [V], σ:{TNS:{past b} AGR:{masc pl}} → X*ē* iii, X [V], σ:{TNS:{past} AGR:{masc}} → X*ā* iii, X [V], σ:{TNS:{past} AGR:{fem}} → X*ēyɛ* iii, X [V], σ:{TNS:{past a} AGR:{masc/fem}} → X
	Block iv	iv, X [V], σ:{AGR:{1 sg}} → X*s* iv, X [V], σ:{AGR:{2 sg}} → X*kh* iv, X [V], σ:{AGR:{2 pl}} → X*wa* iv, X [V], σ:{AGR:{3 sg masc}} → X*v* iv, X [V], σ:{AGR:{3 pl masc}} → X*y* iv, X [V], σ:{TNS:{past a} AGR:{3 sg/pl masc}} → X

I assume that paradigm linkage is best accomplished through the definition of three kinds of functions:

- a ***stem function***, which maps a content cell onto the stem form employed in its realization;
- ***property mappings***, which map a content cell's morphosyntactic property set onto the property set of the corresponding form cell; and
- a ***correspondence function***, which determines a content cell's corresponding form cell by invoking the appropriate stem function and property mapping.

The ***Stem*** function	
Stem(⟨WUP, σ⟩) = *wup*	[‘burn inside’]
Stem(⟨WUPH, σ⟩) = *wuph*	[‘fly’]

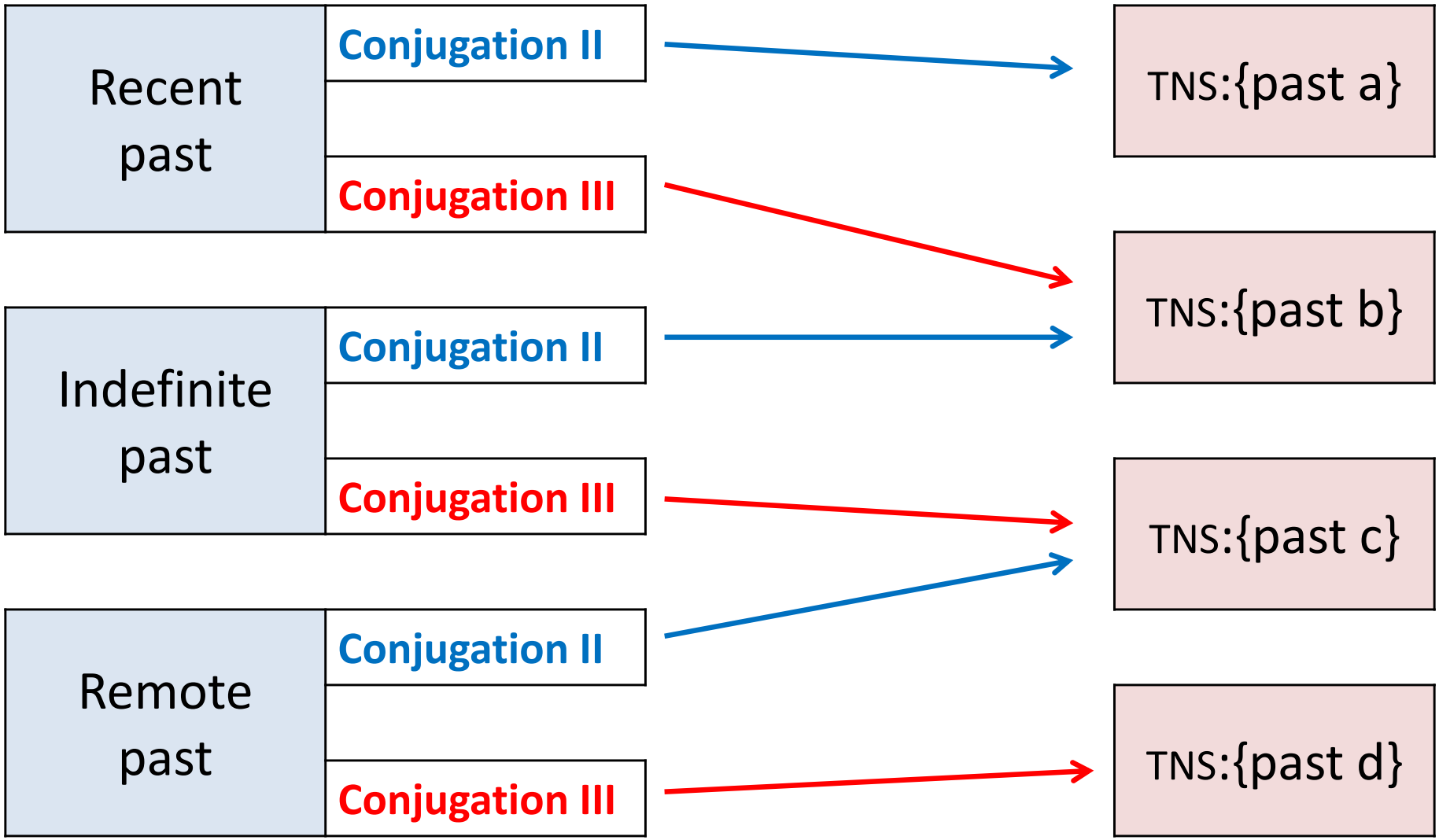
The ***Stem*** function

Stem(⟨WUP, σ⟩) = *wup*	[‘burn inside’]
Stem(⟨WUPH, σ⟩) = *wuph*	[‘fly’]

Inflection classes may be assumed to be classes of stems rather than classes of lexemes. Thus, the inflectional difference between WUP and WUPH is an effect of the fact that the stem *wup* belongs to the second conjugation and the stem *wuph*, to the third.

The property mappings ***pm2***, ***pm3***		

From the point of view of content, there are three past tenses in Kashmiri; but from the point of view of form, there are four.



The property mappings ***pm2***, ***pm3***	***pm2***(σ:{TNS:{recent}}) = σ:{TNS:{a}} ***pm2***(σ:{TNS:{indefinite}}) = σ:{TNS:{b}} ***pm2***(σ:{TNS:{remote}}) = σ:{TNS:{c}}

The property mappings ***pm2***, ***pm3***	***pm2***(σ:{TNS:{recent}}) = σ:{TNS:{a}} ***pm2***(σ:{TNS:{indefinite}}) = σ:{TNS:{b}} ***pm2***(σ:{TNS:{remote}}) = σ:{TNS:{c}}
	pm3(σ:{TNS:{recent}}) = σ:{TNS:{b}} ***pm3***(σ:{TNS:{indefinite}}) = σ:{TNS:{c}} ***pm3***(σ:{TNS:{remote}}) = σ:{TNS:{d}}

The property mappings ***pm2***, ***pm3***	***pm2***(σ:{TNS:{recent}}) = σ:{TNS:{a}} ***pm2***(σ:{TNS:{indefinite}}) = σ:{TNS:{b}} ***pm2***(σ:{TNS:{remote}}) = σ:{TNS:{c}}
	pm3(σ:{TNS:{recent}}) = σ:{TNS:{b}} ***pm3***(σ:{TNS:{indefinite}}) = σ:{TNS:{c}} ***pm3***(σ:{TNS:{remote}}) = σ:{TNS:{d}}

The correspondence function ***Corr***

If ***Stem***(⟨L, σ⟩) belongs to the second conjugation,

$$\textbf{\textit{Corr}}(\langle L, \sigma \rangle) = \langle \textbf{\textit{Stem}}(\langle L, \sigma \rangle), \textbf{\textit{pm2}}(\sigma) \rangle.$$

The property mappings ***pm2***, ***pm3***	***pm2***(σ:{TNS:{recent}}) = σ:{TNS:{a}} ***pm2***(σ:{TNS:{indefinite}}) = σ:{TNS:{b}} ***pm2***(σ:{TNS:{remote}}) = σ:{TNS:{c}}
	pm3(σ:{TNS:{recent}}) = σ:{TNS:{b}} ***pm3***(σ:{TNS:{indefinite}}) = σ:{TNS:{c}} ***pm3***(σ:{TNS:{remote}}) = σ:{TNS:{d}}

The correspondence function ***Corr***
If ***Stem***(⟨L, σ⟩) belongs to the second conjugation, ***Corr***(⟨L, σ⟩) = ⟨***Stem***(⟨L, σ⟩), ***pm2***(σ)⟩.
If ***Stem***(⟨L, σ⟩) belongs to the third conjugation, ***Corr***(⟨L, σ⟩) = ⟨***Stem***(⟨L, σ⟩), ***pm3***(σ)⟩.

Summary

The cell interface model of the interface of semantics with inflectional morphology is too restrictive.

Phenomena such as deponency and morphomic tense inflection show that the properties that determine a word form's semantic interpretation need not be those that determine its inflectional realization.

The paradigm linkage model accommodates this fact about the morphology /semantic interface.

John left.

$\exists$t[PAST(t) & AT(t, ^[**leave‘**(**John'**)])]

John left.

$\exists t$[PAST(t) & AT(t, ^[**leave‘**(**John'**)])]

↑

Quantificational component

John left.

$\exists$t[PAST(t) & AT(t, ^[**leave‘(John'**)])]

↑

Predicative component

John left.

$\exists$t[PAST(t) & AT(t, ^[**leave‘(John'**)])]

↑

Situative component

John left.

$\exists$t[PAST(t) & AT(t, ^[**leave‘**(**John'**)])]

↑

Situative component

leave $\Rightarrow$ **leave‘**

left $\Rightarrow$ λx[PAST(t) & AT(t, ^[**leave‘**(x)])]

A paradigm linkage interface allows various phenomena to be reconceived

Defectiveness

A content cell may fail to correspond to a form cell; that is, a content cell $\langle L, \sigma \rangle$ may be such that ***Corr***$(\langle L, \sigma \rangle)$ is undefined.

Syncretism

Two or more cells in the same content paradigm may share their corresponding form cell; that is, two content cells $\langle L, \sigma \rangle$, $\langle L, \tau \rangle$ may be such that

$$\textbf{\textit{Corr}}(\langle L, \sigma \rangle) = \textbf{\textit{Corr}}(\langle L, \tau \rangle).$$

Homomorphy

(1) a. *He **wears/wore/has worn** combat boots.*

b. *He **wears/wore/has worn** away the grass with all his marching.*

(2) a. *She **sticks/stuck/has stuck*** me in the side with her pen.

b. *This glue **sticks/stuck/has stuck** to my fingers.*

(3) a. *He **casts/cast/has cast** spells on everyone.*

b. *In every film, she **casts/cast/has cast** you as a small-time hood.*

(4) a. *She **draws/drew/has drawn** a new picture.*

b. *She **draws/drew/has drawn** the curtain.*

(5) a. *He **sews*** **[soz]*/sewed*** **[sod]*/has sewn*** **[son]** *on another patch.*

b. *He will reap what he **sows*** **[soz]*/sowed*** **[sod]*/has sown*** **[son]**.

Homomorphy

Two or more content paradigms may correspond to a single form paradigm; that is, two content cells $\langle L_1, \sigma \rangle$, $\langle L_2, \sigma \rangle$ may be such that

$$\textbf{\textit{Corr}}(\langle L_1, \sigma \rangle) = \textbf{\textit{Corr}}(\langle L_2, \sigma \rangle).$$