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A declarative approach to language change: regularization as realignment

A declarative approach to language change: regularization as realignment¹

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1 Introduction

In the play *The Merchant* by the 2nd century BC playwright Plautus one of the characters under his breath criticizes his neighbor's authoritarian treatment of the domestic help, complaining that 'he encouraged the cooks just as a coxswain encourages the oarsmen'. For both instances of 'encourage' Plautus uses *hortor*, a transitive verb whose external argument is 'he' in the first instance and 'coxswain' in the second, both nominative marked. For the internal argument we have 'cooks' and 'oarsmen', both accusative marked. This is typical for active transitive constructions in Latin. We would therefore expect *active* morphology for the verb; however, we actually get *passive* morphology. This is shown in (1) when we compare the gloss with the translation (PASS is passive, ACT is active).

- (1) sed coqu-os, quasi in mar-i
but cook- ACC.PL, as at sea- ABL.SG
sol-et hortator remig-es
wont-3SG.PRES.ACT encourager. NOM.SG oarsman-ACC.PL
hort-ariet ita hort-a-batur
encourage- PRES.INF.PASS thus exhort-3SG.IMPF.PASS
"but he exhorted the cooks, just as the coxswain is wont to exhort the oarsmen."
Plautus *Mercator*, ll. 695-97

After a number of centuries, a change takes place in *hortor* such that the syntactic interpretation of active is realigned with active morphological expression on the verb. In (2) we have an excerpt from Luculentius, a theologian writing in the 5th to 6th centuries AD.

- (2) Horta-bat caeter-os Apostol-us:
encourage-3PL.IMPF.ACT other-ACC.PL Apostle-NOM.SG:
"The Apostle encouraged (=ACT) the others"
Luculentius *Commentary on Romans XII 6*

¹ I would like to thank Greg Stump for comments on an earlier draft of this paper and discussions on paradigm linkage, and also Amanda Barie for editorial assistance. Any errors are mine.

The verb *hortor* is what is called a *deponent* verb, characterized as bearing passive morphology in active syntactic contexts. In classical Latin there were well over a thousand deponents. By the time of Proto-Romance all these deponents had been regularized in the same manner as *hortor*. In this paper I consider how best to model lexical regularization as a type of language change, and more specifically how to capture regularization when it is a question of realigning the syntactic function with the expected morphological expression. While it seems natural to approach language change in procedural terms, I will argue that a declarative / static approach is more natural for at least certain types of lexical change, specifically change that involves a reorganization of the paradigm. This account is modeled in the defaults-based framework of Network Morphology (Corbett & Fraser 1993; Brown & Hippisley forthcoming).

2 Regularization as paradigmatic reorganization

There are two ways of thinking about paradigmatic reorganization. First it is the stems of a paradigm which become phonologically-uniform where previously there was a distinction. This is analogical leveling. Alternatively in analogical extension, reorganization involves the exponents. In stem based reorganization phonological changes can cause distinctions to arise in the stem of different word forms in a lexeme's paradigm. To restore transparency between meaning and form—in this instance the stem—one of the stems is taken as the model for all the stems. An example is the reorganization of the Old English (OE) paradigm for the word 'choose', as discussed in Hock (1986: 168-9) and McMahon (1994: 73-74), given in Table 1 (adapted from McMahon 1994: 74).

	<i>OE</i>	<i>Modern English</i>	
<i>present</i>	cēo[z]-an	choose	[z]
<i>past sg</i>	cēa[s]	chose	[z]
<i>past pl</i>	cu[r]-on	chose	[z]
<i>past</i>	-co[r]-en	chos-en	[z]
<i>participle</i>			

Table 1: Reorganization of OE *cēozan* 'to choose'.

The OE stems are distinct because of different distributions of the vowel and stem final consonant. There is a stem in [s], a stem in [z] and a stem in [r]. These distinctions are the outcome of phonological changes affecting the language as whole. By the time of Modern English the disruption in the paradigm caused by these phonological changes is ironed out by analogy: the stem in [z] is used as the analogical model for the stem of all cells in the paradigm.

Equally we could have reorganization that involves the exponent. In Old English there were a number of rival affixes to mark plural, as shown in Table 2. This system of plural exponence was reorganized in favor of one of the

affixes used for masculine nouns. As with stem-based reorganization, the result of exponent-based reorganization is greater transparency in form and meaning correspondence. Where once there was a one-to-many mapping between the feature PLURAL and its exponence, it is now one-to-one.

	<i>Old English</i>	<i>Modern English</i>
Masculine nouns:	stān-as sun-a	stone-s son-s
Neuter nouns:	steorra-n word sper-u	star-s word-s spear-s
Feminine nouns:	ēag-an car-a tung-an bēc	eye-s care-s tongue-s book-s

Table 2: Plural exponence in Old English and Modern English.

It is exponent-based reorganization that motivates the diachronic changes of Latin deponent paradigms. Whereas the general pattern in the language is $-α$ for active, deponents like *hortor* use $-β$. Moreover, the $-β$ pattern which *hortor* uses coincides with the general pattern of passive exponence. Table 3 schematizes *hortor*'s anomalous / disorganized paradigm as a *misalignment* between function and exponence.

<i>LEXEME I</i>		<i>LEXEME N</i>		<i>HORTOR</i>	
ACT	PASS	ACT	PASS	ACT	PASS
$X-α$	$X-β$	$Y-α$	$Y-β$	$Z-β$	---

Table 3: Exponent-based paradigmatic reorganization: misalignment.

Most lexemes have a pattern of exponence such that $-α$ is used for active syntax and $-β$ for passive syntax. But the lexeme HORTOR upsets the general system by using a different pattern of exponence for active syntax. At the same time this is the exact pattern used for PASSIVE syntax for other verbs, namely $-β$. Notably, *hortor*'s paradigm has the further level of disorganization in that it lacks morphology for passive. Table 4 shows what it would mean for this verb to undergo reorganization, a *realignment* of function with the standard pattern of exponence.

LEXEME I		LEXEME N		HORTOR	
ACT	PASS	ACT	PASS	ACT	PASS
$X-\alpha$	$X-\beta$	$Y-\alpha$	$Y-\beta$	$Z-\alpha$	$Z-\beta$

Table 4: Exponent-based paradigmatic reorganization: realignment.

To capture historical change as *misalignment* of a lexeme’s paradigm of word forms with syntactic context followed by *realignment*, we propose a declarative model of language change which is grounded in the Separation Hypothesis.

3 Separationism and Network Morphology

The Separation Hypothesis (Beard 1995; Beard & Volpe 2005) underlies all approaches to morphology which assume that the information exchanged between morphology and syntax does not lie in the formal constituent structure of a complex word. Rather a word’s structure is the realization of a morphosyntactic feature set, and it is the word as a set of features which provides the interface between syntax and the lexicon, i.e. realization-inferential approaches (Stump 2001). A word’s morphosyntactic representation, not its formal structure, is ‘the only aspect of it that is visible to syntax’ (Anderson 1992: 90). This amounts to a separation between a particular feature set σ_1 and its realization such that σ_1 can be realized in more than one way, as for example in the affix rivalry that embodies inflectional classes. At the same time, a single morphological operation can be associated with $\sigma_1, \sigma_2, \sigma_n$. For example, the suffix $-a$ in Russian expresses {GEN, SG} {NOM, PL} and {NOM, SG}, depending on the lexical item. It should be clear from this that separationism is crucial in accounting for deponency since function and form are completely divorced.

Separationism is built into the architecture of Network Morphology (NM), a declarative framework for analyzing lexical structure. NM situates morphological facts in a network of information sharing nodes; in this way it can capture the generalizations that can be made about morphology, while at the same time characterizing exceptionality. NM provides for this because facts are organized hierarchically, where daughter nodes inherit from their mothers. Generalizations are stated at upper nodes and are inherited by lower nodes; exceptions are expressed as overrides, possible because the inheritance is by default. Fig. 1 is a NM account of Russian noun structure (from Brown et al. 1996).

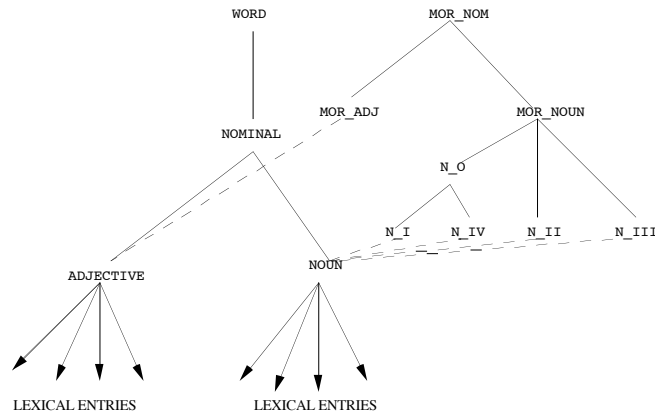


Figure 1: NM account of Russian Nouns.

NM defines a single network of interconnected but nonetheless distinct hierarchies of nodes. The Lexemic Hierarchy captures morphosyntactic generalizations such as the relationship between semantics and gender agreement in Russian. The Morphological Hierarchy holds generalization about form, for example the fact that the suffix *-a* attaches to the stem of a Class I lexeme to express {GEN, SG} but of a Class II lexeme to express {NOM, SG}. The two sets of facts are interconnected so that the morphosyntax of a lexeme (Lexemic Hierarchy) can be spelled out as morphological form (Morphological Hierarchy). The dashed lines represent the inter-hierarchy connections.

3.1 Paradigm linkage theory

In a number of recent papers, Stump has proposed an extension to the Separationism Hypothesis to account for deponency and heteroclisia (Stump 2002; 2006). Lexemes have two paradigms of forms, a paradigm used for lexical insertion and a paradigm of forms that would be expected given the language's set of productive realizational rules. For regular lexemes, the paradigms are linked directly, much in the same way as the dashed lines in Fig. 1 link the Lexemic Hierarchy and Morphological Hierarchy. For deponents there is a misalignment between the two paradigms such that active cells in the syntactic (=lexical insertion) paradigm line up with passive cells in the morphological (=formal) paradigm. Alignment and possible misalignment are captured by *paradigm linkage*.

- (3) *Universal default rule of paradigm linkage* (Stump 2002; 2006)
 Where R is $L[\text{exeme}]$'s root in language l
 $\text{SPF} (\langle L, \sigma \rangle) = \text{MPF} (\langle R, \sigma \rangle)$

The definition is couched within the Paradigm Function Morphology (PFM) framework and basically says that there is a cell in a Lexeme's *syntactic* paradigm

specified by a syntactic paradigm function (SPF) over the lexeme and a specific morphosyntactic feature set. There is also a cell in the same lexeme's *morphological* paradigm, i.e. a paradigm of cells specified by morphological paradigm functions (MPFs). This is a pairing of the same morphosyntactic property set with the lexeme's root (or stem). And importantly, there is a direct link between the two cells belonging to the separate paradigms. It should be noted that in PFM the MPFs are realization rules, so that the cells in the morphological paradigm are outputs of realization rules. Finally, this linkage is described as a *default* rule, such that in theory one could have $SPF \langle L, \sigma \rangle = MPF_2 \langle R, \sigma' \rangle$, where $\sigma \neq \sigma'$, an actual case of which is deponency (Stewart & Stump 2007: 393). Active cells in the syntactic paradigm are not linked to active cells in the morphological paradigm but instead to passive cells. So for Latin deponents the linkage is $\langle L, \{\text{active...}\} \rangle = \langle R, \{\text{passive...}\} \rangle$.

Just as in paradigm linkage the morphological paradigm informs the syntactic paradigm, so in NM a lexeme's set of grammatical words is inherited from the Lexemic Hierarchy, which accesses realization generalizations situated at nodes in the morphological hierarchy. The consequence of all of this is that NM furnishes a lexeme with two sets of facts, one from the morphological hierarchy, its morphological paradigm equivalent, and one from the lexemic hierarchy, its syntactic paradigm equivalent. By default the two paradigms are the same, but this default can be overridden with interesting consequences. Fig. 2 represents both the default situation and the situation where the default link between the two paradigms is overridden.

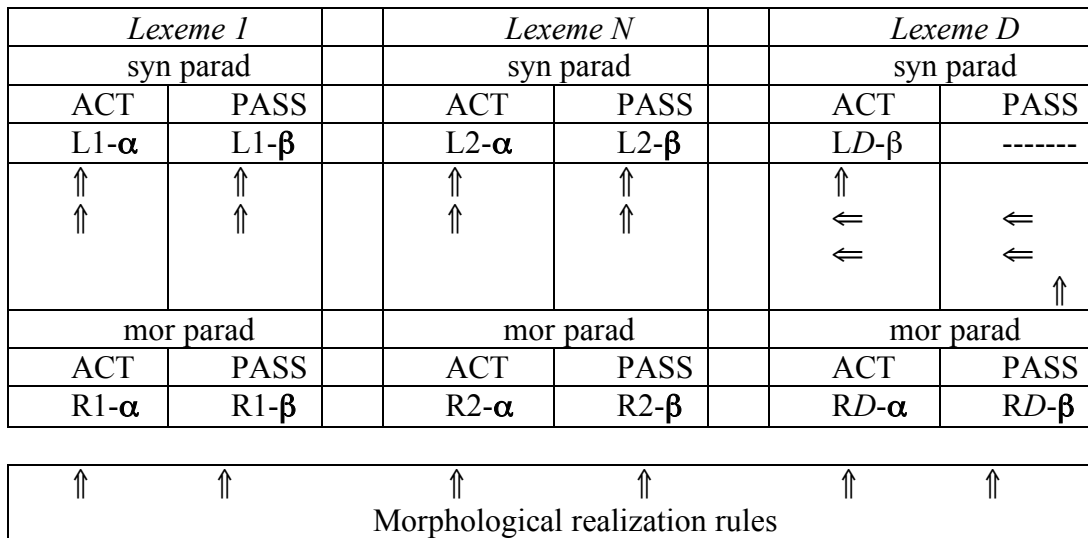


Figure 2: Deponency and separation of paradigms

For most lexemes (Lexeme 1, Lexeme *N*) the syntactic paradigm containing the lexeme's morphosyntactic word forms is informed by a separate morphological paradigm. Reading from the bottom of the figure, the output of morphological

realization rules furnishes a lexeme's morphological paradigm. In this example the active sub-paradigm is expressed by a pattern that modifies the root R with suffixation of $-\alpha$ and the passive sub-paradigm with suffixation of $-\beta$. The values of these cells are passed up to the syntactic paradigm, ready for lexical insertion. Lexeme D represents a deponent lexeme. Looking from the bottom of the figure upwards, this lexeme is similar to other lexemes. Its active and passive morphological sub-paradigms hold the outputs of the same realization rules as for other lexemes, hence it shares the same exponence. The difference between Lexeme D and the other lexemes only emerges when we move up the system, as it were, where we see the morphological paradigm passing information from its passive sub-paradigm to the 'wrong' place in the syntactic paradigm, i.e. to the active sub-paradigm. At the same time nothing from its active sub-paradigm is passed. The result is a deponent verb: passive morphology realizing active morphosyntax and passive morphosyntax rendered defective.

4 NM account of Latin deponents: misalignment

In NM lexical facts are expressed as attribute value pairings using the lexical knowledge representation language DATR (Evans & Gazdar 1996). (4) is a partial representation of the Lexemic Hierarchy in the NM account of Latin verbs in Hippisley (2007). It expresses the way the node `VERB` inherits from `LEXEME`, and the lexical entry for the regular verb *amo* 'love' inherits from `VERB`.

```
(4) VERB:
    <> == LEXEME
    <syn> == "<mor>"
    <mor active> == ACTIVE_FORMS:<>
    <mor passive> == PASSIVE_FORMS:<>
    ...

Amo:
    <> == VERB
    ...
```

The angle brackets on the left of each line represent paths whose values are on the right hand side of the double equals sign. A value may be another path, which itself requires a value. The empty brackets imply all paths and their values at a given node. This is how default inheritance is expressed. So the node `VERB` inherits all the paths and values that are true for `LEXEME`, and the node `Amo` inherits all path and values that are true for `VERB`. In DATR a path implies any extension of itself. So for the second line of the `VERB` node, `<syn> == "<mor>"` is equivalent to (5), and (5) is equivalent to (6).

(5) VERB:
 <syn active imperfective present indic sg 2> == "<mor>"
 ...

(6) VERB:
 <syn active imperfective present indic sg 2> ==
 "<mor active imperfective present indic sg 2"
 ...

This is how NM expresses that the fully-specified cell in the syntactic paradigm, i.e. all extensions of <syn>, inherits its value from the equivalent cell in the morphological paradigm, all extensions of <mor>. Lines 3 and 4 at the node VERB express how <mor active> paths are evaluated through a series of nodes negotiated through the node ACTIVE_FORMS, and <mor passive> paths through the node PASSIVE_FORMS. Each lexical entry is provided with two theorems, the set of paths and their values inherited from the Lexemic Hierarchy, the <syn> path theorem; and the set of paths and values directly associated with the Morphological Hierarchy, the <mor> path theorem. Because of the statement <syn> == "<mor>" located at VERB and which all lexical entries inherit by default, both the <syn> theorem and <mor> theorem are equivalent. We can see this when we compare partial theorems for Amo in (7) and (8). Note that passive sub-theorems are in bold to set them apart.

(7)
 Amo:<gloss> = love.
 Amo:<syn active imperfective present indic sg 2> = am ā s.
 Amo:<syn active imperfective past indic sg 1> = am ā bam.
 Amo:<syn active imperfective past indic sg 2> = am ā bās.
 Amo:<syn active imperfective past indic sg 3> = am ā bat.
Amo:<syn passive imperfective present indic sg 2> = am āris.
Amo:<syn passive imperfective past indic sg 1> = am ā bār.
Amo:<syn passive imperfective past indic sg 2> = am ā bāris.
Amo:<syn passive imperfective past indic sg 3> = am ā bātur.
 ...

(8)
 Amo:<gloss> = love.
 Amo:<mor active imperfective present indic sg 2> = am ā s.
 Amo:<mor active imperfective past indic sg 1> = am ā bam.
 Amo:<mor active imperfective past indic sg 2> = am ā bās.
 Amo:<mor active imperfective past indic sg 3> = am ā bat.
Amo:<mor passive imperfective present indic sg 2> = am āris.
Amo:<mor passive imperfective past indic sg 1> = am ā bār.
Amo:<mor passive imperfective past indic sg 2> = am ā bāris.
Amo:<mor passive imperfective past indic sg 3> = am ā bātur.
 ...

For a deponent lexical entry we want non-equivalence between the <syn> theorem and <mor> theorems. This is achieved by overriding the default <syn>

== "<mor>" by specifying a different evaluation of <syn>. We express deponency in NM as in (9).

```
(9) DEPONENT:  
    <> == VERB  
    <syn active> == "<mor passive>"  
    <syn passive> == undefined  
    ...
```

All <syn active> paths will take values not from <mor active> paths but from <mor passive> paths. At the same time <syn passive> paths will be undefined: Latin deponents are defective for passive (see Fig. 2). The lexical entry for *hortor* 'encourage' is given in (10).

```
(10) Hortor:  
    <> == DEPONENT  
    <gloss> == encourage  
    <stem> == hort  
    ...
```

The <syn> theorem and <mor> theorem of *Hortor* are given in (11) and (12). They are non-equivalent, capturing the fact that for deponents there is a separation between syntactic function and morphological expression.

```
(11)  
Hortor:<syn active imperfective present indic sg 2> = hort ā ris.  
Hortor:<syn active imperfective past indic sg 1> = hort ā bār.  
Hortor:<syn active imperfective past indic sg 2> = hort ā bāris.  
Hortor:<syn active imperfective past indic sg 3> = hort ā bātur.  
Hortor:<syn passive imperfective present indic sg 2> = undefined.  
Hortor:<syn passive imperfective past indic sg 1> = undefined.  
Hortor:<syn passive imperfective past indic sg 2> = undefined.  
Hortor:<syn passive imperfective past indic sg 3> = undefined.  
...
```

```
(12)  
Hortor:<mor active imperfective present indic sg 2> = hort ā s.  
Hortor:<mor active imperfective past indic sg 1> = hort ā bam.  
Hortor:<mor active imperfective past indic sg 2> = hort ā bās.  
Hortor:<mor active imperfective past indic sg 3> = hort ā bat.  
Hortor:<mor passive imperfective present indic sg 2> = hort ā ris.  
Hortor:<mor passive imperfective past indic sg 2> = hort ā bār  
Hortor:<mor passive imperfective past indic sg 2> = hort ā bāris.  
Hortor:<mor passive imperfective past indic sg 3> = hort ā bātur.  
...
```

5 NM account of the regularization of deponents: realignment

Deponent verbs are regularized through two kinds of paradigmatic realignment: (1) passive syntax is realigned with passive morphology and (2)

active syntax is realigned with active morphology. As deponents are lacking in active morphology these values must come from the lexeme's *morphological* paradigm where they lead a virtual existence until paradigmatic realignment occurs. In (12) we have examples of virtual *active* cells for the deponent *hortor*. In this section I look at examples of deponents which have been realigned, drawing on Flobert's (1975) monumental survey of the history of Latin deponent verbs, and give a NM account of Flobert's data as realignment. Let's begin with the first kind of realignment, passive with passive.

5.1 Realigning the passive paradigm

Deponent verbs are defective since they have no means of realizing passive morphosyntax. The passive morphology is already used up, as it were, for active morphosyntax. Part of the regularization of deponents is the reinterpretation of the passive forms as carrying passive meaning. An example with *hortor* from the theologian Jonas, writing in 7th to 8th centuries AD is given in (13) (see Flobert 1975: 355).

- (13) sic enim a Domin-o sub
 thus for by Lord-ABL.SG under
 apostol-orum numer-o hort-amur
 apostle-GEN.PL order-ABL.SG encourage-1.PL.PRES.PASS
 “for thus are we encouraged by the Lord under the order of the apostles”.
 Jonas *Vita Columbani* 2, 9

As is typical for passive, we see that the agent argument is *Domin-* ‘Lord’, which appears as an adjunct in a PP headed by the preposition *a* ‘by’, and the theme argument *pro* ‘we’ is the subject controlling the agreement on the head verb. Unlike Plautus’ Latin the passive morphology on *hortor* is in line with the syntactic function of *hortor*.

An example of the deponent verb *ūtor* ‘use’ is given in (14), from another one of Plautus’ plays.

- (14) At enim nimis long-o sermon-e
 but for excessively long-ABL.SG talk-ABL.SG
 ut-imur
 use-1PL.PRES.PASS
 “But see here, we’re going in for too much talk.”²
 Plautus *Trinummus*, 1.806

² Translation from Nixon (1988).

As with *hortor* we see passive marking on *ūtor* corresponding to an active interpretation. And as with *hortor*, over time this deponent verb is regularized such that its passive morphology is realigned with passive syntax. (15) is taken from Novius, a playwright active about a century after Plautus.

- (15) quia supellex Mult-a, quae
 because chattels.NOM.SG much- NOM.SG.FEM wh.NOM.SG.FEM
 non ut-itur, em-itur tamen
 NEG use-3SG.PRES.PASS buy-3SG.PRES.PASS nevertheless
 “For a lot of furniture is bought even though it is not used”
 Novius *Comedia 13*, cited in Gellius *Noctes Atticae XV*, 13

We account for this kind of regularization in declarative terms by realigning `<syn pass>` paths to inherit from `<mor pass>` paths, as with regular verbs. To achieve this we situate an alternate ‘passivized’ lexical entry in the hierarchy such that it inherits all facts from its irregular counterpart but overrides `<syn passive> == undefined` with `<syn passive> == <mor passive>`.³ This is shown in (16) and (17).

- (16) Hortor:
 <> == DEPONENT
 <gloss> == encourage
 <root> == hort
 ...
- (17) Hortor_PASS:
 <> == Hortor
 <syn passive> == <mor passive>.

The `<syn passive>` theorem will now be equivalent to the `<mor passive>` theorem, as shown in (18) and (19), the imperfective sub-theorem for *Hortor*. At the same time, however, the `<syn active>` theorem remains misaligned with the `<mor>` theorem since `<syn active>` paths are still set to inherit from `<mor passive>`. The consequence is homonymy of passive and active word forms. Realigning active syntax with active morphology is treated as a separate step and, as Flobert claims, occurs at a chronologically later stage, motivated by the homonymy (Flobert 1975: 64).

- (18)
 Hortor_PASS:<gloss> = encourage.
 Hortor_PASS:<syn active imperfective present indic pl 1> = hort ā mur.

³ For historical changes in the lexicon as default inheritance and overriding, see Hippiusley & Gazdar (1999).

Hortor_PASS:<syn active imperfective present indic sg 2> = hort ā ris.
 Hortor_PASS:<syn active imperfective past indic sg 2> = hort ā bār
 Hortor_PASS:<syn active imperfective past indic sg 2> = hort ā bāris.
 Hortor_PASS:<syn active imperfective past indic sg 3> = hort ā bātur.
Hortor_PASS:<syn passive imperfective present indic pl 1> = hort ā mur.
Hortor_PASS:<syn passive imperfective present indic sg 2> = hort ā ris.
Hortor_PASS:<syn passive imperfective past indic sg 2> = hort ā bār
Hortor_PASS:<syn passive imperfective past indic sg 2> = hort ā bāris.
Hortor_PASS:<syn passive imperfective past indic sg 3> = hort ā bātur.
 ...

(19)

Hortor_PASS:<gloss> = encourage.
 Hortor_PASS:<mor active imperfective present indic pl 1> = hort ā mur.
 Hortor_PASS:<mor active imperfective present indic sg 2> = hort ā ris.
 Hortor_PASS:<mor active imperfective past indic sg 2> = hort ā bār
 Hortor_PASS:<mor active imperfective past indic sg 2> = hort ā bāris.
 Hortor_PASS:<mor active imperfective past indic sg 3> = hort ā bātur.
Hortor_PASS:<mor passive imperfective present indic pl 1> = hort ā mur.
Hortor_PASS:<mor passive imperfective present indic sg 2> = hort ā ris.
Hortor_PASS:<mor passive imperfective past indic sg 2> = hort ā bār
Hortor_PASS:<mor passive imperfective past indic sg 2> = hort ā bāris.
Hortor_PASS:<mor passive imperfective past indic sg 3> = hort ā bātur.
 ...

5.2 Realigning the active paradigm

As with deponency passivation, we account for activation by realigning the lexeme's syntactic paradigm with its morphological paradigm. What makes this kind of realignment different is that the values for the <mor active> paths do not have a reality. Recall the <mor> theorem for *Hortor* in (12). We have forms which are purely the output of realization rules represented in the Morphological Hierarchy that act on *Hortor*'s stem, and because *Hortor* is specified as Conjugation 1, they yield forms associated with Conjugation 1 regular verbs such as *Amo* (7-8). Unlike *Amo* they are blocked from appearing in the <syn> theorem. Regularization as deponent activation is a matter of unblocking these forms so that they can appear as word forms, i.e. as values for <syn> paths. Unblocking the application of the productive Conjugation 1 realization rules is expressed as realignment of <syn active> with <mor active> as in (20-21).

(20) *Hortor*:
 <> == DEPONENT
 <gloss> == encourage
 <root> == hort
 <stem> == CONJ_1.

(21) *Hortor_ACT*:
 <> == *Hortor*
 <syn active> == <mor active>.

It is important to note in what respect the (partially) regularized *hortor* differs from the fully deponent *hortor*: its active subparadigm now patterns the same way as regular verbs. For all other features it is equivalent. This is important when we consider inflectional class: it remains a Conjugation 1 verb so its active forms will pattern as other Conjugation 1 verbs. This is borne out by the activation example given in (2) above: *hort-abat* for {3SG, IMPERFECTIVE, ACTIVE} parallels the form that expresses the same combination of features for A_{MO} in line 5 of (7). The difference is that this is a virtual cell in *hortor*'s morphological paradigm, line 4 of (12). In the later regularized *hortor*, this and other cells from the morphological paradigm are coerced into the syntactic paradigm for lexical insertion, expressed in NM as realignment.

Realignment also accounts for the 7th to 8th centuries AD activation examples of the deponent verb *ūtor* 'use' from Flobert (1975: 310) given in (22-23).

- (22) absque taedi-o ute-bat ips-o
 without disgust- ABL.SG use-3.SG.IMPF.ACT pro-ABL.SG
 “[although she considered this vision to be meaningless] she made use of [it] without any actual distaste.”
Vita Landiberti 20

- (23) Arrian-orum sect-a ute-bant
 Arrian-GEN.PL mode-ABL.SG use-3.PL.IMPF.ACT
 “[Those who had settled in Cisalpine regions] practised the way of life of the Arrians”.
Fredegarius Chronicles III 9

The active forms of regularized *ūtor* belong to the same pattern as regular Conjugation 3 verbs because *ūtor* is a Conjugation 3 verb and so holds these forms as virtual cells in its morphological paradigm. By the 7th to 8th centuries AD the virtual forms become real by realigning the syntactic and morphological paradigms.

6 Conclusions

I have shown that for at least one aspect of language change a declarative rather than procedural approach more elegantly captures the facts. Changes in the lexicon which can be characterized as paradigmatic reorganization, specifically exponent-based reorganization that involves a realignment of syntactic function with morphological form, can be expressed as resetting the default that links the syntactic paradigm and morphological paradigm in the spirit of Stump's paradigm linkage theory. My analysis is couched within the declarative NM framework which expresses the two paradigms of a lexeme as orthogonal hierarchies of inherited facts which are interconnected by defaults that can be overridden and reset, expressing misalignment and realignment; and where diachronic stages of a

lexeme are represented as hierarchically-arranged lexical entry nodes where the later stage item inherits from the earlier by default and any overrides express the exact nature of the lexical change.

As a kind of external evaluation of my approach, consider this brief outline of Greek deponent verbs. In the spirit of Flobert, Lavidas and Papangeli (2007) offer a somewhat shorter survey of the history of Greek deponents, specifically transitive deponents. The time periods are Ancient Greek (800-300 BC) > Hellenistic Greek (300 BC - C6 AD) > Early Medieval Greek (C6-C11 AD) > Late Medieval Greek (C12-C15) > Modern Greek (1458AD - present⁴). What we find are similarities with Flobert's story for Latin. In sum there are deponents which, like Flobert's 'activations', take up an active paradigm at one of the post Classical periods. Lavidas and Papangeli do not mention passivations. Unlike Latin there is also a class of verbs which is deponent from Ancient Greek and remain deponent in Modern Greek. One such lexeme is the verb 'fight': Ancient Greek *max-omai* (mediopassive) > Modern Greek *max-ome* (mediopassive)⁵. But like Latin there is a class of neo-deponents. A nice example is the lexeme for 'desire', shown in the (very) Modern Greek sentence about ice-cream in (24) (Lavidas and Papangeli 2007: 107):

- (24) i egkios ligureftike pagato
 the pregnant.NOM.SG desire.PST.3SG.MEDIOPASS ice-cream.ACC.SG
 "the pregnant woman desired an ice cream".

It would appear that historical deponency can be subjected to a paradigmatic realignment analysis for Greek, just as for Latin. Misalignment of syntax and morphology is not confined to Latin and Greek. In a recent survey of 'morphological mismatches', we find similar phenomena in a range of languages including Bantu languages, Chukchee, Spanish and the Iwaidja languages of Australia (Baerman et al 2006; 2007). All these cases in principle lend themselves to a declarative account along the lines of what we propose for Latin where historical change is realigning the syntactic and morphological paradigms, in other words resetting the default between the two.

⁴ i.e. Modern period starts from the fall of Constantinople.

⁵ Lavidas & Papangeli (2007: 117).

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