

Abstract

In this paper, we study Old French declension, a system which exhibits the theoretically challenging phenomenon of morphological reversal (Baerman, 2007). Furthermore, the declension system of Old French only recognises a single exponent *-s*, which marks different case/number combinations in different paradigms, contrasting with the unmarked form. We show that reversal is only one of several syncretism patterns found in the language and propose that Old French declension is best understood in terms of two systematic syncretisms: a natural split between singular and plural for feminines, and a Paninian split for masculines that systematically marks the objective plural. Reversal, and other seemingly morphomic splits arise as a result of idiosyncrasy in the *NOM.SG* cell, comprising inflection class-specific *-s* marking, as well as stem alternation and overabundance. We provide a formal analysis in terms of Information-based Morphology (Crysmann & Bonami, 2016) that effortlessly captures the systematic splits, as well as the variation in the nominative singular. We suggest that the high degree of idiosyncrasy in this cell paired with the reduced frequency of overt nominative NPs when compared to objective NPs may serve to explain why the system was actually quite short-lived.

Among syncretism patterns, morphological reversals must certainly be regarded as one of the theoretically more challenging types (see Baerman, 2007, for a survey). In Old French, the majority of masculine nouns show a pattern where the distribution of unmarked and *s*-marked forms in the plural is reversed in the singular, as illustrated in Table 1. Historically, this pattern came about as a result of regular sound change from Latin via Late Latin to Old French: deletion of accusative singular /*m*/ was already lost in spoken Latin at the time of the Republic and subsequent deletion of unstressed vowels in the transition from Late Latin to Old French neutralised the contrast between accusative singular ($\emptyset < -u < -um$) and the nominative plural ($\emptyset < -i$) in the *o*-declension, as well as between nominative singular (*-s < -us*) and accusative plural (*-s < -ōs*).

	SG	PL
NOM	murs	mur
OBJ	mur	murs

Table 1: Reversal in Old French (Kihm, 2017, p. 41)

Reversals contrast with more well-behaved syncretism patterns such as motivated syncretism (see F1 in Table 3), which can easily be captured by underspecification,

[†]The research reported on in this paper has been partially carried out within the excellency cluster (LabEx) “Empirical Foundations in Linguistics”, supported by a public grant overseen by the French National Research Agency (ANR) as part of the “Investissements d’Avenir” program (reference: ANR-10-LABX-0083). We are especially grateful to Jean-Pierre Koenig for comments on an earlier version of this paper. Finally, we would like to thank the audience of the HPSG 2018 meeting in Tokyo, in particular, Anne Abeillé, Doug Arnold, and Nurit Melnik.

or so-called Paninian splits, where one or more cells are exceptional yet the remainder follows a default pattern: the M2 class noun *pere* in Table 2 may serve as an example. Reversals clearly involve the most unnatural classes, since in Table 1 the syncretic forms have neither case nor number values in common. While no morphological theory we are aware of is fully comfortable with reversals, it is clear that morpheme-based theories are probably the most hard-pressed (Kihm, 2017).

An important question in the study of reversals is to establish to what degree the reversal pattern has actually been generalised, i.e. whether or not it is truly symmetric (Baerman, 2007). For Old French, Kihm (2017) has argued that the system was actually quite unstable and disappeared after only a couple of centuries. This contrasts with more long-lived and more systematic reversals, as found e.g. in Neo-Aramaic (Baerman, 2007; Doron & Khan, 2012).

Another striking property of Old French is that nominal inflection only involves a single exponent *-s* to express distinctions of case and/or number.

In this paper, we shall investigate the exact nature of reversal in Old French and conclude that reversal has not been fully generalised, but is only one of several syncretism patterns. We shall see, however, that the distribution of *-s* in nominal paradigms follows some very regular patterns and show that the single cell that is characterised by massive idiosyncrasy is the nominative singular. We therefore argue that reversal in Old French is only apparent and propose a formal theory within Information-based Morphology (Crysmann & Bonami, 2016; Crysmann, 2017) that concisely captures the full range of syncretisms where reversals emerge by way of a combination of regular and idiosyncratic constraints on the distribution of *-s*.

1 Old French declension

Noun declension in Old French¹ exhibits three paradigms for masculine (given in Table 2) and equally three paradigms for feminine nouns (given in Table 3). The numbering of paradigms reflects overall productivity, i.e. the reversal pattern in M1 holds for the great majority of masculine nouns in the Old French lexicon. The majority pattern for feminines F1, by contrast, does not show any reversal, but instead displays a motivated split between unmarked singular and *s*-marked plural. As for adjectival declension (cf. Table 4), which is generally heteroclite, the by-far most common pattern A1 combines the most productive patterns for masculine and feminine noun declension (M1 and F1).

Compared to M1, the other two masculine inflection classes M2 and MAS only differ with respect to a single cell: in M2, nominative singular is unmarked, and in MAS, this very same cell is subject to both stem suppletion and optionality of *s*-marking, leading to overabundance (see Thornton, 2011, for an overview). One way to conceptualise this paradigm is in terms of underspecification of inflection class membership, i.e. MAS nouns can inflect according to M1 or M2. Likewise, feminine inflection classes F2 and FAS only minimally contrast with F1, and again they do so

¹We follow the nomenclature and empirical description given in Kihm 2017.

	M1		M2		MAS	
	SG	PL	SG	PL	SG	PL
NOM	chevaliers	chevalier	pere	pere	ber(s)	baron
OBJ	chevalier	chevaliers	pere	peres	baron	barons

Table 2: Old French masculine declensions (Kihm, 2017, p. 46–47)

	F1		F2		FAS	
	SG	PL	SG	PL	SG	PL
NOM	porte	portes	flors	flors	none	nonains
OBJ	porte	portes	flor	flors	nonain	nonains

Table 3: Old French feminine declensions (Kihm, 2017, p. 48–49)

in the same cell as masculines: F2 nouns are s-marked in the nominative singular (like M1 and unlike F1), and FAS nouns undergo stem alternation, but otherwise inflect like F1.

In terms of frequency, we should point out that M1 and F1 include the overwhelming majority of Old French nouns. M2 nouns are few and often aligned on M1 by supplying NOM.SG with *-s*, while F2 — often ‘regularised’ as F1 by not supplying NOM.SG with *-s* — gets some bulk from the fact that abstract nouns in *-té* (e.g. *beauté* ‘beauty’) fall into this class. Although not exactly insignificant in number, MAS and FAS nouns (especially the latter) constitute a small subset, progressively reduced by extending one stem to the whole paradigm, usually the OBJ.SG one. There are several types of MAS noun (see e.g. *emperere(s)/emperëor* ‘emperor’), but we cannot enter into that much detail here.

Turning to adjectives, all paradigms are heteroclite, i.e. they are mere combinations of the patterns we already observed for masculine and feminine nouns. While A1 is the combination of M1 and F1 where the feminine stems are affixed with *-e*, A2 does not show any independent gender marking. As for syncretism, A2 inflects just like M1 in the masculine, but it is overabundant in the feminine, patterning with both F1 and F2: again, the nominative singular is special, in that it is the locus of overabundance. AAS, which mainly contains comparatives, finally exhibits stem alternation, targeting again the nominative singular. Inflectional marking in the feminine follows the F1 pattern, like A1 adjectives do, but in the masculine we find again overabundance.

Although the vast majority of masculine nouns and adjectives indeed inflect according to the reversal pattern in Table 1, a look at the full range of paradigms reveals that reversal has not been fully generalised: As witnessed by the paradigms in Table 2 and 3, only two out of the six paradigms display a reversal pattern (M1 and MAS). Among the three paradigms where the nominative singular may bear the same formal

marking as the objective plural, the identical marking of the two cells is either not obligatory, as in the case of MAS (*ber(s)*), or identical marking is part of a larger syncretism pattern, as witnessed by the L-shaped pattern for F2 (*flors*), which singles out the objective singular (unmarked) vs. all other forms (marked with *-s*). In terms of syncretism patterns in the distribution of *-s*, we find four different patterns in total: reversal (M1), marked objective plural vs. unmarked default (M2), unmarked singular vs. marked plural (F1/FAS) and unmarked objective singular vs. all other cells marked by *-s* (F2). In terms of syncretism of the marker *-s*, MAS is overabundant in the nominative singular cell and can be considered as a mix of the syncretism patterns found with M1 and M2.

Looking at the entire set of Old French paradigms, we can establish, however, some straightforward generalisations that are independent of inflection class or syncretism pattern: first, objective singular is always unmarked, objective plural is always overtly marked with *-s*, and so is feminine plural. Second, nominative singular constitutes the one cell that is the domain of class-specific variation and even item-specific idiosyncrasy: while the realisation of nominative singular is clearly class-specific, distinguishing M1/F2 (marked by *-s*) from M2/F1/FAS (unmarked), the same cell is singled out as the locus of stem allomorphy, either idiosyncratic *ber/baron* or subregular *-e/-ain*. Finally, across all paradigms, this cell is the only one where overabundance can be observed, both for masculine nouns and feminine adjectives.

(a) A1 <i>buen(e)</i> ‘good’				
	MASC		FEM	
	SG	PL	SG	PL
NOM	buens	buen	buene	buenes
OBJ	buen	buens	buene	buenes

(b) A2 <i>grant</i> ‘big’				
	MASC		FEM	
	SG	PL	SG	PL
NOM	grant	grants	grant	grants
OBJ	grants	grant	grant(s)	grants

(c) AAS: <i>mieudre/meillor</i> ‘better’				
	MASC		FEM	
	SG	PL	SG	PL
NOM	mieudre(s)	meillor	mieudre	meillors
OBJ	meillor	meillors	meillor	meillors

Table 4: Old French adjectival declensions (Moignet, 1973, p. 26–31)

$$word \rightarrow \left[\begin{array}{l} \text{MPH} \quad \boxed{e_1} \circ \dots \circ \boxed{e_n} \\ \text{MS} \quad \boxed{0} \ (\boxed{m_1} \uplus \dots \uplus \boxed{m_n}) \\ \text{RR} \quad \left\langle \begin{bmatrix} \text{MPH} & \boxed{e_1} \\ \text{MUD} & \boxed{m_1} \\ \text{MS} & \boxed{0} \end{bmatrix}, \dots, \begin{bmatrix} \text{MPH} & \boxed{e_n} \\ \text{MUD} & \boxed{m_n} \\ \text{MS} & \boxed{0} \end{bmatrix} \right\rangle \end{array} \right]$$

Figure 1: Morphological wellformedness

2 Analysis

The analysis of the Old French data we are going to propose is formalised in terms of Information-based Morphology (=IbM; Crysmann & Bonami, 2016; Crysmann, 2017; Broadwell, 2017; Diaz et al., 2017), an inferential-realisation theory of inflection couched entirely in terms of inheritance hierarchies of typed feature structures. IbM differs from other inferential-realisation theories by adopting a morphous approach (Crysmann, 2003), which permits the treatment of the $m : n$ nature of the relationship between form and function at the most basic level, i.e. the individual rules. Furthermore, IbM systematically exploits inheritance, as well as cross-classification in the sense of Koenig (1999), to systematically establish vertical and horizontal generalisations over rules of exponence.

Realisation rules are pairings of a set of morphosyntactic properties to be expressed (MUD; = Morphology Under Discussion) with a list of exponents (MPH), possibly the empty list (cf. *zero-rr* in Figure 7). Members of MPH consist of a phonological description, paired with position class information. Since morphotactic information is now a first class citizen of rule descriptions, standard underspecification techniques of constraint-based grammar can be easily employed to extract generalisations about shape and position independently of each other (Crysmann & Bonami, 2016; Broadwell, 2017). The third top-level feature of every rule (MS) represents the entire morphosyntactic property set of the word and thus provides an easy way to address allomorphic conditioning (Crysmann, 2017; Diaz et al., 2017).

As depicted in Figure 1, a simple principle of completeness and coherence relates the MUD values of the rules to the morphosyntactic property set of the word. In essence, it requires that every member of the word’s MS set be licensed by some realisation rule. The word’s phonology is simply the concatenation of that of the morphs contributed by the rules, in the order of their positional indices, see Bonami & Crysmann (2013) for details. Since the relation between a word’s properties (MS/PH) to the realisation rules is entirely regulated by principle, grammatical specification of an individual inflectional system amounts to defining a signature of the properties themselves (features and appropriate values) and a hierarchy of realisation rules that pair them with the exponents that express these features.

2.1 Inflection classes in Old French

A recurrent observation about inflectional systems is that the exact choice of exponents is determined to one part by the properties being expressed, yet to another by lexically determined class membership. E.g., in Old French we do not just need to know that nominative singular can be expressed by *-s*, but we also need to know which classes of lexemes this rule applies to. Thus, before laying out the inflectional rules proper, we shall sketch how the nominal lexicon of Old French is partitioned into inflection classes, i.e. its morphomic properties (Aronoff, 1994).

In the previous section, we observed two fundamental levels of variation between paradigms: first, we found that nouns and adjectives contrast in using a single stem for all four (eight) cells of the paradigm, or else to use an alternate stem in the nominative singular (MAS, FAS, AAS). Second, both masculine and feminine nouns need to be distinguished as to their inflectional behaviour in the nominative singular, one class each that obligatorily takes the marker *-s* (M1, F2) and another that systematically refuses to do so (M2, F1). Regular adjectives (A1) are special in that they are heteroclite, following the productive pattern for masculine nouns (M1) in one part of the paradigm, yet that of feminine nouns (F1) in the other. What is more, some lexical classes (MAS, AAS, A2) display overabundance, being underspecified for inflection class in either the masculine (MAS,AAS) or the feminine (A2).

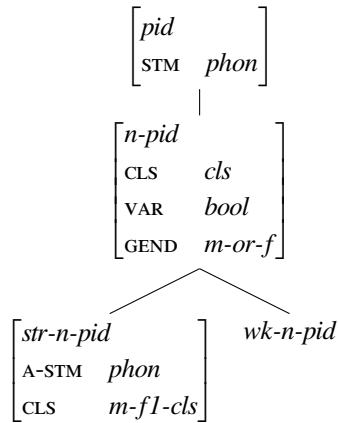


Figure 2: Signature of *pid* values

In IbM, lexically determined information, such as stem shapes or inflection class membership are interfaced with the inflection rule system via a distinguished feature structure (*pid*). We shall propose to represent the first property, i.e. availability of alternate stems, by a type hierarchy on *pid* values (cf. Figure 2), distinguishing *str(ong)-n-pid*, which has an appropriate feature for an alternate stem A-STM from the standard *w(ea)k-n-pid* which only has the STM appropriate of all *pid* values.

The second inflection class property pertains to the selection of paradigms proper: we introduce a feature *CLS* appropriate of *n-pid* that permits, inter alia, a systematic description of heteroclite and overabundant patterns, as given in Figure 3. At the bot-

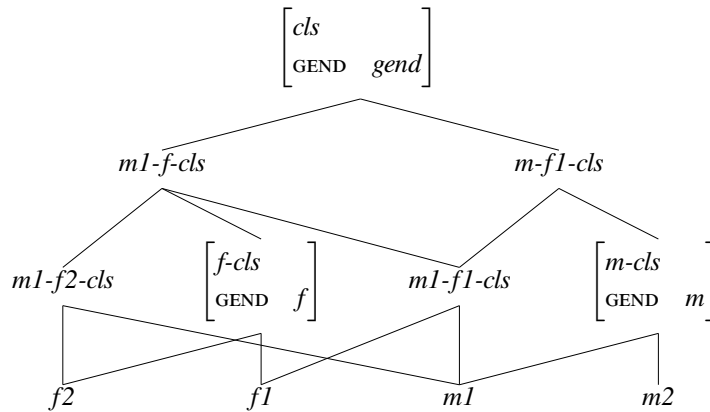


Figure 3: Nominal inflection classes

tom of the hierarchy, we find the four basic paradigm patterns *m1*, *m2*, *f1*, *f2*. The next level up represents three different abstractions: first, two gender types (*m-cl*, *f-cl*) with their appropriate *GEND* specifications, second, the representation of heteroclite regular adjectives (*m1-f1-cl*), and third, a type that singles out the paradigms taking *-s* as the exponent of nominative singular (*m1-f2-cl*). Even further up the hierarchy are the types for overabundance, which are underspecified w.r.t. paradigm membership either in the masculine (*m-f1-cl*), for MAS and AAS, or in the feminine *m1-f-cl*, for A2. Note that there is no abstraction of M2 independent of *m-cl*: this captures the fact that M2 does not serve as a model on its own for adjectival inflection. Furthermore, the inflectional patterning in the nominative singular of M2 corresponds to the unmarked case, such that independent targeting of e.g. F1 and M2 as a class is neither required nor desirable, but left to the elsewhere case.

Another piece of information that may be lexically specified is inherent gender for nouns: since gender is intimately tied to inflection class, we make it a feature appropriate of *cls*: the value of *GEND* will actually be narrowed down by the inflection class subtypes *m-cl* and *f-cl*, as depicted in Figure 3.

The last inflection class feature that we introduce via *pid* is *VAR*, a Boolean valued feature that controls whether or not adjectives have variable bases for masculine and feminine declension.

One generalisation about Old French is already captured at the level of the hierarchy of *pid* types: as depicted in Figure 2, stem alternation is correlated with a reduced set of class options *m-f1-cl*, capturing the fact that F2 stems do not undergo alternation.

The availability of inflectional patterns for any individual lexical item or word class is of course best captured by means of a hierarchy of lexical types. Owing to space considerations, we shall not give a full type hierarchy, but rather provide sample lexical specifications for the relevant nominal and adjectival classes (in Figures 4–6). Using Online Type Construction (Koenig & Jurafsky, 1994; Koenig, 1999), which is already assumed by IbM, extensional statements for subregular and irregular classes

can be cleanly separated from the underspecified description of regular and productive ones.

$$\begin{array}{c}
 \left[\text{MS} \left\{ \left[\begin{array}{l} \text{wk-}n\text{-pid} \\ \text{STM} \quad \text{chevalier} \\ \text{CLS} \quad m1\text{-cls} \end{array} \right] \right\} \right] \\
 \text{(a) M1}
 \end{array}
 \quad
 \begin{array}{c}
 \left[\text{MS} \left\{ \left[\begin{array}{l} \text{wk-}n\text{-pid} \\ \text{STM} \quad \text{pere} \\ \text{CLS} \quad m2\text{-cls} \end{array} \right] \right\} \right] \\
 \text{(b) M2}
 \end{array}$$

$$\begin{array}{c}
 \left[\text{MS} \left\{ \left[\begin{array}{l} \text{str-}n\text{-pid} \\ \text{STM} \quad \text{baron} \\ \text{A-STM} \quad \text{ber} \\ \text{CLS} \quad m\text{-cls} \end{array} \right] \right\} \right] \\
 \text{(c) MAS}
 \end{array}$$

Figure 4: Sample entries of masculine nouns

$$\begin{array}{c}
 \left[\text{MS} \left\{ \left[\begin{array}{l} \text{wk-}n\text{-pid} \\ \text{STM} \quad \text{porte} \\ \text{CLS} \quad f1\text{-cls} \end{array} \right] \right\} \right] \\
 \text{(a) F1}
 \end{array}
 \quad
 \begin{array}{c}
 \left[\text{MS} \left\{ \left[\begin{array}{l} \text{wk-}n\text{-pid} \\ \text{STM} \quad \text{flor} \\ \text{CLS} \quad f2\text{-cls} \end{array} \right] \right\} \right] \\
 \text{(b) F2}
 \end{array}$$

$$\begin{array}{c}
 \left[\text{MS} \left\{ \left[\begin{array}{l} \text{str-}n\text{-pid} \\ \text{STM} \quad \text{nonain} \\ \text{A-STM} \quad \text{none} \\ \text{CLS} \quad f1\text{-cls} \end{array} \right] \right\} \right] \\
 \text{(c) FAS}
 \end{array}$$

Figure 5: Sample entries of feminine nouns

There are two aspects regarding the lexical representation of adjectives that deserve further elaboration, when compared to that of nouns: first, adjectives draw on the paradigms provided already for nouns, giving rise to heteroclisis between M1 and F1 (A1) and overabundance (A2: M1+F1+F2; AAS: M1+M2+F1). While the reliance on nominal patterns can be represented by drawing on the same hierarchy of inflection classes, we need to distinguish that gender is an inherent property for nouns, yet a morphosyntactic property for adjectives. As a consequence, we shall constrain adjectives to expose the value of the *GEND* feature contributed by the morphomic class as an inflectional property of its own, as shown in the sample entries in Figure 6. Second, regular productive adjectives (A1) undergo systematic gender inflection, using the productive M1 pattern in the masculine, whilst assimilating their feminine forms to the productive F2 pattern by affixation of *e* (/ə/). The other two

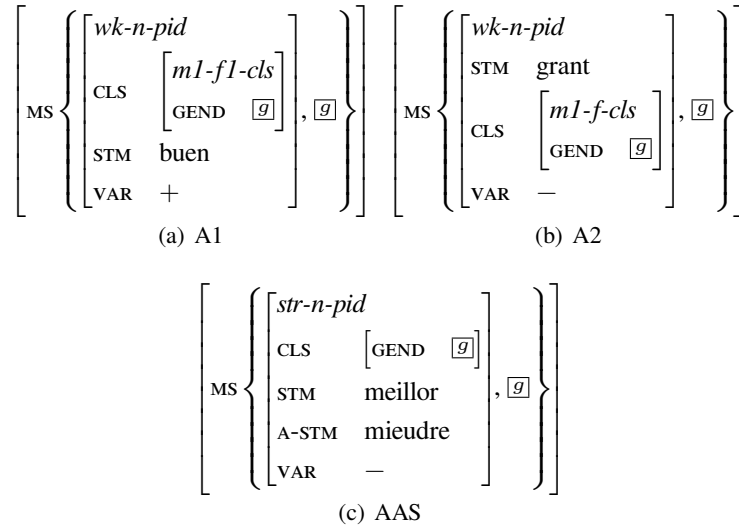


Figure 6: Sample entries of adjectives

patterns (A2 and AAS), however, do not show any direct gender marking. In order to distinguish the invariant patterns of A2 and AAS from the gender-inflected pattern exhibited by A1, we use a Boolean valued feature *VAR*.

2.2 Realisation rules

Now that we have provided a suitable representation of the more idiosyncratic morphomic information such as stem alternations and inflection class membership, we can move on to the core of the analysis, as given by the hierarchy of realisation rules in Figure 7.

As will become apparent shortly, our treatment of apparent reversal in Old French will essentially expose four empirical generalisations: first, the status of *-s* as the only non-stem exponent of case/number marking, and second, the fact that the distribution of this marker is highly regular, and third, that a single cell is the locus of all exceptions. Fourth, objective singular, which never undergoes any overt marking, should be regarded as an instance of the unmarked case.

The type hierarchy in Figure 7 depicts four classes of realisation rules, if understood in terms of *MUD* values: one class for stem realisation (*stem-rr*), one class for *s*-marking (*s-rr*), a third monadic class for feminine gender realisation (*f-rr*), appropriately restricted to a subclass of adjectives, and finally, default zero realisation (*zero-rr*).

The rule type *s-rr* mainly describes the shape and position of the morph *s*, while restricting its function to express some case/number combination. Subtypes of *s-rr* further constrain the *MUD* value. The right-hand subtype captures the fact that the marker may express plural, and its two subtypes further narrow down the conditions: the suffix *-s* can either mark plural in the objective case (true of all paradigms), or else

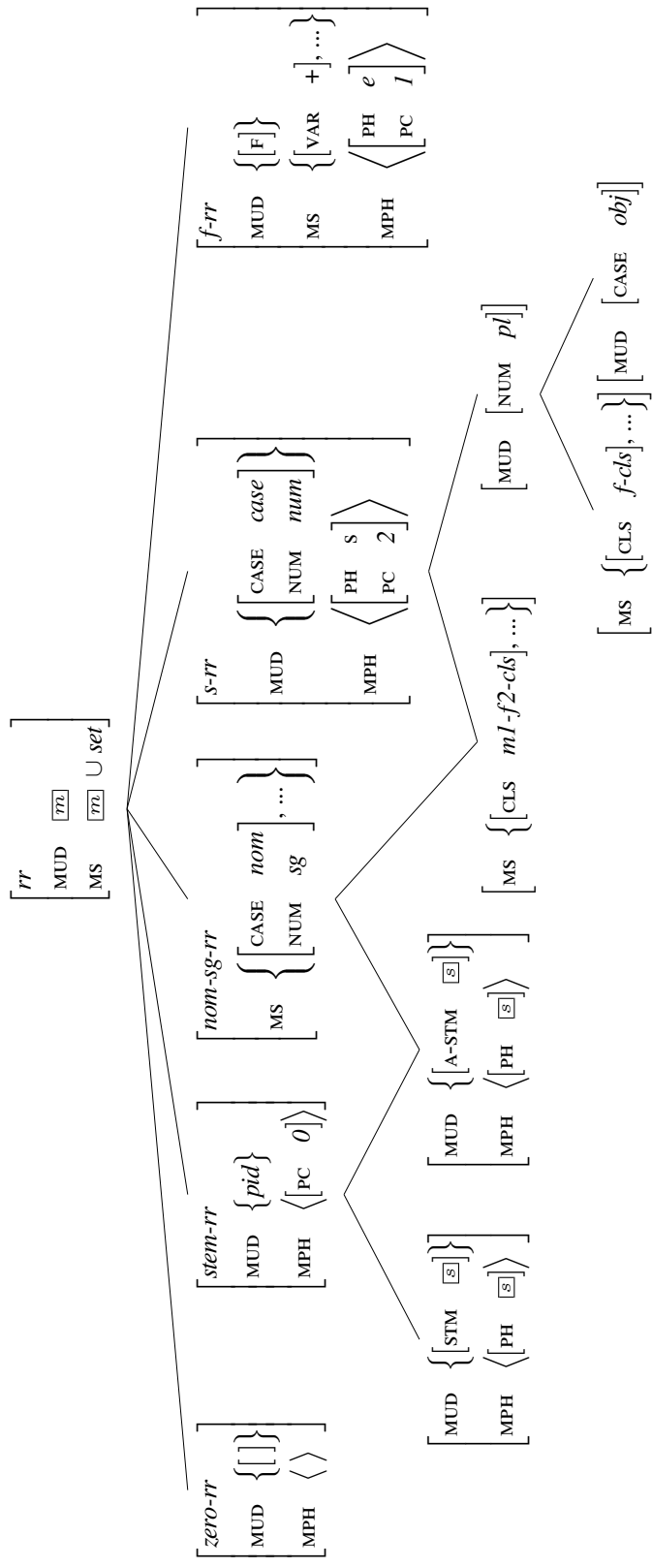


Figure 7: Realisation rules for Old French nominal inflection

$$\left[\begin{array}{c} \text{word} \\ \text{MS } \boxed{0} \left\{ \boxed{a} \left[\begin{array}{cc} \text{str-}n\text{-pid} \\ \text{STM} & \text{baron} \\ \text{A-STM} & \text{ber} \\ \text{CLS} & m\text{-cls} \end{array} \right], \boxed{b} \left[\begin{array}{cc} \text{CASE} & \text{nom} \\ \text{NUM} & \text{sg} \end{array} \right] \right\} \\ \text{RR } \left\{ \left[\begin{array}{c} \text{stem-rr} \wedge \text{nom-sg-rr} \\ \text{MUD } \left\{ \boxed{a} \left[\begin{array}{cc} n\text{-str-pid} \\ \text{A-STM} & \boxed{s} \end{array} \right] \right\} \\ \text{MS } \boxed{0} \left\{ \left[\begin{array}{cc} \text{CASE} & \text{nom} \\ \text{NUM} & \text{sg} \end{array} \right], \dots \right\} \\ \text{MPH } \boxed{x} \left\langle \left[\begin{array}{cc} \text{PH} & \boxed{s} \\ \text{PC} & 0 \end{array} \right] \right\rangle \end{array} \right\}, \left[\begin{array}{c} s\text{-rr} \wedge \text{nom-sg-rr} \\ \text{MUD } \left\{ \boxed{b} \left[\begin{array}{cc} \text{CASE} & \text{nom} \\ \text{NUM} & \text{sg} \end{array} \right] \right\} \\ \text{MS } \boxed{0} \left\{ \left[\begin{array}{cc} \text{CLS} & m1\text{-f2-cl}\text{s} \end{array} \right], \dots \right\} \\ \text{MPH } \boxed{y} \left\langle \left[\begin{array}{cc} \text{PH} & s \\ \text{PC} & 2 \end{array} \right] \right\rangle \end{array} \right\} \\ \text{MPH } \boxed{x} \left\langle \left[\begin{array}{cc} \text{PH} & \boxed{s} \\ \text{PC} & 0 \end{array} \right] \right\rangle \circ \boxed{y} \left\langle \left[\begin{array}{cc} \text{PH} & s \\ \text{PC} & 2 \end{array} \right] \right\rangle \end{array} \right]$$

Figure 8: Derivation of *bers* ‘baron(M).NOM.SG’

it can mark the plural with feminine nouns or adjectives. While these two options are fully regular, *s-rr* caters for another subtype, constrained to class *m1-f2-cl*s, in order to accommodate lexically restricted nominative singular marking, by way of inheritance from *nom-sg-rr*.

Turning to stem selection, we find a similar pattern: *stem-rr* has a general subtype which selects the STM feature as an exponent of lexical identity, yet it also provides an alternate stem rule for the A-STM. The use conditions for this alternate stems are again the nominative singular, just as with the exceptional s-marking. The identity of condition is captured by inheritance from the common supertype *nom-sg-rr*.

Realisation of objective singular, or for that matter any unmarked cell, enjoy the status of a true default: since no rule description exists that is more specific, Paninian competition will license zero realisation (*zero-rr*).

By way of illustration, we shall provide sample derivations of the two possible realisations of the nominative singular of class MAS noun *ber(s)* ‘baron(M).NOM.SG’.

Figure 8 illustrates derivation of the s-marked variant *ber-s*. At the top of the word-level feature structure, we find the representation of the morphosyntactic property set MS, including lexemic information, the RR set of realisation rules, and finally, the word-level list of morphs on MPH. In correspondence with the principle of morphological wellformedness in Figure 1, the MS set of the *word* is exhausted by the MUD values of the rules in the RR set, as indicated by the co-reference tags \boxed{a} and \boxed{b} . Likewise, the morphs contributed by the rules (\boxed{x} and \boxed{y}) are shuffled together on the word’s MPH list, and finally, the entire MS set of the word ($\boxed{0}$) is distributed over the MS

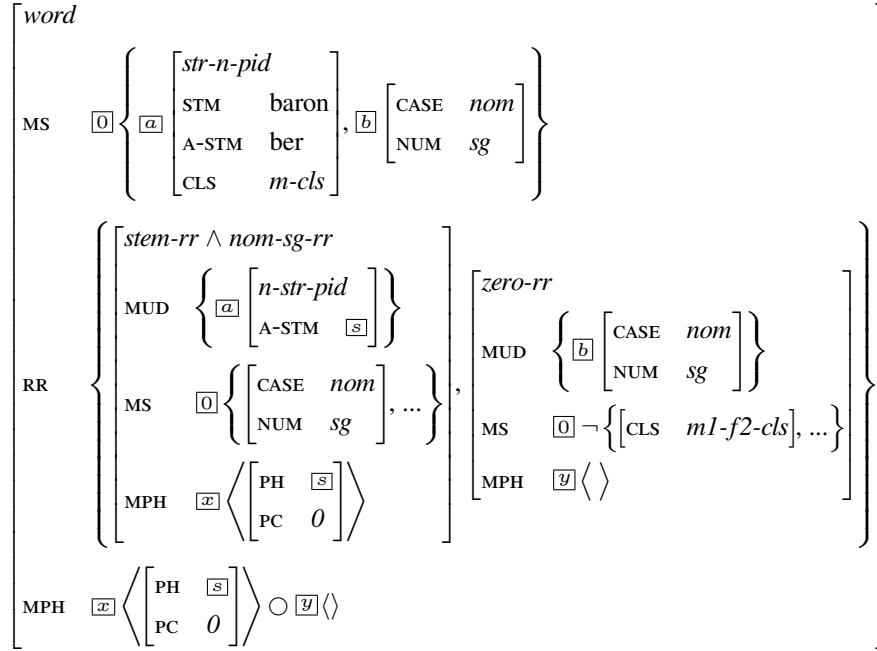


Figure 9: Derivation of *ber* ‘baron(M).NOM.SG’

features of the rules, making it possible for rules to impose allomorphic constraints.

Concretely, lexemic properties (\boxed{a}) are expressed by a stem selection rule, and more precisely by one that selects the alternate A-STM, the phonology of which is inserted in a morph (\boxed{x}). The morphosyntactic properties of case and number (\boxed{b}) are expressed by the morph \boxed{y} , with shape *s*. The realisation rule for *s*-marked nominative singular is restricted to *m1-f2-cl*s, unifying with lexemic *m-cl*s to *m1-cl*s. Conversely, the alternate stem selection rule is constrained to apply to nominative singular. Selection of the regular stem, however, is preempted by Paninian competition (see Crysmann, 2017).

Figure 9, moreover, illustrates derivation of the zero-marked variant *ber*. The main difference is with respect to expression of case/number inflection: here this morphosyntactic property is expressed by *zero-rr*, a rule that pairs the morphosyntactic property \boxed{b} (an element of MUD, and hence MS) with the empty list of exponents (\boxed{y}). This rule is in Paninian competition with the *s*-marking nominative singular rule (by way of subsumption), so therefore its MS value is restricted to the complement of the more specific rule, yielding a negative existential on the class specification for *m1-f2-cl*s. In the case at hand, lexical underspecification (*m-cl*s) and the Paninian constraint ($\neg m1\text{-f2-cl}\text{s}$) will unify to *m2-cl*s.

Adjectival inflection in class A1 displays a systematic variation with respect to gender: as witnessed by the paradigm in Table 4, feminine forms are related to their masculine counterparts by suffixation of *-e* ([ə]), in addition to a shift of the inflectional pattern from M1 to F1. As detailed in Figure 7, feminine marking by *-e* (rule

f-rr) is restricted to [VAR +], effectively applying to A1 adjectives (cf. Figure 6a). Gender for A2 and AAS, by contrast, will be realised by rule *zero-rr*, just like masculine gender for all adjectives.

To summarise the analysis, apparent reversal in Old French emerges as the result of the combination of regular inflectional patterns that are true across all paradigms with class-specific realisation rules for the nominative singular. The formalisation in terms of inheritance hierarchies of realisation rules successfully captures what we take to be the two fundamental observations, namely that there is only a single affixal exponent for case/number distinctions in the entire declension system, and that the “problematic” cell is always the same, for affixation and stem selection alike. Finally, the observation that overabundance targets the same cell just falls out from the fact that this is the only cell where realisation depends on inflection class membership, such that lexical underspecification of class membership will suffice to ensure that MAS nouns, as well as A2 and AAS adjectives can undergo either default zero marking, or class-specific overt marking with *-s*. The treatment of overabundance in terms of lexical underspecification is furthermore fully in line with recent work on overabundance within IbM (Bonami & Crysmann, 2018).

3 Conclusion

In this paper we have looked at apparent reversals in Old French declension and shown that the reversal pattern, though frequent in the masculine, is only apparent. We have argued that with the exception of the nominative singular, Old French declension is highly regular across all paradigms and that the nominative singular cell is problematic in three respects: it is the locus of stem suppletion, class-specific marking with *-s*, and as a result to the availability of alternate inflection patterns, the locus of overabundance.

Furthermore, we have developed a formal analysis of the Old French system within the framework of Information-based Morphology (Crysmann & Bonami, 2016; Crysmann, 2017) that captures several salient facts about Old French concisely by means of underspecification in inheritance hierarchies of realisation rules: within the inflectional system proper, generalisations about exponence are factored out into a supertype, and so are the constraints on exceptional inflection and stem suppletion. On the lexical side, underspecification of inflection class effortlessly derives overabundance.

Finally, on the diachronic side, our analysis helps one understand what made Old French declension an unstable system and why it was as short-lived as it was. As we have shown, fragility was located in the *NOM.SG* cell of M1 nouns. As it became increasingly unmarked, not only did the case contrast in the singular collapse, but, more seriously, the number contrast in the nominative threatened to do so as well. The remedy consisted in doing away with case inflection entirely, keeping only the number contrast of the two formerly objective cells. Since F1 nouns never marked case to begin with, and given the various ‘regularisations’, the whole declension system

simply vanished.

References

- Aronoff, Mark. 1994. *Morphology by itself*. Cambridge: MIT Press.
- Baerman, Matthew. 2007. Morphological reversals. *Journal of Linguistics* 43. 33–61.
- Bonami, Olivier & Berthold Crysmann. 2013. Morphotactics in an information-based model of realisational morphology. In Stefan Müller (ed.), *Proceedings of the 20th International Conference on Head-Driven Phrase Structure Grammar, Freie Universität Berlin*, 27–47.
- Bonami, Olivier & Berthold Crysmann. 2018. Lexeme and flexeme in a formal theory of grammar. In Olivier Bonami, Gilles Boyé, Georgette Dal & Hélène Giraudo et Fiammetta Namer (eds.), *The lexeme in descriptive and theoretical morphology* (Empirically Oriented Theoretical Morphology and Syntax 4), 175–202. Berlin: Language Science Press.
- Broadwell, George Aaron. 2017. Parallel affix blocks in Choctaw. In Stefan Müller (ed.), *Proceedings of the 24th International Conference on Head-Driven Phrase Structure Grammar, University of Kentucky, Lexington*, 103–119. Stanford, CA: CSLI Publications. <http://cslipublications.stanford.edu/HPSG/2017/hpsg2017-broadwell.pdf>.
- Crysmann, Berthold. 2003. *Constraint-based coanalysis. Portuguese cliticisation and morphology–syntax interaction in HPSG* (Saarbrücken Dissertations in Computational Linguistics and Language Technology 15). Saarbrücken: Computational Linguistics, Saarland University and DFKI LT Lab.
- Crysmann, Berthold. 2017. Inferential-realisation morphology without rule blocks: an information-based approach. In Nikolas Gisborne & Andrew Hippisley (eds.), *Defaults in morphological theory*, 182–213. Oxford: Oxford University Press.
- Crysmann, Berthold & Olivier Bonami. 2016. Variable morphotactics in information-based morphology. *Journal of Linguistics* 52(2). 311–374.
- Diaz, Thomas, Jean-Pierre Koenig & Karin Michelson. 2017. Oneida prepronominal prefixes in Information-Based Morphology. Paper presented at the 24th International Conference on Head-Driven Phrase Structure Grammar, 7–9 July, Lexington, Kentucky.
- Doron, Edit & Geoffrey Khan. 2012. The typology of morphological ergativity in Neo-Aramaic. *Lingua* 122. 225–240.
- Kihm, Alain. 2017. Old French declension. In Nikolas Gisborne & Andrew Hippisley (eds.), *Defaults in morphological theory*, 40–72. Oxford: Oxford University Press.

- Koenig, Jean-Pierre. 1999. *Lexical relations*. Stanford: CSLI Publications.
- Koenig, Jean-Pierre & Daniel Jurafsky. 1994. Type underspecification and on-line type construction. In *Proceedings of WCCFL XIII*, 270–285.
- Moignet, Gérard. 1973. *Grammaire de l'ancien français*. Librairie Klincksieck.
- Thornton, Anna M. 2011. Overabundance (multiple forms realizing the same cell): A non-canonical phenomenon in Italian verb morphology. In Martin Maiden, John Charles Smith, Maria Goldbach & Marc-Olivier Hinzelin (eds.), *Morphological autonomy: Perspectives from romance inflectional morphology*, 358–381. Oxford: Oxford University Press.