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Edited by

Geert Booij and Jaap van Marle

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Morphological universals and diachrony

STEPHEN R. ANDERSON*

Although linguistics is plausibly taken to be "the science of language," the actual object of inquiry in the field has changed considerably over time. Prior to the influence of Saussure in the first part of the twentieth century, linguists concerned themselves primarily with the ways in which languages have developed historically. For the next several decades, they devoted their attention to the external facts of sounds, words and sets of utterances. With the advent of the cognitive (or "Chomskyan") revolution around 1960, however, they came increasingly to see themselves as studying the human language faculty: speakers' knowledge of language and the cognitive capacity that makes this possible (Anderson and Lightfoot 2002), Universal Grammar. This is what our theories attempt to represent nowadays.

Unlike the documented facts of language history or the measurable properties of sounds and utterances, such a cognitive faculty is not directly observable, so the question naturally arises of how we might study it empirically. Two important modes of argument have emerged that are generally taken to aid in this enterprise. First, if we can show that speakers know something about their language for which relevant evidence is not plausibly present in the input on the basis of which they learned the language, we assume that this knowledge must be a consequence of the structure of the 'language organ." This is the argument from "the poverty of the stimulus," and (despite the skepticism of some: e.g. Pullum and Scholz 2002) it has proven to have wide applicability, especially with respect to speakers' knowledge of syntax.

A second line of argument is to assume that when we find that something is true of all (or at least nearly all) of the languages we can observe, it must be true of Language more generally, and thus a property of the human language faculty. The assumption that valid generalizations about language typology must be reflected in constraints within linguistic theory is widely agreed to, but is it really valid? Why should we believe that observed regularities across languages are a good guide to the structure of the language organ?

We can note that knowledge of language arises in the individual through the application of some learning strategy – a strategy that may be partly specific to the domain of language, and partly more general – to the data available during a sensitive period in early life. As a result, regularities which we find in the grammars attained by human speakers might have a variety of sources:

The Input Data: Only systems that correspond to the evidence available can be acquired.

The Learning Process: Only languages that are accessible through the procedure employed can be attained, so some cognitively possible grammars might not be learnable.

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The Language Faculty: Only cognitively possible languages can be acquired, whatever abstract regularities may exist in the data.

The argument that cross-linguistic regularities provide us with evidence for the structure of Universal Grammar rests on the assumption that only the last of these is relevant. It assumes that a complete range of input data is (at least in principle) available, and that the learning system can (again, in principle) consider any possible account of those data, so that the only filter on the class of grammars acquired is the nature of the cognitive system, or Universal Grammar. But surely this is extremely implausible.

It might seem contradictory to suggest that properties of the learning process and those of the language faculty are logically independent, but the relation between the two is clearly an empirical matter, if one that is difficult to explore. Learners confronted with a range of primary linguistic data apply some principled analysis to these data, and there is no guarantee that this analysis is capable in principle of extracting every conceivable regularity. But if there are indeed such limitations on the evidence the learning process can take into account, it is at least logically possible that there are some systems that the cognitive faculty of language could potentially encompass but which are unattainable on the basis of the path through which they must arise.

This issue has a substantial research history in the domain of syntax. Wexler and Culicover (1980) argued, for example, that the learner operates solely in terms of data of "degree-2": that is, only evidence which is available within the scope of sentences showing at most two levels of embedding is relevant to the systems that are attained. The importance of this claim for our argument follows from their further argument that actual grammars in fact are consistent with this: that is, no grammar contains properties that would require data of greater complexity to learn *regardless of whether such data actually appear in the input available to learners.* In other words, grammars dependent on the properties of sentences of degree 3 and higher are logically possible, but empirically untattested, a fact which we could explain on the basis of the claim that the learning system is actually constrained to attend only to degree-2 data. Lightfoot (1989) carried this argument somewhat further in arguing that in fact the learning procedure is limited to data of degree-0: that is, that only evidence which can be derived from the simplest structures is necessary to account for the syntactic systems that are actually attested. Again, this would follow from the fact that only "degree-0" evidence is taken into consideration by the learning process.

Both Wexler and Culicover and Lightfoot are at pains to show that their claims are indeed empirical: that is, that there are logically possible grammars that could only be acquired on the basis of more complex data than that which they claim is employed by the learner, but which are not in fact attested among the languages of the world. It is certainly at least *logically* possible that the language faculty itself is perfectly capable of comprehending such grammars,

but that this capacity is never in fact exercised because the learning system only allows access to phenomena of limited complexity (those available in "degree-2" or "degree-0" data), regardless of whether more complex data might in fact be available in the input.

To provide a serious theory of the regularities we find across the languages of the world, we need not only a theory of the language faculty but also theories of the learning system and of various sources for regularities in the input data. In connection with the latter, an important source of regularities in the input is the nature and working of historical change. A variety of linguists from Baudouin de Courtenay to the present have suggested that many of the regularities we find in the grammars of the world's languages actually result from the fact that historical change tends to produce certain configurations and not others, rather than from cognitive limitations that would exclude the unobserved systems.

This paper examines the force of this argument as it applies to morphology. We look first at what seems to be a general correlation between case marking and verbal aspect, one which has been suggested to reflect a property of Universal Grammar, and show that the connection here is an adventitious effect of several converging patterns of diachronic change rather than a systematic property of human language. We look next at the claim that morphological theory should exclude a particular formal device, metathesis, as the marker of morphological information, and show that the observed rarity of this device has plausible roots in the pathways of historical change rather than in a limitation of the language faculty. Finally, we consider the claim that morphological information should be biuniquely related to the markers that express it, as is implicit in morpheme-based models of word structure, and find that the general tendency to such isomorphism of form and content is again a reflection of plausible historical patterns, rather than being inherent in the structure of the language organ. We then briefly draw some broader conclusions.

CASE 1: SPLIT ERGATIVITY AND ASPECT

Many of the world's languages display a pattern of nominative *vs.* accusative marking for the subject and (direct) object of a clause only under some circumstances, while other conditions result in ergative *vs.* absolutive marking. Such *split ergative* patterns are not distributed randomly, however. Typologists have observed that in a number of such cases, nominative/accusative marking is associated with a main verb bearing imperfective aspect (or some form derived from that source), while ergative/absolutive marking is associated with perfective aspect or its descendents. It has been widely assumed (Delancey 1981, Dixon 1994, Tsunoda 1985) that Universal Grammar should account for this

correlation by positing some sort of privileged link between ergativity and perfectivity, accusativity and imperfectivity.

An alternative possibility, however, is that this apparent connection actually results from a quite different source, the pathways of historical change that produce innovations or shifts in case marking patterns. This was the conclusion of an earlier paper (Anderson 1977), in which I investigated several established sources for ergative case marking in natural language, as well as one source that leads to innovative accusative marking.

It has long been known that perfective verbal forms in many languages are historical innovations. Benveniste (1952) studied this process in a number of branches of Indo-European, and documented one common source of such perfects in the re-analysis of originally passive forms. The semantics of a sentence such as *The fish was cooked (by Julia Child)* typically includes the interpretation that the cooking in question is a *fait accompli*, and thus it is entirely plausible that the use of passives should be generalized as a way to focus on perfectivity. If the morphology of the passive is then re-interpreted as a signal of the perfect, the result is a construction in which the original, notional subject is marked with a special form (instrumental, or with a preposition such as English *by*) while the original, notional direct object appears in the same form as an intransitive subject:

(1) (Original) NP_{Obj}-NOM – $Verb_{Pass}$ – NP_{Sbj}-INSTR ⇒
(Innovative) NP_{Sbj}-OBL – $Verb_{Perf}$ – NP_{Obj}-NOM

This development is widely considered to be the source of the ergative constructions found in the modern Indic languages, such as Nepali:

(2)

Sita-le	aluma	nun	haleko	chə
Sita-ERG	potato-LOC	salt-NOM	put	AUX

Sita (has) put salt in the potatoes

While there is still much to be said about the precise sequence of developments by which passives can give rise to later perfects, the possibility of such a development is not seriously in question for a number of languages. The perfects thus derived may themselves be re-analyzed subsequently as simple past tenses.

Assuming the original state of affairs within which this innovation takes place had a nominative/accusative system of case marking, the result is one in which (the new) perfect or past tense forms are associated with an ergative construction, while the (unchanged) non-perfect forms are associated with an accusative construction. This is a standard sort of split-ergative system, but we should note that the parameters of the split are determined by the case marking properties of the (passive) ancestor of the new perfect, not by some constraint of Universal Grammar.

In other languages, though, Benveniste (1960) documents a different source for innovative perfects. He notes that in language after language, whatever verbal expression serves to express possession is also pressed into service as a marker of the perfect – as is the case, indeed, in English, where *have* serves both functions. The expression of possession is often a transitive verb (such as English *have*; Latin *habeō*, despite appearances not cognate with *have*; Spanish *tener*, etc.). In some languages, however, a distinct prepositional construction is used:

(3) **Russian:** U menya ∅ kniga
at me (is) book
I have a book

Breton: Eur velo c'hlas am eus
A bicycle blue at-me is
I have a blue bicycle

In case a construction of this type comes to be employed as a marker of the perfect, note the consequences. The subject of a transitive perfect verb will be marked with some oblique (originally locative) case, while the object will be marked in the same way as the subject in copular constructions: as a nominative. But as in the case of perfects descended from passives, the result is a situation in which the new perfects are associated with what is formally an ergative construction, while non-perfects are associated with the original (presumably accusative) construction. Benveniste argues that this can be seen in the origin of the Armenian perfect. Here the subject appears in the genitive, betraying the possessive origin of the construction, while the object appears in the accusative, presumably by a later extension of this case to all objects.

(4) zayn nšan arareal ēr nora
that miracle-ACC performed AUX he-GEN
He performed that miracle

Benveniste proposes that the Old Persian form *ima tya manā krtam* 'that is what I have done' represents this same evolution of a perfect from a possessive in a 'pure' form (i.e., without extension of the accusative to the object).

Again, we have a split ergative system in which the perfect is associated with ergative marking, the imperfect with accusative marking. The two developments (from passives and from possessive constructions) have nothing to do with one another, and in neither instance is the case marking of the original construction mandated by Universal Grammar. The two developments happen to converge however, on systems with the same inherited, synchronically accidental) correlation of case marking and verbal aspect.

A third, completely independent, development can also lead to the same result. Suppose that instead of innovating a perfect, a language were to reanalyze some construction as an *im*perfect verbal form. What original structure might be appropriate for this purpose? A plausible candidate would be a structure in which the object of a transitive verb, instead of being marked with a direct case such as the accusative, appears as a prepositional adjunct. English has a number of contrasting pairs of this sort:

(5) a. i. Jones read ***War and Peace*** to his wife.
ii. Jones read to his wife from ***War and Peace.***

b. i. Fred shot my cat.
ii. Fred shot at my cat.

In each of these pairs, the (ii) example is interpreted as an action not necessarily completely carried out, the object not completely affected, etc. Similar pairs form the basis of comparable contrasts in a wide range of languages, as discussed in Anderson (1988) among many other sources. The constructions in question clearly overlap semantically with the verbal notion of an 'imperfective'. It would therefore be plausible for a structure in which a transitive verb is constructed intransitively, with its nominal object appearing in an oblique or prepositional form, to serve as the starting point for the development of such a category.

This is exactly what has happened in the history of Georgian, according to a suggestion originating with Braithwaite (1973), developed in Anderson (1977), and made much more precise in Harris (1985). On this account Georgian was originally a consistently ergative language. In the course of its history, a new series of imperfective forms developed from an 'object demotion' construction similar to (5). These forms underlie what are now called the 'series I' tenses, in which case marking is nominative/accusative. A different set of forms, the 'series II' tenses, continues the original situation.

Roughly, the division between series I and series II tenses can be seen as (originating in) a difference between imperfective and perfective forms. Again, as with the two paths of development for new perfects summarized above, the result is a split between ergative perfects and accusative imperfects. Again, however, this split should not be seen as mandated by Universal Grammar, but rather as the accidental consequence of the formal properties of the earlier construction on which the innovated forms – here the imperfectives, as opposed to the perfectives in the earlier cases – are based.

These completely independent developments all happen to converge on the same kinds of data. Each results in a state of affairs in which perfective forms (or their descendents) are associated with an ergative pattern, while imperfectives (or their later reflexes) are associated with nominative/accusative patterns. This is not, however, due to some regularity stipulated by Universal Grammar

which relates case marking and verbal aspect: rather, it is an epiphenomenal regularity that emerges from a number of unrelated lines of development. This should suggest to us that not every pattern we can find in the data of language typology reflects the structure of the language faculty directly.

CASE 2: MORPHOLOGICAL METATHESIS

Another set of issues revolves around the question of whether morphological theory should countenance the possibility of rules of metathesis: rules which simply re-arrange the sequence of segmental material in a form to mark a grammatical category, with no concomitant addition of an affix or other marker. Some morphologists have argued that morphological metathesis rules ought to be excluded in principle from the theory, because such rules are (by definition) unformulable as concatenative affixes. Accommodating them would seem to entail a theory involving the full power of "the extremely rich transformational notation" (McCarthy 1981, p. 373), an undesirable result if we hope to provide a restrictive account of the notion "possible morphological system."

The possibility of metathesis (by itself) as a grammatical mechanism was first raised as a theoretical issue in Thompson and Thompson 1969, who cited a small number of potential cases. Although some of these have resisted all attempts to reduce them to affixal morphology, their number is undeniably quite small, and this has led researchers to hope that the remaining ones would eventually yield to re-analysis as well, allowing for the preservation of the notion that all morphology is affixation.

Arguing that although rare, morphological metathesis must nonetheless be accommodated by a general theory of morphology, Janda (1984) proposes that the explanation for the very small number of plausible cases is rooted in facts about historical change. He argues that morphological metathesis is rare because historical changes that might lead to such a situation are rare. Non-affixal morphology arises when an originally phonological alternation is reanalyzed as morphologically conditioned. But Janda argues that *phonological* metathesis processes are quite rare, and thus the opportunity for a language to morphologize such a rule is hardly ever presented.

This argument has an affinity with the program of Evolutionary Phonology proposed recently by Juliette Blevins (to appear). She argues that much of what we find (or fail to find) in synchronic phonologies is not a product of the basic structure of the human language faculty (as represented by linguistic theories of various domains). Instead, many (perhaps most) typological generalizations result from the pathways of historical change and their results. If historical change operates in such a way as to favor or disfavor certain situations, its results are what we will find, and such generalizations are thus at best a poor guide to the structure of the language faculty itself.

Going back to Baudouin de Courtenay 1895 [1972], still one of the most comprehensive reviews of the processes governing the "life cycle" of alternations, we see that the main path by which morphological processes emerge is when an originally phonological regularity becomes increasingly opaque as a result of other changes. When the phonological conditioning factors for an alternation become lost (or at least difficult to recover from surface forms), it may be reinterpreted as aligned with morphological factors. To the extent phonological bases for such a change are lacking, we would expect the corresponding morphological rules to be rare or absent, regardless of the character of morphological theory *per se*.

Unfortunately for the viability of this explanation, phonological rules of metathesis are actually not rare. In a series of papers devoted to this subject, Blevins and Garrett (1998, to appear) have shown that there are several systematic types of sound change that can result in phonological metathesis rules, and that a substantial number of such processes do in fact exist in a wide variety of languages. If morphological metathesis is rare, then, it cannot be because there are no phonological processes to serve as its precursors.

Given that synchronic phonological metathesis is a real (and not especially rare or exotic) phenomenon, a historical explanation for the rarity of corresponding morphology must take some form other than the one proposed by Janda. Let us ask how morphological metathesis might be expected to arise in a grammar. As noted above, this is most likely where antecedent phonological processes have become opaque as a result of later changes. Eventually, language learners come to align the alternation with some grammatical category, rather than with a phonological trigger whose presence in the environment is highly abstract or perhaps no longer visible at all. On that basis, we can ask how plausible it is for phonological metathesis to be reanalyzed as morphological in this way.

Blevins and Garrett, in the works cited above, identify four categories of phonological metathesis processes:

Perceptual metathesis, in which a phonetic property realized over a multisegmental span of the utterance becomes mis-allocated and is attributed to a segment other than the one from which it originates in the sequence.

Compensatory metathesis, in which a foot-peripheral syllable node is lost and the phonetic content originally assigned to it is re-assigned in a way that does not respect the original phonetic sequence.

Coarticulatory metathesis, in which overlap of gestures in adjacent segments leads to ambiguity with respect to their original order.

Auditory metathesis, in which fricative noise becomes decoupled from the sequential speech stream and re-assigned to a location other than its original one.

Of these possibilities, compensatory metathesis does not really count in a sense, because the primary operation involved is not a re-ordering but rather the loss of prosodic structure, with "metathesis" emerging as a concomitant. One of the instances cited both by Thompson and Thompson (1969) and Janda (1984) is the formation of the incomplete phase in Rotuman. Historically, the primary operation here is not a re-ordering, but rather, alternations due to distinct prosodic contours, where stress prevents vowel loss in one form, and its absence gives rise to vowel loss in another. The Rotuman example has been shown conclusively (Hale and Kissock 1998, McCarthy 2000) to have this character.

Compensatory metathesis, as found in Rotuman, is extremely rare. In this example, it entails a prior morphological contrast whose only exponent is the location of stress. A two stage sound change with extreme CV coarticulation followed by loss of peripheral unstressed vowels then yields, through restructuring, a morphologically conditioned relation which (in part) mimics CV metathesis. Where such systems occur, morphologically conditioned metathesis can emerge as a result, but they fall together with the "crazy rule" cases considered below.

The remaining three types of metathesis are each limited to specific combinations of segment types: laryngeal, rhotic, etc. and vowel for the perceptual type; $p+k$ (becoming $k+p$) for the coarticulatory type; and sibilant plus stop for the auditory type. Crucially, in all three varieties, the conditioning factors are entirely internal to segments undergoing the positional interchange. That is, there are no external conditioning factors for any of these processes, such that that aspect of the structural description could become opaque or be lost altogether. Since the elements that undergo the change are themselves its trigger, the normal historical processes of morphologization can gain no foothold.

Compare this situation with processes such as Umlaut, for example, in which some element (e.g., a high front vowel or glide in a succeeding syllable) conditions the change but is not part of it. When this element itself undergoes change (e.g., reduction to schwa in unstressed syllables), the alternation can persist in morphologized form. No such development is possible for the well established types of phonological metathesis, however.

If there is no natural path by which phonological rules of metathesis can be morphologized, does this mean that metathesis is confined to the phonological domain? No, for while the re-analysis of a corresponding phonological rule may be the most straightforward source for a morphological rule, it is not the only one. In fact, the case which was first cited (by Thompson and Thompson 1969) in this regard, the relation between the "non-actual" and the "actual" forms of the verb in Northern Straits Salish languages like Klallam and Saanich, turns out to be a valid instance of "metathesis as a grammatical device."

In Klallam pairs like those in (6), for example, a sequence of consonant plus vowel in the "non-actual" form is inverted to produce the "actual" (a form with

a semantic interpretation that includes that of the English present progressive), with no accompanying affix or other factor that could be said to condition the change.

(6) Klallam: CCV → CVC

Non-Actual	Actual	gloss
qq'í-	qíq'-	tie up, restrain
pk^{w}ə́-	pə́k^{w}-	smoke
čk^{w}u-	čúk^{w}-	shoot

Where does such a relation originate, if not in an originally phonological rule of metathesis? Demers (1974) argues that in the related language Lummi, the original process involved a rule copying vowels (converting CCV́ into CV̆CV́), followed by a shift of stress in the resulting forms (converting CV̆CV́ to CV́CV̆), and finally loss of the unstressed vowel to yield CV́C. This sequence is plausible as a historical account of the origins of the form of the "actual," and may even be valid as a synchronic analysis of the facts of Lummi. The crucial rules are not, however, operative in Klallam, or in another relevant language, Saanich (Montler 1986, 1989):

(7) Saanich: CCəC → CəCC

Root	Non-Actual	Actual	gloss
θk^{w}-	θk^{w}ə́t	θə́k^{w}t	straighten (something)
t's-	t'sə́t	t'ə́st	break (something)
t^{θ}'ɬək^{w}'	t^{θ}'ɬə́k^{w}'	t^{θ}'ə́ɬk^{w}'	pinch (something)
x̌'pəx	x̌'pə́x	x̌'ə́px	scatter (something)
x^{w}q'p'ət	x^{w}q'p'ə́t	x^{w}q'ə́p't	patch (something)

The Saanich facts are discussed by Stonham 1994, who offers an analysis on which the alternations in (7) do not instantiate grammatically conditioned metathesis, but are rather the result of the addition of a mora in the actual forms with concomitant re-organization of segmental material. Stonham's account involves unusual assumptions about the nature of the association between segmental and prosodic structure, but in any event it does not extend to a full range of the relevant cases. As he notes (Stonham 1994, pp. 175f.), metathesis of a CCV root to CVC would close the syllable, thus plausibly satisfying a constraint that the 'actual' should have one mora more than the 'non-actual' (assuming it could be shown that Saanich and Klallam are languages in which coda consonants are moraic, which is not obvious from the rest of their phonology). But the forms in (7) do not conform to this description. Montler (1989) shows that

roots like the first two are actually vowel-less in their basic form, and become eligible for conversion to an 'actual' form through the addition of a stressable suffix such as *-ót* 'control transitive' which already has a closed syllable. Metathesis would thus not have the desired effect of adding a mora to such stems. The same is true of any root whose basic form already contains a coda consonant, such as the last three in (7), where the transposition of a prevocalic consonant into the coda cannot be said to satisfy such a prosodic requirement for an additional mora. We could only reconcile these examples with Stonham's analysis by assuming that multiple coda consonants can contribute multiple moras to the prosodic weight of a form, something that has not been claimed for any language and which would be extremely hard to justify. See also Kurisu 2001 for discussion of this case, which we must conclude is a genuine (if isolated) instance of "metathesis as a grammatical device."

Examples of this sort do not counter-exemplify the claim above that natural processes of historical change do not produce morphological metathesis rules from originally phonological metatheses.[1] The reason is that the origin of the non-actual metathesis in Salish is apparently something like the path identified by Demers. As such, it is a matter of restructuring rather than simply morphologization. Processes of rule inversion, telescoping, and the like were identified at least as early as Bach and Harms (1972) as the source of "crazy rules," rules cut off from their original phonetic motivation through the ongoing reanalysis of alternations by successive generations of speakers. This is a known source of grammatically conditioned metathesis: Garrett and Blevins (2004) discuss other instances in which metathesis rules have arisen within the Lexical Phonology of a language through restructuring without having a source in a phonetically natural metathesis process.

However inconvenient this may be for theories that assume all morphology to be based on affixation, then, it is necessary for morphological theory to recognize purely non-affixal markers for grammatical categories. If such markers are rare, the explanation for that fact is to be sought not in the nature of the human cognitive capacity for language, but rather in the paucity of historical scenarios that could yield such a process in practice.

This should not be particularly surprising, if we look at a broad range of evidence for the nature of the capacity with whose structure we are concerned. Language games, secret languages, and similar systems show widespread use of re-ordering, as is evident from a systematic survey such as that of Bagemihl 1988. These often instantiate processes which are extraordinarily unlikely ever to be found in any naturally occurring language. One might claim, of course, that such systems are outside the scope of normal language, but the facility with which they are acquired and used in a wide range of the world's cultures makes that unlikely. Indeed, Bagemihl shows that the processes that set them apart from "normal" systems can be precisely placed with respect to the rest of the

grammar, and that it is really only their unusual content that differentiates them from other rules of phonology and morphology.

We should probably conclude that the rules of such systems display a freedom not available to naturally occurring languages precisely because they are not constrained to arise through the usual processes of historical change. Their rules need not originate in perceptual or articulatory effects of the sort argued by Blevins (to appear) to underlie changes of the more familiar sort, but are constrained only by the imaginations of speakers. Further, since there is no "intelligibility constraint" on the relation between the base language and a secret or language-game variant (indeed, precisely *un*intelligibility is sometimes the essence of this relation), these can differ much more dramatically than in the case of systems developed through transfer of a language across generations. These examples provide us with a kind of laboratory, then, in which we can observe some of the differences between what is "natural" (in terms of our phonetically based expectations) and what occurs in nature. The existence of grammatically conditioned metathesis rules is not at all unexpected in this context.

CASE 3: MULTIPLE EXPONENCE

A number of views of morphology assert, as a matter of theoretical necessity, that a single category of content which is reflected in a given word must be indicated by exactly one formal marker (Halle and Marantz 1993, Noyer 1992, Steele 1995). That is, they deny the possibility of what some (e.g. Matthews 1972) refer to as "extended" or "multiple exponence," in which the same category is reflected formally in two or more distinct components of the word's morphology. In a related vein, the theory of "Natural Morphology" (Mayerthaler 1981, Wurzel 1984, Dressler, Mayerthaler, Panagl and Wurzel 1987) regards the unique expression of a single category by a single marker as the "unmarked" state which languages prefer and toward which they tend to develop – again, within this view, a matter of the theoretical characterization of the language faculty. The more seriously one is attached to a model based on the classical notion of the "morpheme" (an irreducible one-to-one association of a piece of form with a piece of content, the minimal Saussurean sign), the more important this matter becomes.

A historical perspective might suggest that the requirement of simple or unique exponence of morphological categories is a plausible one. Morphological markers typically represent pieces of form that have gradually shifted in status over time from fully independent words through phonological reduced forms ("simple" clitics) to clitics more intimately associated with their host, eventually becoming affixes. If this path of development is indeed the origin of all morphological markers, it makes sense that the components of content within a given word should be bi-uniquely related to the components of its form.

Apparent counter-examples to the requirement of uniqueness of exponence are typically dismissed by designating one of the markers as the "real" one, and assigning other formal reflections of the same category the status either of special stem forms associated (non-distinctively) with certain categories, or of morphophonemic changes triggered by the primary marker. For instance, in German *Kraft/Kräfte* 'strength(s)' the category of plural appears to be marked twice, once by the ending *-e* and again by Umlaut of the stem vowel. One might say that Umlaut is a "morphologically conditioned phonological rule," or that Umlaut is a property of a special variant of the noun's stem; and that only the ending is a genuine plural marker. At minimum this analysis is not obvious, given the existence of other words such as *Tag/Tage* 'day(s),' *Jahr/Jahre* 'year(s)' in which the ending *-e* alone marks the plural, without Umlaut, and *Apfel/Äpfel* 'apple(s),' *Graben/Gräben* 'ditch(es)' in which Umlaut alone serves this function.

I have argued (Anderson 2001) that it is impossible to maintain the constraint of "one category, one marker" as a requirement on morphological theory in this way without completely trivializing it (as Distributed Morphology does, for instance, with its array of post-syntactic morphological manipulations including fission, fusion, impoverishment, arbitrary and stipulated morpheme-to-morpheme concord, etc.). Despite the fact that morphological categories and markers line up in a one-to-one fashion in the vast majority of cases, this cannot be a requirement on morphological structures, because in at least some cases, it is violated without any evidence that the result is ill-formed or unstable.

A particularly robust system displaying such multiple exponence is that of verbal agreement in the Kiranti languages of Nepal and neighboring areas (van Driem 1990, 1997). In a form such as Dumi *dza-ŋ-pə-t-ə* 'I'm going to eat' both the *-ŋ-* and the final *-ə* are markers of the first person subject. Such multiple marking of the categories of a verb's arguments is very widespread in all of these languages – indeed, it is the exception, rather than the rule, that a given argument is marked only once in a language like Dumi.

Again, we can look to historical change for the bases of (at least some) instance of multiple exponence. In Dumi or, somewhat more perspicuously, Limbu (van Driem 1987), the verbal agreement markers (apart from a limited set of prefixes) group themselves into two suffix clusters, each of which may contain markers for the same or similar properties of the same argument(s). What is responsible for this state of affairs is clear, on van Driem's reconstruction of the family.

A reasonably common historical source of agreement markers in a language is an original inflected auxiliary. Such an auxiliary may be associated with some or all (lexical) main verb forms; like other words, it may undergo reduction to a simple (and later a special) clitic, thus coming to be attached to an associated uninflected form of the lexical verb. This reduced form of the auxiliary may then come to be reinterpreted as morphology on the verbal base, rather than a

separate element. The Muskogean languages, for instance, have undergone such a development, as argued originally by Haas (Haas 1969) and subsequently confirmed in the study of several of the individual languages.

What has happened in the Kiranti languages is that this developmental pattern has occurred not just once, but (at least) twice in the history of languages like Limbu and Dumi, each time leaving a new set of inflectional markers on the verb. When one examines the patterns of marking within each subset of the suffixes, it becomes clear that the pattern of marking was not the same in the two historical inflected auxiliaries that are now reflected on the verb, but the arguments with which they show agreement are the same, and many of the same category distinctions are made in both cases. The result is a pattern that displays (at least) two distinct markers on the verb corresponding to the same agreement information relevant to a given argument.

While this repeated process of auxiliary reduction is obviously unusual, it does not seem theoretically problematic, and thus the clear instance of multiple exponence to which it gives rise should not be rejected either. Though inconvenient for morpheme-based models of word structure, many-to-many relations between a word's formal markers and the categories they reflect are simply a fact of linguistic structure. The predominance of one-to-one marking has two sources: one in the paths of historical change (along which markers typically originate in the progressive reduction of full words), and the other in the assumption by language learners that such a relation is the most likely connection between form and content, *ceteris paribus.* Nevertheless, undoubted exceptions to this principle have a clear motivation in the historical morphology of individual languages. Unique relations between categories and their exponents may well be the "unmarked" state, as Natural Morphology would have it, but this is a fact about historical origins and the learning process employed in language acquisition, not about the structure of the cognitive faculty of language.

CONCLUSION

We conclude that what we find in language is only partially explained by what is "natural." Some things that we find in the morphology of a language are there not because the language faculty requires them but because change tends to create them for independent reasons; while some things that are rare or perhaps even non-existent are not to be found because there are few if any pathways that could produce them from an available source. These observations have surprisingly important consequences: they mean that our account of the human cognitive capacity for language cannot be based simply on generalizations about what we find in the languages of the world, or on what can be grounded in some other domain, such as phonetics. The cognitive capacity we hope to capture may

well be much more flexible than we might think at first glance, and as a result, it may be considerably harder to determine its properties than has been assumed.

NOTES

* I am grateful to the participants in the Mediterranean Morphology Meeting IV in Catania, especially Paul Kiparsky and Alice Harris, for comments, questions, and suggestions relevant to this paper; and to Juliette Blevins and three anonymous reviewers for comments on an earlier draft. The influence of Blevins' work on the role of historical explanation in phonology will be apparent.

[1] Examples of this sort, where metathesis emerges from the historical re-analysis of other cumulated processes, are referred to as ''pseudo-metathesis'' by Blevins and Garrett (1998).

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Morphological universals and the sign language type*

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> Now the Egyptians, before the reign of their king Psammetichus, believed themselves to be the most ancient of mankind. Since Psammetichus, however, made an attempt to discover who were actually the primitive race, they have been of opinion that while they surpass all other nations, the Phrygians surpass them in antiquity. This king, finding it impossible to make out by dint of inquiry what men were the most ancient, contrived the following method of discovery:- He took two children of the common sort, and gave them over to a herdsman to bring up at his folds, strictly charging him to let no one utter a word in their presence, but to keep them in a sequestered cottage, and from time to time introduce goats to their apartment, see that they got their fill of milk, and in all other respects look after them. His object herein was to know, after the indistinct babblings of infancy were over, what word they would first articulate. It happened as he had anticipated. The herdsman obeyed his orders for two years, and at the end of that time, on his one day opening the door of their room and going in, the children both ran up to him with outstretched arms, and distinctly said "Becos." When this first happened the herdsman took no notice; but afterwards when he observed, on coming often to see after them, that the word was constantly in their mouths, he informed his lord, and by his command brought the children into his presence. Psammetichus then himself heard them say the word, upon which he proceeded to make inquiry what people there was who called anything "becos," and hereupon he learnt that "becos" was the Phrygian name for bread. In consideration of this circumstance the Egyptians yielded their claims, and admitted the greater antiquity of the Phrygians.
>
> Herodotus, *History*, 2.2

1. THE MORPHOLOGY OF NEW LANGUAGES

Most linguists assume with Herodotus that languages can arise de novo, given the right circumstances. However the phenomenon of the birth of a language in a natural social setting has never previously been directly observed, strictly speaking, for either spoken or signed languages. We will report here on the first such direct observation known to us of the advent of a new language in such a setting and more specifically on the morphology of that language. New languages are predicted to have certain properties, because of their newness. As

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regards morphology in particular, they should have very little, because morphology takes time. Every language must arrive at its own particular set of morphosyntactic and morphological categories; arbitrary associations must be established between the morphosyntactic categories and their exponents.

Prototypical creole languages have long been viewed as having very little morphology, either derivational or inflectional (McWhorter 1998), because they are new. But recent findings show that, quite to the contrary, creoles have more morpology than they should (Bakker 2003, Braun and Plag 2003, DeGraff 1999, Good 2003, Lefebvre 2003). That actual creoles contradict the typological prototype set up for creole languages (which are the only new spoken languages that linguists have access to) is not unexpected, since creoles are in fact not entirely new languages. Rather, as contact languages, they result from two or more languages coming together. Furthermore, there often ensues long-term continuous contact between speakers of the creole and one or more of the contributing languages, resulting sometimes in the borrowing of wholesale morphological patterns, just as English borrowed much of its derivational morphology through contact with and extensive borrowing from French and Latin.

Sign languages are often said to resemble young creoles in both their genesis and structure, and hence might be expected to exhibit the morphological characteristics that have been ascribed to prototypical creole languages. Detailed study of the morphology of sign languages (Aronoff et al., 2000, in press) shows, however, that developed sign languages, like actual creoles, also diverge from the expected prototype. They show complex motivated simultaneous morphology, similar across unrelated languages, but limited affixation, mostly arbitrary and different among languages. But would the same be true of a completely new sign language?

The new sign language that we have been studying recently helps to answer this question. Although there is no documentation of a spoken language arising completely de novo since the time of Psammetichus, there are several known instances of sign languages arising in this manner, with no outside influence, the most famous being Martha's Vineyard Sign Language, which flourished in isolation on an island off the northeastern coast of the United States from about 1700 to 1900 (Groce 1985). Harlan Lane and his colleagues (Lane et al. 2000) have described the social and genetic prerequisites for the rise of a sign language de novo. These are social and physical isolation of a community; endogamy (which is usually concomitant on the first condition); genetically-based nonsyndromic recessive deafness; and time for a large enough cohort of signers to develop. Under such circumstances, a sign language will arise which is not used only by an isolated subset of the population, but is widespread among both deaf and hearing members of the community. This is precisely what we have found in the new sign language under study.

We call this new sign language Abu-Shara Bedouin Sign Language (ABSL).[1] This language developed independently within the last seventy years

in a closely-knit endogamous community, consequent to genetically recessive non-syndromic deafness. ABSL, unlike other well-studied sign languages, has little apparent morphology, although it may have the rudiments of agreement and aspect. ABSL morphology thus appears to vindicate the prototype for new languages.

2. THE SIGN LANGUAGE MORPHOLOGICAL TYPE

The study of sign languages from all over the world has made it clear that these languages constitute a morphological type: all well studied established sign languages are reported to have the same particular types of complex morphology. Two central sign language morphological constructions are verb agreement for person and number of subject and object in a semantically defined class of verbs (Engberg-Pedersen 1993, Meir 2002, Padden 1988); and a system of polymorphemic classifier constructions that combine nominal classifier handshapes with path shapes, manners of movement, and locations (Emmorey 2003). This type of morphology is typically nonconcatenative in structure (Sandler 1989), combining morphemes in a way that is simultaneous rather than sequential. We will present an analysis and representation of the sign language verb agreement system in Section 3.

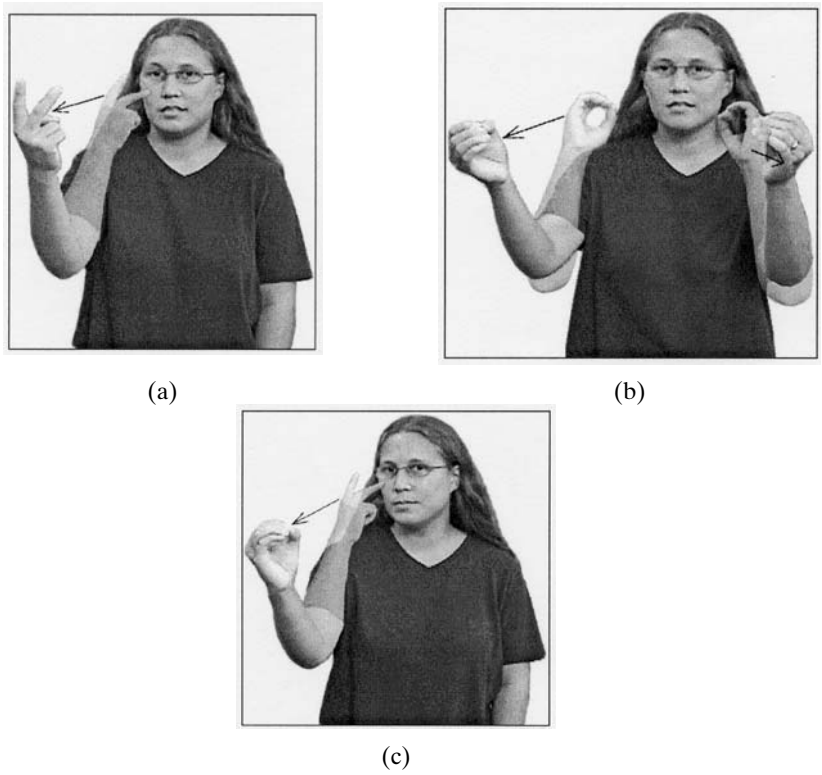
What makes it surprising that sign languages universally possess such complex morphology is the fact that all known sign languages are chronologically young – a few hundred years old at the most. For example, American Sign Language (ASL) is about 200 years old and Israeli Sign Language (ISL) is only about 70 years old. In addition, at any given time, fewer than 10% of signers have learned sign language at home from deaf parents. The rest of the deaf population is born to hearing parents and is exposed to degraded and/or late sign language input, if they are exposed to sign language in their childhood at all. Thus, the youth of sign languages and the perpetual interaction between native and non-native users of these languages make sign languages comparable to spoken creoles, and indeed, some researchers have argued that sign languages have many grammatical characteristics in common with creole languages (Fischer 1978, Gee and Goodhart 1988). Yet creoles typically have limited morphology (McWhorter, 1998), while sign languages all seem to have complex morphology of a particular type. We have argued that the complex morphology found universally in established sign languages is linked conceptually and formationally to visuo-spatial cognition (Aronoff et al. 2000, in press; Aronoff et al. 2003).

But sign languages also have another type of morphology that is more commonly found in spoken languages, including creole languages: sequential affixation that has arisen through grammaticalization.[2] We present here one example of this type of affixation from American Sign Language and another

from Israeli Sign Language. In each case, the affixes correspond to independent words that still exist in the language.

2.1. Sequential affixation through grammaticalization: The ASL-ZERO affix

Like most other languages, ASL has many ways of expressing negation. One of them is through affixation, usually to a verb, of a one-handed form, in which the fingers form the shape of a zero and the hand moves outward from the body. The affix, meaning 'not X at all', is semantically and phonologically similar to a free word. The word is made with two symmetrical hands and means 'none at all'. The free words, SEE and ZERO ('none at all'), and the suffixed verb 'SEE-ZERO ('not see at all') are shown in Figure 1:



(a) (b)

(c)

Figure 1. (a) SEE (ASL). (b) Independent word: NONE-AT-ALL (ASL). (c) Affixed form: SEE-ZERO, 'not see at all' (ASL)

One reason for considering the form a suffix (rather than an independent word) is that it must occur after, never before, its stem. This is one way in which

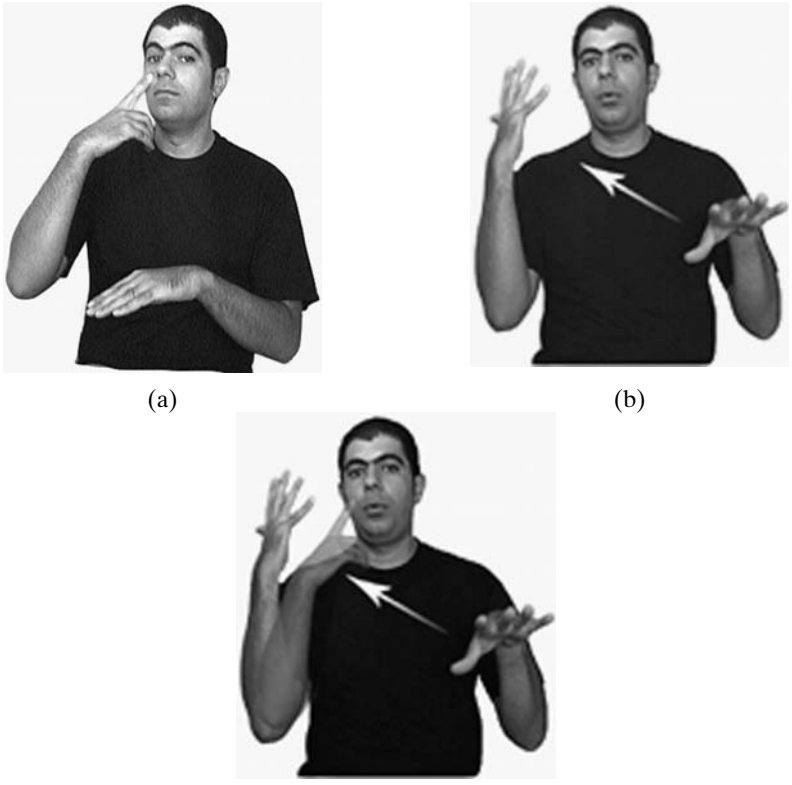
it differs from the free word, which can occur either before or after verbs. Another reason is the recurrence of the same ZERO form with many different stems. For most signers, the suffix appears to be lexicalized, phonologically fused to the verb and occurring only with a limited set of verbs, some of which have idiosyncratic meanings (Sandler 1996). For others, the suffix is more productive, and may also attach to adjectives. Suffixed forms sometimes have idiosyncratic meanings; e.g., TASTE-ZERO does not mean 'not taste at all', but rather has the meaning 'not at all to my taste'. A phonological constraint restricts the suffix to one-handed verbs, and a morphological constraint restricts its use to plain verbs and prohibits it from attaching to agreeing verbs or to spatial verbs (Aronoff, Meir, and Sandler 2000, in press; Sandler and Lillo-Martin, in press).[3] Taken together, these properties demonstrate that -ZERO is a grammaticalized affix in ASL.

2.2. Sequential affixation through grammaticalization: ISL sense prefixes

Affixation can also be found in ISL. One set of affixes, which we call sense prefixes, are glossed by native signers with words that involve either a sense organ – eyes, nose, or ears – or the head or mouth. So far, we have discovered over 70 prefixed forms of this type in ISL. Like the ASL negative suffix described above, the recurring elements in these forms are affixes rather than independent words. First, although many words formed with a sense prefix have transparently componential meanings ('to X by seeing (eye)/ hearing (ear)/ thinking (head)/ intuiting (nose)/ saying (mouth)), many do not. For example, the sign meaning 'cunning' has the mouth or nose prefix, though its meaning is not related to smelling or saying. Also, in several words formed with these prefixes, the base has no independent meaning without the prefix. Finally, while the lexical category of the base may be indeterminate, the affixed forms are always verbs. Like the ASL ZERO suffix, the ISL sense prefixes also show individual variation in their use and productivity. An example is provided in Figure 2.

Consistent with the claim that the sequence is a word and nothing larger, we find that some affixed forms undergo regressive handshape assimilation, a process that also occurs in ISL compounds (Meir and Sandler 2004) but is not attested across independent words. One reason for considering these forms to be affixed words and not compounds is that the first morpheme is always one of a small class of words typically related to the senses. We conclude, then, that we are dealing with complex words, consisting of a prefix and a stem.

This type of morphology is precisely what might be expected in a young language. It involves grammaticalization of free words and shows individual variation in use and productivity. Furthermore, it is very limited, conforming to the young language prototype. Only two affixes have been described so far in



(a) (b)

(c)

Figure 2. (a) SEE (ISL). (b) SHARP (ISL). (c) Affixed form: SEE-SHARP 'discern by seeing' (ISL)

ISL (Meir and Sandler, 2004) and five in the older of the two sign languages, ASL (Sandler and Lillo-Martin, in press). We now turn to an example of the other major group of morphological processes, the group that we argue earmarks sign languages as belonging to a morphological type: complex simultaneous morphology grounded in visuo-spatial cognition. The example presented here is that of verb agreement.

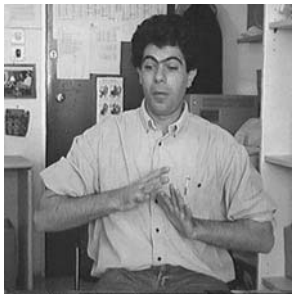
2.3. Sign language typical morphology: Verb agreement

Like verb agreement in spoken languages, sign language verb agreement is a grammatical system, because it involves systematic encoding of syntactic and thematic roles. But Padden (1988) showed that ASL verb agreement is different from that of spoken languages in that the language has a three-way classification

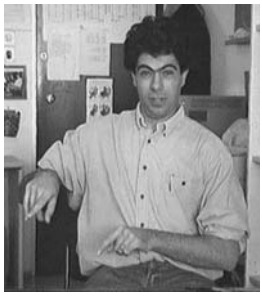
of verbs, according to their agreement patterns: plain, spatial and agreement verbs. This three-way classification holds for other established sign languages as well.

Verb agreement in sign languages takes the following form: the beginning and ending points of the agreeing verb are associated with the points in space established for the arguments of the verb. In sign languages, nominals in a clause are associated with discrete locations in space, called 'R(eferential)-loci'. This association is usually achieved by signing a NP and then pointing to, or directing the gaze towards, a specific point in space, as exemplified in the ISL sentence (1) and in Figure 3 below. In this sentence, the signer signs the noun phrase SON MY, and then points to a specific point in space, on his right. He then signs DOG POSSESSIVE-PRONOUN. He directs the possessive pronoun to the same locus that he established earlier, thus forming a connection between the NP SON, and the possessor of the dog.

(1) SON $POSS_1$ $INDEX_i$, DOG $POSS_i$, FALL-ASLEEP.[4]
'My son's dog fell asleep.'



SON



$INDEX_i$

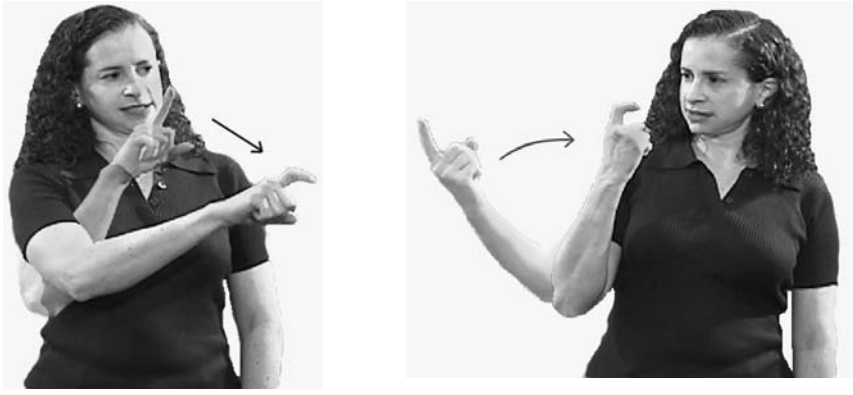
DOG

$POSS_i$

Figure 3. Establishing and referring back to a reference locus (ISL): SON $INDEX_i$, DOG $POSS_i$

These R-loci are used for anaphoric and pronominal reference for the nominals associated with them, and are therefore regarded as the visual manifestation of the pronominal features of the nominals in question (see e.g., Bahan 1996, Janis 1992, Klima and Bellugi 1979, Lillo-Martin and Klima 1990, Meier 1990). Note, however, that these locations are not determined by categories of features like e.g., gender or noun class. Each argument is assigned its own R-locus, and therefore it can be regarded more as an index than as feature complex. Sign languages, then, have overt R-indices (Lillo-Martin and Klima 1990).

In addition to pronominal signs, verbs which inflect for agreement (the so-called 'agreement verbs') also make use of the system of R-loci: the direction of the path movement of the verb is determined by the R-loci of the verb's arguments. In agreement verbs, the beginning and end points are determined by the R-loci of their grammatical arguments. The ASL verb ASK, for example, moves from the location associated with its subject argument towards the location associated with its object argument. Figure 4 exemplifies two forms of this



(a) (b)

Figure 4. (a) $_{1}$ASK$_{2}$ 'I ask you'. (b) $_{j}$ASK$_{1}$ 'S/he asks me'

verb: $_{1}$ASK$_{2}$, 'I ask you' (the verb moves from 1st person locus to 2nd person locus) and $_{j}$ASK$_{1}$ 'S/he asks me'(where the path movement is from the locus established to a 3rd person referent to 1st person locus).

The two other classes of verbs behave differently with respect to verb agreement. Plain verbs have invariant beginning and end points; in particular, the direction of the path movement of these verbs is not determined by the R-loci of their arguments. Spatial verbs are those with beginning and end points determined by spatial referents, that is, actual locations and not subjects or objects. The locations encoded by verbs in this class are interpreted analogically and literally, and not as representing grammatical arguments (Padden 1998).

Subsequent research on many sign languages has revealed an important similarity: all of them have verb agreement, and all exhibit this tripartite division of verbs into the same categories.[5]

The sign language verb agreement system described above characterizes the sign language universal morphological type: it is simultaneous, rule-governed, predictable, productive and universal among sign languages.

a. *Simultaneous*: A sign canonically assumes a prosodic LML template: a location, a movement, and another location (Sandler 1989). This template typically characterizes any sign, whether morphologically simple or complex. Many of the morphological processes that are most typical of sign languages respect this LML template, simply altering the specifications of the location segment(s) or of the movement segment of the sign (Sandler 1990, 1993, 1999). Verb agreement is simultaneous in that sense: the agreement markers are the location specifications of the verb, determined by the R-loci of the verb's arguments. Agreement inflection does not add phonological segments to the sign, but simply provides the phonological specifications of the initial and final locations (Figure 5).

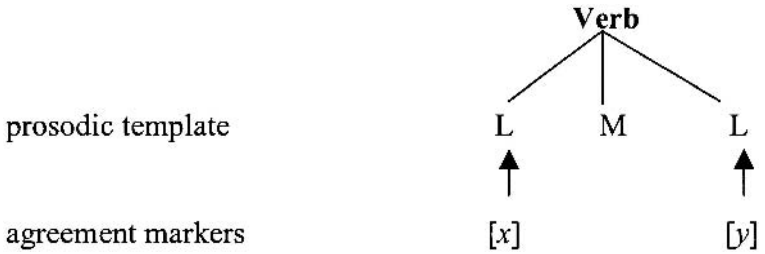


Figure 5. Agreement verb template

b. *Rule-governed*: The principles that govern the direction of the path movement are fully specifiable. The beginning and end points of the verb are the R-loci associated with the subject and the object of the verb, which are linked to the thematic roles of source and goal. The path of the verb moves between these loci. In addition, there is another mechanism involved in verb agreement: the facing of the hand, that is, the direction towards which the palm or fingertips are facing. The two morphological mechanisms, the path movement and the facing, are determined by the following principles (Meir 1998a): (i) the path movement is from source to goal. (ii) the facing of the hand is towards the syntactic object. The interaction between these principles yields the different forms of the various agreement verbs.

c. *Predictable*: Comparing verb agreement in ISL with that of ASL and other sign languages, Meir (1998b, 2002) argues that the classification of verbs into

plain, spatial and agreement verbs is predictable, and need not be listed as an idiosyncratic property of each verb. The classification is semantically determined: verbs denoting motion in space will turn out to be spatial verbs. Verbs denoting transfer are agreement verbs, and plain verbs are defined negatively, as denoting neither transfer nor motion. Most apparent counter-examples to these generalizations are easily explained on phonological grounds: some verbs denoting transfer fail to inflect for agreement because of constraints imposed by their phonological structure.

d. *Productive*: The system is productive in that all verbs that meet the semantic and phonological conditions for agreement inflection indeed inflect for agreement. New verbs entering the language, such as FAX (in ASL and ISL), take on this agreement pattern. And there is hardly any individual variation with respect to the verbs that comprise the class of agreement verbs.

e. *Universal*: All sign languages investigated so far have verb agreement, and they resemble each other in both the morphological instantiation of agreement and the meaning of the members of each class. This includes not only the sign languages of Europe, the US, Canada, Australia and New-Zealand, which might be historically related, but also non-Western sign languages, such as Indo-Pakistani Sign Language (Zeshan 2000), Taiwan Sign Language (Smith 1990) and the Sign Language of Japan (Fischer 1996). This strong cross-linguistic resemblance by no means implies that all sign languages have identical agreement systems. There are significant differences as well. For example, some sign languages have auxiliary-like elements which mark the subject and the object of non-inflecting verbs (e.g., Taiwan SL (Smith 1990), Sign Language of the Netherlands (Bos 1994), Sign Language of Japan (Fischer and Osugi 2000), German Sign Language (Rathmann and Mathur 2003)). Languages may also vary with respect to the encoding of plural, and the encoding of 1st person object agreement (Engberg Pedersen 1993).[6] Nevertheless, in all sign languages that we know of, the tri-partite classification of verbs still holds, as does the spatial and simultaneous nature of their instantiation. Furthermore, the kernels of verb agreement have been found in sign systems that are not fully developed sign languages, such as home sign (the signing systems developed by deaf children raised in an oral environment without exposure to any sign language (Goldin-Meadow 1993), the very young sign language which has evolved in Nicaragua (Senghas 1995, 2003), International Sign (Supalla and Webb 1995), and the signing of deaf children exposed only to Manually Coded English (Supalla 1990).

This specific cluster of properties, in particular the universality of this verb agreement system in sign languages, and its absence in spoken languages, calls for an explanation. We suggest (Aronoff et al. 2000, in press; Aronoff, et al. 2003, Meir 1998b, 2002), that the universality of this system in sign languages

derives from the interaction of language structure with the visuo-spatial domain of transmission. The visuo-spatial domain has properties that enable languages transmitted in it to convey in a direct manner certain spatio-temporal conceptual categories, such as source, goal and path. The path movement of agreement verbs, which is determined by the R-loci of the arguments, can be regarded as a direct manifestation of the conceptual category (source-goal) Path. This Path is part of the semantic structure of verbs denoting transfer in any language, spoken or signed (since an entity is "moving" from one possessor to another). However, sign languages, as languages transmitted in space, can represent these spatial-conceptual relations directly, and they (all) seem to exploit this possibility. The universality of these categories, and the fact that they can be represented directly in manual-visual languages, determine the similarity in form and structure among sign languages.

3. THE EMERGENCE OF TYPICAL SIGN LANGUAGE MORPHOLOGY

How does such a system emerge and develop, and what might be expected in a new language? Two hypotheses present themselves, each making different predictions.

One might argue that such systems are prevalent because the three classes correspond to a basic three-way semantic contrast: Agreement verbs refer to actions of transfer, spatial verbs to motion and location, and plain verbs are defined negatively, as denoting neither transfer nor motion and location. Many plain verbs refer to emotional and psychological states. Moreover, some of the semantic concepts underlying this classification, e.g., source, goal and path, are represented in a direct manner by the form of these verbs, as explained above. Hence one possible hypothesis concerning a new sign language is that this tripartite classification will be found in the early stages of its development. Supporting evidence for this hypothesis comes from work on gesture and on sign systems that are not fully developed sign languages. Hearing non-signers use gestures to indicate motion and position while speaking (McNeill 1992), and they sometimes use directional gestures to indicate referents when they are not allowed to speak (Casey 2003). Very young deaf children, acquiring ASL as their mother tongue, use directionality in gesture and in their early signs. They do so more often when referents are present in their environment, and with verbs denoting literal iconic movement (Casey 2003). Directional manipulation of signs is also found in home sign (and other sign systems that arise without a full sign language model).

However, directional manipulation of signs and gestures does not imply the existence of a morphological system. As argued above, morpho-syntactic categories take time to develop. Agreement verbs are morphologically complex, since they contain affixes for person and number. For a sign language to have a

morphological class of agreement verbs, it needs to have acquired the following properties: (a) consistent use of space; (b) location of referents in space (that is, establishment of R-loci for referents); (c) the use of R-loci for non-present referents; (d) the abstract categories 'person' and 'number'; and (e) use of the signer's body to represent 1st person, whether subject or object. Accordingly, one might promote the opposite hypothesis: that, like the creole prototype, new sign languages will lack marking for person and number, because the morphological categories of person and number, like all morphological categories, take time to develop and are not likely to be found in any new language, signed or spoken. The data from ABSL, presented in the next section, will help decide between these two competing hypotheses.

4. DATA FROM ABSL

The Abu Shara Bedouin group was founded about 200 years ago in the Negev region of present-day Israel. Originally *fellahin* 'peasants' from Egypt who worked for traditional Bedouins as laborers, the Abu Shara now function autonomously and are regarded by outsiders as Bedouin. The group is now in its seventh generation and contains about 3,500 members, all of whom reside together in a single community exclusive of others. Consanguineous marriage has been the norm in the group since its third generation. Such marriage patterns are common in the area and lead to very strong group-internal bonds and group-external exclusion. It is indicative that the Abu Shara still view themselves as a single large family, though now subdivided into subfamilies.

Within the past three generations, approximately 150 individuals with congenital deafness have been born into the community, all of them descendants of two of the founders' five sons (Scott et al. 1995). Kisch (2000) has done a detailed anthropological study of deafness in the Abu Shara community, showing that the deaf members of the community are fully integrated into is social structure and are not shunned or stigmatized. Kisch was the first to report that the deaf members of the community and a significant fraction of its hearing members communicate by means of a sign language. The significance of this rather unusual situation is that the signing community of Abu Shara is actually much larger than the number of deaf members in the community, thus contributing to the stability and continuity of the emerging sign language. ABSL is passed from one generation of signers to another in a natural social setting for language acquisition, and deaf children born into the community are exposed to native-like linguistic input. These two characteristics, two fundamental properties of natural human languages, are very rare in signing communities, where most of the children are born into hearing, non-signing, families. Thus, the Abu Shara community presents a unique situation of a language that developed de novo in a stable community.

We have identified three generations of signers. The first generation in which deafness appeared in the community (the fifth since its founding) included fewer than ten deaf individuals, all of whom are deceased. Information on their language is limited to reports that they did sign and one very short videotape record of one of these individuals. We restrict the present discussion to the language of the second generation. We have worked with eight signers of the second generation, seven deaf and one hearing, all currently in their thirties and forties, except one in her twenties.

From inquiries and interviews with both deaf and hearing members of the community, we have learned that the first two generations of signers had no contact with other deaf people outside the village. Schooling for the deaf children was restricted to the local elementary school, where deaf children attended the same classes as hearing children; they did not receive any special education for the deaf. Older deaf members of the community usually remained in the village. Hence for the first two generations, ABSL developed without known external influence. It is only the youngest generation that has had some contact with ISL signers, through schooling. However, members of the community who have any familiarity with Israeli Sign Language, including those who have attended schools for the deaf outside the village, recognize that the two sign languages are distinct, and are not mutually intelligible. Nor do Abu-Shara signers understand the Jordanian sign language used in simultaneous interpreting on Jordanian television programs received in the area. Hence ABSL seems to constitute a very rare case, in which a language develops de novo, within a stable community, without external influence.

Two sets of sign language data were gathered from eight of the oldest ABSL signers, representing the second generation of signers in the community. The data consisted of signed responses to video clips depicting actions between individuals as well as movement of objects through space;[7] and spontaneous narratives. The signed responses were divided into clauses, using semantic and prosodic criteria for determining constituency and clause boundaries. Predicates were linked to their arguments according to meaning, and rhythmic cues together with facial expressions marked boundaries between constituents (Nespor and Sandler, 1999). We were also guided by a spoken language translation provided by a consultant fluent in ABSL. These data were analyzed according to the following parameters: word order; the use of space to indicate motion and location; and the use of space to indicate verb agreement. We found that the word order was remarkably systematic, and we report those results in Sandler, Meir, Padden, and Aronoff (2004). We restrict the present discussion to the morphological issues.

a. *The use of space to indicate motion and location*: The data obtained from both the free narratives and the signed responses to the video clips indicate that

there is a preliminary use of space: signers may use space to indicate the locations, and to express actions denoting real motion. For example, when describing a clip showing two men standing opposite each other (on the two sides of the screen), one kicking a ball to the other, in three out of the seven responses to the clip the signers localized the two men on a sideward axis, and three of them used a pointing sign which moved between those locations in order to depict the path of the ball. However, it should also be noticed that four signers did not localize the referents, and one signer localized the referents, but did not use these locations to indicate the path of the ball. This pattern is repeated with other clips as well. Some signers use space to show the location of the referents involved in the action, and some signers modify the path movement of the predicate in order to depict the motion of an object between the two referents. These mechanisms do not seem to be obligatory for our signers: there is significant variation among signers, and sometimes even within the same signer. Out of 48 sign responses describing clips with two people transferring an object from one another (e.g., kicking, giving, throwing etc.), only in 13 did the signers localize the referents. What is consistent is that the axis used to represent motion between two locations is usually the side-to-side axis. This contrasts with the axis used for verbs which do not denote actual motion, as we show in (ii).[8]

b. *The use of space to indicate verb agreement*: In the data we have collected so far, we have not found verb forms inflected for agreement. Our elicitation material includes actions involving transfer, such as giving, throwing something to someone, taking and catching. Such actions are usually expressed in sign languages by verbs that inflect for agreement (the so called 'agreement verbs'). We expected to find similar forms in ABSL. However, when looking at predicate forms referring to acts of transfer, we found a striking absence of morphology marking person. Instead, we found predicates in which the transfer motion extended from the signer's own body outward. In these cases, there was no agreement with the R-loci of subject or object referents. In the following example, an ABSL signer positions the referents corresponding to subject and object opposite each other in the side-to-side axis, sequentially, as shown in 6a and b, suggesting their R-loci. But in the next clause, there is no agreement with either of these R-loci. That is, the hand does not move on the side-to-side axis, from the R locus of the subject to the R locus of the object. Instead, it simply moves outward from the body of the signer, as shown in Figure 7.[9] Example 2 includes the gloss, with the portions that are represented in Figures 6 and 7 printed in bold, and a rough translation of the utterance.

(2) MAN **INDEX**$_i$, WOMAN **INDEX**$_j$. APPLE **GIVE**$_0$.
'There is a man here, and a woman there. Give an apple.'

Out of 64 occurrences of signs denoting acts of transfer, in only 5 cases did the signers modulate the direction of the path movement of the sign to indicate

(a) (b)

Figure 6. Establishing spatial positions. (a) **INDEX**$_i$. (b) **INDEX**$_j$.

Figure 7. Signing the verbal sign **GIVE**$_0$ on the back-front axis, not incorporating spatial locations into the sign

the path that the object traverses. It is significant that in these 5 cases, the signers did not use the sign glossed as GIVE, with a stable handshape, but rather a sign that looks like a grasping gesture followed by a change in the location of the hand. Such signs clearly mimic an act of grasping an object and then moving it to another location. Hence they are much more spatial in nature, and do not denote transfer. Directionality is completely absent in transfer predicates.

For predicates of transfer in ABSL, we find a consistent use of the body as subject, in which the motion of transfer extends outward from the signer's body. Unlike ASL and ISL where the body marks the location of first person, there appears to be no first person marking on ABSL predicates among the older

signers. In established sign languages, agreement verbs with first person subjects move outward from the signer's body, and in forms with first person objects, the motion is inward toward the body. Thus person and subject are marked separately. Furthermore, there is a subclass of "backwards verbs," when the subject is the recipient or benefactor of an action such as INVITE, TAKE, COPY, GRAB. In these verbs, the motion begins at the R-locus of the object and moves toward the subject. These verbs appear to be "backwards" since the motion is backwards toward the subject.[10]

We do find the backwards verbs TAKE (15 occurrences) and CATCH (8 occurrences) in our data. These verbs are characterized by an inward movement towards the signer's body. However, we find no predicate forms in ABSL where there is a split between subject and first person. Crucially, we find no forms in which the body is the location of a first person *object*. Instead, a backwards verb will be used. For example, when signing a sentence meaning 'He gave me the scarf', where the first person pronoun is in object position, an ABSL speaker will say $_0\text{TAKE}_{\text{body}}$ ('I got a scarf'), where the first person pronoun is in subject position. In such a form the body is the syntactic subject, rather than the object. We do find some forms where the outward movement is from the signer toward one side or the other, suggesting some possibility of second or third person marking, but it is not yet clear to us that this is indeed *agreement* marking. They may be spatial forms in which the signer depicts movement between locations, including locations to one or the other side of the signer. We find no absence of spatial reference among the older ABSL signers; they point to locations of objects and people, and can show how these locations change as well as relationships between locations. However, we have no clear evidence that these locations are R-loci marking person.

The fact that we find reference to locations of various entities and people suggests to us that locational reference may precede agreement morphology in the development of a new sign language. Secondly, the fact that we find consistent word order within clauses and phrases also suggests to us that argument structure appears early in the form of word order, but is not marked morphologically.

To sum up, the data from second generation ABSL signers support the second hypothesis, that the tripartite verb system common among established sign languages is not present in the earliest forms of a sign language. Instead, systematic word order appears prominently. In the next phase of the project, we will address the question of when person marking appears, and how it interacts with word order, by fine-tuned analysis of a larger and more varied corpus across the generations.

5. CONCLUSION: ABSL HOLDS LESSONS FOR TYPOLOGY

We have shown that established sign languages comprise a morphological type. In all these languages, visuo-spatial concepts and relations are represented in a

motivated yet rule-governed and linguistic morphological system. Developed sign languages also show non-motivated, grammaticalized morphology, but to a limited extent, because they are young. ABSL shows neither the motivated nor the arbitrary morphology found in more developed sign languages. The lesson from ABSL is therefore that even the motivated morphology that we find in all established sign languages requires social interaction over time to crystallize. ABSL thus vindicates the new language prototype: little or no systematic morphology. This prototype was originally formulated on the basis of creole languages, but the formulation has run into empirical difficulty in recent years, as we noted above. Because ABSL is a completely new language, it allows us to distinguish between relatively young languages (established creoles and sign languages) and new languages, and to realize that the prototype holds of the latter.

NOTES

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[1] In the interest of preserving their privacy, we adopt a pseudonym for this community used in Kisch (2000).

[2] 'Grammaticalization' is used here as a cover term for various processes which result in the development of an affix from a free word. See Aronoff et al. (in press) for a discussion.

[3] These affixes are discussed in detail together with other sequential affixes in ASL and ISL in Aronoff, Meir, and Sandler (2000, in press) and in Sandler and Lillo-Martin (in press).

[4] A subscript which follows the sign indicates that the sign is articulated in a specific locus position. Articulation at 1P locus is indicated with a 1 subscript. Articulation at 2P locus is indicated with a 2 subscript. Articulation at 3P locus is indicated with letters *i, j, k.* A *0* subscript indicates articulation in neutral space. For signs which have a path movement (i.e. the articulation of the sign involves moving from one locus position to another), the subscript which precedes the sign indicates its beginning point, and the subscript which follows the sign its end point.

[5] Though different researchers may vary regarding the theoretical status of these classes, descriptively all well-studied sign languages show the tri-partite verb classification. For works on verb agreement in different sign languages, see references in Meir, 2002 and Sandler and Lillo-Martin, in press.

[6] For more differences between the verb agreement systems of sign languages, see Mathur and Rathmann (2003).

[7] We are grateful to the Language and Cognition Group at the Max Planck Institute for

Psycholinguistics, Nijmegen, The Netherlands, for making their elicitation materials available to us.

[8] The side-to-side axis used when localizing people might be due to the fact that in the clips the two participants are located on the two sides of the screen. However, what is significant is that when signers used verbs denoting transfer, such as GIVE, TAKE, THROW, they do not use the side-to-side axis, even though transference of the object in the clip (e.g., an apple, a scarf) is on this axis as well.

[9] The identity of the woman in Figure 7 is masked, in keeping with the norms of the community.

[10] See Padden (1988) and Meir (1998b) for analyses of backwards verbs.

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Typology and the formal modelling of syncretism*

MATTHEW BAERMAN

1. INTRODUCTION

Inflectional syncretism is the expression of two or more distinct morphosyntactic feature values by a single form,[1] as illustrated in the Macedonian example in (1), where 2SG and 3SG are identical in both of the past tenses, though not in the present. (Throughout this paper syncretized values are represented by '/'. Thus, we can represent the Macedonian pattern as '2SG/3SG' syncretism.)

(1) Macedonian 'fall' (discussed in Stump 1993)

	present	aorist	imperfect
1SG	padnam	padnav	padnev
2SG	padneš	padna	padneše
3SG	padne	padna	padneše
1PL	padneme	padnavme	padnevme
2PL	padnete	padnavte	padnevte
3PL	padnat	padnaa	padnea

The interpretation of such examples remains a disputed question in morphological theory. On the one hand, the collapse of these two values may be ascribed to some underlying affinity, on the assumption that they constitute a natural class. On the other hand, it may be treated as a purely formal relationship, arbitrarily stipulated in the morphology. It is probably fair to say that most scholars who have written on the topic have favoured the former approach, viewing syncretism as a reflection of the internal structure of morphosyntactic features. The pioneering works in this vein were Jakobson's (1936, 1958) studies of Russian nominal inflection, in which case values were broken down into semantic components in the same way phonemes may be broken down into phonological features. Syncretic forms are thus construed as realizations of the natural classes of semantic components that make up morphosyntactic features.

On this view, it is desirable that a formal model of morphological structure be inherently restrictive, allowing some syncretic patterns to be described while banning others. Examples of this approach include Bierwisch (1967), Carstairs (1987), Carstairs-McCarthy (1998), Noyer (1997, 1998), Bobaljik (2002), Williams (1994), Neidle (1984), Blevins (1995), Calabrese (1998), Müller (forthcoming), Lumsden (1992) and Wiese (1996). However, though various constraints on syncretism have been proposed, either explicitly or implicitly, there has been no systematic attempt to assess these claims against the evidence of more than a handful of languages. It is the goal of this paper to evaluate some plausible claims against a large corpus of examples.

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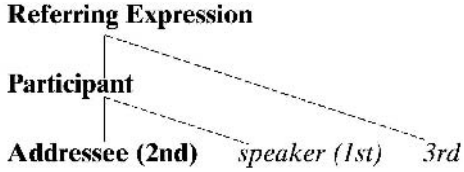
The scope of the present study is restricted to subject person marking on verbs. Person has been chosen because its possible values are constrained, allowing us to make more direct comparisons across languages than other features would. We assume that languages which mark person distinguish at least the three values of first (exclusive and inclusive), second and third person; additional distinctions (e.g. honorific versus familiar, proximate versus obviative, and same subject versus different subject) are limited, and for the most part will not play a role in what follows. The core sample used below is a corpus of 109 genetically and geographically diverse languages which evince person syncretism on verbal subject markers (see the appendix). Additional languages are adduced as needed. We only consider syncretism at the whole word level – that is, where the identity obtains over the entire inflected word form, and is not restricted to one morphological component. In those examples where only inflectional affixes are cited (as in § 3), it can be assumed that the other components of the word are invariant. We have also tried to eliminate instances where the identity of distinct forms is transparently ascribable to a synchronically active phonological rule.[2]

Below we assess two predictions that have been derived from formal constraints: (i) which person values can be combined in a single form, and (ii) do patterns of syncretism reflect markedness relations between the syncretized values?

2. PATTERNS OF SYNCRETISM

If syncretism reflects underlying natural classes of feature values, then we should expect to find only those values syncretized which are licensed by feature structure. In order to assess this assumption, we shall take the model of person feature structure recently proposed by Harley and Ritter (2002). The feature person is analyzed as a hierarchy of three nodes. The dominant node, Referring Expression (RE), indicates the presence of pronominal features. The second node, Participant (PARTIC), is dependent on RE. The value +PARTIC marks a discourse participant, that is, speaker or addressee, while −PARTIC is interpreted as a third person by default. The third node, Addressee (ADDR), depends on +PARTIC, and marks the addressee, namely second person. −Addr is interpreted by default as the speaker, namely first person. Number is construed as a separate hierarchy.

(2)



First and second person are construed as a natural class, subsumed under the node +PARTIC. Thus syncretism of first and second person is the only pattern licensed by feature structure. On a strict version of the hypothesis we are testing, this should be the only pattern we find; or, on a looser interpretation, it should predominate.

A superficial glance at the data in the appendix is not promising: not only does this pattern *not* predominate, no pattern does. However, we can bring some order to the apparent chaos: if we distinguish between *complete* and *partial* syncretism, the results are less equivocal. By complete syncretism we mean that a given pattern is consistently found in all the paradigms in the language, while partial syncretism is restricted in scope, for example, to a particular tense or conjugation class. This is admittedly a crude division: where a language has only one set of inflectional markers, it achieves complete syncretism vacuously. Nevertheless, it proves to be a useful criterion, in that it allows some distinct patterns to emerge.

Where syncretism is complete, there is a sharp contrast between the behaviour of person in the singular versus non-singular. Complete syncretism of person solely in the singular is uncommon. Out of twenty nine examples of complete person syncretism in the sample (from twenty seven languages), only six are restricted to the singular. Of these, two come from languages where person is not distinguished in the plural, so that it is not so much the case that the syncretic pattern is restricted to the singular, but that person marking itself is restricted to the singular. In the non-singular, 1/2 and 2/3 both occur in roughly equal measures, while 1/3 is less common. A similar distribution is found where number is irrelevant, with examples of 1/2 and of 2/3 predominating.

(3) Examples of complete syncretism, by language

	singular	non-singular	number-neutral
1/3	Koiari*, Zoque	Aleut, German, Hindi	
2/3	Atakapa, Hindi, Nivkh*, Nubian	Amele, Kapau, Kewa, Kobon, Slovene	Chitimacha, Guambiano, Kiwai, Wambon
1/2		Burarra, Dogon, Manchad, Nubian, Prinmi Tetun	Hunzib, Ingush, Nez Perce, Sango Waskia

* Person distinguished in singular only.

Thus, cross-linguistically, there seems to be a preference for syncretism of first with second person, and of second person with third, in both cases restricted to non-singular or number-neutral contexts. Interestingly, this corresponds well with the sorts of patterns found in free pronouns, as shown in (4). (The sample here is based on Cysouw 2003, with other examples added informally.)

(4) Compound person values in free pronouns

	singular	non-singular	number-neutral
1/3		Dakar Wolof	
2/3		Amele*, Kalam*, Kamoro, Kobon, Korafe*, Meyah, Mansim, Nez Perce*, Sango*, Warekena*, Wolof	Kawesqar
1/2		Awa*, Fongbe, Slave*, Yimas	Winnebago

* Examples from Cysouw (2003). Other sources: Dakar Wolof from Nussbaum et al. (1970), Fongbe from Lefebvre and Brousseau (2002), Kamoro from Voorhoeve (1975), Kawesqar in Clairis (1985), Mansim and Meyah from Reesink (2002), Winnebago from Lipkind (1945), Yimas from Foley (1991).

As with inflectional marking, nearly all the examples of combined person values in free pronouns involve 1/2 and 2/3 in the non-singular; none involve syncretism of singular person values alone. (Note that the evidence from number-neutral pronouns is exceedingly thin: we are aware of only two examples, the 1/2 emphatic personal pronoun of the Siouan language Winnebago (Lipkind 1945: 29) and the 2/3 pronoun of the Patagonian language Kawesqar (Clairis 1985: 465); the latter is only partial, in that there are distinct possessive forms for these two persons).

These patterns cannot be derived from the model of feature structure found in Harley and Ritter (2002). First, their model licenses only 1/2 syncretism, but not 2/3. However, not only does 2/3 syncretism occur, it is no less common than 1/2.[3] Second, since number occupies a node separate from person, this model predicts that number will have no influence on patterns of person syncretism.

If we choose to ascribe a semantic rationale to these patterns, it is probably significant that non-singular numbers favour syncretism, since this is precisely the context where there may be referential overlap, and hence ambiguity. Thus,

in a language without an inclusive–exclusive distinction, first person plural may or may not include the addressee, so blurring the distinction between first and second person. Likewise, second person plural may or may not be construed as including some non-addressees, so blurring the distinction between second and third person. Nevertheless, there are reasons to be cautious about overemphasizing the semantic naturalness of such syncretic combinations, which are especially apparent when one considers the behaviour of the first person inclusive. Since semantically it overlaps with first and second person, we should expect syncretism with those two persons. While this does occur, instances of 1INCL/1EXCL syncretism are far more frequent than 1INCL/2, which is not readily accounted for if semantic overlap is deemed to license the syncretism; signficantly, 1INCL/2 syncretism is no more frequent than 1INCL/3, which cannot be accounted for by the notion of semantic overlap (Cysouw forthcoming a). An example of such an 'unnatural' pattern comes from the Austronesian language Kwamera (5), where the first inclusive is syncretic with the third person in the dual, precisely the pattern one would expect not to find.[4]

(5) Kwamera verbal prefixes (Lindstrom and Lynch 1994: 10)

	SG	DU	PL
1(EXCL)	iak-	iak-rou-	iak-ha-
2	ik-	ik-rou-	ik-ha-
3	r-	k-rou-	ha-
1 INCL	.....	k-rou-	sa-ha-

Conversely, in the Australian language Burarra (see (20) below), the first person inclusive has a distinct form, while the first person exclusive and second person are syncretic in the dual and plural. Since the first exclusive and second person are mutually exclusive, there can be no question of a semantic or functional overlap between the values of the syncretic form (see Noyer 1997: 118–131 for discussion of a similar pattern in the Mayan language Mam).

3. DIRECTIONAL EFFECTS

Directional effects occur where the syncretic form looks as if it has 'borrowed' the form of one of its component values. Stump (1993) adduces the Macedonian paradigms in (1) as an example of this. The syncretic 2SG/3SG of the past tenses has the ending -Ø in the aorist, which he identifies as a 3SG form on the basis of the present tense paradigm. In Stump's analysis this effect is attributed to a purely morphological device, a rule of referral, whereby the 2SG takes the form

of the 3SG (see also Zwicky 1985, Stump 2001, Corbett and Fraser 1993). On this approach, there is no way to predict which values will provide forms, and which values will receive them. However, there are other researchers who see directional effects as a reflection of underlying markedness relationships within feature structure. On this approach, the behaviour of directional effects should be predictable. Below we will examine two proposals, namely Noyer's (1998) version of impoverishment, and Carstairs-McCarthy's lexical semantic constraint on syncretism.

In impoverishment theory (Noyer 1998), it is held some feature values are marked with respect to others. Under certain language-specific conditions, marked values may be deleted, in which case they are replaced by the unmarked value for that feature. This means that wherever we see directional effects, the form which prevails should be the one associated with the unmarked value. With respect to person, it is commonly assumed that third person is the default value. This is how Bobaljik (2002) analyzes the Macedonian example above: the person value 2 is deleted in the singular of the past tenses, and replaced by the default person value, namely 3. This licenses the use of third person morphology even where second person should be expected.

Carstairs-McCarthy (1998) develops a somewhat different set of predictions concerning directional effects. The underlying principle is that inflectional meaning should be governed by the same constraints that obtain for lexical semantics, which leads to three relevant axioms, summarized below:[5]

A. Lexical items do not contain meanings consisting of incompatible disjuncts, e.g. *'apple OR banana'. By the same token, inflectional meaning should not contain incompatible disjuncts consisting of competing values for the same feature, e.g. *'ablative OR locative'. (Carstairs-McCarthy assumes that feature structure is flat.)
C. Lexical items may contain compatible disjuncts. For example, the different senses of *climb* in
   (a) the boy climbed up the tree
   (b) the boy climbed down the tree
   (c) the snake climbed up the tree
   can be reconciled by characterizing its semantics as 'go, upward OR clambering'. Sentence (b) contains only the element 'clambering' and sentence (c) only the element 'upward', but the two meanings are compatible with each other, as witnessed by sentence (a). (Carstairs-McCarthy takes this example from Jackendoff 1985.)
E. No rule can make overt reference to the unmarked value of a feature

Axioms A and E by themselves account for a subset of the phenomena allowed in Noyer's (1998) model, allowing directional effects that appear to involve the extension of the unmarked value in an unmarked context. Consider the singular

person paradigm from the Chibchan language Ika, illustrated in (6). First and third person singular are syncretic in all tense paradigms except the distal past. The syncretic 1SG/3SG form has no overt person-marking affix, which makes it look like the 3SG form of the distal past.

(6) Ika (Frank 1990)

	distal past	elsewhere
1SG	(stem)-rua-na	(stem)
2SG	n- (stem) -na	n- (stem)
3SG	(stem) -na	(stem)

This distribution of the person markers can be accounted for by underspecification, as illustrated in (7), assuming that third person and 'elsewhere' are the unmarked values for person and tense, respectively. The ending *-rua* is specified as the first person distal past ending, *n-* as the second person prefix, unspecified for tense, and *Ø* is the general default, unspecified for tense and person. The effect is the same as an impoverishment analysis in which the value 2SG was deleted, but axiom E imposes a further constraint. Since no overt reference can be made to unmarked values, the syncretism is predicted to occur only in the unmarked context; that is, one could not have 2SG/3SG *Ø* in the distal past but not in the 'elsewhere' tenses.

(7) *-rua* 1, distal past
n- 2
Ø

However, axiom C allows for a second type of directional effect, which Carstairs-McCarthy illustrates with an example from Hungarian conjugation, shown in (8). At issue is the distribution of the 1SG affixes *-k* and *-m*, which are isolated in (9). In the present, *-k* marks the indefinite and *-m* the definite, but in the past *-m* marks both. Thus, definite and indefinite are syncretic in the past, and it looks as if the form of the definite has prevailed.

(8)

	present	past
1SG INDEF	vár-o-k	vár-t-a-m
1SG DEF	vár-o-m	vár-t-a-m

(9)

	present	past
1SG INDEF	-k	-m
1SG DEF	-m	-m

Carstairs-McCarthy assumes that plural and past are the marked values for number and tense, respectively. He attributes the distribution of the affixes to

the rules in (10). Since the values 'past' and 'definite' can co-occur, the value of *-m* contains a compatible disjunction; *-k* is simply an elsewhere form.

(10) *-m* 1, definite OR past
-k 1

Thus, the use of disjunctive feature values yields for Hungarian a pattern which is the mirror image of that found in Ika. In Ika, the form associated with the unmarked value prevails in the unmarked context, while in Hungarian, the form associated with the marked value prevails in the marked context.

Thus, both Noyer (1998) and Carstairs-McCarthy (1998) predict that directional effects are constrained by markedness, but the actual predictions differ. Noyer predicts that directional effects will involve the extension of the unmarked form. Carstairs-McCarthy predicts a kind of markedness harmony: directional effects will involve either (i) the extension of the unmarked form in the unmarked context, or (ii) the extension of the marked form in the marked context.

In order to evaluate these predictions, we present below examples of directional effects in person syncretism. By necessity, this is an informal corpus. Quite simply, it constitutes all the reasonably convincing examples that we have come across; the corpus could be expanded or shrunk depending on what one considers to be a convincing example of directionality. We have limited ourselves to examples where the syncretism is realized by an overt morphological marker, rather than by a bare stem, as in the Ika example above (6). In so doing we eliminate instances which would be transparently interpretable as underspecification under practically any formal model.

Since both predictions that we propose to investigate crucially depend on markedness, we must first establish what the markedness hierarchy is between person values. Both Noyer and Carstairs-McCarthy concur that third person is the unmarked value, but the relationship between first and second person, if any, remains indeterminate. For the purposes of exposition we will assume the hierarchy implied by Harley and Ritter (2002), illustrated above in (2), where second person is marked with respect to first person. Note that only the inflectional affixes are given in the examples below; unless otherwise indicated, the stems are identical in all the forms.

3.1. First person/third person

There are not many convincing examples of directionality involving these values. The Papuan language Koiari of the Trans-New Guinea phylum (11) seems to confirm the prediction that the third person form should prevail, in as much as the 1SG obligatory mood may optionally be identical to the 3SG (else-

where, first and third person are always identical). Livonian (see below, 27) presents a diachronic example where the third person form prevailed.

(11) Koiari (Dutton 2003: 345, 351)

	obligatory mood		imperfect	perfect
	option 1	option 2		
1SG	-ahina	-ahima	-ma	-nu
2SG	-ihama	-ihama	-a	-nua
3SG	-ahima →	-ahima	-ma	-nu
PL	-ihava	-ihava	-a	-nua

But there are also examples where the first person form seems to prevail. In the Nilo-Saharan language Murle (12), first person (inclusive) and third person are syncretic (in both numbers) in the subjunctive but not the perfect. In the perfect, the first person is characterized by prefixed *k-*, while the third person has no prefix. The syncretic form in the subjunctive has a prefixed *k-*, just as the distinct first person of the perfect. Thus, it appears as if an overtly first person element is serving for third person as well.[6]

(12) Murle (Lyth 1971: 83)

	perfect		subjunctive
1SG	k- -a	→	k-
2SG	-u		Ø
3SG	(-un)[7]		k-
1INCL PL	k- -it	→	k- -it
1PL	k- -da		k- -da
2PL	-tu		-it
3PL	-it		k- -it

3.2. Second person/third person

Here there are rather more clear examples of directionality than with 1/3 syncretism, though the results are mixed. In some examples the third person form prevails, e.g. in Macedonian, as discussed in (1). Likewise, in the Nilo-Saharan language Nobiin (13), the 2SG appears to take the form of the 3SG in

both tenses (present and past). In Dutch (14), the syncretic pattern is correlated with the position of the subject pronoun. When subject pronouns are preposed, 2SG takes the ending *-t*, identical to that of the 3SG. When the subject pronoun is postposed (as occurs in questions and in subordinate clauses), only 3SG takes *-t*; thus *jij kom-t ~ kom je* 'you're coming ~ are you coming?' versus *zij kom-t ~ kom-t zij* 'she's coming ~ is she coming?'.[7]

(13) Nobiin present ~ past (Werner 1987)

	indicative	interrogative
1SG	-ir ~ -is	-re
2SG	-nam ~ -onam	-i ~ -o
3SG	-i ~ -o ⟶	-i ~ -o
1PL	-ir ~ -is	-ro ~ -so
2PL	-rokom ~ -sokom	-ro ~ -so
3PL	-inna ~ -sa	-inna ~ -sa

(14) Dutch 'come'

	verb + pronoun	verb + pronoun
1SG	-Ø	-Ø
2SG	-Ø	-t
3SG	-t ⟶	-t
1PL	-en	-en
2PL	-en	-en
3PL	-en	-en

Although there are examples where the third person form prevails, there are even more which favour second person. For example, in Callahuaya, a Quechua-based language, the original second person marker *-nki* is sometimes found with third person; contrariwise, 3rd person *-n* is *not* used for second person (Muysken 1997: 437–8). In the Bantu language Kongo (15), indicative subjects are marked by a prefix on the auxiliary, while subjunctive subject markers are prefixed to the main verb stem; note that the latter prefixes are asyllabic. The syncretic prefix *o-* of the indicative is the same as the distinct 2SG *w-* of the subjunctive, if one factors out the difference in syllabicity.[8] In Old Icelandic (16), the syncretic 2SG/3SG ending *-er* of the present indicative is the same as the distinct 2SG ending found in the other tense-mood paradigms. (The

indicative ~ subjunctive contrast is marked by a vowel alternation in the ending for all but 1SG and 2PL.)

(15) Kongo (Carter and Makoondekwa 1979: 6, 9, 11, 19–21)

	subjunctive	indicative
1SG	y-	i-
2SG	w- ⟶	o-
3SG	k-	o-
1PL	tw-	tu-
2PL	nw-	nu-
3PL	b-	be-

(16) Old Icelandic weak verb (Noreen 1923: 353–4)

	subjunctive, preterite	present indicative
1SG	-a	-a
2SG	-er ⟶	-ar
3SG	-e	-ar
1PL	-em	-om
2PL	-eþ	-eþ
3PL	-e	-a

The Papuan language Dani (Trans-New Guinea phylum) illustrated in (17) shows a syncretic 2PL/3 ending *-ep* in the hypothetical mood which matches the distinct 2PL ending *-ip* of the past. (The hypothetical mood is also characterised by a lowering of the vowel of the ending.) In Carib (Kalihna), shown in (18), the interrogative form of the copula distinguishes 2PL and 3PL, while elsewhere they are syncretic, displaying the form of the 2PL.

(17) Dani (Bromley 1981: 192)

	past	hypothetical
1SG	-i	-e
2SG	-in	-en
3SG	-e	-ep
1PL	-u	-o
2PL	-ip ⟶	-ep
3PL	-a	-ep

(18) Carib copula (Hoff 1968: 212)

	interrogative	present
1SG	waŋ	wa
2SG	maŋ	ma:na
3SG	naŋ	maŋ, na
1PL	kïta:toŋ	kïta:toŋ
2PL	mandoŋ ⟶	mandoŋ
3PL	nandoŋ	mandoŋ

The Papuan language Suena (Trans-New Guinea phylum) presents a particularly striking example (19): the syncretic 2DU/3DU and 2PL/3PL of the remote tense have the same element *-w-* that is found in the 2DU and 2PL endings found in the other tenses. (The forms in the first column are used with the future, present, today's past, yesterday's past and past tenses. The vowel symbol *-V-* denotes the variable mood marker.)

(19) Suena (Wilson 1974: 59)

	default	remote
1SG	-n-V	-n-V
2SG	-s-V	-s-V
3SG	-i-V	-nu-V
1INCL DU	-n-V-ge	-n-V-ge
1EXCL DU	-n-V-to	-n-V-to
2DU	-w-V-to →	-w-V-to
3DU	-r-V-to	-w-V-to
1INCL PL	-n-V-kai	-n-V-kai
1EXCL PL	-n-V-kare	-n-V-kare
2PL	-w-V →	-w-V
3PL	-r-V	-w-V

3.3. *First person/second person*

In the light of the failure of 1/3 and 2/3 syncretism to reflect any consistent morphological hierarchy between these values, we should not be surprised to find the evidence of 1/2 syncretism to be equally inconclusive. In some examples the second person form prevails. Thus, in the non-Pama Nyungan Australian language Burarra (20), 1/2 augmented (plural) and unit-augmented (dual) are marked by the same prefix *nyi-* which serves for second person in the singular.

(20) Burarra (Glasgow 1984, cited in Cysouw 2003)

	minimal	augmented	unit augmented
1INCL	arr-	ngu-burr-	a-rri-
1(EXCL)	ngu-	nyi-burr-	nyi-rri-
2	nyi- →	nyi-burr-	nyi-rri-
3	(a-)	a-burr-	(a)birri-

In the Tungusic language Udihe (21), first and second person are syncretic both in the singular and plural in various paradigms, and the form corresponds to the distinct second person form as found in other paradigms.[9]

(21) Udihe (Nikolaeva and Tolskaya 2001: 212–13)

	past, past participle	present	permissive, subjunctive	perfect, conditional	future, converbs, present and future participles
1SG	-mi	-mi	-mi	-i	-i
2SG	-i	-i	-i ⟶	-i	-i
3SG	-ni	-ini, -ili	Ø	Ø	-ni
1INC PL	-fi	-fi	-fi	-ti	-fi
1PL	-mu	-u	-u	-u	-u
2PL	-u ⟶	-u	-u	-u	-u
3PL	-ti	-iti, -du-	-du-	-du-	-ti

In the Omotic language Shinassha (22), the 1PL subjunctive appears to be based on the 2PL form, in both the prefix conjugation and the suffix conjugation.

(22) Shinassha (Lamberti 2001: 149–53, 163–5)

	(prefix ~ suffix conjugation) default	subjunctive
1SG	tì- ~ -è	ni- ~ -ee
2SG	ní- ~ -í	ni- ~ -ii
3SG MASC	bí- ~ -é	ni- ~ -ee
3SG FEM	bì- ~ -à	bi- ~ -aane
1PL	nò- ~ -ò	it- ~ -əte
2PL	ít- ~ -ét ⟶	it- ~ -ətɛ
3PL	bó- ~ -nóó	bo- ~ -noo

On the other hand, there are languages where first person form seems to prevail over second. Thus, Nobiin shows this pattern in the plural interrogative (23); note that second person is involved in a different directional effect in the singular (see above, 13). In literary Kannada (24), 1SG is distinguished from 2SG by the addition of the element *-nu* in the future. In the past, the *-nu* element is extended to 2SG.

(23) Nobiin (Werner 1987)

	(present ~ past)	
	indicative	interrogative
1SG	-ir ~ -is	-re
2SG	-nam ~ -onam	-i ~ -o
3SG	-i ~ -o	-i ~ -o
1PL	-ir ~ -is →	-ro ~ -so
2PL	-rokom ~ -sokom	-ro ~ -so
3PL	-inna ~ -sa	-inna ~ -sa

(24) Literary Kannada (Sridhar 1989: 221–2)

	future	past
1SG	-enu →	-enu
2SG	-e	-enu
3SG M	-anu	-anu
3SG F	-aḷu	-aḷu
3SG N	-uu	-itu

3.4. First/second/third person

In the future tense in Gujarati (25), 2SG has no distinct form: it is either identical to the 1SG or to the third person, the two forms being in free variation (Cardona 1964: 142). Note that Dutch displays a similar alternation, at least superficially (see above, 14); we do not treat this example as parallel to Gujarati because the 1SG/2SG pattern is transparently a default form.

(25) Gujarati future (Cardona and Suthar 2003: 682, 684)

	option 1		option 2
1SG	-iš	←	-iš
2SG	-iš		-še
3	-šɛ	→	-šɛ
1PL	-š(i)ũ		-š(i)ũ
2PL	-šo		-šo

3.5. Assessment of Noyer's (1998) and Carstairs-McCarthy's (1998) predictions

The relationship of the examples from § 3.4 to the markedness hierarchy $2 > 1 > 3$ is given in (26). The table is to be read as follows. 'U' indicates unmarked and 'M' indicates marked. The symbol to the left of the slash ('/') stands for the syncretized value, the symbol to the right of the slash represents the context. Thus U/U means 'the form associated with the unmarked person value is extended to a marked value in the unmarked context', M/M means 'the form associated with a marked person value is extended to the unmarked value in a marked context', and so on. We have assumed that values such as singular,

present tense, indicative and declarative constitute the unmarked values of contextual features; in a number of cases it is not obvious what markedness values to assume.

(26)

	1/2	2/3	1/3
a. Koiari			U/?
b. LiteraryKannada	U/?		
c. Gujarati	U/?	U/?	
d. Nobiin	U/M	U/M	
e. Dutch		U/M	
f. Murle			M/M
g. Dani		M/M	
h. Suena		M/M	
i. Burarra		M/M	
j. Shinasha	M/M		
k. Udihe	M/?		
l. Callahuaya		M/?	
m. Kongo		M/U	
n. OldIcelandic		M/U	
o. Carib		M/U	

The results shown in (26) do not strongly favour either Noyer's (1998) impoverishment model or Carstair's-McCarthy's lexical semantic model. (26a-c) are compatible with both models, because the unmarked form prevails in what could be construed as the unmarked context. (26d-e) are compatible with impoverishment but not with the lexical semantic model, because the unmarked form is extended in the marked context. On the other hand, (26f-o) are not compatible with impoverishment, because they involve extension of the marked form. Of these, (26f-l) are compatible with the lexical semantic model, because the marked form is extended in the marked form, while (26m-o) appear to be incompatible with both models, because they involve the extension of the marked form in the unmarked context. Even those examples which would

appear to comply with one or the other of the predictions may pose problems when subjected to a more detailed morphological analysis (as pointed out by a referee). Thus, the facts adduced in § 3.4 suggest, at the very least, that the theoretical predictions should be reconsidered.[10]

3.6. A note on diachrony

Directionality can also be observed in diachrony, where one form replaces another over time. A familiar example, adduced in Kuryłowicz's famous article on analogy (1949), involves Old Icelandic, cited above in (16). These paradigms are interpreted as the result of the extension of the 2SG ending to the 3SG in place of the expected **-Þ* (Haugen 1982: 129). The syncretic pattern itself is attributed to analogy with verbs in *-l* and *-n*, where it was the result of a general phonological development (syncope of the theme vowel and assimilation of the ending into the stem-final consonant; Kuryłowicz 1949). As with synchronic directionality, various patterns are found.

Many examples involve extension of the third person form, which would follow from the assumption that third person serves as a default. For example, in Livonian (27), the 3SG present tense ending *-b* is found in place of the expected 1SG ending **-n → -Ø* (Viitso 1998: 112). Compare the paradigm from the closely related Estonian, where the original 1SG ending is found.[11] Note that in monosyllabic stems in West Livonian dialects, vacillation was recorded between the original 1SG form and the innovative one, thus the verb 'to be' has the singular forms *uo* or *uob* '1SG', *uod* '2SG', *uob* '3SG' (Kettunen 1938: lx). Kettunen (1938: lx–lxii) attributes this to analogy with the preterite paradigm, where 1SG and 3SG fell together as the result of regular sound change. Thus, as with Old Icelandic, the syncretic pattern was already established in the language by regular sound change. (Note that the 2PL/3PL pattern of the preterite was *not* extended.)

(27)

	present		preterite	
	Livonian	Estonian	Livonian	Estonian
1SG	lugub	loen	lugiz	lugesin
2SG	lugud	loed	lugist	lugesid
3SG	lugub	loeb	lugiz	luges
1PL	lu'ggɔm	loeme	lugizmɔ	lugesime
2PL	lu'ggət	loete	lugist(ə)	lugesite
3PL	lu'ggəbɔd	loevad	lugist(ɔ)	lugesid

German likewise shows what appears to be the extension of third person forms. In Middle High German (MHG), all persons were distinct in the present tense plural; by the Early New High German (ENHG) period, four different syncretic patterns were found, varying according to dialect (28). In type I, the third person form has been extended to second person. In type II, it has been extended to all three persons. In type III (ultimately established as the literary norm), 1PL and 3PL are syncretic. Though the form looks like the original 1PL, the source is more likely to have been the *-n* found in the 3PL preterite, likewise *-n*. In IV, this *-n* is extended to all plural persons.

(28) Present tense endings in Early New High German (Wegera 2000: 1546, Grosse 2000: 1333)

	MHG	I	II	III	IV
1PL	-n	-n	-nt	-n	-n
2PL	-t	-nt	-nt	-t	-n
3PL	-nt	-nt	-nt	-n	-n

The third person also prevails in the Kumta dialect of Kannada (29), where, in place of the historically expected 1PL ending *-vV* (found in other dialects, as well as the literary language), the 3PL ending *-ru* is found. As in the German examples above (28), this same ending may replace the 2PL ending *-ri* as well.

(29) Kannada dialects 'kept' (Upadhyaya 1976: 130–2)

	Bellary	Kumta
1PL	iṭṭive	iṭṭru
2PL	iṭṭri	iṭṭru /-ri
3PL	iṭṭru (masc., fem.) iṭṭuvu (neut.)	iṭṭru

A similar development has been reconstructed for the plural passive of Gothic: 1PL and 3PL fell together by regular sound change, and the 2PL was analogically altered to match them, leading to the attested 1PL/2PL/3PL ending *-anda* (Szemerényi 1989: 255).

A particularly striking example of the extension of third person forms comes from the Oceanic language Anejom (30). In the nineteenth century, the auxiliary had distinct forms for first person (inclusive and exclusive), second

and third in the dual, trial and plural. Between the nineteenth and twentieth century the language underwent catastrophic change (due in part to population loss). The result is a system with considerable variation, if not to say confusion. Lynch (2000) hypothesizes that it is moving in the direction of generalizing the third person plural for all non-singular persons.

(30) Ancjom auxiliary (Lynch 2000: 91–5)

	aorist (typical for all paradigms)	
	19th c.	20th c.
1SG	ek	ek
2SG	na	na
3SG	et	et
1INCL DU	intau	
1DU	ecrau	
2DU	ekau	
3DU	crau	
1INCL TRI	intaj	
1TRI	cktaj, cktij	cra
2TRI	ahtaj	
3TRI	chtaj	
1INCL PL	inta	
1PL	ecra	
2PL	eka	
3PL	cra →	

However, not all such examples favour the third person. Thus, Romani shows evidence of multiple directionality (31). In the present tense, syncretism of 2PL/3PL is common to all the dialects. (The origin of this pattern is unclear, so we take it as a given.)[12] What is of interest to us is the extension of this pattern into the perfect, which occurs in a few dialects. Significantly, it is sometimes the 2PL ending which prevails (Sinti), and sometimes the 3PL ending (Northeastern Romani, and partly in Welsh Romani).

(31) Romani (Matras 2002: 145)

	present	perfect				
		reconstructed	Central, Finnish, Balkan, Vlax	Sinti	Welsh	Northeast
1PL	-as	*-am	-am	-am	-am	-am
2PL	-en	*-an	-an, -en	-an	-e, -an	-e
3PL	-en	*-e	-e	-an	-e	-e

Thus, while there is some diachronic evidence that third person forms can replace others diachronically, it is hardly an exceptionless generalization. Especially striking are the examples that appear to show second person replacing third, for which no explanation readily comes. Nevertheless, there is one area where the default status of third person is more firmly established, namely the wholesale loss of person marking, as seen above in German, the Kumta dialect of Kannada and in Gothic; in all these examples it is the etymological third person form which prevails. A seeming counterexample to this observation comes from the present tense in Modern East Scandinavian languages (Swedish, Danish and Norwegian), where person distinctions have been eliminated, and there is but a single form in *-r* (see 16 above). The first stage in this development was shared with Old Icelandic, namely the extension of second person *-r* to the third person in the present indicative. However, it was only after it was extended to third person singular that this form ultimately predominated (32); that is, the form which was extended to *all* person values served as a third person form (among other things) immediately prior to its extension.

(32) Eastern Scandinavian (present indicative)

	proto-ES		Old ES		Modern ES
1SG	*-(V)		-(V)		-(V)r
2SG	*-(V)r	→	-(V)r	→	-(V)r
3SG	*-(V)þ		-(V)r		-(V)r

This suggests that two types of operation were at work: (i) an idiosyncratic, morphologically specified extension of the second person to the third, and (ii) a cross-linguistically unexceptional extension of the 3SG form.

In some of these cases, for example in Old (and Modern) Icelandic, the diachronic extension of a form has resulted in synchronic directionality, pro-

vided the extension did not affect all paradigms. However, there is another potential source for synchronic directional effects. Consider Nobiin (see (13) above), where the 3SG form appears to be the source for the syncretic 2SG/3SG interrogative, and the 1PL form appears to be the source for the 1PL/2PL interrogative. In the the ancestor of Nobiin, Old Nubian (first attested in the seventh century; Browne 2002: 1), 2SG/3SG and 1PL/2PL syncretism was characteristic of all paradigms (33).

(33) Old Nubian present indicative (Bechhaus-Gerst 1996: 237)

	SG	PL
1	-ire	-iro
2	-ina, -ena	-iro
3	-ina, -ena	-iran, -eran

In Nobiin, 2SG and 2PL suffixes were innovated and added to the indicative and negative paradigms, but not to the interrogative or conditional. Thus, the syncretic paradigms represent the older state of affairs, and the directional effect that results is a reflection of diachronic layering.

4. CONCLUSION

The contrast is often made between a restrictive theory, which is able to make predictions about possible and impossible structures, and a descriptive framework, which is open-ended. The question we have posed above is: to what extent can a formal model of syncretism serve as a restrictive theory? The results are not encouraging. In § 2 we reviewed a recent model of the internal feature structure of person, and showed that it does not allow us to predict the attested patterns of syncretism. In § 3 we compared two different models which aim, among other things, to derive directional effects in syncretism, and showed that neither makes empirically verifiable predictions. In fact, the data are heterogeneous enough to make any prediction circular; at best, what the model cannot account for can be labelled 'accidental' (see fn. 3). This suggests that a formal model should not presume to make predictions.

However, it would be irresponsible to leave the matter there. There *are* some decided tendencies, for example, the prevalence of syncretism of 1/2 and 2/3 person in non-singular numbers (suggesting that these do constitute natural classes at some level), and the frequency with which third person serves as a default in diachronic change. The challenge for morphological theory is to allow the formal model to be open-ended, while still giving an account of the fact that some patterns are common, and others rare. Below we suggest that the statistical distribution of patterns is a reflection of diachronic processes.

Consider first the change undergone by Anejom, discussed above in (30). Though striking in its rapidity, the direction of change does not seem unexpected: third person substitutes for the other forms, and plural substitutes for dual and trial. The basis for the innovative system of twentieth century Anejom need not be sought in language-specific morphological quirks. Rather, it follows from quite widespread assumptions about the unmarkedness of the third person with respect to other person values, and of plural with respect to other non-singular number values.

Contrast this with the developments in the Cushitic language Dhaasanac, illustrated in (34). In the tense-aspect paradigms where person is marked (the perfect and imperfect positive, the dependent positive and the short past) there are two distinct stems, which Tosco (2001) labels 'A' and 'B' (following Sasse 1976). The contrast between the A and B forms is illustrated in (34). It takes a number of different shapes, depending on the verb stem, involving stem-final (a-e) or stem-initial (f) consonant alternations and vowel insertion (c) and alternation (d-e). The distribution of the A and B forms can hardly be described as reflecting any natural classes of morphosyntactic values: the A form is used for the first person singular, third person singular masculine, first person inclusive plural and the third person plural, while form B is used for the second person in both numbers, third person singular feminine and the first person exclusive plural. What is of interest here is that this morphologically systematic, morphosyntactically unnatural pattern is itself the product of a morphological innovation. The stem alternations descend from an older system of affixation: most verbs took person-number marking suffixes, a small handful took prefixes. This state of affairs is still found in other Cushitic languages, such as Somali. Crucially, the first person exclusive form in *-n* was distinct from the 2/3SG FEM form in *-t*. Under Sasse's (1976: 219–20) reconstruction (35), forms in *-n* and *-t* fell together by regular sound change in stems ending in a resonant. This syncretism was then extended by analogy to all other stem classes, as well as to stems with person-number *prefixes*.

(34) Dhaasanac stem alternations (Tosco 2001: 123–206)

	examples of stem alternation A	B	
a.	leeði	leeti	'fall down.PERF'
b.	kufi	kuyyi	'die. PERF'
c.	guurma	guuranna	'migrate. IMPERF'
d.	ʔuufumi	ʔuufeeni	'cough. PERF'
e.	seð	sieti	'walk. PERF'
f.	yes	ces	'kill. PERF'

(35) Development of Dhaasanac endings (Sasse 1976: 219–20)

	attested state	original state
1SG	A	*Ø
2SG	B	*-t
3SG FEM	B	*-t
3SG MASC	A	*Ø
1INCL PL	A	*Ø
1EXCL PL	B	*-n
2PL	B	*-t
3PL	A	*Ø

Thus, the change in Anejom yielded a 'natural' result, while the change in Dhaasanac yielded an unnatural result. But in essence the two kinds of change are the same. The original paradigmatic space was reorganized according to a new template. The difference lies in the source of the template. In the case of Anejom, we can suppose its source lay in (universal?) properties of feature structure, whereby 3PL is unmarked with respect to other non-singular person-number values. Thus, this template is shared across most (all?) languages. In the case of Dhaasanac, the template was created by a phonological change that affected one stem class. By definition, this template is language-specific. The difference between natural (i.e. common) and unnatural (i.e. uncommon) syncretic patterns thus need not be reflected in the formal model. We suggest that contrast between these two diachronic routes is sufficient to account for the statistical predominance of morphosyntactically natural patterns, as argued also by Cysouw (forthcoming b). Paradigmatic templates based on common or universal elements of feature structure (i) are available to all languages, (ii) can arise spontaneously (as in Anejom), and (iii) are self-regenerating in case of disruptions. Templates based on phonological change, although they may be resistant to change, and even productive (Maiden 1992), nevertheless are still language-specific, and always in competition with templates based on feature structure. It only follows that the former type should be more widespread.

On this view, even if we manage to construct a comprehensive model of feature structure that will account for some syncretic patterns, the possibility still remains that patterns may be codified which are independent of feature structure. The crucial question here is whether there are any constraints on the production of *unnatural* syncretic patterns. At present we do not have enough information to decide this question; as the discussion above will have shown, it can only be resolved empirically.

APPENDIX 1: PERSON SYNCRETISM IN 109 LANGUAGES

The core of the sample is based on the 200 language corpus used in Haspelmath et al. (forthcoming), which has been expanded. Complete syncretism (where the syncretic pattern is systematically found in all the paradigms of a language) is marked by 'x', partial syncretism (restricted in scope, e.g. by tense-aspect-mood, lexical class, gender or syntactic context) is marked by '(x)'. Syncretism of number that affects only one person value is not recorded here. For example, in Latvian, 2SG may be syncretic with third person, which does not distinguish number; this is recorded as 2/3 syncretism in the singular.

	singular			non-singular			number irrelevant			Other
Language	1/3	2/3	1/2	1/3	2/3	1/2	1/3	2/3	1/2	patterns
Abipon							(x)			
Aleut				(x)						
Amahuaca							(x)	(x)		
Amele			(x)		x					
Arabic		(x)			(x)					
Atakapa		x								
Awa Pit							(x)	(x)		
Aymara									(x)	
Bagirmi				(x)		(x)				(2SG/1PL/3PL), (SG/1PL/3PL)
Barasano									x	
Beja	(x)									
Bulgarian		(x)								
Burarra						x				
Burushaski		(x)				(x)		(x)		
Canela-Kraho							(x)			
Carib					(x)					
Cayuvava										(1PL/ 1INCL PL)
Chichimec	(x)			(x)						
Chitimacha								x		
Daga	(x)									(1SG/3PL)
Dargi						(x)				

Language	singular			non-singular			number irrelevant			Other patterns
	1/3	2/3	1/2	1/3	2/3	1/2	1/3	2/3	1/2	
Dimili		(x)								
Diola-Fogny										(2SG/1PL), (3SG/1PL)
Dogon						x				
Ekagi	(x)									2SG/1PL
English										(1SG)/2SG/PL
Estonian										(2SG/3PL)
Ewe		(x)								
French		x		(x)						(1SG/2SG/ 3PL), (1SG/2PL)
German	(x)			x						(3SG/2PL)
Gimira					(x)					(3SG/2PL/3PL/ 1INCL PL)
Guambiano								x		
Harar Oromo	(x)	(x)								
Hayu		x			x					(2DU/3DU/ 1INCL DU)
Hindi		x		x						
Hixkaryana				x						
Hunzib									x	
Ibibio								(x)		(3SG/PL)
Ika	(x)					(x)				
Ingush									x	
Iraqw		(x)							(x)	
Irish										(3SG/2PL), (2/3), (SG/2PL/3PL)
Kannada			(x)							
Kapau					x					(1SG/2PL/3PL)
Karok								(x)		
Kashmiri				(x)			(x)			
Ket							(x)			

Language	singular			non-singular			number irrelevant			Other patterns
	1/3	2/3	1/2	1/3	2/3	1/2	1/3	2/3	1/2	
Kewa			(x)		x					
Khanty					(x)					
Kiowa				(x)						(3SG/1PL)
Kiwai								x		
Kobon		(x)			x					
Koiari	x									
Kongo		(x)								
Koryak		(x)								
Krongo			(x)							
Kunama			(x)		(x)					
Kwamera				(x)						
Lak								(x)	(x)	
Lango										3PL/1DU
Latvian		(x)								
Lavukaleve						(x)				
Lower Grand Valley Dani					(x)					
Luvale		(x)		(x)						
Manchad						(x)				
Marind										(3SG/2PL)
Me'en		(x)								
Miskito									x	
Muna										(3PL/1INC DU), (2SG/1PL)
Murle	(x)	(x)					(x)			
Nama		(x)								
Nez Perce									x	
Nganasan								(x)		
Ngiti				(x)						
Nivkh		x								
Nkore-Kiga				(x)						
Nubian (Dongala)		x				x				(SG/1PL/2PL)

Language	singular			non-singular			number irrelevant			Other patterns
	1/3	2/3	1/2	1/3	2/3	1/2	1/3	2/3	1/2	
Nunggubuyu						(x)				
Olo										(1PL/3DU)
Otomi								(x)		
Pumi						x				(2SG/3/1PL/ 2PL)
Rongpo		(x)				(x)				
Sango									x	
Sentani										(2SG/3DU)
Shuswap										3SG/1PL
Siuslaw										2SG/3PL
Slovene					x					
Spanish			(x)							
Suena					(x)					
Swahili		(x)								
Tanglapui								(x)		
Taos		(x)				(x)				
Telugu										
Tetun									x	
Tiwi		(x)				(x)				
Tlapanec										(1SG/3PL)
Tol		(x)	(x)							
Totonac										(3SG/1PL)
Udihe			(x)			(x)				
Usan								(x)		
Vanimo	(x)	(x)		(x)						(1SG/2PL)
Wambon								x		
Warekena					x					
Waskia									x	
Yele										(2SG/1DU), (1PL/2DU)
Yukaghir			(x)							(1SG/2SG/3SG/ 1PL/2PL)

Language	singular			non-singular			number irrelevant			Other patterns
	1/3	2/3	1/2	1/3	2/3	1/2	1/3	2/3	1/2	
Zoque	x									
Zulu		(x)								(3SG/1PL)

APPENDIX 2: GENETIC AFFILIATION OF THE LANGUAGES IN THE SAMPLE

In general, the attribution of genetic affiliation follows that assumed in Haspelmath et al. (forthcoming).

Afro-Asiatic: Arabic, Beja, Gimira, Harar Oromo, Iraqw; **Altaic:** Udihe; **Arawakan:** Warekena; **Austronesian**: Kwamera, Muna, Tetun; **Aymaran:** Aymara; **Burarran:** Burarra; **Carib:** Carib (Kalihna), Hixkaryana: **Isolates:** Atakapa, Burushaski, Cayuvava, Chitimacha, Ket, Nivkh, Nunggubuyu, Tiwi, Tlapanec, Tol, Yukaghir; **Chibchan:** Ika, Miskito; **Chukoto-Kamchatkan:** Koryak, **Dravidian:** Kannada, Telugu; **East Papuan:** Lavukaleve, Yele; **Eskimo-Aleut:** Aleut; **Ge-Kaingang:** Canela-Kraho; **Guaicuruan:** Abipon; **Hokan:** Karok; **Indo-European:** Bulgarian, Dimili, English, French, German, Hindi, Irish, Kashmiri, Latvian, Slovene, Spanish; **Kordofanian:** Krongo; **Khoisan:** Nama; **Kiowa-Tanoan:** Kiowa, Taos; **Nakh-Dagestanian:** Dargi, Hunzib, Ingush, Lak, **Niger-Congo:** Diola-Fogny, Dogon, Ewe, Ibibio, Kongo, Luvale, Nkore-Kiga, Sango, Swahili, Zulu, **Nilo-Saharan:** Bagirmi, Kunama, Lango, Me'en, Murle, Ngiti, Nubian (Dongala); **Oto-Manguean:** Chichimec, Otomi; **Paezan:** Awa Pit, Guambiano; **Panoan:** Amahuaca; **Penutian:** Nez Perce, Siuslaw; **Salish:** Shuswap; **Sko:** Vanimo; **Tibeto-Burman:** Hayu, Manchad, Primi, Rongpo; **Tucanoan**: Barasano; **Torricelli:** Olo; **Totonacan:** Totonac; **Trans-New Guinea:** Amele, Daga, Ekagi, Kapau, Kewa, Kiwai, Kobon, Koiari, Lower Grand Valley Dani, Marind, Salt-Yui, Sentani, Suena, Tanglapui, Usan, Wambon, Waskia; **Tucanoan:** Barasano; **Uralic:** Estonian, Khanty, Nenets.

NOTES

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[1] In general, the existence of a morphosyntactic distinction is determined on a language-particular basis. For example, in (1), it is clear that second and third person singular are potentially distinct values in Macedonian, because they are associated with distinct inflectional forms in the past tenses. Further, a distinction made in one number can be extended to another, as in German, where the distinction between first and third person in the singular (*ich mache* 'I make' versus *sie macht* 'she makes') justifies the assumption that they are distinct in the plural as well, even though they are always syncretic (*wir machen* 'we make', *sie machen* 'they make'). For the purposes of the present paper, we have relaxed this morphological criterion, assuming a minimum of three person values (first, second and third) for the languages under consideration, even where inflection shows no more than two distinctions.

[2] For example, the regular reduction of unstressed vowels leads to homophony of feminine and neuter in the past tense of Russian verbs where the endings are not stressed: *neslá* ~ *nesló* 'carried.FEM ~ NEUT' versus *pisál*[ə] 'wrote.FEM/NEUT'. Such obvious instances are rare in our corpus, and we do not otherwise presume to distinguish between 'systematic' and 'accidental' homophony, for reasons which should be made clear by the Dhaasanac example discussed in § 3.6; also see fn. 3 for an observation on the possible pitfalls of resorting to this distinction.

[3] The aim of Harley and Ritter (2002) is specifically to account for the values of free pronouns, not the inflectional marking of person (though it does not appear that their model would distinguish between the two). They predict that if a language does display a 2/3 or 1/2 pronoun, that this is a result of accidental homophony, and will be disambiguated by verb agreement (p. 513, note 42). This prediction is contradicted by Amele, Kobon (dual only) and Nez Perce. Even if this prediction were true, it is curious that accidental homophony would be more frequent than systematic syncretism, which the data in (4) suggest.

[4] Note though that Kwamera has an impersonal marker *k-*, and a morphological relationship between impersonals and the first plural is known from other languages. Thus, in some Athapaskan languages, the unspecified person marker is used for the first plural (Rice 2000: 201), in Ngiti, the third person indefinite form is used for first person inclusive when preceded by a free pronoun (Kutsch Lojenga 1994), and, of course, the use of the French impersonal *on* for first plural is well known.

[5] There are two further axioms, but they are not of direct relevance in describing directional effects.

[6] Note though that the related language Mursi (both members of the Surmic branch of Nilo-Saharan) has a similar pattern, in which the 3SG may have a stem alternant distinct from the others (Turton 1981: 344).

[7] The suffix *-un* is found optionally in the perfect.

[8] This pattern is not entirely systematic, as there is one verb which displays a stem alternation which disambiguates the 2SG and 3SG (*jij heb-t* 'you have' versus *zij heef-t* 'she has'), and another verb where 2SG has *-t* even though 3SG does not (*jij ben-t* 'you are' versus *zij is* 'she is'). Historically, the 2SG form descends from the 2PL, whose ending *-t* is cognate with the German 2PL seen in (28).

[9] The alternation between syllabic indicative prefixes and asyllabic subjunctive prefixes is phonologically regular: indicative prefixes attach to the (consonant-initial) verb stem, while the subjunctive prefixes precede the subjunctive marker *a-*, which is prefixed to the verb stem.

[10] Historically, the second person forms had the form *-sV*, with the *-s-* lenited to *-h-* in some varieties of Udihe (Sunik 1997: 238) and to *Ø* in others (including the variety illustrated here).

[11] Further permutations of Noyer's and Carstairs-McCarthy's predictions are possible, but they do not improve matters greatly. In the case of Noyer's model, one can also allow for

simple underspecification, without the device of impoverishment (as described in (7)). For example, the plural forms in Carib (18) could be analysed as *kïta:toŋ* '1PL', *mandoŋ* 'PL' and *nandoŋ* '3PL interrogative', with 2PL/3PL syncretism due to the underspecification of *mandoŋ*. In this is allowed, Noyer's model makes no obvious predictions about directionality. On the other hand, Carstairs-McCarthy's model may be more restrictive than has been assumed here, since he assumes that feature structure is flat. Thus, there can be no markedness relation between marked values. The consequence of this would seem to be the prediction that directional effects should not obtain between marked values, which is contradicted by all the examples of 1/2 person syncretism.

[12] Though note that the expected reflex of final *-n* should be *-Ø* in Estonian as well. Its retention in 1SG forms is anomalous.

[13] The syncretic 2PL/3PL corresponds to what would be expected for the 3PL (Matras 2002: 143). This is unexplained, but it may be connected with the resemblance between the 2PL perfect ending *-an* and the 3PL present ending *-en*.

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An inflectional approach to Hausa final vowel shortening

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1. INTRODUCTION

In this paper, I will address the phenomenon of final vowel shortening (FVS) in Hausa.[1] Based on detailed morphological evidence, I shall argue that FVS is but one exponent of a systematic morphosyntactic distinction in the language. Given the systematicity of the distinction together with the diversity of exponence, I shall conclude that a treatment in terms of inflectional morphology is to be preferred over Hayes (1990)'s analysis as Precompiled Phrasal Phonology (PPP). The morphological view will furthermore enable us to connect the Hausa data to a typologically well-established inflectional category, namely marking of the mode of argument realisation, a perspective that will deepen our understanding of Hausa syntax and morphology.

The paper is organised as follows: after a brief introduction to the basic pattern and a discussion of Hayes's account in terms of phrasal allomorphy, I shall present additional data to the effect that FVS cannot be singled out as an isolated allomorphic process. Rather, we shall see that vowel length alternation is subject to close interaction with Hausa stem morphology. Moreover, under a broader empirical perspective, the two-fold length distinction will turn out to be only one of many patterns in which an underlyingly tripartite distinction is morphologically neutralised.

Next, I shall submit Hayes's surface-oriented adjacency requirement – a necessary criterion for precompiled phonologies – to some further scrutiny and show that Hausa provides a body of evidence against such a surface-oriented view, supporting instead an analysis in terms of argument structure and lexicalised trace-less extraction. In section 4, I shall connect Hausa to strikingly similar phenomena in Chamorro and French, all displaying morphological sensitivity to extraction contexts (Bouma et al. 2001). Furthermore, we shall see that Hausa already provides independent evidence for its membership in the typological class of extraction-marking languages. Section 5 provides a formal analysis in terms of realisational morphology, implemented in Head-driven Phrase Structure Grammar (HPSG).

1.1. Hausa final vowel shortening (FVS): the basic pattern

Since Parsons (1960), Hausa verbs are classified into a system of lexical stem classes, standardly referred to as grades (but see also Newman 2000 for a recent

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synopsis of the Hausa grade system). In its initial form, the grade system consisted of 7 grades, out of which the first 3 stem classes (Grade 1, 2, 3) are considered primary, whereas grades 4–7 are called secondary or derived. Stem classes are primarily defined in terms of morphophonological properties, namely the quality and length of the stem-final vowel, together with the stem's tonal pattern. For example, in their citation form (A-form), regular grade 1 verbs are characterised by a H-L(-H) tone pattern, and end in a long *-a:*, regular grade 6 verbs have a H tone and a final long *-o:* etc. (See table 1 for details on all grades). Additional lexico-semantic properties are sometimes attached with a certain grade, most notably with secondary grades: grade 6 stems ("ventive") is mostly used to denote distance from the speaker and/or movement toward the speaker, grade 5 is used for causatives or to transitivise an otherwise intransitive stem, while, e.g. grade 4 is often used to signal the totality of an action. Grades are also associated with prototypical valence properties: thus, grades 3 and 7 are exclusively intransitive, with grade 7 being a productive class for the expression of medio-passives, whereas grade 2 consists exclusively of transitives. Stems in the remaining grades 1, 4, and 6 can be either transitive or intransitive, although, according to Newman (2000), grade 1 should be regarded as a mainly transitive grade. The forms of the seven major grades are summarised in the table in (1) below, adapted from Newman (2000: 628).[2]

(1)

Grade	A-form		B-form		C-form	
1 (tr/intr)	-a:	H-L(-H)	-a:	H-L(-H)	-a	H-L(-L)
2 (tr)	-a:	L-H(-L)	-e:	L-H	-i	L-H
3 (intr)	-a	L-H(-L)	–	–	–	–
4 (tr/intr)	-e:	H-L(-H)	-e:	H-L(-H)	-e	H-L(-L)
					-e:	H-L(-H)
5 (caus/tr)	-ař	H	-ař [dà]	H	-ař [dà]	H
			-she:	H		
			∅	H		
6 (tr/intr)	-o:	H	-o:	H	-o:	H
7 (intr)	-u	L-H	–	–	–	–

As depicted in the table above, each grade is further subdivided into three forms (or frames), which correspond to the morpho-syntactic environments in which a stem form can be used. As a curt characterisation, the C form is used before direct object NPs, the B form before direct object pronominals, and the A form, the citation form, is used, whenever a direct object is either absent or extracted.

Now, it is a well-known fact about Hausa that verb forms in some of these grades, most notably grades 1 and 2, undergo shortening[3] of the final vowel, when followed by an overt full NP direct object: "A verb-final long vowel is shortened immediately before an object NP" (Hayes 1990: 87).

(2) a. Na: ka:m**à** ki:fi: (H:93)
1.S.CMPL.ABS catch.V.Gr1.C fish
'I caught fish.'

b. Na: ka:m**à:** (H:93)
1.S.CMPL.ABS catch.V.Gr1.A
'I caught (it).'

c. Na: ka:m**à:** shi. (H:93)
1.S.CMPL.ABS catch.V.Gr1.B him
'I caught it.'

d. Na: ka:m**à:** wà Mu:sa: ki:fi: (H:93)
1.S.CMPL.ABS catch.V.Gr1.D(=A) for Musa fish
'I caught fish for Musa.'

e. ki:fîn dà na ka:m**à:**
fish.DEF COMP 1.S.CMPL.ABS catch.V.Gr1.A
'The fish I caught'

The data in (2) illustrate the basic pattern with the regular grade 1 verb *ka:mà(:)* 'to catch': if the direct object NP is right-adjacent to the verb, as in (2a), the verb's final vowel is short. Hausaists standardly refer to this syntactic context and the form used there as the C-frame or C-form, respectively.

If the direct object is unexpressed (=A-frame; see (2b)) or realised as a pronominal clitic or affix[4] (=B-frame; see (2c)), no shortening can be observed in grade 1. The same holds, if an indirect object intervenes (=D-frame;[5] (2d)), or if the direct object is extracted (=A-frame; (2e).

In spite of the apparent sensitivity to phrase-structural context, Hayes (1990), however, argues that the rule of Final Vowel Shortening must apply in the lexicon, since it interacts with other lexical-phonological rules of the language, such as low-tone raising (Leben 1971).[6] Low Tone Raising applies to heavy final syllables, realising an underlying L as H, if preceded by another L. FVS can bleed Low Tone Raising, as witnessed by the following trisyllabic grade 1 verb:

(3) a. Na: karànt**a:**.
1.S.CMPL.ABS read.V.Gr1.A
'I read.'

b. Na: karànt**a:** shi.
1.S.CMPL.ABS read.V.Gr1.B it
'I read it.'

c. Na: karàntà litta:fìi.
1.S.CMPL.ABS read.V.Gr1.C book
'I read the book.'

Besides interaction with other lexical-phonological rules, the shape of the pre-NP direct object form (or C-form) is not always fully predictable: some verbs, e.g., *gani:* 'see' or *bari:* 'leave', feature idiosyncratic C-forms, viz. *ga* or *bar*, respectively.

With a large number of stems, i.e. those in grade 2, shortening is accompanied by segmental change of the final vowel, which is *-i* in the C-form, *-e:* in the B-form, preceding pronominal direct objects, and *-a:* elsewhere (A-form).

(4) a. Na: sày**a:**. (H:94)
1.S.CMPL.ABS buy.V.Gr2.A
'I bought.'

b. Na: sày**e:** shì.
1.S.CMPL.ABS buy.V.Gr2.B him
'I bought it.'

c. Na: sày**i** àbinci. (H:94)
1.S.CMPL.ABS buy.V.Gr2.C food
'I bought food.'

Finally, in grade 2 one can find a few irregular A-forms (Newman 2000: 637), characterised by an exceptional tonal pattern (H-L instead of L-H) and/or segmental changes, e.g. *dî:bà: (A), dê:be: (B), dê:bi (C)* 'dip out, take'.

1.2. Precompiled Phrasal Phonology (PPP; Hayes (1990))

In order to reconcile the apparent sensitivity of the FVS phonological rule to phrase-structural contexts with basic tenets of both Prosodic Hierarchy Theory (Selkirk 1986, Nespor and Vogel 1982, Nespor and Vogel 1986, Hayes 1989) and the *Principle of Phonology-free Syntax* (Pullum and Zwicky 1988), Hayes proposes to preserve the restrictiveness of the indirect approach to phonology-syntax interaction offered by the theory of prosodic domains and complement it with what he calls Precompilation Theory (or Precompiled Phrasal Phonology; PPP), a kind of "phrasal allomorphy" (Hayes 1989: 92) reminiscent of Zwicky (1985)'s *Shape Conditions.*

He suggests that alternations such as Hausa FVS are allomorphic in nature, and should be derived in the lexicon. Sensitivity to syntactic context, however, is captured by means of "phonological instantiation frames": in essence, the allomorphic variant is diacritically marked for a specific insertion context, and

selection of a particular allomorph is handled by lexical insertion, subject to the Elsewhere Condition (Anderson 1969, Kiparsky 1973).

(5) *Hausa shortening*:
V: → V / [… _]$_{[Frame\ 1]}$ (H:94)

(6) *Frame 1*:
[$_{VP}$ _ NP …], NP non-pronominal (H:93)

(7) *Hausa raising*:
a → i / [… _]$_{[Grade\ II\ \&\ Frame\ 1]}$ (H:94)

In the concrete case at hand, a (lexical) shortening rule (5) derives the C-form allomorph and diacritically annotates it with a reference to a particular phonological instantiation frame, as given in (6) above. Other morphophonological rules can make reference to this insertion frame as well, e.g., the grade 2 vowel raising rule in (7).

It should be clear from this very brief description that rules of allomorphy, under this approach, can make reference to heterogeneous types of information, namely morphological class, phonological shape and surface-syntactic and phrase-phonological environment. Furthermore, reference to surface context does not appear to be constrained by structural configurations, such as functor-argument relations, or even tree locality.

Although I have no reason to doubt, at least at this point, that Hayes's proposal can successfully account for the empirical patterns encountered so far, there are nevertheless theoretical and methodological issues lurking here encouraging us to explore an alternative perspective on the data: first, the instantiation frames invoked by Hayes resemble very much the subcategorisation frames of Aspects-style lexical entries. However, as we have seen above, FVS only applies in the context of direct objects *in situ*. We are thus forced to assume that these instantiation frames are not meant to be reducible to ordinary subcategorisation. Under this perspective, we are confronted with a massive duplication problem: why should a language invoke two distinct, though strikingly similar, systems of subcategorisation? Moreover, if phonological instantiation frames are considered a mode of subcategorisation in its own right, PPP blurs the distinction between lexical and prosodic phonology, in that morphophonological idiosyncrasies, which were hitherto considered unambiguous evidence in favour of lexical status, do now receive an alternative interpretation as instances of PPP.[7] As a net effect, the scope of Zwicky and Pullum (1983)'s Criterion C, which takes morphophonological idiosyncrasies as a strong indicator of affixhood, will be severely limited.

There is, however, a theoretically less harmful interpretation of Hayes's proposal, namely to assume that morphophonological alternations can (only) make reference to lexicalised syntactic context. Under this perspective, PPP will

be reducible to standard notions of subcategorisation in lexicalist theories of syntax, e.g., HPSG or LFG, essentially regarding phonological alternations as an exponent of morpho-syntactic distinctions, or, in other words, as exponents of an inflectional category. It is of note that Selkirk (Hayes 1990: 106) has once proposed, in response to Hayes's proposal, to analyse all instances of precompiled phonology as inflection. I will argue, in the subsequent sections, that an interpretation along these lines will not only provide a theoretically cleaner solution to the paradox, but that it will also provide for a better understanding of Hausa morphosyntax, both language-internally and in a broader cross-linguistic, typological context.

2. HAUSA FVS: EXTENDING THE EMPIRICAL BASE

2.1. Neutral paradigms

The perspective on Hausa FVS assumed by Hayes is essentially that of a syntactically conditioned allomorphy, described by means of a phonological rule, i.e. as a fossilised or lexicalised version of a phrase-phonological rule (Hayes 1990: 105f). This characterisation of precompiled phonology appears to me somewhat instrumental for setting apart this new device from standard notions of inflectional morphology, placing PPP half-way between true phrasal phonology and morphology. Yet, on closer inspection, this picture of a phonologically determined allomorphy seems to obscure how tightly FVS is integrated with the morphological paradigms of the language.

A first piece of evidence pointing in this direction is the fact that entire classes of verbs are exempt from the application of the shortening rule. Among the 7 Hausa grades, "grade 6 is […] very productive and commonly used" (Newman 2000: 663) indicating distance from or orientation towards the speaker. Also phonologically, verbs in this grade are highly regular, characterised by all H syllables and a final long theme vowel *-o:*.

Given Hayes's shortening rule, one would expect a short final vowel in the C-form. Yet, despite the fact that grade-6 verbs do match the structural description of the rule, no contrast in morphological expression can be observed (cf. (8)).

(8) a. ya: sa:to: jiyà. (N:662)
3.S.M.CMPL.ABS steal.V.Gr6.A yesterday
'He stole (it) yesterday.'

b. ya: sa:to: shì (N:662)
3.S.M.CMPL.ABS steal.V.Gr6.B him
'He stole it.'

c. ya: sa:to: mo:tà: (N:662)
3.S.M.CMPL.ABS steal.V.Gr6.C car
'He stole the car.'

Newman (2000: 662) mentions that in Western Hausa dialects, some speakers tend to shorten the final vowel in the C-form, as shown in (9). He adds, though, that this should be regarded as an innovation by analogy with grades 1, 2, and 4. Moreover, even for these speakers, shortening appears to be subject to an additional phonological restrictions, namely the weight of the penultimate,[8] a restriction that is not operative in any other grade.

(9) a. ya: karant**o** là:ba:rì: (N:662)
3.S.M.CMPL.ABS read.V.Gr6.C news
'He read the news.'

b. sun harb**o** za:kì: (N:662)
3.P.CMPL.ABS shot.V.Gr6.C lion
'They shot a lion.'

c. mun bar**o:** yâ:ra: à gida: (N:662)
1.P.CMPL.ABS leave.V.Gr6.C children at house
'We left the children at home.'

If Newman's interpretation is correct, we have good reason to question a phrase-phonological rule as the historical basis of current FVS.

Apart from grade 6, there is another set of verbs which fails to undergo FVS, all characterised by the subregular pattern *CiCa:*. Although verbs like *kiraa* 'call', given in (10), and *jiraa* 'wait' are pretty similar to grade 1 and grade 2 verbs, as far as the segmental level is concerned, still no shortening applies.

(10) ya: kir**a:** mùtûm
3.S.M.CMPL.ABS call.V.Irr.C man
'He called the man.'

Although I concur with Hayes in adopting the lexicon as the locus of rule application, I take the tight integration of this phenomenon with Hausa stem classes as an indicator of the morphological status of the alternation.

2.2. Tripartite paradigms

We have already mentioned in passing that shortening is not the only device by which Hausa C-forms are marked: in grade 2 shortening is accompanied by vowel change. Moreover, unlike in grade 1, not only is the C-form set apart,

but rather three different situations are morphologically distinguished. Traditionally, Hausaists adopt (at least) a three-fold system to describe the verb forms in all Hausa grades. Under this perspective, the identity of A and B-forms in grade 1 can be regarded as just another instance of syncretism.

(11) a. Na: sày**a:**. (H:94)
1.S.CMPL.ABS buy.V.Gr2.A
'I bought (it).'

b. Na: sày**e:** shì.
1.S.CMPL.ABS buy.V.Gr2.B him
'I bought it.'

c. Na: sàyi àbinci. (H:94)
1.S.CMPL.ABS buy.V.Gr2.C food
'I bought food.'

d. sày**i**!
buy.V.IMP.Gr2.A (N:264)
'Buy (it)!'

e. sày**è: shi**! (N:264)
buy.V.IMP.Gr2.B
'Buy it!'

f. sàyi àbinci.
buy.V.IMP.Gr2.C food
'Buy food!'

Further evidence in favour of an essentially tripartite morphological system comes from grade 2 imperatives (see (11d-f)): here, the A-form of grade 2 verbs is identical to the C-form, displaying a short final *-i*. Selection of the C-form in the A-frame context is probably best understood as a rule of referral, since identity does not only involve selection of the final vowel, but also selection of stem form.

(12) a. ya: dı̃:bà:
3.S.M.CMPL.ABS dip.out.V.Gr2.A
'He dipped (it) out.'

b. dı̃è:bi! (N:264)
dip.out.V.IMP.Gr2.A
'Dip out!'

Taking together the evidence from grades 1, 2 and 6, we can conclude that

what we find in Hausa is essentially a tripartite system of morphological marking that displays different patterns of syncretism: A-B-C (grade 6), A-B vs. C (grade 1), A-C vs. B (grade 2 imperative),[9] and A vs. B vs. C (grade 2 "indicative"). These syncretisms, together with the ones involving verbal nouns to be discussed in section 2.3, are represented schematically in table (13) below.

(13)

	Patterns of syncretism			Examples		
	A-form	B-form	C-form	A-form	B-form	C-form
Grade 2	X	Y	Z	sàya:	sàye:	sàyi
Grade 1	X	X	Y	ka:mà:	ka:mà:	ka:mà
Grade 2 imp Irr. monosyllabics	X	Y	X	ɗè:bi yi	ɗè:be: yi:	ɗè:bi yi
Grade 6	X	X	X	ka:wo:	ka:wo:	ka:wo:
Grade 6 VNs Strong VNs Nouns	X	Y	Y	ka:wɗ̀:wa: kàrga: litta:fì:	ka:wo: kàrgan litta:fìn	ka:wo: kàrgan litta:fìn

The syncretism that can be observed between the A- and C-form cells in the grade 2 imperative yet again underlines the tight integration of vowel shortening with the overall morphological system: with bisyllabic grade 2 A-forms, borrowing of the C-form in an A-frame context constitutes the sole exponent of the morphological category imperative, as the typical L-initial tonal pattern of imperatives is effectively masked in this grade.

2.3. Verbal nouns (gerunds)

Verbal inflectional categories like tense and aspect are signalled by means of discrete markers, which are often fused with exponents of subject agreement. Typically these TAM markers select a verb in its base form. Exceptional in this respect are the continuative markers (absolute/relative/negative), where a gerundive form of the verb is chosen, standardly referred to as verbal nouns in the literature (see Tuller 1986 and Davis 1993 for detailed discussion of the syntactic properties of verbal nouns). These verbal nouns (VNs) come in essentially two forms: a regular, or weak VN, and a strong form, which morphologically behaves more or less like a noun.

In this section, I will show that the object-sensitive alternation found with verbs carries over to non-verbal categories as well, and that, in sum, these alternations, despite clear difference in exponence, are far too pervasive to be

regarded as a mere instance of allomorphy, at least not without missing a central property of Hausa morphology.

2.3.1. Weak verbal nouns

Verbs in grades 1, 4, 5, 6 and 7 typically choose the regular weak VN as their gerundive form (Newman 2000: ch. 77), although some verbs in these grades also possess (alternate) strong form VNs (e.g. *dînkà:* 'sow' – *dînkì:* 'sowing (m)').

Weak VNs in the A-form are derived by suffixation of *`wa:*. In all other forms, the weak VN is identical to the corresponding form of the base verb.

(14)

grade	form	A	B	C	D
1	V	*karànta:*	karànta: shi	karàntà	karànta:
	VN	*karàntâ:wa:*	karànta: shi	karàntà	karànta:
4	V	*rufè:*	rufè: shi	rufè(:)	rufè:
	VN	*rufè:wa:*	rufè: shi	rufè(:)	rufè:
6	V	*ka:wo:*	ka:wo: shì	ka:wo:	ka:wo:
	VN	*ka:wô:wa:*	ka:wo: shì	ka:wo:	ka:wo:

Two things are worth noticing here: First, in the context of neutralisations within a basically tripartite system, the grade 6 VN data provide the missing type of syncretism (A vs. B-C).

Second, and most importantly, overt marking of this deverbal form singles out the A-form. In contrast to the picture drawn by Hayes, where forms other than the C-form were regarded as default realisations, governed by the Elsewhere Condition, the above data appear to support the view that the A-form actually forms a natural class, comprising intransitives, suppressed direct objects, and non-locally realised direct objects.

(15) a. yanà: karàntâ:wa:
3.S.M.CONT.ABS reading.VN.Gr1.A
'he is reading it'

b. litta:fîn dà yakè: karàntâ:wa:
book.DEF.M that 3.S.M.CONT.REL reading.VN.Gr1.A
'the book he is reading'

Recall that under Hayes's account the C-frame was regarded as a special syntactic environment into which the marked, shortened allomorph could be inserted. Insertion of the unmarked, unshortened form, by contrast, was

assumed to be governed by the Elsewhere condition. In other words, morphophonologically derived forms (marked forms) are inserted in marked environments, whereas morphophonologically underived (unmarked forms) are inserted into the unmarked syntactic context. If we wanted to integrate the morphology of weak VNs with Hayes's approach, we would have to assume that, even here, the C-frame is the marked environment, with the A-frame being the default. Although technically viable, such a solution would stand in sharp contradiction to what is standardly assumed as a working principle of human language, namely that zero derivation is *the* default option in the absence of any more specific marking, cf., e.g., Stump's *Identity Function Default* (Stump 1993, 2001). Furthermore, such a solution would be highly uneconomical, owing to the fact that all other zero-marked instantiation frames, the pre-pronominal B-frame and the pre-dative D-frame, would have each to be specified to override the default as well, in identical ways. As a consequence, the generalisation that all forms other than the A-form are derived by means of the identity function will remain unexpressed.

Finally, the fact that marking of A-forms can even be attested for deverbal forms in grades that otherwise fail to mark the distinction should be taken as strong evidence both for the centrality of such an inflectional distinction and for the status of the A-form as a natural inflectional class.

2.3.2. Strong verbal nouns

Verbs in grade 2 and 3 typically use a subregular or irregular strong VN in the continuative. Newman (2000: ch. 77) subdivides strong VNs into two broader classes: regular stem-derived VNs, which are identical to the A-form in grade 2 and which are assigned mostly feminine gender, and base-derived VNs, which display a greater variation with respect to shape. Many grade-2 verbs, as well as verbs from other grades have an alternate base-derived VN, alongside the stem-derived or weak form. In a few cases, the irregular form has completely replaced the regular one. Although the forms of strong VNs, in particular base-derived ones, are morphologically quite heterogeneous, they all obligatorily take the "linker" *-n/-r* in the B and C-forms, thereby behaving essentially like nouns: within the NP, the head noun is suffixed with the linker preceding a pronominal or full NP complement. Choice of the linker depends on the inherent gender of the head noun or VN, i.e. *-n* for masculine and *-r* for feminine.

(16) a. ta: kàrɓ**i** kuɗi:
3.F.S.CMPL.ABS receive.V.Gr2.C money
'She received money.'

b. ta: kàrɓ**e:** shì
3.F.S.CMPL.ABS receive.V.Gr2.B him
'She received it.'

c. abîn dà ta kàrɓ**a:**
thing that 3.F.S.CMPL.REL receive.V.Gr2.A
'the thing she received'

d. ta: kàrɓ**a:**
3.F.S.CMPL.ABS receive.V.Gr2.A
'She received (it).'

(17) a. tanà: kàrɓa**n** kudî:
3.F.S.CONT.ABS receive.VN.M.C money
'She is receiving money.'

b. tanà: kàrɓa**n**sà
3.F.S.CONT.ABS receive.VN.M.B.POSS.M
'She is receiving it.'

c. abîn dà takè: kàrɓa:
thing.DEF.M that 3.F.S.CONT.REL receive.VN.M.A
'The thing she is receiving'

d. tanà: kàrɓa:
3.F.S.CONT.ABS receive.VN.M.A
'She is receiving it.'

(18) a. ta: karàntà litta:fî**n** Audù
3.S.F.CMPL.ABS read book.M Audu
'She read Audu's book.'

b. ta: karàntà litta:fî**n**sà
3.S.F.CMPL.ABS read book.N.M.B.POSS.M
'She read his book.'

c. Audù ne: ta karàntà litta:fî**n**sà
Audu 3.S.F.CMPL.REL read book.N.M.B.POSS.M
'It's Audu she read a book of'

d. ta: karàntà litta:fî:
3.S.F.CMPL.ABS read book.N.M.A
'She read a book.'

If we abstract away from difference in exponence – FVS and "ablaut" in (16) vs. affixation of the linker to the "nominal" forms in (17) and (18) –, we can observe that highly similar morphological distinctions, namely the marking of argument realisation modes, are operative in nominal morphology as well. Several things are important here: first, despite the difference in major morphological class, the morphosyntactic *distribution* of the A-form of strong VNs is

identical, in all relevant aspects, to that of ordinary verbs, subsuming intransives, zero anaphora and extraction. Second, we again find syncretism, this time affecting frames B and C. Thus, the contrast between A and C form that is so characteristic of FVS, is replicated here by the absence vs. presence of the linker *-n/-r*.[10] Third, under the broader perspective of a basically tripartite system for marking argument realisation, Hayes (1990)'s claim that X'-categories are treated differently cannot be maintained: while this may be true, if we regard FVS as an isolated phonological process, we have established in the preceding sections that this view has a very limited explanatory potential, failing to account for the full range of variation and patterns of syncretism within the verbal paradigms. As illustrated by the data in (16–18), marking of argument realisation not only generalises from verbs to verbal nouns (17), but also to ordinary common nouns like *litta:fi:* 'book' (18). Within proper NPs, not all environments for the A-form are attested, owing to the fact that extraction out of NPs is independently ruled out in Hausa. Instead, a resumptive (affixal) pronoun must be used. Still, in intransitive contexts, the partitioning is exactly parallel to that of VNs. With verbal nouns, where this island effect is not operative, A-frame environments are exactly those found with true verbs.

2.4. Summary

In this section, I have argued that Hausa FVS is but one exponent of a much more fundamental morphological distinction drawn in the language. To my mind, the alternation is far too pervasive to warrant an analysis in terms of (subregular) allomorphy, at least not without missing an important property of the language. In particular, it affects the two major open class categories of Hausa, namely verbs and nouns in a similar way. Furthermore, we have seen that opposition with respect to vowel length, which is regarded as quite fundamental in Hayes's account, is but one way in which an at least threefold morphological distinction is neutralised, depending on a specific morphological class. Finally, we have established, mostly on the basis of the marking of weak VNs, that the A-form must be considered a natural morphological class in Hausa, ranging over intransitives as well as transitives with unexpressed or non-locally realised direct objects. On the basis of the striking similarity of the distinctions involved, together with the degree of variation found in the set of exponents, I conclude that we are dealing here with an inflectional category.

3. ADJACENCY

In the preceding section, I have restricted myself to a discussion of the morphological aspects of Hausa FVS and related phenomena. The proposal to regard

FVS as an instance of PPP, however, was mainly motivated by an apparent surface-syntactic constraint on the alternation. In order to maintain an essentially morphological analysis of the data, it is crucial, though, to determine what exactly the morphosyntactic property is that is morphologically expressed. Consequently, I will subject the syntactic environments of the alternation to some further scrutiny, showing that (a) the apparently surface-syntactic conditioning is but an artefact of canonical Hausa word order, and (b) that exceptions to a purely surface-oriented constraint can be found which point towards argument structure as the proper representation to formulate the contextual restrictions.

3.1. Intervention

3.1.1. Indirect objects

One of the main pieces of evidence to motivate the surface-syntactic conditioning of FVS concerns the intervention data found in ditransitives (Hayes 1990: 93):

(19)	Na:	ka:m**à**	wà	Mu:sa:	ki:fi: (H:93)	
	1.S.CMPL.ABS	catch.V.Gr1.D(=A)	for	Musa	fish	
	'I caught fish for Musa.'					

Here, shortening does not apply, even though *ka:ma:* does take a direct object complement (*ki:fi:*), realised in the local clause. At first blush, it appears that it is not transitivity *per se* that matters but surface adjacency of an NP complement.

However, a property of Hausa not taken into account by Hayes (1990) is the very strict word order in this language. As detailed by Newman (2000: ch. 39) (but cf. any learner's grammar of Hausa, e.g., Cowan and Schuh 1976) the canonical position of the indirect object, be it pronominal or not, is directly after the verb. Nothing save a few very light modal particles can intervene between the verb and the indirect object marker *-wà*. Direct objects, in particular, canonically follow the indirect object. If, for reasons of prosodic weight, an indirect object must be shifted to the right, it has to be expressed by means of a prepositional phrase headed by *gà*:[11]

(20)	a.	ya:	fad̂à:	wà	mutànên	làba:rì:
		3.S.M.CMPL.ABS	tell.V.Gr2.D(=A)		men.DEF	news
		(N:468)				
		'He told the men the news.'				

b. ya: fàɗi làba:rì: gà mutànên dà
3.S.M.CMPL.ABS tell.V.Gr2.C news to men.DEF that
sukè: goyon ba:yansà (N:468)
3.P.CONT.REL supporting him
'He told then the news to the men who were supporting him.'

In this respect, basic Hausa ditransitives are quite similar to dative shift in English, where the indirect before direct object order is equally strict.

If we assume that word order in languages such as Hausa and English is determined by an obliqueness hierarchy on the argument structure of the verb (Pollard and Sag 1987), right dislocation of the indirect object will necessarily involve demotion to an oblique PP argument. Under this perspective, non-application of FVS with ditransitives can readily be accounted for at the level of argument structure, without any reference to surface adjacency.

In this context, it is of note that in the Kano dialect, the stranded IO marker *-wà* is lengthened whenever the IO itself is extracted. Newman (2000: 277) offers a potential explanation to the extent that speakers of this variety have reanalysed the almost inseparable IO marker as a verbal clitic (or rather affix [BC]).

(21) Standard Hausa

a. shi: nè: mùtumìn dà ya gayà:
he COP man that 3.S.M.CMPL.REL tell.V.Gr1.D(=A)
wà (N:277)
IOM
'He is the man I told it to.'

b. wà: ka ji: **wà** ciwo: (N:277)
who 2.S.M.CMPL.REL feel.V.Irr.D IOM injury
'Whom did you injure?'

c. ya ji: **wà** ya:rò: ciwo: (N:277)
3.S.M.CMPL.REL feel.V.Irr.D IOM boy injury
'He injured the boy.'

(22) Kano dialect

a. shi: nè: mùtumìn dà ya gayà:
he COP man that 3.S.M.CMPL.REL tell.V.Irr.D(=A)
wà: (N:277)
IOM
'He is the man I told it to.'

b. wà: ka ji: **wà:** ciwo: (N:277)
who 2.S.M.CMPL.REL feel.V.Irr.D IOM injury
'Whom did you injure?'

c. ya ji: **wà** ya:rò: ciwo: (N:277)
3.S.M.CMPL.REL feel.V.Irr.D IOM boy injury
'He injured the boy.'

With the IO marker being reanalysed as part of the verb, these speakers now choose short (="C form") *wà*, whenever the least oblique complement is locally realised, but lengthen it to "A-form" *-wà:*, if it is extracted. Note that presence or absence of a more oblique direct object does not have any impact on the lengthening. To summarise, these Kano dialect speakers have generalised FVS to be sensitive to the least oblique complement, regardless of function, whereas the Standard Hausa pattern can be reinterpreted in such a way that this sensitivity additionally takes into account the grammatical function of this complement.

3.1.2. Modal particles

With the exception of the Kano dialect data, our discussion of word order and obliqueness in the preceding section has so far not been very conclusive, only offering an alternative interpretation of the data, i.e. in terms of argument structure rather than surface adjacency.

Clear evidence against the adjacency condition[12] formulated by Hayes (1990) comes from modal particles (Schmaling 1991, Newman 2000). Although other modifiers cannot separate a verb from its direct object or indirect object complement (Joseph McIntyre, p.c.), modal particles can actually intervene.

(23) a. Ya: shuukà **kuma** audùga:.
he.CMPL.ABS planted.V.Gr1.C also wheat
'He also planted wheat.'

b. *Ya: shuukà: **kuma** audùga:.
he.CMPL.ABS planted.V.Gr1.A also wheat
'He also planted wheat.'

(24) a. ya: ga **kuma** irìn ka:yàyya:kîn dà
3.S.M.CMPL.ABS see.V.Irr.C also kind goods that
kè: ciki (N:331)
CONT.REL inside
'he saw also the kind of goods that were inside'

b. ta: tàmbàyi **kùwa** mà:târ (N:331)
3.S.F.CMLP.ABS ask.V.Gr2.C moreover woman
'She asked, moreover, the woman.'

What is telling about these data is that surface intervention does not affect

selection of the short vowel C-form, in any of the cases. Sure, one could try and refine the phonological instantiation frames to take these elements into account, but in doing so, the adjacency-oriented precompilation approach will lose much of its appeal: as Hayes claims himself (p. 106), strict adjacency is a defining property of precompiled phonologies and not so typical of inflection. If the adjacency requirements have to be relaxed, this can be taken as indirect evidence in favour of inflectional status.

3.1.3. Negation (Northern dialects)

Similar evidence can be found in some Northern dialects of Hausa (Newman 2000). In Standard Hausa, sentential negation is expressed, in most tenses, by a discontinuous negative marker *bà … ba* where the first part immediately precedes the TAM marker (and sometimes fuses with it) and the second part is found VP-finally, either including (marked) or excluding complement sentences.

As noted by Newman (2000: 639), in some Northern varieties the second part of the discontinuous negation marker also appears directly after the verb, separating it from its direct object NP complement. With pronominal direct objects, such intervention is not possible, underlining the affixal status of the Hausa object pronouns (see footnote 6).

(25) Standard Hausa

a. bài hàrbi gi:wa: **ba** (N:639)
3.S.M.CMPL.NEG shoot.V.Gr2.C elephant NEG
'He didn't shoot an elephant.'

b. bài hàrbe: tà **ba** (N:639)
3.S.M.CMPL.NEG shoot.V.Gr2.B her NEG
'He didn't shoot it.'

(26) Northern dialects

a. bài hàrbi **ba** gi:wa: (N:639)
3.S.M.CMPL.NEG shoot.V.Gr2.C NEG elephant
'He didn't shoot an elephant.'

b. *bài hàrbe: **ba** tà (N:639)
3.S.M.CMPL.NEG shoot.V.Gr2.B NEG her
'He didn't shoot it.'

It should come as no surprise now that intervention, again, does not impede selection of the C-form (26). In contrast to modal particles, the marker of sentential negation cannot, under any circumstances whatsoever, be reanalysed

as part of the following NP. Thus, the Kano dialect data discussed above, together with the Northern dialect data presented here reveal, even more clearly than the standard variety, that surface adjacency is not the relevant concept to address the distribution of FVS in Hausa.

3.2. Double accusatives

The finally conclusive piece of evidence on the issue comes from verbs taking two DO complements. Although, in these constructions, both complements are realised as direct objects (27), the first DO receives special status, being the "structural" object susceptible to promotion (in grade 7; see (28)):

(27) a. Bintà ta: ɗarà Kànde
Binta 3.S.F.ABS.COMPL slightly exceed.V.Gr1.C Kande
tsawo:
height
'Binta is a little taller than Kande.'

b. an sa:kè naɗà wa:nè sarki
4.S.ABS.COMPL repeat appoint.VN.Gr1.C so-and-so emir
(N:686)
'They again appointed so-and-so emir.'

c. sunà: biyàn Mu:sa: kuɗi:
3.P.CONT.ABS pay.VN.M.C Musa money
'They paid Musa money.'

(28) a. kadà kà rò:ƙi Bàla: go:rò! (N:685)
2.S.M.NEG.SUBJ beg.V.Gr2.C Bala cola nut
'Don't ask Bala for cola nuts!'

b. Abdù ba: yà: rò:ƙuwa: go:rò
Abdu 3.S.M.CONT.NEG beg.VN.Gr7.A cola nut
à ha:lin yànzu (N:686)
now
'Abdu was asked for cola nuts.'

c. *Go:rò ba: yà: rò:ƙuwa: Abdù
cola nut 3.S.M.CONT.NEG beg.VN.Gr7.A Abdu
à ha:lin yànzu (N:686)
now

However, if this first DO is extracted, as in (29)–(31), the verb (or VN)

appears in its A-form, despite the presence of a right-adjacent direct object complement (Newman 2000).

(29) a. Kànde cè: Bintà ta ɗarà
Kande COP Binta 3.S.F.REL.COMPL slightly exceed.V.Gr1.A
tsawo: (N:686)
height
'It's Kande that Binta is little taller than.'

b. *Kànde cè: Bintà ta ɗarà
Kande COP Binta 3.S.F.REL.COMPL slightly exceed.V.Gr1.C
tsawo: (N:686)
height

(30) a. wândà akà sa:kè naɗà:**wa:**
who.M.REL 4.S.REL.COMPL repeat appoint.VN.Gr1.A
sarki (N:686)
emir
'whom they again appointed emir'

b. *wândà akà sa:kè naɗà
who.M.REL 4.S.REL.COMPL repeat appoint.VN.Gr1.C
sarki (N:686)
emir

(31) a. su wà: kukè: biyà: kuɗîn? (N:686)
who.p 2.P.CONT.REL pay.VN.M.A money.DEF.M
'Who are you paying the money?'

b. *su wà: kukè: biyà**n** kuɗîn? (N:686)
who.p 2.P.CONT.REL pay.VN.M.C money.DEF.M

To conclude, these facts suggest, just like the intervention data, that surface adjacency fails to capture the full range of data and that reference to a privileged argument and its mode of realisation provide a more consistent picture of the Hausa data, a solution that I will explore in more detail in the following section. Moreover, this perspective will also align more neatly with the morphological facts established in the previous section, ultimately providing a definition of the inflectional category I consider FVS to be an exponent of.

4. MODES OF ARGUMENT REALISATION AND MORPHOLOGICAL MARKING

In the preceding sections, I have argued that FVS in Hausa is but one exponent of a highly systematic distinction drawn in the language relating to the mode of

realisation of some privileged argument, viz. the direct object. In particular, we have seen that the contexts in which A, B, and C-forms appear are highly consistent, even across major categories. As such, the underlying distinction is "based on a fairly restricted set of syntactic structural relations", a property Hayes (1990: 106) takes as a defining property of inflectional morphology. Furthermore, the closer look at the full range of morphological alternation has revealed that, unlike Hayes's characterisation of precompiled phonology, these data do not "involve rather haphazard environments that reflect [their] origin in true phrasal phonology" (Hayes 1990: 106). Moreover, the phenomena at hand are not "subject to a strict locality requirement" (Hayes 1990: 106) defined in terms of surface adjacency, as claimed by Hayes. Indeed, as evidenced by the morphology of weak VNs, reference to non-local realisation is a fundamental property of the system.

In this section I will review independent evidence both from Hausa and from language typology that underlines that the approach adopted here can not only do justice to the systematicity of the phenomenon, but that it will also further our understanding of Hausa morphosyntax in a broader cross-linguistic context.

4.1. Cross-linguistic evidence

In their 2001 article, Bouma et al. propose a novel theory of extraction that operates crucially on argument structure: in this theory, which is developed within the framework of Head-driven Phrase Structure Grammar (Pollard and Sag 1987, 1994), both the introduction of a gap and the percolation of non-local information up the tree proceed via the argument structure of a lexical head. Thus, "information about the extracted element is locally encoded throughout the extraction path" (Bouma et al. 2001: 1).

What is important about this proposal in the present context, is that the authors motivate their approach on the basis of a wide range of extraction-sensitive morphological data. In particular, they discuss evidence from languages as diverse as Irish (Sells 1984, McCloskey 1989), Chamorro (Chung 1998), and French (Kayne and Pollock 1978, Kayne 1989, Miller and Sag 1997), all involving morphological marking of extraction contexts. The authors claim that similar evidence can be found in a number of other languages, including Palauan, Icelandic, Kikuyu, Ewe, Thompson Salish, Moore, Spanish, and Yiddish (see Bouma et al. (2001: 2) for references).

In Chamorro, as illustrated by the following data, verbs are morphologically marked depending on the mode of realisation of their subject, i.e. inflection signals whether or not a subject is extracted or contains a gap.

(32) Chamorro (Bouma et al. 2001: 27)

a. Hayi *f-um-a'gasi* i kareta
who WH.SU-wash the car
'Who washed the car?'

b. Hayi si Juan ha-sangan-i hao [*f-um-a'gasi* i kareta]
who UNM Juan tell you WH.SU-wash the car
'Who did Juan tell you washed the car?'

c. Hafa *um-istotba* hao [ni malagao'-na i lahi-mu]
what WH.SU-disturb you COMP WH.OBL-want-3SG the son-your
'What does it disturb you that your son wants?'

These data[13] show some striking similarity with what we found in Hausa: in both languages, verbal morphology is used to mark local vs. non-local realisation of some argument.

An even closer analogue to Hausa is French participle agreement (Kayne and Pollock 1978, Kayne 1989, Miller and Sag 1997): when used in conjunction with the auxiliary *avoir*, past participles in this language may display agreement with the direct object. Presence vs. absence of agreement, however, depends on the way the direct object is realised: with locally realised direct object NPs, past participle agreement is ruled out, and a default masculine singular form is selected. If, however, the direct object is extracted or realised as a pronominal affix on the auxiliary, the participle has to agree in number and gender with its direct object.

(33) a. Marie a écrit / *écrite la lettre.
Marie has written the letter
'Marie has written the letter.'

b. Marie l'a *écrit / écrite.
Marie her.DO-has written
'Marie has written it (= the letter).'

c. la lettre que Marie a *écrit / écrite.
the letter that Marie has written
'the letter that Marie wrote'

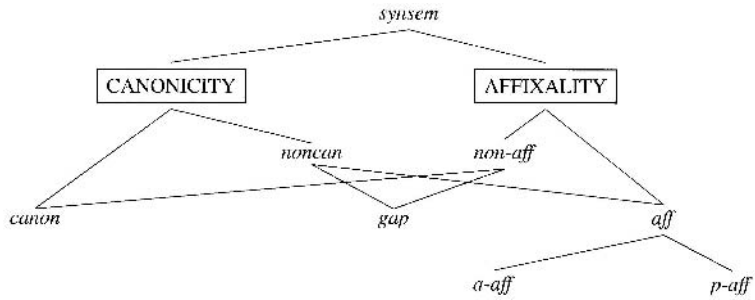
(34) a. Marie s'est coupée/*coupé.
Marie self.DO-is cut
'Marie has cut herself.'

b. Marie s'est coupé/*coupée les cheveux.
Marie self.IO-is cut the hair.DO
'Marie has cut her hair.'

c. la maison qu'il s'est construite/*construit.
the house that he self.is built
'the house he has built for himself'

Miller and Sag (1997) provide an analysis of this phenomenon in terms of argument realisation types. In HPSG (Pollard and Sag 1994), the arguments a lexical head subcategorises for are represented on valence lists. The elements on these lists are objects of type *synsem*, i.e. they include local (and non-local) syntacto-semantic information, but neither phonology nor information about the complement's internal phrase structure. Once a head combines with a complement, the corresponding element is cancelled off, under unification, in Categorial Grammar-style fashion. Miller and Sag (1997) now propose to augment the type *synsem* into a cross-cutting hierarchy of argument realisation types, as given in (35). With a hierarchy of argument realisation types, it now becomes possible to record the mode in which a subcategorisation requirement has been satisfied. As stated by the given hierarchy of synsem types, the two modes of argument realisation that do trigger participle agreement are generalised into a common class, represented by the supertype *noncan*, for non-canonical realisation.

(35)



If a subcategorisation requirement is either morphologically satisfied (by a pronominal affix) or it is inserted into SLASH (for non-local feature percolation) the corresponding element on the argument structure is restricted to be an affixal or gap synsem, respectively. Since French auxiliary participle constructions are considered complex predicates, involving argument composition (see Abeillé and Godard 1994, Abeillé et al. 1998 for motivation), any restriction regarding realisation type imposed on the argument structure of the auxiliary will be present on that of the participle as well, due to the formalisation of

argument inheritance as structure sharing. Thus, presence vs. absence of participle agreement can be locally decided on the argument structure of the participle, depending on the realisation type of the least oblique complement: participle agreement will require this element to be a non-canonical synsem, whereas selection of the default form will impose the restriction that this argument be of type *canon*.

If we compare now the French data with Hausa, we find that the former is actually a mirror image of the latter: while in French, presence of participle agreement morphologically expresses non-local realisation of a direct object complement,[14] in Hausa, it is by-and-large local realisation of a direct object that receives morphological expression. Under this view, the role of the A-form, which is morphologically unmarked in the overwhelming majority of the cases, functions as a default form: in addition to non-local realisation, this form is used in all those cases where the distinction simply has no bearing.

4.2. Further evidence from Hausa: Marking of UDCs

Although the typological similarity between French and Hausa plays an important role in our understanding of FVS and related phenomena, it would be even more satisfying, if we could find independent language-internal evidence, showing that Hausa is really an instance of this typologically well-attested type of languages, where morphological marking of extraction or unbounded dependency constructions (UDCs) is a defining characteristic. As we will see shortly, exactly this type of evidence can in fact be found.

As we have already mentioned above, verbal inflectional categories such as marking for tense, aspect and mood are expressed, in Hausa, by a set of independent TAM markers, preceding the verb or VP. Often, these markers are fused with subject agreement and the marker of negation. Although neutralised in most tenses (including all negative "tenses"), continuative and completive aspect have two independent sets of forms, called absolutive (or general) vs. relative.

Although, in narratives, the relative completive has a secondary function for describing a series of events, in normal speech, choice between these sets is syntactically conditioned (Tuller 1986, Davis 1986, Newman 2000).

(36) declaratives

a. mutà:ne: sun zo: jiyà:
people 3.P.CMPL.ABS come yesterday
'The people came yesterday.'

b. mutà:ne: sunà: zuwà:
people 3.P.CONT.ABS coming
'The people are coming.'

(37) relative clauses

a. mutà:nên dà sukà / *sun zo:
men.DEF.P that 3.P.CMPL.REL 3.P.CMPL.ABS come
jiyà:
yesterday
'the people who came yesterday'

b. mutà:nên dà sukè: / *sunà: zuwà:
men.DEF.P that 3.P.CONT.REL 3.P.CONT.ABS coming
'the people who are coming'

(38) wh questions

a. mè: ya / *ya: gani:
what 3.S.M.CMPL.REL 3.S.M.CMPL.ABS see
'What did he see?'

(39) topicalization

a. Kànde cè: ta / *ta: zo:
Kande COP 3.S.F.CMPL.REL 3.S.F.CMPL.ABS come
'It's Kande who came?'

b. cikin mo:tà: ne: mukà / *mun zo:
in car COP 1.P.CMPL.REL 1.P.CMPL.ABS come
'By car we came.'

As illustrated by the data above, markers from the absolutive set are chosen in ordinary sentences without any unbounded dependencies. Once a non-local dependency is present, forms from the relative set must be used instead.[15]

(40) mè: sukè: fatan sun / *sukà
what 3.P.CONT.REL hoping 3.P.CMPL.ABS 3.P.CMPL.REL
gamà:
finish
'What did they hope they have finished?'

Although it is pretty evident that this alternation is sensitive to extraction contexts, the data in (40) reveal that selection of the relative set of TAM markers is only triggered at the point where the nonlocal dependency is bound off by a filler (Davis 1986, Newman 2000).

In sum, we can conclude that marking of nonlocal dependencies is a central property of Hausa morphosyntax. Marking of unbounded dependencies actually demarcates the two extreme points of a UDC, i.e. the filler and the gap:

while the position of the former is morphologically signalled by the choice of TAM marker, position of the latter is marked, at least for direct objects, by selecting the A-form. [16]

5. ANALYSIS

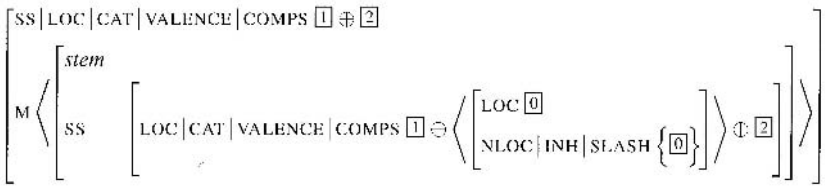
5.1. Ingredients

The analysis I am going to propose will be developed in the framework of Head-driven Phrase Structure Grammar (HPSG; Pollard and Sag 1987, 1994). Within unification-based lexicalist syntactic frameworks, such as HPSG or LFG, information about valence realisation, including introduction of an unbounded dependency, is readily available at the lexical level, either in terms of trace-less extraction (Sag and Fodor 1994, Pollard and Sag 1994, Bouma et al. 2001), as in HPSG, or by means of inside-out functional uncertainty (LFG; Dalrymple 1990, Kaplan and Zaenen 1989).

5.1.1. The representation of unbounded dependencies

Trace-less theories of extraction in HPSG standardly assume that gaps do not enjoy an independent representation as a phonetically empty syntactic sign, but rather assume that introduction into the non-local SLASH set is performed directly in the lexical entry of the selecting head.[17] From there it will percolate up the tree, as regulated by the Nonlocal Feature Principle (Pollard and Sag 1994), until a suitable filler is found, and the content of SLASH is retrieved, equating the LOCAL value of the filler with an element in SLASH, which is then removed.

(41)



As illustrated in (41), introduction of a dependent's LOCAL value into SLASH is typically accompanied by removing the corresponding subcategorisation requirement from the valence list (here: COMPS, a list containing subcategorisation requirements for non-subject complements) of the lexical sign. Note further that the way we have specified lexical slash introduction by means of a unary

schema, slash introduction leaves a "trace" of its application on the morphologically embedded valence list, namely a dependent whose LOCAL value is token-identical to the single element in its SLASH feature. As we will see shortly, Hausa morphology will make crucial reference to such a specification, ultimately distinguishing slashed from unslashed dependents.

5.1.2. Realisational morphology

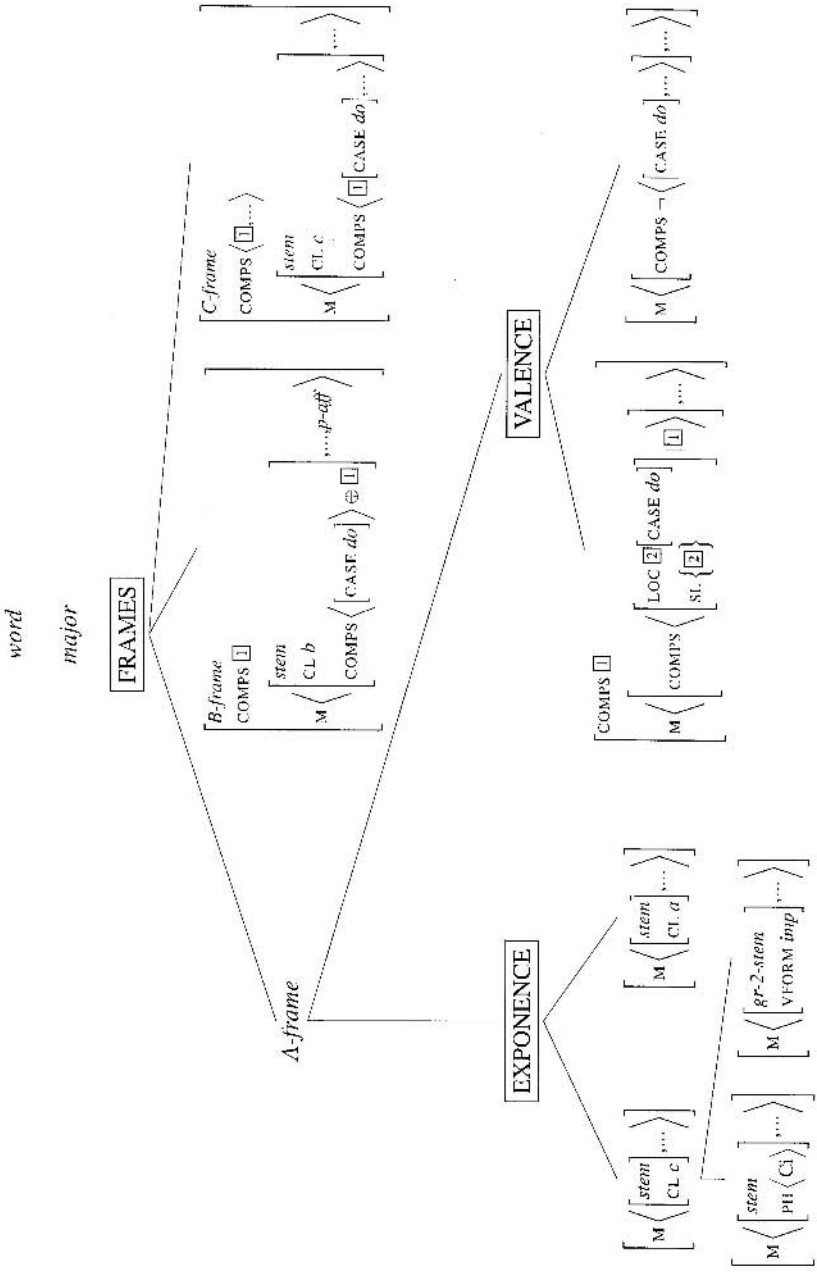
As to the formal treatment of morphology, I assume a variant of Koenig (1999)'s Type Underspecified Hierarchical Lexicon (TUHL), a constituent structure-based model of realisational morphology, cast in terms of monotonic multiple-inheritance hierarchies expressed as a system of conjunctive dimensions and disjunctive types.[18] What makes his system extremely useful in the domain of morphology, is that it integrates a model of lexical regularity and productivity: in TUHL, regular and productive patterns are only intensionally described by highly underspecified types, which can be dynamically combined. The set of inferable types is defined by what Koenig calls an AND/OR network: each maximally specific type must inherit from exactly one leaf type in each dimension. Thus, in contrast to the dimensions used in the closed-world type hierarchies employed by Pollard and Sag (1987), which serve mainly expository purposes, here, they can be regarded as a generative device, constraining the dynamic inference of fully-resolved types in an open-world type hierarchy.

In the TUHL, a principled distinction is drawn between basic types, and the set of fully-resolved, inferable types. Well-formed lexeme categories, in this system, correspond to maximal, fully-resolved types. Thus, conjunctive dimensions serve the purpose of specifying which information needs to be inherited to yield a well-formed lexeme category. To give an example, consider the underspecified type hierarchy given in (42) below: any inferable subtype of *A-frame* must inherit from at least one leaf type in every dimension of this type, viz. EXPONENCE and VALENCE. As a result, the underspecified type hierarchy under *A-frame* describes a set of 6 fully resolved types obtained, by pairwise intersection (unification) of the leaf types within each dimension.

Productive morphological patterns are represented as (partially) specified rule schemata. As such, they are applicable to any morphological entities that unify with the constraints the schema imposes on its morphological daughter(s), represented on the M(ORPH) list. Thus, fully productive patterns are exclusively described in terms of their properties.

Subregularity and irregularity are captured in this system by means of pre-typing: in contrast to fully productive patterns, irregular classes are not defined intensionally by way of properties described via feature structures, but rather extensionally by means of enumerating their class members. Subregular patterns, by contrast, are defined both extensionally and intensionally, abstracting out redundant class-specific information as a property of the supertype. An

(42)


word
major
FRAMES
A-frame
B-frame
COMPS 1
stem
CL b
M
COMPS
CASE do
⊕ 1
...p-aff
C-frame
COMPS
1
...
stem
CL c
M
COMPS
CASE do
EXPONENCE
VALENCE
COMPS 1
M
COMPS
LOC 2
CASE do
SL. 2
1
...
M
COMPS ¬
CASE do
M
stem
CL c
...
M
stem
CL a
...
M
stem
PH Ci
...
M
gr-2-stem
VFORM imp
...

example of pre-typing can be found in (44) with the irregular grade 2 stem *dī:bà:*. Such supertypes, however, only serve the purpose of a redundancy rule, i.e. no new class members can be dynamically inferred, owing simply to the fact that online type construction can only target leaf types. Thus, subregular patterns, just like irregular patterns are closed classes.

5.2. Hausa frames

As we have seen in the discussion of the empirical patterns, mode of argument realisation is a crucial underlying distinction in Hausa morphosyntax. We have also established there that, sometimes, this tripartite distinction is morphologically (partially) neutralised in various ways. Furthermore, although the syntactic environments are strikingly similar, even across major categories, morphological expression is quite heterogeneous, as far as exponence is concerned. Thus, the phenomenon at hand lends itself quite naturally to a treatment in realisational terms.

As a first step towards a formal analysis along these lines, I propose a hierarchy of morphosyntactic frames, given in (42) above, defined in terms of valence information.[19]

This hierarchy actually serves a dual purpose: first, it defines a class of morphologically relevant syntactic environments. As this hierarchy is set up as a dimension of *major*, a subtype of *word* which I take to comprise nouns and verbs, every fully type-specified lexeme from the major syntactic categories can and must be assigned (dynamically) to one of the leaf types in this dimension.

Second, and equally importantly, types in this hierarchy can be regarded as realisational schemata, pairing selection of a specific frame with a constraint on the stem class, encoded in the CL(ASS) feature.[20] Separation of the basic system of morphosyntactic divisions from stem selection enables us to formulate borrowing of stems, e.g. to capture the fact that with grade-2 verbs in the imperative, the form used for the A-frame is identical to the C-form. In a sense, the schemata defined here can be equated with paradigm functions in Stump (2001)'s Paradigm Function Morphology. Morph classes, by contrast, perform a similar function to rules of exponence.

The definition of the C and B frames is quite straightforward: the C frame is defined in terms of the mode of argument realisation of the least oblique complement, requiring this to be a direct object that has not been lexically suppressed, neither by lexical slash introduction (extraction) nor by means of affixal realisation (see below). The B frame, by contrast, captures the situation where the direct object has been expressed by a pronominal affix, reflected by the suppression of the least oblique complement, together with the presence of an exponent of pronominal affixation in the morphological structure.[21] Both schemata also place a restriction on the class of the stem they can be used with.

The definition of the A frame, however, is slightly more complex, both syntactically and morphologically. Morphologically, we can identify two patterns here: direct exponence, and a rule of referral, operative with grade 2 imperatives and a small set of monosyllabic verbs. In an independent, cross-cutting dimension, we capture the syntactic characterisation of this frame, using two leaf types: one that specifies marking of non-local realisation of a direct object complement, and another one which captures all those cases where the least oblique complement fails to be a direct object, including intransitives.

Since the syntactic patterns are defined in a dimension independent of that of exponence, every *word* belonging to the two major categories that gets dynamically assigned a subtype of *A-frame* must inherit from exactly one leaf type of every dimension of this type. Thus, we can concisely represent a whole range of patterns by means of this still rather simple two-dimensional hierarchy.

5.3. Hausa verbal paradigms

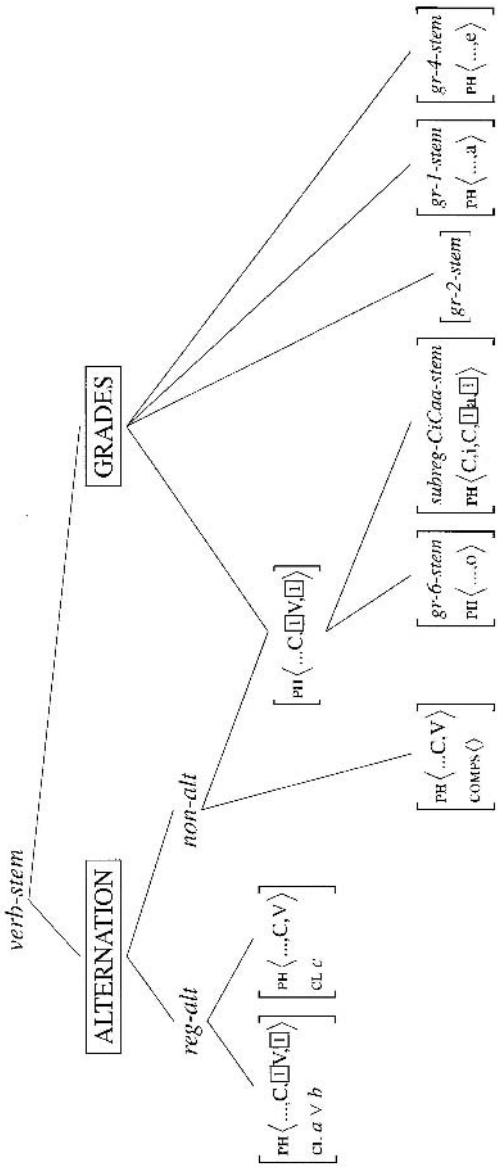
Having now established the basic partitioning of the morphosyntactic distinction underlying Hausa inflectional marking of argument realisation, we can now proceed towards a morphological analysis of exponence and the associated patterns of neutralisation.

The main hierarchy of stems is given in (43). This hierarchy is partitioned into two main dimensions: the grades on the right hand side represent an abstraction of (some of) the morphological and phonological properties of verbal stems. At the leaves of the types in this dimension one will actually find the individual stem entries that are instances of these more abstract classes.

The main challenge of the morphological analysis now is to capture the regularity and productiveness of FVS despite different patterns of neutralisation: full or partial neutralisation of entire classes, as well as sporadic irregularities, regarding theme vowel or stem phonology, within an otherwise regularly alternating class. Given the productivity of the process, I would deem the use of mere redundancy rules a rather suboptimal solution.

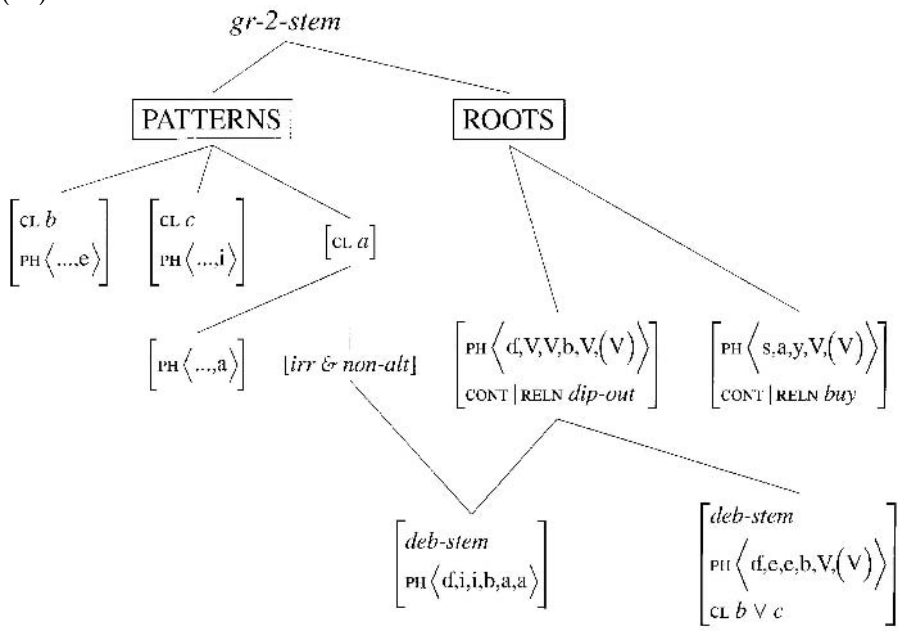
Fortunately, we can again use online type construction and abstract out the regular phonological patterns into a dimension of their own. At the top level, this dimension is divided into regularly alternating (type *reg-alt*) and non-alternating stems (*non-alt*). Entire classes that do not participate in the vowel length alternation will be pre-typed to this latter type, precluding inheritance from any other type in the ALTERNATION dimension. Apart from the neutral grade 6, the ''intransitive'' grades 3 and 7 are also pre-typed to this exemption type, because they uniformly end in a short theme vowel (A-form). The type *reg-alt*, however, is subdivided into two types describing *intensionally* the alternation in final vowel length. As these two types are leaf types, having no classes or instances pre-typed to them, they are available for dynamic type

(43)


verb-stem
ALTERNATION
GRADES
reg-alt
non-alt
PH ⟨ ...,C,V ⟩
CL c
PH ⟨ ...,C,1V,2 ⟩
CL a ∨ b
PH ⟨ ...,C,V ⟩
COMPS ⟨⟩
PH ⟨ ...C,1V,2 ⟩
gr-3-stem
PH ⟨ ...,C,V ⟩
gr-7-stem
PH ⟨ ...,u ⟩
gr-6-stem
PH ⟨ ...,o ⟩
subreg-CiCaa-stem
PH ⟨ C,i,C,2a,1 ⟩
gr-2-stem
gr-1-stem
PH ⟨ ...,a ⟩
gr-4-stem
PH ⟨ ...,e ⟩

inference: every stem type that is not pre-typed to a type within this same dimension can be combined with any of these two types, thereby modelling the productive length alternation. As one can easily verify, this is the case for every instance of *gr-1-stem* and *gr-4-stem*, as well as most instances of *gr-2-stem*.

(44)



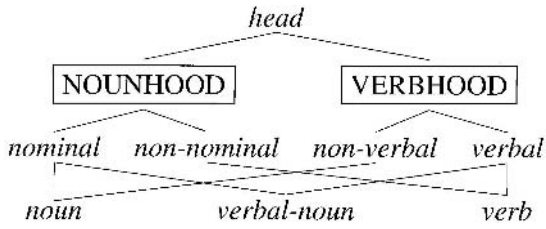
Now that we have seen the overall picture, let us briefly have a closer look at grade 2 (see (44)). In addition to vowel length alternation, this grade features the famous change in final vowel quality. Recall from our discussion earlier that some grade 2 verbs have irregular forms in the A-frame. Despite these sporadic exceptions, the B and C forms participate in the regular pattern of vowel length and vowel quality alternation. Again, we can abstract out this class-specific regularity by means of a two-dimensional system of patterns and roots. Just like the length alternation above, vowel quality alternation is described intensionally in terms of phonological properties. Every stem of type *gr-2-stem* that is not pre-typed to the exemption type *irr*, can and must be intersected with one of these three leaf types to form a fully type-resolved category. Verb stems, which are partially exempt from the alternation, have their A-form pre-typed to the exemption type (itself pre-typed to *non-alt*), whereas the regularly alternating B and C-forms are still derived via type inference. Note further that the grade-2 subhierarchy only specifies vowel quality: length alternation for regular grade 2 verb stems is inferred, by means of dynamic inheritance, from the two subtypes of *reg-alt*.

5.4. Verbal nouns

With the basic morphological machinery in place, we can now go on and investigate how the system carries over from verbal to (verbal) noun inflection.

Before we can enter into a discussion of the morphology proper, a few words are due concerning the categorial status of weak and strong VNs. Based on their syntactic distribution as complements of continuative aspect markers, it is clear that both weak and strong VNs must share some syntactic category that sets them apart from ordinary verbs. In this respect they also pattern with "action nouns", i.e. words like *aikì:* ('work'), which denote activities and therefore introduce an event variable, a property that makes them suitable for continuative aspect marking. Morphologically, strong VNs are clearly nouns. Weak VNs, except in the A-form, are morphologically indistinguishable from the corresponding verb form, as used, e.g., in the completive. Newman (2000) therefore concludes that only the A-form of weak VNs should be considered nominal, with all other weak forms being ordinary verbs. Although this makes sense from a purely morphological perspective, it will inevitably require syntactic selection by the continuative marker to be sensitive to the morphological distinction between weak and strong VNs, not a desirable result at all. Instead, I would like to attack this issue by means of underspecification,[22] essentially a mixed category approach of the kind advanced by Malouf (2000):

(45)



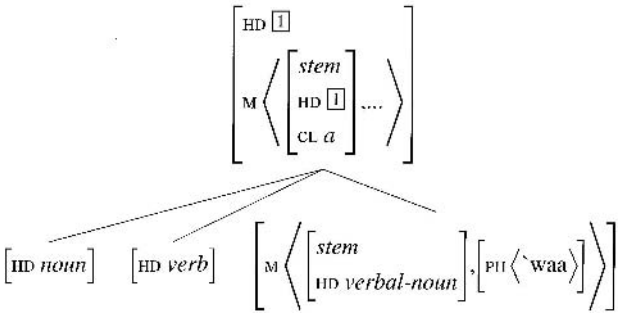
Given the hierarchy in (45), I will assume that verb stems of grades 1, 4, 5, 6, and 7 are underspecified with respect to the distinction between VN and true verb status, i.e. they are assigned the major category *verbal*. Strong verbal nouns, however, which behave essentially like nouns, both morphologically and syntactically, are assigned the major category *noun*. Verb stems that do not have a weak VN, e.g. those in grade 2, are lexically specified as *verb*.

Continuative aspect markers will then select for a complement of type *nominal*, combining with weak and strong verbal nouns, but ruling out unambiguous verbs as their complements. Similarly, all other TAM markers will select for the type *verb*, ruling out combination with any *nominal* forms.

While underspecification of verbal stems already gives sound results in the B and C frames of verbs and weak VNs, it does not yet capture the obligatory inflection of weak VNs in the A frame. As I understand it, this obligatory

marking of weak VN is an exponent of frame selection, on a par with stem class selection. It is therefore only natural to expand the type for regular A-frame stem selection in (42) to differentiate weak VN, verb and noun inflection:

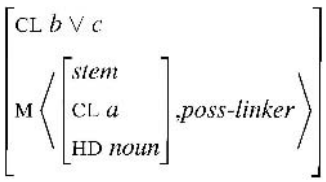
(46)



As depicted by the realisational hierarchy in (46), A-frame inflection performs the required disambiguation of underspecified verbal stems: while affixation of *`waa* will derive unambiguous verbal nouns, disambiguation to the types *noun* and *verb* will be performed by zero derivation, represented by the presence of the stem as the only element on the M(ORPH)) list.

Turning finally to strong verbal nouns, I will assume that these stems are lexically classified as unambiguous nouns. Just like other base nouns, I will assume that only the A-form is listed. B and C form stems are then derived by an inflectional schema, as given below:[23]

(47)



The result of this rule application will then have to match the morphosyntactic constraints pertaining to frames B and C. Thus, the inflectional rule itself can be specified in a maximally general fashion, with morphosyntactic restrictions imposed on the morphological top level, i.e. feature structures of type *word*.

5.5. Pronominal affixation

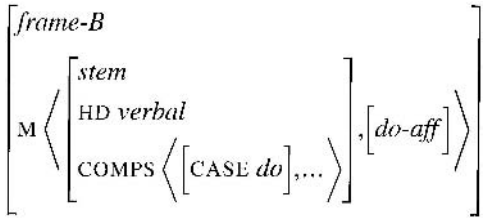
The last aspect of Hausa inflection for realisation mode that I will address in this paper relates to pronominal affixation. As I have hinted at in footnote 6

above, there is good reason to believe that weak pronominals in Hausa should best be analysed as pronominal affixes, modelled as lexical valence alternation in the sense of Miller and Sag (1997). Thus, akin to inflection of A form weak verbal nouns, stem selection is not the only morphological property relevant in frame B.

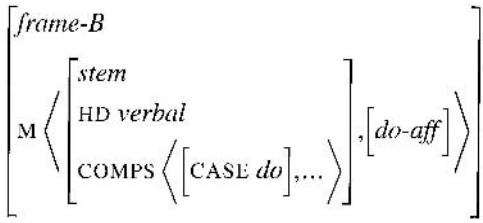
Thus, a straightforward way to incorporate the introduction of pronominal affix exponents is to simply expand the constraint on frame B into two realisational schemata, governing the selection of affix classes for nominal and verbal pronominal affixation.

(48)

a.



b.



Accordingly, *frame-B* in (42) will have the two subtypes specified in (48) above, regulating the choice of markers. Restrictions pertaining to stem selection will be inherited from the supertype. As a result, nouns, including strong VNs, will be required to come already inflected with the linker.

Before we close, let me draw your attention again to the specification of *frame-B*: so far, it only pairs introduction of a pronominal affix with the suppression of the least oblique complement. Suppression of complements, however, is also a side effect of slash introduction. As specification of SLASH is crucially underspecified in the B-frame (but not in the A or C-frames), we correctly predict selection of B forms, once a resumptive pronoun strategy to extraction is adopted, as illustrated by the data in (18) above. What is again noteworthy, is that the domains of extraction and pronominal affixation may (partially) overlap, similar to the situation found with French participle agreement (Crysmann 2003a, Miller and Sag 1997).

6. CONCLUSION

In this paper, I have argued that Hausa FVS is but one exponent of a systematic distinction drawn in Hausa morphosyntax, namely marking of argument realisation modes, ranging from direct local realisation, over pronominal affixation to extraction. This basic distinction, which has been shown to be highly characteristic of Hausa morphosyntax, receives a natural explanation, once we abandon the narrow perspective of an isolated rule of phrasal allomorphy in favour of a morphological perspective on the data, accounting for the tight integration of FVS with Hausa stem morphology, the diversity of exponence expressing the morphosyntactic distinction, as well as the class-specific and sporadic patterns of neutralisation, including rules of referral. This morphological perspective has also paved the way for a deeper understanding of Hausa morphosyntax, brought about by the connection we have established between the phenomenon at hand to the typologically well-attested pattern of morphologically marked extraction contexts, thereby characterising Hausa as the mirror image of French.

Furthermore, we have investigated in some detail the syntactic environments defining the underlying inflectional categories and have found that simple surface-oriented adjacency requirements should be supplanted with reference to argument structure. In the formal part of the analysis, we have shown how recent developments within unification-based theories of grammar such as HPSG enable us to state the observable regularities elegantly in entirely lexical terms. Thus, lexicalist theories of grammar appear to provide a convenient basis for the expression of realisational theories of morphology.

Finally, it is worth noting that a morphological analysis is not only to be preferred on empirical and typological grounds, but that it is also advantageous for methodological reasons: besides the usual Occamian arguments, which surely apply here as well, elimination of Precompiled Phrasal Phonology from the theory of grammar will ultimately provide for a more strengthened division between phrasal and lexical phonology. This goal seems actually quite attainable, given that, for a variety of seemingly precompiled phonologies, alternative analyses in terms of an enriched theory of the prosodic hierarchy are readily available (Cowper and Rice 1987), e.g., the Mende and Kimatuumbi data, which, alongside Hausa, have formed the empirical base of Hayes's original proposal.

ACKNOWLEDGEMENTS

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NOTES

[1] Hausa is a Chadic language spoken by some 30 million speakers in Northern Nigeria and bordering areas of Niger. Hausa is a tone language, featuring 3 distinct surface tones: H, L, HL (=falling). Throughout this paper I will only mark L, using a grave accent, and falling tone, indicated by a circumflex. All syllables not marked with any diacritic are high. Vowel length, which is also distinctive, is marked by means of a colon.

The data in sections 2 and 3 of this paper are almost entirely taken from Newman's reference grammar of Hausa (Newman 2000), marked (N:page number) and Hayes's original paper (H:page number), with glosses added by me. The Hausa data in section 4 are mainly reproduced from Davis (1986) (D).

[2] For ease of exposition, I have left out some of the minor grades, in particular grade 3a, 3b, and 0, which were not part of Parson's original system. For our purposes, intransitives are only of very limited use anyway. Grade 0 verbs are treated as irregular or subregular verbs in the context of this paper.

[3] Throughout this paper, I will use the term "shortening" as an entirely descriptive term, without attaching to it any analytical significance, except when referring to the analysis provided by Hayes (1990). This should be most evident from the formal analysis given in section 5, where the alternation is implemented as such, without implying any derivation in what-so-ever direction. Given that the direction of rule application is quite immaterial to my own approach, I have decided to use a terminology compatible with that of Hayes, describing the phenomena in relation to the citation form (A-form). Historically, as argued, e.g., in Newman (2000), it is the C-form that should be regarded as basic, with the A-form being derived, a point that has also been pointed out to me by two anonymous reviewers. It is of note, though, that Hayes (1990: 95) finds a lengthening rule unworkable for his account, whereas the approach advocated here is pretty neutral as to the direction of application, reducing diachronic derivation to synchronic alternation.

[4] Although it is clearly beyond the scope of this article to engage into a full-fledged discussion of the clitic vs. affix status of Hausa direct object pronominals, there is, however, initial evidence in favour of an affixal analysis: first, they show a high degree of selection towards their host (Zwicky and Pullum (1983)'s Criterion A), nothing can intervene between a direct object pronominal and its host, not even modal particles (Newman 2000: 331), nor can they get fronted. Furthermore, these elements are segmentally and tonally weak, consisting of a single light (CV) syllable to which a polar tone is assigned. Choice of tone, however, does not depend on the preceding surface tone, but on the underlying tone, as detailed in the discussion of Low Tone Raising below. For the sake of this article, I conclude that an analysis of direct object pronominals as inflectional affixes is defensible on empirical grounds.

[5] For the purposes of final vowel shortening, the D-frame is quite marginal, since the forms used there are identical to the A-forms in most cases. Exceptions include grade 2 and grade 7 verbs, which display an additional "pre-dative suffix (pds)" (Newman 2000), and some subregular monosyllabic (grade 0) verbs, which have short final vowel in A- and C-frames, but a long one in the B- and D-frames. Throughout the examples, I have glossed the D-form explicitly, indicating its identity to the A-form, whenever appropriate.

[6] Besides word-boundedness, the main reason for regarding Low Tone Raising as a lexical rule is the existence of lexical exceptions. On the basis of these exceptions, Newman (2000: 241f) even contests the status of Low Tone Raising as a productive synchronic rule of Hausa. See Newman and Jaggar (1989a, 1989b), and Schuh (1989) for detailed discussion.

[7] This possibility has already been exploited by Vigário (1999) as an escape hatch to discuss away unambiguous morphophonological evidence for the affixal status of European Portuguese clitics (see Crysmann 2003b, and Luís and Spencer 2004 for a detailed criticism of Vigário's position).

[8] For these speakers, shortening of the final *-o:* in grade 6 applies, whenever the penultimate syllable is heavy (9a, b), yet fails to apply, if it is short (9c).

[9] As pointed out to me by Joe McIntyre (p.c.), irregular monosyllabic verbs of the Ci type also display syncretism between A and C forms, e.g. *fi* 'exceed', *ci* 'eat', and *ji* 'hear'.

[10] The shortening of the final vowel here is entirely conditioned by phonotactic constraints on syllable weight, and therefore unrelated to the issue of FVS studied in this paper.

[11] Although historically, there is reason to believe that *wà* derives from *gà* (Newman 2000: 276), synchronically, these two must be clearly distinguished, since *-wà*, unlike prepositions is obligatorily stranded in extraction contexts, whereas stranding is ruled out for true prepositions.

[12] Hayes mentions these facts in a footnote, casually remarking that his *Frame 1* needs to receive some refinement to take these elements into account.

[13] In the examples above, the glosses WH-SU and WH-OBJ refer to the exponent of marking wh-extraction of a subject or oblique object.

[14] See Crysmann (2003a) for a unified analysis of extraction and cliticisation in French, regarding the latter as a special (local) subcase of the former.

[15] Embedded declaratives pattern with matrix declaratives, underlining that the sensitivity involves extraction paths, not merely a filled COMP position.

[16] Within the context of long-distance extraction, marking of local vs. nonlocal realisation also receives a functional explanation: with transitives, choice of non-A forms (as witnessed by C-form *fa:tan* in (40) above) can provide a clue, during sentence processing, as to the location of the gap site.

[17] See Bouma et al. (2001) for the treatment of adjunct extraction.

[18] See also Koenig and Jurafsky 1994) for a concise introduction. For a similar approach to HPSG morphology, see Riehemann (1998).

[19] For clarity of exposition, I give a slightly simplified picture of Hausa frames here, ignoring the difference between the A and D frames used in dative environments. See, however, Newman (2000) for evidence (from grade 2) confirming a morphological perspective on the issue.

[20] This is actually a purely morphological feature. See Aronoff (1994) for justification of this notion.

[21] I assume here a variant of Koenig (1999) which reifies affixal exponents as pure-form

types in the morphological structure. This move greatly facilitates the expression of morpho-phonological and morphotactic regularities among exponents and is mainly motivated by the study of cluster morphology. See Crysmann (2003b) for details.

[22] See Davis (1993) for a conceptionally similar, though technically slightly different proposal.

[23] Of course, this schema must be further refined to select the appropriate subtype of the linker (*-n/-r*), depending on the inherent gender of the noun.

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Blocking and periphrasis in inflectional paradigms

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Paradigms that combine synthetic (one-word) and periphrastic forms in complementary distribution have loomed large in discussions of morphological blocking (McCloskey and Hale 1983, Poser 1986, Andrews 1990). Such composite paradigms potentially challenge the lexicalist claim that words and sentences are organized by distinct subsystems of grammar. They are of course grist for the mill of Distributed Morphology, a theory which revels in every kind of interpenetration of morphology and syntax. But they have prompted even Paradigm Function Morphologists to introduce syntactic constructions into their morphology. I shall argue, instead, for a lexicalist treatment, which is based on the idea that blocking is a filtering device that applies to the output of the generative system, rather than operating directly on its derivations (Wunderlich 1996). I present this approach to blocking in section 1, and show in section 2 how it deals with the intricate composite verb paradigm of Latin, where the periphrastic perfect passive supplies the missing pieces of an otherwise synthetic inflectional system.

This part of Latin verb morphology has recently been treated from the perspective of Distributed Morphology and Paradigm Function Morphology. I compare my solution to these treatments and argue that it is superior in two respects: it predicts the complementarity of the synthetic and periphrastic formations and yet allows their respective morphological and syntactic properties to be captured, and it readily covers some basic data that the other analyses get wrong.

1. BLOCKING IN THREE MORPHOLOGICAL THEORIES

1.1. Blocking in lexicalist morphology

Central to the approach to blocking adopted here is the idea that blocking is not a relation between competing word-formation rules, but between competing *expressions*. This approach is a natural consequence of any non-rule-based approach to word-formation, including both older analogical theories such as Paul's (1886) and recent OT theories. Wunderlich 1996 pointed out that, properly articulated, it offers a straightforward account of the constitution of paradigms. On his view a grammar consists of two components, a generative component and a filter. The generative component – which includes the syntax, lexicon, and morphology in the traditional sense – specifies the potential expressions of the language and their potential interpretations. The filter consists of a blocking mechanism which selects the language's actual expressions and their

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actual meanings from this set.[1] Wunderlich makes a number of further assumptions, which together define a theory that he calls Minimalist Morphology. These additional assumptions will not be at issue here. So for present purposes I will refer to any theory of morphology which is both lexicalist and treats blocking as a relation between expressions as "lexicalist morphology".

The blocking mechanism operates by resolving the competition between the potential expressions whose meaning is compatible with a given input meaning (think of it as the 'intended' meaning). I will assume that the competition holds only with respect to meaning features which are paradigmatically expressed in the language by morphological means. (For example, *worse* competes with *badder*, but *wine* does not compete with *fermented grape juice*). I take it to be uncontroversial that some morphological categories in a language are paradigmatic and others not, and that a given category may be paradigmatic in one language and non-paradigmatic in another (e.g. feminine is paradigmatic in French and German but not in English). And I take it to be an unsolved problem why that is the case. Pending a solution of this problem, the paradigmatic status of a feature must simply be stipulated.

Compatibility will be understood as identity or subsumption. Thus, blocking adjudicates between those outputs which express either all of the input meaning (feature content) or some subpart of it. This is done by two constraints:

(1) a. ECONOMY: Avoid complexity.

b. EXPRESSIVENESS : Express meaning.

In OT terms, ECONOMY is a markedness constraint, which requires that, other things being equal, the simplest expression be chosen,[2] and EXPRESSIVENESS is a faithfulness constraint, which requires that, other things being equal, all of the input meaning should be expressed by the output expression. The 'other things being equal' clause is not part of the constraints, of course, but comes from OT constraint ranking.[3]

The interaction between ECONOMY and EXPRESSIVENESS gives rise to four types of situations.[4]

(2) a. Among equally expressive expressions, the simplest is optimal.

b. Among equally simple expressions, the most expressive is optimal.

c. Among equally expressive and unmarked expressions, these constraints make no decision. Unless other constraints apply, there is "free variation".

d. When EXPRESSIVENESS and ECONOMY conflict, their ranking decides. If they are freely ranked, there is again free variation: each ranking gives a different winner.

Cases (a) and (b) are the standard types of blocking: semantic blocking and morphological blocking, respectively. Cases (c) and (d) yield two kinds of free variation.

An example of blocking is the relation between *worse* and its potential rivals, among which *badder, more bad* and plain *bad* are the most interesting. All the competing expressions are generated by the grammatical system and must be filtered out by the blocking system. Though all of them indeed have acceptable uses, none can mean *worse* – and that is what blocking must ensure.

On our lexicalist assumptions, *worse* and *bad* are listed in the lexicon, with their respective meanings. **Badder* is generated by the morphology, and **more bad* is generated by the syntax. The constraints EXPRESSIVENESS and ECONOMY in (1) explain the distribution of the four expressions as follows.

Consider first the forms *badder* and *more bad*. In so far as they mean the same thing as *worse*, they compete with it. The compositional forms are superseded by the synonymous simple form because they violate ECONOMY. This is an instance of case (a) in (2): synonyms tie on EXPRESSIVENESS, so the competition between them is necessarily resolved by ECONOMY.

What about *bad*? Inasmuch as 'worse' subsumes (implies) 'bad' (at least, 'bad' in comparison to some other, 'better' thing), *bad* and *worse* compete for the meaning 'worse'.[5] However, because *bad* does not express the semantic content of the comparative, it incurs a violation of EXPRESSIVENESS which is not incurred by *worse*. Therefore *worse* is the better candidate. This is an instance of case (b): the candidates are equally simple (both being monomorphemic), so they tie on ECONOMY, and the competition between them is resolved by EXPRESSIVENESS.

Why then are the three other forms ever acceptable at all? Because they have certain special meanings which *worse* (for various reasons) does not have. *Worse* does not have *bad's* secondary meaning 'tough, mean' (which must be recorded in the lexical entry), so the comparative of *bad* in that particular sense must be *badder*. And "external" comparatives, as in *more bad than unlucky* 'more appropriately described as bad than as unlucky', can only be periphrastic, presumably for good syntactico-semantic reasons. For these meanings, there are no competing expressions, and no blocking.

As our example illustrates, the blocking mechanism is the source of *paradigms*. Paradigms, on this view, are not listed, or generated by rules or constraints; they emerge through blocking from the competition between expressions. Provisionally, let us say that a morphological feature F is intrinsically PARADIGMATIC if there is a morpheme which is specified only for F (a 'default' morpheme), and that a paradigm is COMPLETE if there is a default morpheme for every feature.

In this paper, I shall only discuss competition among free forms, that is, words and phrases. In reality, the role of blocking probably goes deeper. Within the lexicon, blocking can be seen as the principle that organizes allomorphs into

morphemes. A morpheme is itself a micro-paradigm composed of the basic allomorph (the general case) plus possibly a set of competing allomorphs restricted to specific contexts (the special cases). However, this extended concept of blocking will play no role in what follows.

To summarize, blocking

(3)
- is a relation between expressions, not between rules or constraints, which
- results from competition between EXPRESSIVENESS and ECONOMY, and
- organizes expressions into PARADIGMS.

1.2. Paradigm Function Morphology

A very different view of blocking and paradigms can be found in Stump 2001. Stump regards blocking as a relation between morphological rules, and treats paradigms as primitives of the theory.

For him, blocking is effected by a version of the familiar "Elsewhere" condition which says that special rules block general rules:

(4) *Pāṇini's Principle:* If two or more rules in the same block are compatible relative to an expression X and a complete and well-formed set σ of morphosyntactic properties, then the narrowest of these rules takes precedence over the others in the inflection of X for σ. (Stump 2001: 22)

The notion of paradigm is itself defined in terms of a set of morphological categories.

(5) The PARADIGM of a lexeme L is a set of CELLS*; each such cell is the pairing* $<Y, \sigma>$ of an inflected form Y of the lexeme L with a complete set σ of morphosyntactic properties for L. (Stump 2001: 43)

These are among the core tenets of Paradigm Function Morphology. For this theory, the two hallmarks of paradigmaticity, that each cell is filled, and that it is filled only once, hold in virtue of Pāṇini's Principle, with the stipulation that the relevant rules must belong to the same block. A general difficulty for this approach is the fact that it leaves no room for morphologically underspecified forms in paradigms. To say that every cell of a lexeme's paradigm must have a *complete* set of morphosyntactic properties for L in effect denies that inflectional categories can be optional. Yet languages can have "defective" categories which represent neutrality with respect to one or more inflectional categories. An example is the injunctive in Sanskrit, which is a tenseless (albeit finite) verb form (Kiparsky 1968, Kiparsky MS).[6] Instantiating case (d) in (2), such inflectionally depleted expressions compete successfully with more expressive ones – syntax permitting, of course.

The decision to treat blocking as a relation between morphological rules has consequences for the treatment of paradigms with a mixture of monomorphemic and morphologically complex forms, and of paradigms with a mixture of synthetic and periphrastic forms. This is clear from Stump's treatment of the English comparative. In order to account for the blocking of **badder* by *worse*, he assumes that the general rule which introduces *-er* is blocked by a special rule that introduces *worse*:

(6) a. $RR_{1.\{DEG:compar\},A}(<X, \sigma>) =_{def} <Xer', \sigma>$

b. $RR_{[1.0]\{DEG:compar\},BAD}(<X, \sigma>) = def <worse, \sigma>$

But positing realization rules which output monomorphemic portmanteau words, such as (6b) is a questionable artifice unless it is done in a general way on principled grounds (as in Kiparsky 1982). In PFM, the only reason for making *worse* the output of a realization rule seems to be the blocking effect itself, because of the initial assumption that blocking is necessarily a relation between rules. As far as I can tell, nothing in the theory prevents just listing *worse* as a lexical entry, in which case it would *not* block **badder*. In effect, this amounts to stipulating the blocking effect, rather than deriving it from principles of the theory.

Paradigms that mix synthetic and periphrastic forms also have unhappy consequences for this approach. Because it excludes blocking between morphology and syntax, it must generate mixed paradigms within the morphology. But allocating the periphrastic comparative to the morphology does not sit well with the fact that *more* (unlike *-er*, of course), is syntactically separable from its adjectival or adverbial head by deletion and parenthetical expressions, as pointed out by Poser 1986.

(7) a. Is it less successful, or *more* (so)?

b. This one is more impressive, or at least expensive. (= or at least more expensive)[7]

c. It is a more – shall we say – *delicate* undertaking.

More is just as independent syntactically as, say, *very* is. In many languages, including Latin (see below) the auxiliary of the periphrastic tenses is as freely positioned as any verb. Therefore it is not possible to treat such periphrastic formations as single words.

1.3. Distributed Morphology

The distinguishing claim of Distributed Morphology, as developed by Halle, Marantz, Noyer, Embick and others, is that movement and other transformational operations are responsible for word formation. Lexical morphology, of

course, rejects this position and claims that words are formed by combining morphological objects (such as roots, stems, and affixes) subject to morphological principles. But except for this one important point, Distributed Morphology is not all that different from lexical morphology. Notably the two approaches agree in recognizing morphemes as lexical objects with intrinsic properties, in countenancing constituent structure in words, and in separating morphology from (morpho)phonology. In contrast, Paradigm Function Morphology eliminates morphemes by taking morphological rules and operations as its basic entities, denies that words have constituent structure (except for compounds), and claims that morphological form is the same as phonological form.

For Distributed Morphology, composite paradigms would seem to be no problem at all at the technical level; it can readily derive the English comparative paradigm. Actually, the theory makes available *two* distinct devices for coping with what lexical morphology and Paradigm Function Morphology treat in a unified fashion as a single empirical phenomenon. The first device is the SUBSET PRINCIPLE on lexical insertion (Halle 1997: 427), which corresponds to Paradigm Function Morphology's (6) and our EXPRESSIVENESS principle (1b).

(8) The phonological exponent of a vocabulary item is inserted into a position if the item matches all or a subset of the features specified in the terminal morpheme. Insertion does not take place if the vocabulary item contains features not present in the morpheme. Where several vocabulary items meet the conditions for insertion, the item matching the greatest number of features specified in the terminal morpheme must be chosen.

Distributed Morphology's second device for dealing with what are ostensibly blocking effects is the syntactic mechanism of morphological merger (postsyntactic lowering). Where this operation is obligatory, only the synthetic form occurs, and where it is inapplicable, only the periphrastic form occurs. Mixed paradigms result from restrictions on merger.

DM in effect stipulates blocking twice: once by positing that merger processes are obligatory – an undesirable stipulation in itself – and secondly as the Subset Principle (8). On the other hand, the merger operation is both unmotivated and unconstrained. Consider the discussion of the English comparative in Embick & Noyer 2001. They propose that *more* is lowered onto the adjective to form the synthetic comparative,

(9) t_i smart+er$_i$

provided of course that the familiar prosodic and other conditions are satisfied, e.g.:

(10) a. John is smarter than Bill.
b. John is more intelligent than Bill.
c. *John is intelligent-er than Bill.
d. ?*John is more smart than Bill.

In support of the lowering analysis, Embick and Noyer claim that the operation in (9) is blocked when there is an intervening element (*amazingly* in (11)), which apparently indicates a syntactic locality constraint at work.

(11) the mo-st amazingly smart person ↛ *the amazingly smart-est person

However, the constituent structure of (11) is (12a), not (12b) as Embick and Noyer's argument presupposes.

(12) a. [most amazingly] smart
b. most [amazingly smart]

This is shown by the fact that *most* modifies just the adjective or adverb that immediately follows it. The data in (13) illustrate how *most* in such phrases is selected by the adverb, and has no relation to the adjective that follows.

(13) a. the most recently elected member (most recently, *most elected)
b. *the most hardly respected member (*most hardly, most respected)

The data in their entirety follow from the assumption that there is no "lowering" process and that *most* (like *very* and other adverbs of its class) immediately precedes its head.

Since this failed argument is all that Embick and Noyer offer, they have no case for a lowering analysis of synthetic comparatives. Nor, as far as I know, has *any* serious argument of this form ever been produced for any merger analysis in any language. And the other types of arguments for merger are not empirical, but internal to non-lexicalist versions of Minimalist syntax. Since Minimalist syntax can also be implemented in a way that is consistent with lexicalist assumptions, I conclude that there is no support for a theory which makes merger a theoretical option, let alone a preferred option. The burden of accounting for blocking should therefore devolve solely on an appropriate version of the Subset Principle (8), which, as I have argued, is (1).

2. PERIPHRASIS AND MIXED PARADIGMS: THE LATIN PERFECT PASSIVE

2.1. A lexicalist analysis

To better assess the relative merits of the three approaches to morphology and to periphrasis in particular, let us turn to a more complex set of data. The

composite conjugation system of Latin is an ideal subject for this purpose because there are recent reasonably explicit analyses couched in both Paradigm Function Morphology (Sadler & Spencer 2001) and Distributed Morphology (Embick 2000). I propose to show that, in spite of the theoretical chasm that separates the two, both encounter rather similar difficulties, and that the lexicalist approach provides a simpler and better analysis which avoids those difficulties.

The interest of the Latin perfect passive is that it is a periphrastic formation which occupies a slot in an otherwise synthetic inflectional paradigm. The following table shows the 3.Sg forms of *laudat* 'praises' and its passive *laudātur* 'is praised' in the different tense/aspect combinations.

(14)

Non-Perfect	*Active*	*Passive*
Present	laudat 'praises'	laudātur 'is praised'
Past	laudābat	laudābātur
Future	laudābit	laudābitur
Perfect		
Present	laudāvit	**laudātus/ā/um est**
Past	laudāverat	**laudātus/ā/um erat**
Future	laudāverit	**laudātus/ā/um erit**

Lexical Morphology suggests the following straightforward blocking analysis.

(15) a. Latin morphology lacks perfect passive inflections (there is a principled reason for the location of this gap, as will be seen below).

b. The periphrastic construction completes the paradigm in the syntax.

c. By ECONOMY (1a), the periphrastic forms (the **boldfaced** forms in (14)) are used *only* when there is no synthetic perfect.

What is "passive"? It is well-known that passive morphology in Latin has several distinct functions, most but not all of them detransitivizing in some sense:

(16) a. Passive morphology marks syntactically passive verbs. In fact, nearly all such verbs have obligatorily passive inflection.

b. However, a few verbs, such as *facit* 'makes' and *perdit* 'destroys' don't take passive morphology in the present tense. Let's call such present stems ACTIVA TANTUM. Their missing passive form is supplied by active verbs: *fit* 'becomes, is made', *periit* 'perishes, is destroyed'. These verbs are not just passive but also function as normal (unaccusative) intransitives with no implied agent.

c. On the other hand, passive morphology is also one way of marking lexical reflexives and reciprocals, mostly belonging to the characteristic semantic class of verbs denoting grooming, equipping, and similar actions (see Kiparsky 2002b for discussion) e.g. *ungitur* 'anoints himself', *cingitur* 'girds himself'.

d. In addition, passive morphology marks intransitives corresponding to transitive motion verbs (inchoatives), e.g. *vertitur* 'turns, is turned' (from *vertit* '(causes to) turn'), *volvitur* 'revolve', *congregitur* 'gathers, is gathered', *vehitur* 'rides, is carried', *movētur* 'moves'. Some of these intransitives can also have active endings, e.g. *vehit* 'rides', *movet* 'moves'.

e. Finally, and most perplexingly, passive morphology is an idiosyncratic feature of a class of syntactically active but morphologically passive verbs, the DEPONENT VERBS.

The paradigm of deponent verbs corresponding to (14) is shown in (17).

(17)

Non-Perfect	Present	hortātur 'exhorts'
	Past	hortābātur
	Future	hortābitur
Perfect	Present	hortātus/ā/um est
	Past	hortātus/ā/um erat
	Future	hortātus/ā/um erit

Deponent verbs include not just unaccusatives, such as *moritur* 'dies', but verbs of any semantic type:

(18)
- unergatives: *loquitur* 'speaks', *queritur* 'complains'
- transitives: *sequitur* 'follows', *hortātur* 'encourages'
- psych-verbs: *verētur* 'fears', *mirātur* 'wonders'

There are also SEMI-DEPONENT verbs, which have passive inflection in the perfect only, such as *gāvīsus est* 'he has rejoiced; the present tense *gaudet* 'rejoices' is active in form.

These data suggest that passive inflection in Latin is a *conjugational* feature – we'll call it [±Passive] – which can be lexically specified, for verb stems as well as for inflectional endings, or left unspecified. This feature classifies stems and endings into three types each:

(19) a. Verb stems:
1. Unspecified: verbs which may be active or passive e.g. *laudā-* 'praise'

2. [+Passive]: deponents, e.g. *hortā-* 'exhort'
3. [−Passive]: *activa tantum*, e.g. *perdi-* 'destroy'

b. Endings:
1. Unspecified: indifferent endings, e.g. Pres. Part. *-ns* (/-nt-s/)
2. [+Passive]: passive endings, e.g. 3.Sg. Passive *-tur*
3. [−Passive]: active endings, e.g. 3.Sg. Active *-t*

Most verbs are unspecified for the feature [±Passive]. These verbs can unify with any inflectional ending. When they receive [−Passive] endings or unspecified endings, their argument structure remains unmodified. [+Passive] inflections trigger one or more of the operations on the verb's argument structure listed in (16), forming passives, as well as possibly reflexives, reciprocals, and inchoatives, depending on further, partly idiosyncratic, properties of the verb.

(20) a. *laudat* 'praises'
b. *laudāns* 'praising'
c. *laudātur* 'is praised'

Deponent verbs are inherently specified as [+Passive], and can therefore unify with a [+Passive] or unspecified inflectional ending, but not with a [−Passive] ending.

(21) a. **hortat*
b. *hortāns* 'exhorting'
c. *hortātur* 'exhorts'

Activa tantum (like *facit*) are inherently specified as [−Passive], and can therefore unify with a [−Passive] ending or with an unspecified inflectional ending, but not with a passive ending.

(22) a. *facit* 'does'
b. *faciēns* 'doing'
c. **facitur* 'is done'

The endings which are undifferentiated (unspecified) for the feature [±Passive], hence morphologically compatible with all types of verbs, are all nonfinite. They include the present participle, the future participle, the gerund, the supine, and sometimes the 3.p. imperative endings Sg. *-tō*, Pl. *-ntō*, e.g. *ūtuntō* 'let them use'.

(23) a. From regular verbs (stems unspecified for [±Passive]): *laudāns* 'praising' (not 'being praised'), *laudātum* 'in order to praise', *laudandō* 'by praising'

b. From deponents (stems specified as [+Passive]): *loquēns* 'speaking', *hortāns* 'encouraging', *homo ratiōnem ūtēns* 'a person using reason', *hortātum* 'in order to exhort', *potitum* 'in order to possess'

c. From *activa tantum* (stems specified as [−Passive]): *perditum* 'in order to destroy', *perdendō* 'by destroying', *faciendō* 'by doing'

There are some exceptional cases. They can be treated by more fine-grained morphological marking of the feature [±Passive]. In particular, the class of semi-deponent verbs (such as *gaudet, gāvīsus est* 'rejoices', *audet, ausus est* 'dares') have Perfect stems which must be listed as inherently passive. This listing is often necessary anyway, because the perfect stems tend to be formally irregular, or at least unpredictable from the present.

2.2. Paradigm Function Morphology

The idea of accounting for the relation of periphrastic and synthetic (one-word) forms by extending the resources of morphology was first proposed by Börjars, Vincent, and Chapman (1997), and elaborated in the framework of Paradigm Function Morphology by Sadler and Spencer (2000).

Sadler and Spencer present two arguments against deriving the periphrastic forms syntactically, and therefore, against the kind of blocking analysis I proposed above. Their first argument is that the periphrastic forms of the Latin perfect are not compositional, because the *imperfect(ive)* form of the copula is used to express *perfect(ive)* tense/aspect. The assumption behind this argument, that words must combine compositionally, is questionable. Numerous idioms consist of parts which are placed by syntactic rules but whose semantics is noncompositional, e.g. verb-particle combinations such as *send him up* 'ridicule him'. Therefore, even if the relation between the auxiliary and the participle in the periphrastic perfect were partly or fully noncompositional, it doesn't follow that the periphrastic perfect is a *morphological* formation.

But in any case, the argument does not go through for the more immediate reason that the periphrastic perfect, in both its main uses, *is* compositionally derived from the meanings of its parts. The present perfect is a 'relative tense' which denotes the past in the present (and, correspondingly, the past perfect denotes the past in the past). The past participle denotes the past. Therefore, the meaning of the periphrastic perfect is a compositional function of its parts. In fact, calling it 'periphrastic' is a misnomer – rather, the synthetic perfect is a portmanteau.

Although the past participle is often called the 'perfect' participle, its temporal meaning is clearly 'past' and not 'perfect'. This can be seen clearly in those independent uses where it does not combine with a present tense to form a perfect. A nice example is the Finnish tense/aspect system, illustrated here with the 1.Sg. forms of *puhu-* 'speak'.

(24)

	Affirmative	Negative	
Present	*puhu-n*	*e-n puhu*	'I (don't) speak'
Past	*puhu-i-n*	*e-n puhu-nut*	'I spoke, didn't speak'
Pres. Perf.	*ole-n puhu-nut*	*e-n ole puhu-nut*	'I have (not) spoken'
Past Perf.	*olé-i-n puhu-nut*	*e-n ol-lut puhu-nut*	'I had (not) spoken'

Negation is expressed by the auxiliary *e-*, which inflects for person and number, and must combine with a non-finite verb form, either the present (which has the same form as the imperative), or the past (which ends in *-nut*). Since negation + *-nut* = negated past, it follows that *-nut* = past. Thus, the 'present perfect', formally present + *-nut*, is the past in the present, and the 'past perfect', formally past + *-nut*, is the past in the past.

The Reichenbach-style treatment of the perfect as a *relative past* exploits precisely such a compositional analysis.[8] The Finnish tense morphemes in (24) have the following temporal meanings:

(25) a. Present (morphologically unmarked): the event E extends over a time *t* that extends over "now"

b. Past *(-i-, -nut)*: E extends over a time *t* that is past w.r.t. "now"

c. Present Perfect *(be-Present -nut)*: E extends over a time t_1 that is past *(-nut-)* w.r.t. a time t_2 that extends over "now" *(Present)*

d. Past Perfect *(be-Past -nut)*: E extends over a time t_1 that is past *(-nut-)* w.r.t. a time t_2 that is past *(-i-)* w.r.t. "now"

I.e. *has spoken* = Pres(Past(speak)), *had spoken* = Past(Past(speak)). Whenever the past participle appears without the auxiliary, its status as a past tense (rather than perfect) is obvious, as in Sanskrit, where participles can function as heads of clauses.

The overt syntax of periphrastic constructions in language after language shows a present tense auxiliary in combination with a past tense form, in line with the semantic decomposition suggested here. The Marathi perfect is formed by combining the imperfect (past) tense with the present of the auxiliary *as* (Ashwini Deo, p. c.). The participle agrees in number and gender and the auxiliary agrees in person and number.

(26) Imperfect

	SG	PL
1-M	dhāv-l-o	dhāv-l-o
1-F	dhāv-l-e	dhāv-l-o
2-M	dhāv-l-ā-s	dhāv-l-ā-t
2-F	dhāv-l-ī-s	dhāv-l-ā-t
3-M	dhāv-l-ā	dhāv-l-e-t
3-F	dhāv-l-ī	dhāv-l-yā-t
3-N	dhāv-l-a	dhāv-l-ī-t

Perfect

	SG	PL
1-M	dhāv-l-o āhe	dhāv-l-o āho-t
1-F	dhāv-l-e āhe	dhāv-l-o āho-t
2-M	dhāv-l-ā āhe-s	dhāv-l-ā āhā-t
2-F	dhāv-l-ī āhe-s	dhāv-l-ā āhā-t
3-M	dhāv-l-ā āhe	dhāv-l-e āhe-t
3-F	dhāv-l-ī āhe	dhāv-l-yā āhe-t
3-N	dhāv-l-a āhe	dhāv-l-ī āhe-t

See Steever 1993, Ch. 3 for Dravidian parallels.

The Latin perfect has another meaning: it is a *perfective past* (expressing the past tense of telic predicates). This use of the Perfect triggers past sequence of tenses, like the imperfect, whereas the relative past use of the Perfect triggers present sequence of tenses. This perfective past contrasts with the *imperfective past* – the past tense of predicates denoting states and activities – expressed by the Imperfect tense.

(27) Imperfect: E extends over a state which extends over a time *t* that is past w.r.t. "now".

The second meaning of the Latin Perfect seems to be indistinguishable from that of a past tense. This meaning results from treating the auxiliary as tenseless (leaving its Present feature uninterpreted). Since Latin participles cannot function as finite verbs, a finite auxiliary must be added the past participle when it is a clausal predicate. Since finite verbs must have morphological tense in Latin, this auxiliary must have tense, and it can only be present tense, which is unmarked and therefore can remain uninterpreted.[9]

The simple past meaning of the Latin perfect is available only with telic predicates. This is due to blocking by a competing tense, the imperfect. The imperfect is intrinsically specialized to atelic predicates, and in that domain it pre-empts the extended perfect. In other words, there is no constraint on the

Latin perfect itself which limits its plain past use to telic predicates; it is simply another case of blocking by the general EXPRESSIVENESS constraint (1b).

See Kiparsky (2002a) for further discussion of the the different meanings of the perfect in crosslinguistic perspective. I argue there that perfect is a universal category defined as above, and that the variety of its meanings (existential, universal, resultative, recent past, and stative present) are semantically and structurally distinct (and not just pragmatically distinct) and that they emerge from alternative mappings of the predicate's event structure onto the parameters that define temporal relations.

If the 'periphrastic' perfect is a semantically complex category, then it follows that the morphologically simple synthetic perfect is a portmanteau which folds those categories together. And that makes immediate sense of the gap in the morphological paradigm (14): the missing synthetic perfect passive ending would express the three features PRESENT, PAST, and PASSIVE, which would have made it the only *triple* portmanteau in (14). As is well-known, morphological complexity is one of the factors that typically determine the distribution of gaps in paradigms. A synthetic perfect passive is obviously not impossible, but *if* there is a gap in the paradigm, this is a likely place for it to occur. The first argument of Sadler & Spencer, then, is invalid if the compositional nature of the perfect is recognized.

Sadler & Spencer's second argument is that deponent verbs are ''active in meaning''.

> Therefore, their form cannot possibly be derived from a syntactic construction which realizes passive content. Therefore, the periphrastic construction must form part of the (morphological) paradigm of the verb because it expresses an opposition of form which is not necessarily an opposition of content. (p. 78).

This argument is based on the wrong premise that ACTIVE and PASSIVE are categories of content rather than categories of form. For the reasons sketched out above, there is no ''active meaning'' or ''passive content'', nor indeed any *syntactically* relevant feature PASSIVE in any language. At the level of morphology, [±Passive] is a morphological feature (analogous to features that distinguish conjugations and other form classes). At the level of syntax and semantics, it correlates (but only imperfectly) with a property of a verbal predicate's lexical representation that restricts the way its highest Theta-role (its logical subject) is assigned to syntactic arguments. Lexical reflexives, reciprocals, and inchoatives are also classes with particular lexical argument structures (Blumenfeld, paper read at MMM4, Catania, 2003). Syntactically, passive predicates have no special properties: the form of a language's passive sentences is entirely determined by independent rules/constraints of its syntax. Just as the

rules of syntax care about the gender of a noun but not whether it is formally of the first or second declension, so the rules of syntax care about the argument structure of a verb but not whether it is formally active or passive. That there is no "passive syntax" is actually standard and uncontroversial in modern syntactic theory, and that there is no "passive meaning" is equally uncontroversial in semantics. These assumptions prove useful in Latin as well: they make a reasonable analysis of deponent verbs possible, see (20)–(23). But, if there is no syntactic or semantic feature [±Passive], Sadler & Spencer have no argument.

Starting from their conception of the perfect and of the passive, Sadler & Spencer propose an analysis according to which, conversely, *the periphrastic perfects block the synthetic perfects.*

They adopt the framework of Paradigm Function Morphology, and argue that the Latin data support that framework. According to this approach, morphological paradigms are generated by realizational rules. Morphemes, therefore, do not exist as lexical entities, and have no intrinsic properties (Stump 2001). In addition to regular realizational rules, the theory allows "transderivational" realizational rules (RULES OF REFERRAL) which make reference to the outputs of other realizational rules.

Sadler & Spencer propose a "constructional" treatment of periphrasis, according to which both the auxiliary and the participle are "pure forms", in themselves "devoid of meaning". Only their combination means PERFECT ASPECT. This is the diametrical opposite of our claim that the perfect is compositional and not a primitive semantic feature.

The key idea of Sadler & Spencer's analysis is that Rules of Referral can introduce syntactic constructions into morphology, so that periphrastic forms can become exponents of cells in inflectional paradigms. In detail, their proposal works like this. The perfective passive is a subtype of the PREDICATIVE ADJECTIVE CONSTRUCTION (*pac*) which they define by the rule reproduced in (a) below. This subtype, the PREDICATIVE PARTICIPLE CONSTRUCTION *(ppc)*, is defined in rule (b). Rule (c) defines the declensional class of the passive participle, (d) is a rule of referral which defines the *ppc* as the exponent of the morphological features Perfective Passive, and (e) assigns deponent and semi-deponent verbs passive morphology. (M-features are morphological features.)

(28) a. *pac* = Complement:[$_{AP}$ … A[Subj Agr:[…] …]]
+Head:[$_{V}$ Type:Copula]

b. *predicative-participle construction (ppc)*
= Complement:[$_{AP}$ … A[m-Vform:PassPart,]]
+Head:[$_{V}$ Type:Esse, [m-Aspect:Imperfective]

c. [Vform:PassPart] ⇒ [m-Class:1/2]

d. Given a verbal lexeme,m-feature set σ (excluding [m-Voice:Passive,m-Asp:Perfective]), then [m-Voice:Passive, m-Asp:Perfective, σ](X) $=_{\text{def}}$ *ppc*

e. If lexeme L is marked [Class:Deponent], then for all feature sets σ, if ([Class:Deponent:Semi] & [Asp:Perf]), or ([Class:Deponent:Full], $\subset \sigma$ then [m-Voice:Active] $\Rightarrow$ [m-Voice:Passive]

Realization rule (28d), the rule of referral which introduces the periphrastic perfects, is more specific than the other rules which realize the Perfect and Passive features, and therefore overrides them. Thus periphrastic perfects block synthetic perfects.

Treating the periphrastic perfect as a constructional idiom is undesirable for several reasons.

First, it loses some important cross-linguistic generalizations.

- The periphrastic Perfect is built on the past participle (and not, e.g., on the present participle or some other verb form).
- The present Perfect has a present auxiliary, and the past Perfect has a past auxiliary (and not, e.g., the other way round).
- As in many languages, it is the perfect that is periphrastic, and not the present or imperfect.

Secondly, it implies that deponent verbs should have the same morphology as passive verbs. This is a direct consequence of rule (28e). But, as we have seen, they don't. The fact is that deponent verbs, like active verbs, but unlike passive verbs, have present participles, future participles, gerunds, supines, and third person imperatives.

Third, the notion that periphrastic perfects block the synthetic perfects misses the fact that distributional generalizations which determine their respective distribution are always more perspicuously stated on the synthetic forms. Gaps in the inventory of synthetic forms are often motivated by phonological or morphological constraints on words, but as far as I know there are no instances of gaps in the inventory of periphrastic forms which are motivated by any properties statable on the periphrastic forms themselves. This means that gaps in the inventory of periphrastic forms are the result of blocking by synthetic forms, and cannot be sensibly restated in terms of the periphrastic forms themselves.

The English comparative is a simple instance of this situation, inasmuch as the distribution of the synthetic and periphrastic form is governed by prosodic constraints on the distribution of the affix *-er*. There are much more compelling instances. In Sanskrit, synthetic perfects are blocked just when reduplication is impossible for some morphological or morphophonological reason. The missing

forms are then supplied by periphrastic perfects, which are formed by combining an auxiliary verb in the perfect with a nominalized verb form derived by affixing *-ām* to the present stem.[10] There are several classes of cases where the synthetic perfect is unavailable. Vowel-initial roots with superheavy syllables ($\bar{V}C$ or VCC) do not reduplicate (because the reduplicated form would either be identical with the non-reduplicated form, or phonologically deviant, for obvious reasons), and form periphrastic perfects only.

(29) a. *īkṣ* 'see' (middle)
b. **īkṣe* 'has seen'
c. *īkṣāṃ cakre* 'has seen'

Secondly, only monosyllabic unsuffixed roots can undergo perfect reduplication. When the root is polysyllabic or has one or more derivational suffixes (causative etc.), the periphrastic perfect is used instead.

(30) a. *cint-ay-* 'think' (active)
b. **cicintaya* 'has seen'
c. *cintayām āsa*, or *cintayāṃ cakāra* 'has seen'

Third, when the synthetic perfect has a nonstandard semantics, the periphrastic formation supplies the perfect with the standard meaning.[11]

(31) a. *veda* 'knows', *bibhāya* 'fears' (formally perfects)
b. **veda* 'has known', **bibhāya* 'has feared'
c. *vidāṃ cakāra* 'has known', *bibhayāṃ cakāra* 'has feared'

Sadler & Spencer's reasoning for Latin would also apply to Sanskrit periphrastic perfects. So they would have to be formed in the morphology by a Rule of Referral on the basis of the syntactically derived periphrasis. The periphrastic perfects formed under the special circumstances illustrated in (29)–(31) would then block the synthetic perfect. This analysis destroys the *phonological* rationale for the distribution of perfect types. Why would roots with superheavy syllables make better periphrastic perfects than other roots do? No reason. But there is an excellent phonological reason why they make worse synthetic ones: superheavy vowel-initial syllables can't be reduplicated. This shows that synthetic forms block periphrastic forms, not, as Sadler & Spencer claim, the other way round.

2.3. Distributed Morphology

Embick (2000) has developed a comparably elaborate analysis of the Latin

periphrastic perfect based on Distributed Morphology. Two assumptions behind it are:

(32) *Late insertion:* syntax feeds morphology.

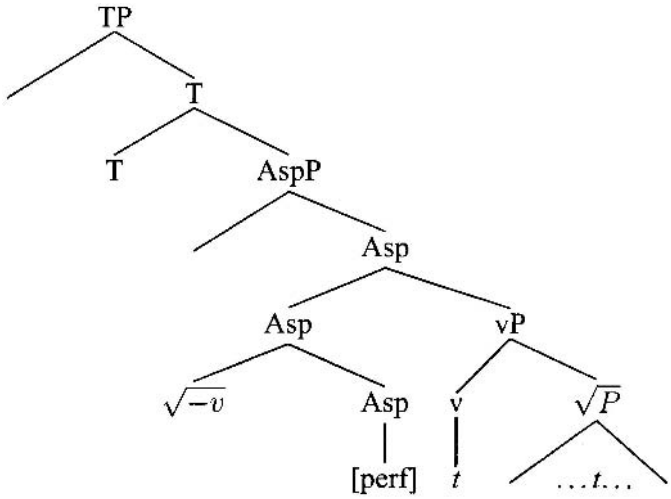
(33) *Feature Disjointness* (E 188)
Features that are phonological, or purely morphological, or arbitrary properties of vocabulary items, are not present in the syntax; syntactico-semantic features are not inserted in the morphology.

According to Embick, periphrastic and synthetic perfects are derived from the same syntactic structure. The difference between synthetic and periphrastic perfects is that synthetic perfects undergo a process of Merger, which postsyntactically fuses the Aspect node that houses the auxiliary with the main verb, by adjoining the Tense + Agr node to Asp. The resulting merged structures are then spelled out as synthetic perfects, while the unmerged structures are spelled out as periphrastic perfects.

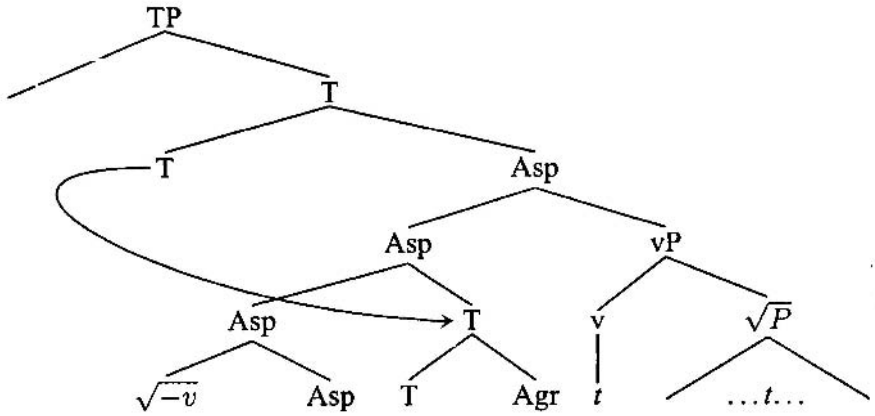
For deponent verbs, Embick suggests they are not derived from the same syntactic structures as true passive verbs, though they share with them the abstract feature [pass]. The difference between deponents and true passives is that the abstract feature is realized on a different node in the syntax.

The following derivation should make the general idea clear.

(34) *Passive (output of syntax)*



(35) *Merger (movement of T-Agr to $\sqrt{}$-v-Asp)*



Technically a solution of this kind is hard to implement. Somehow the feature [pass] must block movement of perfect aspect to T (so that perfect passives and deponents do not undergo Merger and remain periphrastic). Also, perfect aspect, when not selected by T, must select [pass] (so that perfect participles are always passive or deponent). Embick considers three formal options and finds that each runs into conceptual and/or technical difficulties.

(36)
- Solution 1: A morphological feature [pass] blocks Merger. The problem is that the auxiliary in the periphrastic perfect can be separated from the participle by syntactic processes (in the same way as any verb can be separated from its complement). But these syntactic processes must follow Merger, lest they bleed it. This requires two rounds of syntax, pre- and post-morphological, with Vocabulary insertion between, clearly an undesirable option.
- Solution 2: An uninterpretable syntactic feature [pass] blocks Merger. The feature is below *v* when *v* does not license an external argument syntactically (in passives and unaccusatives). For deponent verbs, a [pass] feature is generated syntactically in the head of *v*'s complement (the position where Roots are inserted), and a constraint is imposed on deponents that they can only be inserted into [pass] Root nodes. This is undesirable because it leads to massive syntactic complications.
- Solution 3: Roots (at least deponents) are visible in the syntax. The problem with this solution is a theory-internal one; it is incompatible with the principle of Late Insertion (see (32)).

Regardless of which of these three implementations is adopted, the

Distributed Morphology analysis has some empirical weaknesses, which interestingly enough are rather parallel to the weaknesses of Paradigm Function Morphology that we identified earlier.

As above, we can again ask why it is the perfect that is periphrastic, and not the present or imperfect. I argued that this is due to the compositional nature of the perfect. Feature manipulations, on the other hand, merely stipulate this.

The claim that deponent verbs have the same inflectional paradigm as passive verbs is simply incorrect: deponents, like active verbs, but unlike passive verbs, have present participles, future participles, gerundives, and supines, as seen in (23) and following examples. In order to capture this distinction, further feature manipulations would be required so that the feature [pass] can be blocked from "merging" with present participles and the other categories in question only in true passives. It is not clear how this could be done. The morphological differences between syntactic passives and deponents prove as troublesome for Embick's analysis as they were for Sadler & Spencer's.

Finally, the Sanskrit periphrastic perfect is clearly incompatible with late insertion. The merger operation must see both the phonology (syllable structure) and the meaning (whether the perfect has a perfect or present interpretation) but the resulting structure is subject to syntactic movement, e.g. ***vidāṃ*** *vā ìdam ayaṃ* ***cakāra*** 'he truly knew this'. This is exactly the kind of situation whose existence Distributed Morphology is designed to exclude.

Towards the end of his article, Embick briefly criticizes what he supposes a lexicalist treatment of the Latin system would look like. The critique consists of one argument: since deponent verbs have passive morphology, lexicalism predicts that they should have passive syntax. (Recall that, for Embick, the difference between deponents and passives is a matter of which syntactic node the abstract feature is realized on.) This is not so. The answer is that [+Passive], a morphological (quasi-conjugational) feature, affects argument structure only when it is assigned by affixation. When [+Passive] is inherently specified on a stem, its effect on the verb's argument structure is overridden by what is specified in the verb's lexical entry. This is simply the 'derived environment effect', which was expressed in rule-based phonology as the generalization that rules are blocked if they are applicable within the lexical entry itself. The derived environment effect is even more common in morphology. For example, Latin nouns which inherently belong to the first declension (stems ending in *-ā*) may be either masculine or feminine (e.g. *nauta* 'sailor') – whereas *derived* nouns of that declension formed by suffixing *-ā* are invariably feminine (e.g. *serva* 'female servant'). Similarly, in Sanskrit, the suffix *-ay* makes causatives from simple verbs, e.g. *kār-ay-a-ti* 'causes to make' from *kr̥-* 'make', but some verbs have obligatory *-ay-*, and these are not necessarily causatives, e.g. *cint-ay-a-ti* 'thinks'. Words like *nauta* and *cint-ay-a-ti* – which could be listed ad libitum – are formally analogs to deponent verbs, and are readily accommodated in lexicalist morphology along the lines suggested above for Latin deponents. They all

illustrate the generalization that only *derived* affixes must pass their properties on to their stems. Once this generalization is understood, Embick's sole objection to lexical morphology falls apart.

3. CONCLUSION

The main finding of this study is that a filtering approach to blocking, superior to rule-based blocking in its own right, also provides the key to periphrastic inflection. Blocking organizes expressions into paradigms through a competition between faithfulness (EXPRESSIVENESS) and markedness (ECONOMY). From that perspective, paradigms that mix synthetic and periphrastic forms do not invalidate lexicalist morphology, but actually provide new support for it. This was argued on theoretical grounds and justified empirically through an analysis of Latin verb inflection.

The larger question is whether and to what extent the weaknesses of the other two analyses count as evidence against Paradigm Function Morphology and Distributed Morphology. That depends of course on how rigorously the analyses actually follow from those theories and how strong the evidence is that those analyses really are wrong. In general, a theory is falsified if it imposes a wrong analysis on a language, or allows an analysis which is impossible for any language. Clearly we don't as yet have the first type of falsification. For neither Sadler & Spencer nor Embick nor I have shown that the analyses in question are strict consequences of the theories in question; moreover neither Paradigm Function Morphology and Distributed Morphology (nor lexical morphology, for that matter) have so far been formulated precisely enough to even allow such a demonstration. Arguably we are close to the second type of falsification, though. Sadler & Spencer have shown that Paradigm Function Morphology can rather naturally express grammatical analyses in which periphrastic forms block synthetic forms. In reality it seems to be the other way round: synthetic forms always block periphrastic forms. Embick shows that Distributed Morphology divorces phonology from combinatoric morphology in a way which leads to what we have seen is the wrong analysis of mixed paradigms like those of Latin and Sanskrit. A lexical morphological approach such as the one advocated here predicts the correct direction of blocking and allows for the well-attested types of phonology-morphology interactions. So, if the respective cross-linguistic generalizations are correct, Paradigm Function Morphology and Distributed Morphology must be rejected, whereas lexical morphology remains a viable theory of morphology.

NOTES

[1] The filter is thus quite different from that suggested by Halle (1973), which contains language-specific constraints.

[2] We shall assume here that complexity is measured by the number of morphemes, but other reasonable metrics would give the same results for the cases considered here.

[3] See Koontz-Garboden (2002) for a stochastic OT treatment of blocking which also uses conflicting markedness and faithfulness constraints.

[4] See Kiparsky MS for more details and empirical justification.

[5] Since the converse does not hold, they do not compete for the meaning 'bad'. Therefore, *bad* is the only candidate for this meaning (among the expressions considered here).

[6] Similar claims have been made for the imperfective in classical Arabic.

[7] Note that *more* is not omissible when the preceding comparative is synthetic: *This one is better, or at least expensive* can't mean 'This one is better, or at least more expensive'.

[8] For the evidence, see Kiparsky (1998, 2002a).

[9] In Sanskrit, which does not have the finiteness requirement, past participles function freely as past tenses.

[10] Note that the features of the perfect are distributed in a different way in these periphrastic constructions.

[11] A small number of verbs form both synthetic perfects and periphrastic perfects. This is to be expected from variation in the acceptability of the synthetic perfect.

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Morphological autonomy and diachrony*

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1. MORPHOLOGY BY ITSELF

In his book *Morphology By Itself* (1994)[1] Mark Aronoff convincingly shows that morphological paradigms can have autonomous properties which are expressible neither in terms of component morphemic structure nor of coherent morphosyntactic functions. To take one of his clearest examples, Latin verb stems sometimes display a special allomorph (the so-called 'third stem'), which is inexpressible in phonological terms, in that the form of this stem can vary completely from one lexical verb to the next, and which is distributed over an array of paradigmatic 'cells' (the supine, the past participle, the future participle, not to mention various derivationally related forms) sharing no common morphosyntactic function. The third stem constitutes an allegedly[2] inviolable distributional regularity – what Aronoff terms a *morphome* – in that its presence in any one member of the specified, idiosyncratic, set of cells, always implies its presence in all of the other members of the set.

In what follows I shall seek to achieve two, connected, aims. First, there is always a risk that the existence of *synchronic* morphomic regularities is merely an inert residue of some earlier *état de langue* in which the relevant distributional pattern did still have some 'extramorphological' motivation. In principle, the observed patterning could be synchronically accidental – visible to the linguist but not to the ordinary speaker. In the case of the Latin 'third stem', native speakers might simply have learned each lexical verb, with its irregularities, separately, and never have actually made the kind of cross-paradigmatic generalizations inherent in the notion of morphome. An obvious way of guaranteeing the 'psychological reality' of morphomic structure is to seek out diachronic changes which *presuppose* morphomic structure, and it is a series of changes of exactly this kind in the history of the Romance languages which forms the core of the present study.[3] What emerges is that 'morphomic' structure plays a fundamental role in the morphological system of the Romance languages, a fact which leads us to ask whether autonomously morphological phenomena are not in fact more important, and pervasive, in language than has hitherto been assumed.

This brings us to my second aim. Aronoff is admirably vigorous in combating the sterile reductionism of approaches (especially associated with the generative tradition) which tend to deny any importance at all to morphology, and treat paradigms as a kind of epiphenomenon of the interaction of syntax and phonology. Yet even he seems to regard morphology in general as an aberrant, fundamentally 'unnecessary' (1994: 165) language-specific, domain, somehow

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divorced from universal principles of linguistic structure, and autonomous morphological structure as a kind of 'last resort', a residue left when some phenomenon cannot be wholly reduced to phonological or morphosyntactic principles (Aronoff 1994: 63; 166). For Aronoff, the importance of studying morphology lies in understanding individual systems on their own terms – as 'langues' (1994: 166; 1999), rather than as part of 'langage' in general. This view is strikingly enunciated as follows (1998: 413):

> … morphology is inherently unnatural. It's a disease, a pathology of language. This fact is demonstrated very simply by the fact that there are languages, though not very many, that manage without it – you don't need morphology – and by the perhaps more widely recognized fact that some languages like West Greenlandic or Navajo have morphology much worse than others do. I think it's clear that the notion of morphologization or grammaticalization is rooted in this disease view of morphology as being inherently unnatural, as is also Sapir's view of language, read *morphology*, as a collective art. Morphology, or grammar, is to a great extent not isomorphic, that's what makes it morphology, or as Saussure would have it, arbitrary.

There also appears to be a sharp divide between a 'perfectionist' approach to language, compatible with morpheme-based perspectives, and local and idiosyncratic 'imperfectionism', located especially in inflectional morphology (Aronoff 1999: 321f.):

> … the search for perfect systems may blind us to those aspects of individual *langues* that may be systematic but imperfectly so.
>
> Accepting the possibility that languages are imperfect systems amalgamated from natural and unnatural components may open our minds to new sorts of analyses and generalizations. Let us call this esthetic, with its willingness to accept and appreciate imperfect systems, IMPERFECTIONISM. The imperfectionist esthetic is more compatible with an inductivist than a deductivist sensibility. It allows for languages to differ from one another systematically in ways that are not predicted by properties of UG. Imperfectionism is likely to have greater payoff in those domains where languages are known to differ from one another quite radically. Inflectional morphology is likely to be a breeding ground for imperfection, because, although languages are highly divergent in their morphology, inflectional morphology is obligatory and hence systematic. And within inflection, the mapping between morphosyntax and morphological realization is an especially likely place for imperfections to arise, since it is the locus of Saussurean arbitrariness within the inflectional system.

All this deserves enthusiastic applause. A willingness to take systematic local idiosyncrasies on their own terms, neither ignoring them nor forcing them into the procrustean bed of morphemic structure, is surely desirable. Indeed in what follows we shall see that such an attitude is essential if we are to account for various aspects of the history of the Romance inflectional paradigm. But equally we shall see that it is very hard to account for the changes in question if we regard 'morphology' and 'morphomes' as mere local idiosyncrasies. I shall argue that there is in fact a seamless link between what seem to be erratically local morphomic phenomena and the fundamental and universal principles of iconicity. Moreover, I shall suggest that autonomous morphological structure may be far more pervasive than has hitherto been suggested, in that it may be present not only among the language-specific complexities of inflectional paradigms, but even at the level of the type of simple, linear, morphemes which occur in *every* language.

2. METHODS AND DATA

In sections 3–5 I explore the evolution of three 'morphomic' paradigmatic alternations in the Romance verb. Each is 'phonologically incoherent', in that both the form of the alternants and their distribution within the paradigm defy phonological generalization. And each is 'morphosyntactically incoherent', in that the set of paradigmatic 'cells' implicated in the alternation is irreducible to any natural morphosyntactic class.

The origins of these phenomena are unproblematic: in one case, an already phonologically heterogeneous set of allomorphs is inherited from Latin, but their original shared function (that they signalled aspect) is lost; in the other two, regular sound changes create novel, and phonologically disparate, allomorphy in verb roots, with an arbitrary paradigmatic distribution not aligned within any one morphosyntactic class. Nothing exceptional so far, but what the history of the Romance languages demonstrates is that these doubly (phonologically and morphosyntactically) 'incoherent' allomorphies must have been far more than just the 'inert' outcome of earlier changes. For there are numerous subsequent developments which not only presuppose the 'psychological reality' of these patterns, but show that they play a major, determining role, in paradigmatic change. The developments in question fall into three types: coherence, convergence and attraction.

In 'coherence', the outcomes mentioned above show persistent resistance to any morphological change liable to disrupt their peculiar paradigmatic distribution. If an analogical change affects one 'cell' of the paradigm in which the relevant allomorph occurs, it affects of all the others in the same way. The relationship of mutual implication between 'cells' always survives intact. In 'convergence' the set of paradigmatic cells affected by the original change tends

over time to acquire certain common phonological characteristics across all verbs in which they occur – a development akin to classic analogical levelling of the 'one meaning – one form' type, except that here there is no 'meaning' outside the morphomic pattern itself. 'Attraction' is similar to classical analogical extension, except that here the basis of the extension is the abstract paradigmatic patterning alone, independently of phonological or morphosyntactic content: new sources of allomorphy (especially cases of rivalry between lexically distinct but virtually synonymous verbs) are integrated into the grammar by making them conform to the idiosyncratic paradigmatic patterning previously 'etched out' by sound change.

The data are gathered from my own extensive and ongoing survey of the history of the inflectional morphology of the Romance verb, based principally on the evidence of historical and synchronic studies of individual dialects/languages, and on linguistic atlases. I shall make in what follows a number of strong – and eminently falsifiable – generalizations about the data. The philological argumentation needed to support every detail would submerge this study in a sea of footnotes, so I have made liberal reference to a series of studies of my own in which more detailed philological support will be found. My main focus here will be on the theoretical implications of my findings.

Finally, I shall turn my attention to the syntagmatic dimension, in Romance and some other languages, again using 'coherence' and 'convergence' to demonstrate that autonomous morphological structure may be present even at the level of the simple, linear, formative in word structure, and therefore potentially present cross linguistically, given that all languages possess morphological structure of this kind.

3. THE REMNANTS OF THE LATIN PERFECTIVE IN ROMANCE

3.1. Phonological incoherence with functional coherence in Latin

Aspectual differences (imperfective vs. perfective) were fundamental to the Latin verb, but largely effaced from the Romance inflectional paradigm. Yet old perfective *forms* persist. These inherit from Latin a high degree of phonological incoherence, but add to it a new *functional* incoherence, in that they are no longer aligned with any coherent set of morphosyntactic properties.

In Latin present, past, future and infinitive, imperfective forms were distinguished from a perfective. In most 1st and 4th conjugation verbs, the perfective was characterized by a formative [w] immediately following the thematic vowel: e.g., AMAT 'loves', AUDIT 'hears' vs perfective AMAUIT, AUDIUIT. In some cases (notably 2nd conjugation verbs), [w] was adjacent to the root (e.g., TENET 'holds' – TENUIT). In 3rd (and some 2nd and 4th) conjugation verbs the perfective was

expressed by a motley array of root-allomorphs, whose irreducible phonological heterogeneity (including reduplication, vowel lengthening, modifications of the root final consonant) is striking. The (3sg.) imperfective and perfective present of a number of verbs are illustrated in (1), respectively on the left and right:

(1) DAT DEDIT 'give'; FACIT FECIT 'do'; UIDET UI:DIT 'see'; UENIT UE:NIT 'come'; MITTIT MI:SIT 'send'; SCRIBIT SCRIPSIT 'write'; DICIT DI:XIT 'say'; MANET MANSIT 'stay'; PO:NIT POSUIT 'put'; PREMIT PRESSIT 'press'; COQUET COXIT 'cook'; TRAHIT TRAXIT 'draw'; FUNDIT FU:SIT 'pour'; EST FUIT 'be'

3.2. Phonological incoherence with functional incoherence in Romance

Most types of Latin perfective root survive intact in Romance, and those lost were often replaced by other perfect-root patterns (original root-final [w] and [s] induced various novel types of allomorphy as a result of regular sound changes – cf. Maiden 1999; 2000; 2001a). Here are examples of the range of such survivals (and innovations) from Old Spanish, and Italian, contrasting third person singular present indicative with preterite forms (2):

(2) Old Spanish *ve* 'sees' – *vido; quiere* 'wants' – *quiso; viene* 'comes' – *vino; tiene* 'holds' – *tovo; haze* 'does' – *hizo/hezo; escribe* 'writes' – *escriso; conduce* 'leads' – *condujo; plaze* 'pleases' – *plogo; sabe* 'knows' – *sopo; pone* 'puts' – *puso; puede* 'can' – *podo; está* 'stands/is' – *estovo/estido; ha* 'has' – *ovo; remane* 'remains' – *remaso; nasce* 'is born' – *nasco; vive* 'lives' – *visco; yaze* 'lies' – *yogo; trae* 'brings' – *trajo; ciñe* 'girds' – *cinxo; conoce* 'knows' – *conuvo; dice* 'says' – *dijo*; *mete* 'puts' – *miso; es* 'is' – *fue;*

Italian *vede* 'sees' – *vide; prende* 'takes' – *prese; viene* 'comes' – *venne; mette* 'puts' – *mise; fa* 'does' – *fece; scrive* 'writes' – *scrisse; piove* 'rains' – *piovve; dice* 'says' – *disse; cinge* 'girds' – *cinse; morde* 'bites' – *morse; pone* 'puts' – *pose; fonde* 'melts' – *fuse; piace* 'pleases' – *piacque; ha* 'has' – *ebbe; sa* 'knows' – *seppe; vuole* 'wants' – *volle; nasce* 'is born' – *nacque; vive* 'lives' – *visse; cresce* 'grows' – *crebbe; cade* 'falls' – *cadde; trae* 'draws' – *trasse; rompe* 'breaks' – *ruppe; dà* 'gives' – *diede; sta* 'stands' – *stette, è* 'is' – *fu*

In Romance, not only does phonological incoherence persist and even increase, but the originally perfective forms become *functionally* incoherent too. The following schematically summarizes the functional changes of the originally perfective forms (a question mark indicates that the derivation is not universally accepted):

(3)

Latin (perfectives)	Romance (disparate functions)
present perfective indicative	past perfective indicative (preterite)
present perfective subjunctive	future subjunctive (Ibero-Romance) present conditional (Romanian dialects)
past perfective indicative	pluperfect indicative (Portuguese, O. Spanish) present conditional (many Italo- and Gallo-Romance varieties) imperfect subjunctive (Spanish)
past perfective subjunctive	imperfect subjunctive (most varieties) pluperfect indicative (Romanian)
future perfective	? future indicative (Dalmatian) ? conditional in Romanian dialects future subjunctive (Ibero-Romance)

Only the preterite retains a clear aspectual alignment (the other surviving forms generally becoming aspectually neutral). In fact, in no Romance variety does there survive any unique, common functional factor linking the (originally) perfective roots.[4]

Henceforth I label the originally perfective roots in Romance languages as 'PYTA roots', the acronym being suggested by the expression used in Spanish grammars to describe such roots and their paradigmatic distribution: *perfecto y tiempos afines* 'perfect and related tenses'.

3.3. 'Coherence' of PYTA roots

There is virtually no evidence of 'mixed systems' – either in modern Romance or at earlier historical stages – such that, for example, the PYTA root appears in some of the originally perfective cells of the paradigm, but disappears in the others.[5] This does not mean that originally perfective tense-forms are inseparably bound together in a relationship of mutual presupposition: most Romance varieties have lost the Latin future perfect and perfect subjunctive forms, and many northern Italian dialects have lost the old past perfect but not the old past perfect subjunctive. Moreover, even where the two or more originally perfective tense-forms survive, they may be *differentially* subject to certain analogical changes affecting the inflectional endings (cf. Bybee and Brewer 1980: 211f.; Ronjat 1937: 271; 284 for some Occitan examples). The point is, simply, that

wherever originally perfective subparadigms survive, the presence of the PYTA root in any one of them always implies the presence of that root in all the others.

Across the Romance languages, and throughout their history, it is a virtually[6] exceptionless generalization that any morphological change affecting a PYTA root in one cell of the paradigm affects all the other specified cells. For example, there has been widespread replacement of PYTA root by non-PYTA roots. In Ibero-Romance (Maiden 2001a) this always affects equally the preterite, imperfect subjunctives and future subjunctive. Similarly, in Occitan (Languedocien, Alibèrt 1976: 110) levelling of PYTA in favour of a non-PYTA root *never* differentiates between preterite and imperfect subjunctive: e.g., *cenhèri cenhèsse* (for older root *ceis-*) 'gird', *jonheri jonhèsse* (for older root *jois-*) 'join', *bevèri bevèsse* (for older root *bec-/beg-*) 'drink', *respondèri respondèsse* (for older root *respós-*) 'answer'. A feature of some Occitan varieties is that the present subjunctive root is extended to other parts of the paradigm. Speakers could have created a 'common subjunctive' root, by limiting the extension to the imperfect subjunctive, but this does not occur, as shown for example by Languedocien present subjunctive *aja* 'have', *veja* 'see', *sacha* 'know' > preterite *ajèri* impf. subjunctive *ajèsse*, *vejèri vejèsse*, *sachèri sachèsse*, etc., where the preterite is equally affected. In French (and Gallo-Romance generally) there has been notable recession of PYTA in favour of non-PYTA roots since the middle ages, but if the PYTA root is eliminated from one cell of the paradigm, then it is always eliminated from every cell in which it originally occurred: there are simply no 'mixed systems' (say,[7] preterite ***mors* 'I bit' vs. imperfect subjunctive *mordisse* or preterite ***mordis* vs. *morsisse*).

Analogical generalization of a high vowel [i] or [u], originally found (for reasons of regular sound change)[8] only in the 1sg. preterite of the PYTA root, is widespread in Romance. Since this vowel happened originally to be peculiar to the preterite of the relevant verbs, one might expect it to have remained a specific marker of just the preterite. But extension of the 1sg. preterite high vowels in Ibero-Romance (cf. Maiden 2000) *always* affects all PYTA roots in the paradigm of the relevant verb, in the subjunctive as much as the preterite. For example, Spanish and Portuguese reflexes of the Latin perfective root *fec-* originally retained the mid vowel [e] in all parts of the paradigm except the 1sg. preterite, where for reasons of regular sound change there was [i] (e.g., 1sg. preterite *hice* 'I did' vs. 3sg. *hezo*, imperfect subjunctive *heziese*, future subjunctive *heziere* etc., etc.). Subsequently, this vowel extends not only throughout the preterite, but equally, and indifferently, to all the specified tenses (e.g., modern *hice … hizo … hiciese … hiciere*), and the same is true of all verbs which originally had a high vowel restricted to 1sg. preterite. Similar developments are observable in the history of French (cf. Fouché 1967: 276; 336f.), affecting equally the imperfect subjunctive and the conditional derived from the old past perfective.

3.4. Formal convergence in PYTA roots

In various respects the Romance languages reduce the phonological heterogeneity of PYTA roots. The result is a characteristic phonological shape for these roots in general. The changes reviewed here affect the PYTA root exclusively, and are not part of wider convergence between the lexical verbs in question.

As the examples in 3.2 show, all five vowels of Castilian occurred in the PYTA roots in the medieval language. Today only the high vowels [i] and [u] occur; needless to say, this change is entirely 'coherent', and all PYTA forms are so affected. We can illustrate the change from the modern 3sg preterite and imperfect subjunctive forms:

(4) *quiso* 'wanted' – *quisiese; vino* 'came' – *viniese; dijo* 'said' – *dijese; tuvo* 'had' – *tuviese; hizo* 'did' – *hiciese; condujo* 'drove' – *condujese; supo* 'knew' – *supiese; puso* 'put' – *pusiese; pudo* 'could' – *pudiese; estuvo* 'was' – *estuviese; cupo* 'fitted' – *cupiese; hubo* 'had' – *hubiese;* [*trujo* 'brought' – *trujese*][9]

In part this is an effect of the extension of high vowels from the 1sg., preterite, described in 3.3. But even verbs such as *haber* 'have', *estar* 'stand', *tener* 'have', *saber* 'know', *caber* 'fit' whose preterites never contained a high vowel, are affected. In Maiden (2001a) I argue that the combined effect of certain verbs in which the vowel is etymological, plus those in which it was analogically extended from the 1sg. preterite, has been to induce a reanalysis of PYTA as characteristically containing a high vowel, to which all the remaining roots succumb.

In Old Castilian and Old Portuguese (cf. Fouché 1929: 71f.) root-final [ʃ] (or [ʒ]) substitutes expected [s] in all the PYTA forms of certain verbs. The palatal probably originates in a subset of verbs in which it was etymologically present (DIXI 'I said' > 'diʃe, etc.), and there is evidence from Portuguese that it originated *just in the 1sg. preterite.*

Malkiel (1960) argues that Old Castilian intervocalic [d] in PYTA forms of *ver* 'see' (*vido vidiese* etc.) is preserved from otherwise phonologically regular deletion because all other PYTA roots ended in a consonant. This implies that speakers postulated a root-final consonant as characteristic of PYTA, and resisted a change liable to violate that characteristic.

The earliest French texts attest to various convergences among PYTA roots. Several verbs acquire a counteretymological root-final *s* [z], apparently attributable to the model of verbs such as *mis* 'I put' *mesist*; *mesisse* … etc., where it is etymological. From Latin FECI 'I did', FECISTI, etc., one would regularly expect ***fiz* ***feisis*, ***feisisse* not the occurring *fis fesis*; *fesisse.* From DIXI, 'I said' etc.

one should expect an unstressed *deis*-, with voiceless [s] (Fouché 1967: 287), yet we have *dis*, *desis*; *desisse*, etc., with voiced [z]; likewise *escresis* 'I wrote' for expected ***escressis.*

In the late 12th century, many French PYTA roots assumed the PYTA root structure of *veoir* 'see' (cf. Fouché 1967: 277; Zink 1989: 195), which lacked a root-final consonant (e.g., 2sg. preterite *vëis*, imperfect subjunctive *veïsses*). So *mesis mesisses, fesis fesisses* etc. become *mëis mëisses, fëis fëisses*, and later *mis misses, fis fisses*, etc. Rather as Spanish showed signs of convergence on a (C)VC structure, French tended towards a (C)V structure, prompted by the fact that not only *veoir*, but also verbs like *avoir* 'have' (*oi, eus; eusse* etc.), *savoir* 'know' (*soi, seus; seusse* etc.) had such root structure.

Magni (2000) argues, in effect, that the frequent occurrence of unexpected root-final long consonants in Italo-Romance PYTA roots (e.g., *venni* 'I came', *mossi* 'I moved', *caddi* 'I fell') may be a type of convergence modelled on other PYTA roots where the lengthened consonant is phonological in origin (e.g., TENUI > *tenni* 'I held').

In every Romance language, PYTA roots are in a mutually implicational relationship with *unstressed inflections* in the formerly perfective verb-forms, such that where there is a PYTA root, there will always be at least one ex-perfective word-form with an unstressed inflection. In verbs lacking a PYTA root, the ex-perfective forms have no unstressed inflections. Typically, the unstressed inflection occurs in the 1sg. and 3sg preterite: Latin DĪXI 'I said' DIXÍSTI DÍXIT, FÉCI FECÍSTI FÉCIT, etc. > Sp. *díje dijíste díjo, híce hicíste hízo*; It. *díssi dicésti dísse, féci facésti féce*; (some Romance varieties reflect root-stress in the 3pl. pret. as well: DĪXERUNT, FĒCERUNT > It. *díssero, fécero*). Certain S. Italian and Romanian dialects retain Latin unstressed endings in the 1pl. preterite; an unstressed ending also occurs in medieval Italian (and Gallo-Romance) conditionals derived from the Latin pluperfect (cf. Rohlfs 1968: 346f.; Maiden 2000). Replacement of PYTA by a non-PYTA root implies replacement of the unstressed inflections by stressed inflections: there are no cases in which the PYTA root disappears but the unstressed inflection remains, such that Latin SCRĪPSI 'I wrote' SCRIPSÍSTI SCRÍPSIT > Spanish ***escríbe escribíste* ***escríbo*, Italian ***scrivi scrivésti* ***scrive* (rather than the actually occurring *escribí escribíste escribió, scríssi scrivésti scrísse*).

This impossibility of 'non-PYTA root + unstressed ending' may be a consequence of the so-called 'No Blur Principle' – as elaborated by Carstairs-McCarthy 1994; also Cameron-Faulkner and Carstairs-McCarthy 2000), disfavouring absolute synonymy among inflectional affixes. No Romance language seems to have non-optional and synonymous, verb inflections. A sequence non-PYTA root + unstressed suffix would fall foul of this principle, since it would mean that, unpredictably, some verbs have unstressed preterite endings, and others stressed endings, without any systematic difference, e.g., Italian ***scrívi scrivésti* ***scríve scrivémmo scrivéste* ***scrívero* but *ricevéi ricevésti ricevé*

ricevémmo ricevéste ricevérono with the complete set of stressed preterite endings. Carstairs-McCarthy argues that autonomously morphological entities may function as 'signata' of inflectional endings, and PYTA can be seen as a 'signatum' for the unstressed desinences. Italo-Romance has *hypercharacterized* the interdependency by making the unstressed desinence a unique defining characteristic of PYTA roots. If other Romance varieties tend to make PYTA converge paradigmatically, Italo-Romance also does so syntagmatically.

4. ROMANCE PALATALIZATION AND ITS MORPHOMIC CONSEQUENCES

4.1. Yod and palatalization

In its early history Romance underwent three phonological changes which yielded unprecedented patterns of allomorphy in verb roots:

i. Unstressed front vowels became yod before vowels. This environment was met, in Latin non-first conjugation verbs, wherever a 'thematic' front vowel E or I followed the root and preceded a vocalic inflection, namely in *1sg. present indicative, and throughout the present subjunctive* (a distribution I label[10] 'L-pattern'); in 3rd and 4th conjugation verbs, yod also appeared in the *3pl. indicative* ('U'-pattern). Most varieties subsequently replaced the U-pattern with the L-pattern, although most Italo-Romance dialects generalized the U-pattern in place of the L-pattern, and Romanian retains both.

ii. By the second century yod palatalized and/or affricated immediately preceding consonants (henceforth 'YE' = 'yod effect'). The subsequent history of the resulting consonants is complex (cf. Lausberg 1976: §§ 451–78). Suffice it to say that yod modifies preceding consonants (by palatalization, affrication, sometimes lengthening), and the result is major alternation of root-final consonants.

iii. By the fifth century, most Romance varieties underwent palatalization and/or affrication of velar consonants immediately preceding front vowels (henceforth 'PAV'). Phonological outcomes are again complex and locally divergent.

In most cases the distribution of front vowels happened to be in exact complementary paradigmatic distribution to that of yod. This means that YE and PAV produce phonologically disparate but paradigmatically identical L/U-pattern alternation. Consider the paradigmatic effects of YE, illustrated from Portuguese and Old Italian present indicatives and subjunctives:

(5) Portuguese (*nh* = [ɲ], *j* = [ʒ], *ç* = [s])

Indicative	*tens*	*tem*	*temos*	*tendes*	*têm*
tenho 'I have'					
Subjunctive					
tenha	*tenha*	*tenha*	*tenhamos*	*tenhais*	*tenham*

Likewise: *vejo* ves vê vemos vedes vêem; *veja vejas veja vejamos vejais vejam* 'see'; *meço* medes mede medimos medis medem*; meça meças meça meçamos meçais meçam* 'measure', etc.

Old Italian (*gli* = [ʎʎ], *gn* = [ɲɲ], *ggi* = [dʤ], *cci* = [tʧ])

vaglio 'I'm worth'	*vali*	*vale*	*valemo*	*valete*	*vagliono*
vaglia	*vaglia*	*vaglia*	*vagliamo*	*vagliate*	*vagliano*

Likewise *rimagno* rimani rimane rimanemo rimanete *rimagnono; rimagna rimagna rimagna rimagnamo rimagnate rimagnano* 'stay'; *veggio* vedi vede vedemo vedete *veggiono; veggia veggia veggia veggiamo veggiate veggiano* 'see'; *piaccio* piaci piace piacemo piacete *piacciono*; *piaccia piaccia piaccia piacciamo piacciate piacciano* 'please'; *muoio* muori muore morimo morite *muoiono; muoia muoia muoia moiamo moiate muoiano* 'die', etc.

Some examples of the paradigmatic effects of PAV are shown in (6):

(6) Portuguese

digo 'I say'	*dizes*	*diz*	*dizemos*	*dizeis*	*dizem*
diga	*digas*	*diga*	*digamos*	*digais*	*digam*

Likewise, from Spanish: *digo* dices dice decimos decís dicen; *diga digas diga digamos digáis digan* 'say'; *crezco* creces crece crecemos crecéis crecen; *crezca crezcas crezca crezcamos crezcáis crezcan* 'grow'; etc.

Modern Italian (before *i* and *e*, *c* = [ʧ], *g* = ʤ], *gl* = [ʎʎ], *sc* = [ʃʃ])

dico 'I say'	*dici*	*dice*	*diciamo*	(*dite*)	*dicono*
dica	*dica*	*dica*	*diciamo*[11]	*diciate*	*dicano*

Likewise: *leggo* leggi legge leggiamo leggete *leggono*; *legga legga legga* [leggiamo leggiate] *leggano* 'read'; *cresco* cresci cresce cresciamo crescete *crescono*; *cresca cresca cresca* [cresciamo cresciate] *crescano* 'grow'; *colgo*

cogli coglie cogliamo cogliete *colgono*; *colga colga colga* [cogliamo cogliate] *colgano* 'pluck', etc.

From early date, none of these Romance alternations has been predictable on purely phonological grounds. In YE, the conditioning yod has largely disappeared. And throughout Romance non-palatalized velars can occur before front vowels, while the consonants created by PAV can occur (for independent reasons) before non-front vowels.[12] Although YE and PAV yield similar paradigmatic patterns, the phonological content of the resultant alternants is extremely heterogeneous (cf. Italian [g], [k], [j], [ʎʎ], [ɲɲ], [lg], [ŋg], [dʤ], [tʧ]). The paradigmatic distribution is also *functionally* heterogeneous.[13] 'Subjunctive' hardly forms a natural class with 'first person + singular' (in the L-pattern) or with '[+ first person, + singular] + [+ third person, + plural]' (in the U-pattern), and in any case the distinctive root does not characterize 'subjunctive', but only *present* subjunctive.

4.2. Analogical spread of the L/U-pattern

Despite its phonological and functional idiosyncrasy, the L/U-pattern shows remarkable diachronic resilience and robustness. It is strongly 'coherent' and there are very few examples of 'mixed systems', such that the alternants survive in some of the designated cells of the paradigm but not others (cf. Maiden 1992; 2001b). By and large L/U-alternations not only survive but play a major role in driving morphological change, often being analogically extended to verbs with previously *invariant* roots.

In early French (Fouché 1967: 93f.; 113) a partial resemblance between *poeir* 'be able' (1sg. ind. *puis* 1pl. ind. *poons*, subj. *puisse*) and *ro(v)er* 'ask' (e.g., 1pl. *roons*) yielded an unprecedented and nearly suppletive L-pattern alternation in *ro(v)er*, *trover* 'find' and *prover* 'prove', e.g. (7):

(7)

truis	*trueves*	*trueve*	*trovons*	*trovez*	*truevent*
truisse	*truisses*	*truisse*	*truissiens*	*truissiez*	*truissent*

In Portuguese nearly all non-first conjugation verbs having a mid vowel in the root show L-pattern alternation between on the one hand a high mid vowel (in 2nd conjugation) or a high, non-mid vowel (in 3rd conjugation) in the 1sg. present indicative and present subjunctive vs., on the other, a low mid vowel elsewhere, even where a high mid vowel would be etymologically expected, as in *b*[ɛ]*be* 'drinks' or *t*[ɔ]sse 'coughs' for expected ***b*[e]*be*, ***t*[o]*sse*). It is not wholly impossible that these forms have a phonological explanation (see further Maiden 1991), but there is undoubtedly analogical creation of L-pattern alternation in one verb with originally invariant root in [i] (*frigir* 'fry'), and in several originally with invariant [u] (8):

(8)

frijo	*fr*[ɛ]*ges*	*fr*[ɛ]*ge*	*frigimos*	*frigis*[14]	*fr*[ɛ]*gem*
frija	*frijas*	*frija*	*frijamos*	*frijais*	*frijam*

Likewise: *fujo* f[ɔ]ges f[ɔ]ge fugimos fugis f[ɔ]gem; *fuja fujas fuja fujamos fujais fujam* 'flee'.

4.3. The L/U-pattern as attractor/redistributor of allomorphy

The L/U pattern also provides a 'template' to which other verbal allomorphs, originally with a different distributions, come to conform. POSSE 'be able' was one of the few Latin verbs with root allomorphy (POSS- vs. POT-) correlated with person, number and tense. Thus the present (9):

(9)

ind.	POSSUM	POTES	POTEST	POSSUMUS	POTESTIS	POSSUNT
subj.	POSSIM	POSSIS	POSSIT	POSSIMUS	POSSITIS	POSSINT

Of Romance varieties that retain reflexes of these alternants, none directly preserves the original distribution. The allomorph is always redeployed replicating the locally prevalent L- or U- pattern; for example (10):

(10) Old Tuscan (and other central Italian varieties)

posso	*puoi*	*può*	*potemo*	*potete*	*possono*
possa	*possa*	*possa*	*possiamo*	*possiate*	*possano*

Portuguese

posso	*podes*	*pode*	*podemos*	*podeis*	*podem*
possa	*possas*	*possa*	*possamos*	*possais*	*possam*

In Old French *aler* 'go' (see below for general suppletive allomorphy in this verb) there emerged in some varieties a 1sg. present indicative *voi(s)*. Although this specific allomorph with *-i-* has no historical *raison d'être* in the present subjunctive (cf. Fouché 1967: 425–27), the present subjunctive was reformed as *voise voises*, etc., thereby creating L-pattern identity between 1sg. and present subjunctive.

Old Romanian forms of the verb *ucide* 'kill', with root-final [d], acquired novel 1sg. *ucig* (vs. 3pl. etc. *ucid*) and pres. subj. *ucigă (*vs. ind. *ucide*) (cf. Maiden 1996; Wilkinson 1981: 80f.; 1982: 115), in L-pattern distribution. The [g] – [d] alternation is unprecedented, and the [g] is probably an effect of a proportional analogy of the type

Pres. 1sg. *ating* 'I touch' 3sg. *atinge* etc. : preterite 1sg. *atinsei* 3sg. *atinse* etc.
Pres. 1sg.? : 3sg.? = preterite 1sg. *ucisei* : 3sg. *ucise* etc.

The remarkable point is that this analogy affects *only* the L-pattern 'cells' of the present, leaving etymological *d* in place elsewhere in the paradigm (in other words, the predicted 3sg. ***ucige* etc. fails to occur).[15]

Old Portuguese generally lost L-pattern allomorphy, so *paresco pareces …* ; *paresca* 'seem' and *jaço jazes …* 'lie'.; *jaça* > *pareço pareces …* ; *pareça* and *jazo jazes …* ; *jaza*. But L-shaped allomorphy was also sometimes reinforced: alongside *jaço jaça*, also *jasco jasca*, although this *-sc* vs. *-z* alternation (*jasco jazes* etc.) was unprecedented. There has apparently been convergence of the 1sg. pres. and subj. root-final consonant with that of verbs such as *parescer*, *nascer (paresco, nasco* etc.). The modern verb *perder* 'lose': *perco perdes* etc.; *perca* etc. coexisted with *perço perdes* etc.; *perça* etc. and *pergo perdes* etc.; *perga* etc. in the medieval language, but apparently underwent the influence of old verbs such as *conhosco conhoces* etc., 'know'; *fingo finges* etc.; *finga*, etc., 'feign', but only in the L-pattern forms.

Systematic creation of novel L/U-pattern allomorphy (cf. Menéndez Pidal 1941: 294; Maiden 1992), occurs both in Ibero- and Italo-Romance. What is involved, in each case, is 'convergence', such that an originally disparate set of consonantal alternants are replaced by a common velar form. From the earliest records of Spanish, expected *[ɲ] and *[ʎ] from *[nj] and *[lj] are replaced by [ŋg], [lg] (11):

(11) Old Spanish

valgo 'I'm worth'	*vales*	*vale*	*valemos*	*valéis*	*valen*
valga	*valgas*	*valga*	*valgamos*	*valgáis*	*valgan*

Likewise: *vengo* vienes viene venimos venís vienen; *venga vengas venga vengamos vengáis vengan* 'come'; *salgo* sales sale salimos salís salen; *salga salgas salga salgamos salgáis salgan* 'go out'; *fago* faces face facemos facéis facen; *faga fagas faga fagamos fagáis fagan* 'do'.

Originally *[gj] or *[dj] yielded [j], which was then deleted after a front vowel (e.g., *'vedjo > *veo*). From *'audjo, *'audes … :

(12)

oyo 'I hear'	*o(d)es*	*o(d)e*	*o(d)imos*	*o(d)ís*	*o(d)en*
oya	*oya*	*oyas*	*oyamos*	*oyáis*	*oyan*

The yod was analogically introduced into other verbs with root-final vowels, e.g.:

(13)

trayo 'I bring'	*traes*	*trae*	*traemos*	*traéis*	*traen*
traya	*trayas*	*traya*	*trayamos*	*trayáis*	*trayan*

A model for the innovatory [ɡ]-alternant is verbs like *decir (digo, dices; digas)*, etc., where the velar occurs in 1sg. ind. and subj. pres. Menéndez Pidal (1941: 293f.) suggests that [ŋg] – [n] alternations originate in verbs like *plañer* 'cry' (14), where [ŋg] is etymological:

(14)

plango 'I weep'	*plañes*	*plañe*	*plañemos*	*plañedes*	*plañen*
planga	*planga*	*planga*	*plangamos*	*plangades*	*plangan*

There was early optional levelling in favour of the palatalized *-ñ-* alternant, so that *plango, planga* etc. coexisted with *plaño, plaña*, etc. Such equivalence of *ñ* with *ng* apparently favoured substitution of **veño -a* with *vengo -a*, giving rise to an entirely novel /ɲ/ – /n/ alternation. The velar apparently then spread to other sonorant-final roots, e.g., *duelgo – dueles … ; duelga* 'hurt' (and also in OSpanish *fiergo – fieres … ; fierga* 'strike'). In fact almost *all* Spanish L-pattern verbs, have ended up with root-final [ɡ] in pres. 1sg. and subj. (see Penny 2002: 179). By the 16C, root-final [ɡ] had been introduced into 1sg. pres. ind., and pres. subj. of most verbs with root-final yod. Thus, from earlier *oyo -a, trayo - a* (15):

(15)

oigo	*oyes*	*oye*	*oímos*	*oís*	*oyen*
oiga	*oigas*	*oiga*	*oigamos*	*oigáis*	*oigan*

There are parallels in Italy. The velar frequently replaces historically regular alternants (16), yielding new alternant pairs such as [ŋg] – [n], [lg] – [l] and [gg] – [d]:

(16) Old Tuscan

vegno 'I come'	*vieni*	*viene*	*venimo*	*venite*	*vegnono*
vegna	*vegni*	*vegna*	*vegnamo*	*vegnate*	*vegnano*

Likewise: *veggio* vedi vede vedemo vedete *veggiono; veggia veggi veggia veggiamo veggiate veggiano* 'see'; *vaglio* vali vale valemo valete *vagliono; vaglia vagli vaglia vagliamo vagliate vagliano* 'be worth'.

(17) (Early) modern Italian

vengo	*vieni*	*viene*	*veniamo*	*venite*	*vengono*
venga	*venga*	*venga*	*veniamo*	*veniate*	*vengano*

Likewise: *veggo* vedi vede vediamo vedete *veggono; vegga vegga vegga vediamo vediate veggano; valgo* vali vale valiamo valete *valgono; valga valga valga valiamo valiate valgano*, etc.

The [dʤ] – [d] pattern, and the [gg] – [d], both were sometimes extended into verbs with hitherto invariant root-final [d]: *chiuggio/chiuggo – chiudi …; chiugga …* 'close'; *chieggio/chieggo - chiedi*, etc.; *chieggia/chiegga*, etc., 'ask'.

According to Tekavčiç (1980: 273–79), substitution of [gg], [ŋg], [lg], for [dʤ], [ɲɲ], [ʎʎ], pivots on an earlier levelling, such that palatalized roots in -dʤ, -ɲɲ, -ʎʎ optionally extend into the 1sg. and present subjunctive (e.g., 1sg. *leggio* or *leggo* 'I read', *coglio* or *colgo* 'I gather', *pugno* or *pungo* 'I prick' – based on 3sg. *legge, coglie, pugne* etc.). The etymologically 'correct' forms with final velars ultimately prevailed, but the velar was then extended, 'hypercorrectly', to *vengo* for *vegno* 'I come', *salgo* for *saglio* 'I go up', etc.

5. ROMANCE STRESS-RELATED VOCALIC ALTERNATIONS AND ITS MORPHOMIC CONSEQUENCES

5.1. The vocalic effects of stress

Early Romance underwent differentiation of vowel quality correlated with stress. Since in Latin (for reasons internal to the prosodic system) stress fell on the root of the verb in 1st, 2nd, 3rd pers. singular, and the 3rd pers. plural of the present tense, and usually in no other part of the paradigm, vowel differentiation acquired the same paradigmatic distribution in the verb (hereafter, 'N-pattern' distribution). Vowel differentiation originally affected (low) mid vowels; but it has been a recurrent feature of some Romance varieties, affecting a wide range of vowels with a wide range of phonological outcomes. I illustrate this below with examples from modern Romance languages (18). The stress-placement rules soon lost their original phonological conditioning, as did most of the rules differentiating vowel quality.

(18) Romanian

Pres. indic.

mor 'I die'	*mori*	*moare*	*murim*	*muriţi*	*mor*
vin 'I come'	*vii*	*vine*	*venim*	*veniţi*	*vin*
plac 'I please'	*placi*	*place*	*plăcem*	*plăceţi*	*plac*
mănânc 'I eat'	*mănânci*	*mănâncă*	*mâncăm*	*mâncaţi*	*mănâncă*
usuc 'I dry'	*usuci*	*usucă*	*uscăm*	*uscaţi*	*usucă*
iau 'I take'	*iei*	*ia*	*luăm*	*luaţi*	*iau*

Imperf. indic. *muream, veneam, plăceam, mâncam, uscam, luam*

Italian
Pres. ind.

muoio 'I die'	*muori*	*muore*	*moriamo*	*morite*	*muoiono*
siedo 'I sit'	*siedi*	*siede*	*sediamo*	*sedete*	*siedono*
odo 'I hear'	*odi*	*ode*	*udiamo*	*udite*	*odono*
devo 'I must'	*devi*	*deve*	*dobbiamo*	*dovete*	*devono*

Impf. ind. *morivo, sedevo, udivo, dovevo*

Medieval French (cf. Fouché 1967: 8–61):
Pres. ind.

lef 'I wash'	*leves*	*leve*	*lavons*	*lavez*	*levent*
crief 'I burst'	*crieves*	*crieve*	*crevons*	*crevez*	*crievent*
truef 'I find'	*trueves*	*trueve*	*trovons*	*trovez*	*truevent*
peis 'I weigh'	*peises*	*peise*	*pesons*	*pesez*	*peisent*
mein 'I lead'	*meines*	*meine*	*menons*	*menez*	*meinent*
parol 'I speak'	*paroles*	*parole*	*parlons*	*parlez*	*parolent*
manju 'I eat'	*manjues*	*manjue*	*manjons*	*mangiez*	*manjuent*

Impf. *levoie, crevoie, pesoie, menoie, parloie, manjoie*

Portuguese
Pres. ind.

j[ɔ]*go* 'I play'	*j*[ɔ]*gas*	*j*[ɔ]*ga*	*j*[u]*gamos*	*j*[u]*gais*	*j*[ɔ]*gam*
ap[ɛ]*go* 'I stick'	*ap*[ɛ]*gas*	*ap*[ɛ]*ga*	*ap*[ɔ]*gamos*	*ap*[ɔ]*gais*	*ap*[ɛ]*gam*
f[a]*ło* 'I speak'	*f*[a]*łas*	*f*[a]*ła*	*f*[ɑ]*łamos*	*f*[ɑ]*łais*	*f*[a]*łam*

Impf. ind. *j*[u]*gava, ap*[ɔ]*gava, f*[ɑ]*łava*

5.2. Analogical changes that replicate the N-pattern

Romance languages have acquired a remarkable range of novel N-pattern alternations which are not the result of any sound change.[16] Here are just some:

Almost all Romance varieties suppletively conflate two, sometimes three, etymologically different lexemes for 'go', deriving from ire, uadere, ambulare (and also a form probably derived from *ambitare). Repeatedly, such conflation takes on an N-shaped distribution (Aski 1995 gives more detailed treatment). Commonly i: - roots survive outside the present, and in 1pl. and 2pl. present indicative:

(19) Old Tuscan

vado	*vai*	*va*	*gimo* Inf. *gire*	*gite*	*vanno*

This pattern remains widespread throughout central and southern Italy, and recurs in Iberia (although modern Spanish has extended *v-* throughout the present).

In northern Italy, Catalan, Gallo-Romance and western Romansch varieties, verbs derived from AMBULARE (>Fr. *aller*) or *AMBITARE (>It. *andare*) supplant earlier i- forms. In *both* substitutions, the N-distribution remains undisturbed:

(20)

French	*vais*	*vas*	*va*	*allons* Inf. *aller*	*allez*	*vont*
Catalan	*vaig*	*vas*	*va*	*anem* Inf. *anar*	*aneu*	*van*
Italian	*vado*	*vai*	*va*	*andiamo* Inf. *andare*	*andate*	*vanno*

Portuguese shows generalization of regular N-pattern vowel alternations into verbs historically containing high mid vowels, for which no stress-related alternation would be expected. Almost all Portuguese verbs display lowering of [e] and [o] in stressed syllables. From original *'bevo etc. 'drink', *'ploro etc. 'weep':

(21)

(b[e]bo)[17]	*b[ɛ]bes*	*b[ɛ]be*	*bebemos*	*bebeis*	*b[ɛ]bem*
ch[ɔ]ro	*ch[ɔ]ras*	*ch[ɔ]ra*	*choramos*	*chorais*	*ch[ɔ]ram*

Maiden (1991: 290f.) argues that a sporadic tendency, observable also outside the verb paradigm, for high mid vowels to be lowered finds systematic and regular expression in the verb. The result is a major extension of the N-pattern of alternation between open and close mid vowels, and the disruption of previously invariant verb-roots. Romanian, too, sometimes generalizes a regular N-pattern alternation (e.g., *port* 'I wear' vs. 1pl. *purtăm*), into normally invariant verbs where [u] was originally present throughout the paradigm (e.g., *măsor* 'I measure' *măsurăm*).

The N-pattern also impinges on the (consonantal) L/U-pattern root of the present subjunctive. In French *vouloir* 'want', *valoir* 'be worth', *aller* 'go', *tenir* 'hold' and *venir* 'come' there has been introduction of the N-pattern by eliminating the characteristic present subjunctive root from 1pl. and 2pl. (see Fouché 1967: 88; 173f.; 426f.; also Aski 1995: 421). Similar developments are widely observable in Rhaeto- and Italo-Romance.

Some Surselvan dialects of Romansch have integrated a preterite root (characterized throughout by root-final [t] – see Decurtins 1958: 197; 200f.) into the pres. subjunctive of dar 'give' and ʃtar 'stand', following the N-pattern. Thus the dialect of Sagogn:

(22) ʃtɛti ʃtɛties ʃtɛti 'ʃtæjan 'ʃtæjas ʃtɛtien

There has been a similar development in Sardinia at Escalaplano and in some localities on the Italian mainland (Schmid 1949: 33; 35).

Romansch varieties developed two alternants in the verb 'sit', se- (<*sɛd-) vs. sez-saz- (<*sɛdj-), the latter originating in the 1sg. pres. ind. and in the subjunctive (following the L-pattern). There has been analogical generalization of this alternant in the pres. indic., but in such a way that only 1pl. and 2pl. are affected. Thus Surselvan:

(23) Pres. ind.

'seza	ses	se	sa'zein	sa'zeis	sen

Pres. subj.

'sezi	'sezias	'sezi	sa'zejan	sa'zejas	'sezian

Catalan dialects have generalized a morph containing [g] into the subjunctive of verbs in which no [g] was originally present. Wheeler (1993: 197f.) notes that the [g] element does not always affect all persons of the verb: in some dialects it appears in 1sg., 2sg., 3sg. and 3pl., and in others it appears only in 1pl. and 2pl.: either way, the result is an N-pattern. Similarly, many Italo-Romance varieties have introduced root-final [g] into the subjunctive of certain verbs. But this [g] is frequently restricted to the N-pattern.

Castilian has a historically regular alternation in the verb *jugar* 'play' between [we] in stressed syllables (*juégo, juégas*, etc.) and [u] in unstressed (*jugámos, jugáis*). In some dialects there has been levelling (cf. Chacón Berruga 1981: 260) in favour of one or the other alternant. I hypothesize that two coexistent variants of this verb, one having generalized [we] and the other having generalized [u], must underlie their subsequent integration into a single paradigm in Leonese dialects of the Maragatería area (Alonso Garrote 1947: 89), in a way that actually *reverses* the expected distribution of the alternants,

despite the fact that Maragatería dialects have many other verbs in which [we] regularly appears in *stressed* syllables:

(24)

júgo	*júgas*	*júga*	*juegámos*	*juegádes*	*júgan*
			Impf. ind.	*juegába*, etc.	

N-pattern distribution is also widely displayed by 'root-augments': these are 'empty' morphs appearing immediately after the root, and preceding the inflectional endings. The most widespread of these appears throughout Romance, and arises from protoforms *-isk- (or *-esk-) and characterizes fourth conjugation verbs (25). Some dialects with this augment (Lucanian (southern Italy), Corsican, northern Veneto, Ladinia, Istrian and Romanian), also display a second type, usually restricted to the first conjugation, and continuing protoforms of the type *-edj- (or *-edz-) (26):

(25) The *-isk-/*-esk- augment

Catalan	Gascon	Surselvan	Italian	Istrian	Romanian
aparéix	*orbéishi*	*finéschel*	*finísco*	fi'nisi	*iubesc*
'I appear'	'I open'	'I end'	'I end'	'I end'	'I love'
aparéixes	*orbéishes*	*finéschas*	*finísci*	fi'nisi	*iubeşti*
aparéix	*orbéish*	*finéscha*	*finísce*	fi'niso	*iubeşte*
aparím	*orbím*	*finín*	*finiámo*	fi'nimo	*iubim*
aparíu	*orbítz*	*finís*	*finíte*	fi'ni	*iubiţi*
aparéixen	*orbéishen*	*finéschan*	*finíscono*	fi'niso	*iubesc*
Imperfect indicative 1sg. (and other tenses)					
aparía	*orbívi*	*finével*	*finìvo*	fi'nivi	*iubeam*

(26) The *-edj-/*-edz- augment

Tursi (Lucania)	Istrian	Romanian
mattsəˈkiːj 'I chew'	mazeˈneji 'I grind'	*lucréz* 'I work'
mattsəˈkiːjəsə	mazeˈneji	*lucrézi*
mattsəˈkiːjətə	mazeˈneja	*lucreáză*
mattsəˈkæːmə	mazeˈnemo	*lucrăm*
mattsəˈkæːsə	mazeˈne	*lucráţi*
mattsəˈkiːjənə	mazeˈneja	*lucreáză*
Impf. ind.		
mattsəˈkæβə	mazeˈnavi	*lucrám*

There is an extensive literature[18] on the *-isk-/*-esk- augment. Briefly, some Latin verbs had a morph -sc-, following the thematic vowel, which generally

indicated 'ingressive' aspect. In most Romance varieties, the augment becomes characteristic of the 4th conjugation, although the form of the augment is either -esk- or -isk-, according to language, with an original second or fourth conjugation thematic vowel, as a consequence of certain structural mergers between the 2nd and 4th conjugation.

The augment has N-pattern distribution in Catalan, Gascon, Romansch, Italo-Romance and Balkan Romance, and is assumed[19] to have become semantically 'empty' at an early date. And at an early date its paradigmatic distribution must have become unintelligibly erratic. For reasons of semantic incompatibility, the ingressive augment was excluded from the perfective forms of the verb, and from the past participle. The virtual collapse of inflectional aspectual distinctions in Romance, and the increasing use of past participles in analytic constructions of the type 'auxiliary verb + past participle', must have meant that in early Romance the inherited paradigmatic distribution of the augment must have lost any obvious *raison d'être.* The N-pattern seems to have presented itself as a template for the integration of otherwise erratic allomorphy between augmented and unaugmented roots.

The *-edj-/*-edz- augment originates (cf. Lausberg 1976: § 801; Rohlfs 1968: 244f.) in the Greek verbal derivational affix -iz-, and entered Late Latin especially via Christian vocabulary (e.g., *baptizein* 'I baptize'). In most Romance varieties, reflexes of this element, especially prominent in forming denominal verbs and neologisms, occur throughout the paradigm. It is striking that wherever this augment has been redistributed according to the N-pattern, there has also been N-pattern remodelling of the *-isk-/-esk-* augment, so that it appears likely that the paradigmatic redistribution of the latter has served as the basis for the former.

The unique pair of alternants encountered in Tuscan *uscire* 'go out' follows the N-pattern. Maiden (1995) demonstrates that this alternation arises from suppletive conflation of Old Italian *escire* with the noun *uscio* 'doorway' (27):

(27) | *ésco ésci ésce* | *usciámo* *uscíte* | *éscono* |
Inf. *uscíre*

In Dalmatian (cf. Bartoli 1906: 203), the verb 'eat' has root manʧ- alternating with 1sg and 3sg. pres. maˈnai̯k- (2sg. and 3pl. are unattested. Their common etymon is *maniˈkare, but while manʧ- is almost certainly an Italo-Romance loan, maˈnai̯k- is an indigenous phonological development. So an 'etymological doublet' has merged into a suppletive paradigm, following the N-pattern.

Many northern Italian dialects show influence of the root-final [l] of *voˈlere 'want' on that of poˈtere 'be able': but this analogy usually does not operate on the 1pl. and 2pl. present, nor on other tenses. A typical example is Roncone (AIS point 340):

(28)

pos	*pœl*	*pœl*	*po'dom*	*po'de*	*pœl*
vœj	*vœl*	*vœl*	*vo'lom*	*vo'le*	*vœl*

The continuants of Latin STARE 'stand' and DARE 'give' have a (C)CV-shaped root. For example, old Tuscan:

(29)

do	*dai*	*dà*	*damo*	*date*	*danno*
sto	*stai*	*sta*	*stamo*	*state*	*stanno*

These verbs appear to have favoured analogical remodelling of certain other very frequent verbs. What is striking is that unlike 'stand' and 'give', the remodelled verbs acquire the CV structure only in the singular and third person plural of the present. The verb 'have' (<HABERE) loses the root-final labial across Romance in just those cases (30). In some places reflexes of SAPERE 'know' and FACERE 'do' are similarly affected (31).

(30)

Portuguese	*hei*	*has*	*ha*	*habemos*	*habeis*	*hão*
				Inf. *haver*		
French	*ai*	*as*	*a*	*avons*	*avez*	*ont*
				Inf. *avoir*		
Romanian	*am*	*ai*	*a(re)*	*avem*	*aveţi*	*au*
				Inf. *avea*		

(31) Old Tuscan

so	*sai*	*sa*	*sapemo*	*sapete*	*sanno*
			Inf. *sapere*		

Various dialects of Sicily (cf. Schmid 1949: 118f.) merge reflexes of *do'nare (>Sicilian ru'nari) with *'dare 'give' (>'rari) according to the N-pattern. Leone (1980: 36–39.; 91f.) documents an N-pattern integration of *af'flare (>[a]ʃ'ʃare) with *tro'vare (>tru'vari), both meaning 'find':

(32)

'ruŋŋu	'runi	'runa	'ramu	'rati	'rununu
			Impf. ind. 'rava		
'trwovu	'trwovi	'trova	'ʃamu	'ʃati	'trovunu
			Impf. ind. 'ʃava		

Schmid (1949: 120–24) finds evidence for a similarly suppletive distribution of the first two verbs in Old Occitan, and some varieties of Catalan.

5.3. The nature of the N-pattern

My belief is that the abstract paradigmatic pattern created by stress-related vowel differentiation, possibly abetted by development peculiar to the verb 'go', is the prime cause of the proliferation of N-pattern verbs. It is a matter of pure morphology, synchronically independent of phonological, semantic, or functional factors. But we need to eliminate first some other possible lines[21] of explanation.

Is the N-pattern motivated by 'markedness'?

'Present tense' is 'unmarked' with respect to other tenses, singular with respect to plural, and third person with respect to other persons, so the N-pattern 'diagrams' markedness relationships, given that singular, third person and present tense forms are 'unmarked' in relation to the rest of the paradigm.

Three parameters of markedness are involved, and the pattern is irreducibly arbitrary because of the way in which they intersect. If plural is 'marked' with respect to singular, why should the diagrammaticity of that relationship be disrupted by the fact that the 3rd person plural present usually shares a root with all three persons of the singular? If third person is marked in respect to other persons, why should 1st, 2nd and 3rd person share an alternant in the singular but not in the plural? If present is unmarked against other tenses, why should the diagrammaticity of that relationship be disrupted by the fact that 1pl and 2pl. present share a root with other tenses?[22] And why are other possible parameters of markedness, such as mood, not involved?

Might the N-pattern be 'phonologically' conditioned?

Of the three main phenomena illustrated in this study, the N-pattern is the only one for which a phonological motivation is potentially available. Indeed, Carstairs(-McCarthy) (1988; 1990) cites certain N-pattern phenomena in Italian in a list, drawn from various languages, of examples of 'phonologically conditioned suppletion' – where the conditioning of the alternation is statable in phonological terms, even though the alternants themselves are suppletive (and irreducibly 'unnatural' from a phonological perspective). Since the N-pattern is exactly coterminous with root stress (one alternant occurs where the root is stressed and the endings unstressed, the other where the root is unstressed and the endings stressed), why not claim that N-pattern alternation is *triggered* by stress? Carstairs(-McCarthy) suggests, in fact, that the conditioning factor in the case of the Italian augments, and the v- allomorphs in the verb 'go', is an unstressed inflectional ending.

How is one to choose between stress-based phonological conditioning of the N-pattern, and the purely 'morphomic' account specifying '[present

[singular + third person]]'? On the one hand (and regardless of how one analyses his Italian examples), Carstairs convincingly establishes the existence of phonologically conditioned suppletion in the world's languages, on the other hand Romance languages clearly do have morphomic patterning in the verb, as I have established elsewhere in this study. One might take the view that where a phonological and a morphological analysis are available, the phonological one should always be assumed, unless the morphological one can be specifically defended. But such an assumption seems to me questionable in a case such as the N-pattern, where most of the alternants are irremediably 'unnatural' as products of stress (or of any other natural phonological process), so that the stress-based account seems just as synchronically *arbitrary* as the morphomic one. Criteria of formal economy do not help much either: one has a choice between specifying tense, person and number features for paradigmatic cells, or stress values for inflectional endings, but the latter analysis would be slightly complicated by the fact that it is not quite true that 'unstressed inflections' trigger the allomorphy: in an Italian form such as fini'rɛbbero 'they would finish' (not **finiʃʃi'rɛbbero), the unstressed inflection immediately adjacent to the root does not trigger the augment. Rather, one needs to formulate the rule in such a way that the presence of a stressed inflection to the right of the root 'overrides' unstressed inflections – a trivial enough modification no doubt, but one that complicates yet further the 'phonological' analysis and makes comparison between that and the morphomic account even more difficult in terms of formal economy.

Yet formal economy could be invoked in another way. If it could be shown that the N-pattern is independently required – because there is at least one phenomenon which directly makes reference to it – then invocation of a second factor, such as stressless inflections, to account for the remaining N-pattern phenomena becomes superfluous (cf. also Pirrelli 2000: 12f.). In fact, stress, rather then triggering N-patterns alternations seems to be a phenomenon which is itself sensitive to the N-pattern. For it is overwhelmingly the case in Romance languages that the class of '[present [singular + third person]]' inflections is always unstressed. The alternative, obviating the N-pattern specification, would be to specify each phonologically distinct present tense singular and third person inflection (indicative and subjunctive) as being unstressed, thereby losing a major generalization – and making it seem quite accidental that this pattern has survived intact throughout the history of all Romance languages.

There is in fact a body of comparative evidence in support of the view that the N-pattern is independent of stress. Italian had a number of third conjugation verbs with N-pattern vocalic alternation originally caused by stress, except that the infinitive, being itself root-stressed in this conjugation, *also* showed the alternant (e.g., *cuòcere* 'bake', *chièdere* 'ask', *muòvere* 'move'). It is precisely in these verbs, which slightly deviate from the N-pattern, that speakers have tended to 'level' the alternation by introducing the diphthongal alternant

through all or most of the paradigm (thereby distributing the alternant quite independently of stress), whereas *solère* 'be wont', *volère* 'want', *sedère* 'sit', *tenère* 'hold', *morìre* 'die' which generally conform to the N-pattern (with some interference from the U-pattern), show no such levelling. So both the abolition of the allomorphy and the retention of the allomorphy seem to be sensitive not to stress but to morphologically-defined N-pattern distribution.

There is also evidence of the N-pattern being dissociated from stress, where stress shifts onto the root, but the vocalic N-pattern persists. It is a characteristic of some Occitan varieties that the (unstressed) root of the preterite and imperfect subjunctive is analogically extended into the (N-pattern root-stressed) present subjunctive; but the originally unstressed vocalic alternant now appears in the stressed root. Thus the verb 'want' in the Pays de Seyne (Quint 1998: 55):

(33)	pres. ind.	'vwɔlu	'vwɔs	vwɔ	vu'lẽ	vu'lɛs	vwɔn
	pres. subj.	'vuge	'vuges	'vuge	vu'gen	vu'ges	'vugen
	impf. subj.	vu'gɛse					

Occitan also occasionally shifts stress from the ending onto the root in infinitives, but the original 'unstressed' vowel alternant still persists in the newly stressed root: accordingly in the Basses Pyrénées we have:

(34)	pres. ind.	pœets	pots	pot	pu'ðem	pu'ðets	'poðen
		'I can'		inf. 'puðe			

Infinitive 'bule, 'want', arises in the same way. Ronjat (1937: 245) gives Occitan examples in which the introduction of rhizotonic stress in the imperfect had not led to loss of the 'unstressed' vocalism of the root: e.g., inf. *voulhí* 'want', 1sg. pres. *vóle*, 1sg. imperf. *vóulio*. Furthermore, in some Romance languages which fuse UADERE and IRE in the verb 'go', the N-pattern is not correlated with stress, because the root is stressed throughout the present tense. Thus Old Spanish:[23]

(35) | *voy* | *vas* | *va* | *imos* | *ides* | *van* |

The fact that original N-pattern alternants can be redeployed to conform to the L/U -pattern also suggests that they have become dissociated from stress, but associated with arbitrary clusters of paradigm cells. A number of Romance varieties show 'hijacking' of N-pattern alternants, such that they are redistributed according to the purely morphomic L/U patterns. Thus in northern Spain (cf. Arnal Purroy 1998), we have for Laredo indic. 1sg. 'gwelo 'I smell', 2pl. o'lemos, but subj. 1sg. 'gwela 1pl. gwe'lamos), with the N-pattern alternant found in 1sg. pres. extended to all persons of the present subjunctive. At Sobrescobio (Arnal Purroy 1998: 355; 362), indicative 1pl. *dormín* 'we sleep' 2pl. *dormíz* but present subjunctive *duermán duermáz*, etc. What is, in effect,

the reverse distribution occurs in a number of western Ibero-Romance varieties where the first person singular pres. indicative, and the whole present subjunctive of the verb share an 'L-pattern' root in which, as a result of metaphonic raising caused by an original root-final yod. In some localities, this pattern impinges on the N-pattern, so that the diphthong appears only in 2sg., 3sg. and 3pl. indic. In some varieties of Tuscan (Rohlfs 1968: 243), and in various northern Italian varieties such as Piedmontese the augment appears in all persons of the present subjunctive, again independently of stress. In the verb 'go' in various Occitan varieties, the unstressed alternant an- appears throughout the pres. subjunctive (cf. Quint 1998: 61). An example of the reverse – (optional) redeployment of an L-pattern alternant into the N-pattern – appears in Galicia at Verín (Taboada 1979: 153). Such facts are not consistent with a view of the N-pattern as a different kind of phenomenon (a phonological one) from the indisputably morphomic L/U-pattern; rather they suggest that they are entities of the same kind.[24]

A type of evidence that would support the 'phonological' account over the morphological one would be provided by analogical extension of N-pattern alternants into other forms of the verb characterized by unstressed inflections outside the '[present [singular + third person]]' class (for example, some forms of the preterite (see above) and rhizotonic past participles of certain verbs). To the best of my knowledge, this never occurs, but in principle it provides a way of falsifying my 'morphological' position. There is however evidence of the opposite, with the N-pattern existing independently of stress. N-pattern forms often seem strikingly insouciant of associations with stress which they none the less have elsewhere in the grammar. Some Romance languages, such as Romanian, Occitan and Sicilian, have reduced atonic (clitic) forms of the verb 'have' when it is used as an auxiliary. However, this is not the form that appears in the unstressed root-forms of the *lexical* verb 'have'. In fact, it is the apparently 'stressed' alternant (characterized by lack of a final labial consonant) which appears in the auxiliary. Thus Romanian: *am/ai/áre/avém/ avéţi/au o carte* 'I/you, etc. have a book' vs. *am/ai/a/am/aţi/au citit o carte* 'I/you, etc., have read a book'. Similarly, in the paradigmatic integration of *esc-* and *usc-* in Italian, the inherently *stressed* root of the noun *uscio* assumes an *unstressed* distribution in the verb.

A problem with an account which invoked syntagmatic triggering of N-pattern alternants by unstressed inflections would arise when the inflections themselves are subject to N-pattern redistribution. This occurs in certain Romanian verbs such as *a sprijini* 'support', where '[present [singular + third person]]' belongs to the first conjugation (*sprijin sprijini* [imperative *sprijină*] *sprijină sprijină*), while all other parts of the verb have fourth conjugation inflections (e.g., 1pl. pres. *sprijinim* 2pl. pres. *sprijiniţi*; 1sg. imperfect *sprijineam*). One might still maintain that the relevant factor remains the distinction between stressed and unstressed affixes (although in this case the mechanism

would be paradigmatic and not syntagmatic), but the history of Romanian[25] verbs with the *esc-* augment suggests that even this version will not stand up. Recall that *-esc* is historically a third conjugation form and that in Latin, as to this day in Romanian, third conjugation verbs are root-stressed throughout the present: e.g., Latin CRÉDO 'I believe' CRÉDIS CRÉDIT CRÉDIMUS CRÉDITIS CRÉDUNT > Romanian *cred crézi créde crédem crédeţi cred*. This would lead us to expect that augmented verbs in Romanian should conjugate *iubésc* 'I love' *iubéşti iubéşte **iubéştem **iubéşteţi iubésc*. The fact that fourth conjugation endings actually intrude into 1pl. and 2pl. present (*iubím, iubíţi*), regardless of the fact that the historically regular inflections here should be *unstressed*, suggests that it is not stress, but the abstract morphomic pattern '[present [singular + third person]]', which modulates the conjugational fusion.

I conclude that there is no strong reason to analyse the N-pattern as conditioned by stress, and good evidence, both from economy of representation and from diachronic change, in favour of the morphomic analysis, with stress itself figuring as one of a number of factors which are sensitive to the morphomic pattern. Yet even if sound new evidence were found to tip the balance in favour of the 'phonological' account, it would be a mistake to regard a stress-triggered N-pattern as something fundamentally different from a purely morphomic account. The hallmark of morphomes is their *arbitrariness*, the impossibility of anchoring them in functional or phonological factors outside the inflectional paradigm. We have seen that the stress-based account is hardly less arbitrary than the morphomic one. They are in fact equally 'unnatural' from a phonological perspective, and equally embedded in idiosyncrasies of verbal morphology: the difference is that the morphomic version includes no phonological specification whereas the 'phonological' one happens to include just one, namely stress. I suggest that the growth and expansion of something as arbitrary as the N-pattern in Romance languages is equally remarkable, whether or not one includes a phonological feature in the specification of its distribution.

5.4. Is the N-pattern unique to Romance?

If the N-pattern recurred in non-Romance languages which have a similar system of person, number and tense distinctions in the verb, then my claim that the pattern is a morphologically abstract and idiosyncratic effect of an early Romance sound change would be undermined. So far as I have been able to ascertain, there is no parallel pattern in other Indo-European varieties (Albanian, Germanic, Slav, Greek, Indo-Aryan and, not least, Italic languages other than Romance). But the hypothesis could also be tested internally: if there were a Romance language in which stress-related vowel differentiation never happened, there should be no N-pattern verbs of any kind. Now in Logudorese dialects of Sardinian such differentiation was minimal, affecting

mid vowels only, and in a way which was distributionally allophonic (mid vowels were open in stressed syllables and closed in unstressed).[26] Precisely and uniquely in Logudorese there are *no* N-pattern verbs: the augments occur throughout the paradigm and even the verbs 'go' and 'have', common loci of allomorphy elsewhere, show no sign of N-patterning (cf. Wagner 1939: 156–60). It is striking, however, that in the Campidanese varieties of southern Sardinia, where stress-related mid vowel differentiation is not exclusively predictable on phonological grounds (because the unstressed forms undergo merger with independent high vowel phonemes /i/ and /u/), we *do* encounter N-pattern allomorphy in 'go' (e.g., Villacidro (*AIS* 973): 'bandu 'bandas 'bandaða an'daus an'dais 'bandanta.)[27]

6. INVARIANCE: A FOURTH PARADIGMATIC MORPHEME?

The three abstract paradigmatic structures discussed in sections 3 to 5 are idiosyncratically distinctive of Romance languages. Yet the Romance languages display other morphological changes which appear, at first sight, to be 'common or garden' analogical levellings of allomorphy, ostensibly extramorphologically motivated by iconic matching of form and lexical meaning. Each of the alternations discussed above, in fact, has occurred alongside changes tending to eliminate allomorphy and confer an invariant shape on verb roots. In all Romance languages the PYTA root has been subject to sporadic elimination in favour of a common, non-PYTA root (3.3). L/U-pattern morphomes have developed alongside levellings of original YE and PAV alternations. In some cases they seem to presuppose such levelling (4.4), so that for example modern Italian *tengo tieni tiene …* for earlier *tegno tieni tiene* is held to have emerged from the coexistence of verbs like *spengo* 'I extinguish' *spegni spegne …* with levelled variants like *spegno spegni spegne …* Many Italian dialects eliminate YE and PAV allomorphy, even at the same time as, in other verbs, they show 'convergence' of the alternants.[28] As for N-pattern allomorphy, all Romance languages – even those which also demonstrate convergence and attraction in N-pattern verbs – show sporadic cases of elimination of the original allomorphy in favour an invariant root (e.g., Italian *suona* 'it sounds' – *sonava* > *suona* – *suonava*; *miete* 'he reaps' – *meteva* > *miete* – *mieteva*). Castilian almost appears 'unable to make up its mind': there is both elimination of alternation and equally analogical extension of alternation into previously invariant roots (cf. Penny 2002: 183f.). The rather peculiar dialectal creation of N-pattern allomorphy in *jugar* in some Castilian dialects seems inexplicable without assuming prior levellings in favour of *both* alternants.

The conventional explanation of such levelling appeals to matching of form with extramorphological, lexical, meaning. But could we exclude an autonomously morphological, 'morphomic', alternative, namely that there is a 'fourth

morphome' which happens to specify *every* cell of the paradigm as its distribution? The implication would be profound, for it would open up the possibility that in general, across the world's languages, analogical levelling of allomorphy could have an autonomously morphological dimension, being a specification about the shape of paradigms, rather than a direct signalling of lexical meaning. Now such a 'morphomic' account of the Romance levellings is not obviously wrong, it is simply impossible to demonstrate, given the availability of the alternative, 'lexical', account. However, the Romance languages provide some evidence that perhaps analogical levelling of root allomorphy really could have an intramorphological motivation.

Maiden (1991) demonstrates that in French and northern and central Italo-Romance varieties all root vocalic allomorphy is systematically eliminated (either optionally or obligatorily), only in first conjugation verbs. The Italian examples of first conjugation *suona – suonava* and third conjugation *miete – mieteva* given above are not really representative, for while *some* non-first conjugation verbs show levelling, *all* first conjugation verbs have evicted allomorphy (although a few *optionally* retain it). Italian first conjugation levelling is also distinctive by virtue of being bi-directional (unstressed as well as stressed vocalic allomorphs may be generalized), and even shows signs of primitive resistance to stress-related vowel differentiation. In Galician a morphological analogy creating vocalic allomorphy in the root is blocked, just in the first conjugation. Ibero-Romance, Catalan, Occitan and Italo-Romance show resistance to an otherwise regular rule of palatalization before front vowels, which would cause allomorphy in root-final consonants, precisely before first conjugation inflectional endings containing front vowels, but nowhere else. I argued that one reason for this distinctive behaviour by first conjugation verbs was that it so happened that these verbs were originally inherited from Latin with very little root allomorphy, and did not undergo (for regular phonetic reasons) the effects of allomorphy produced by yod. In other words, root invariance was interpreted as an abstract characteristic of an abstract morphological entity, conjugational class.

My interpretation of the Romance first conjugation data suggests the possibility that even root-levelling – resulting in a one-to-one matching of form and lexical meaning – can have an intramorphological motivation as an abstract 'morphomic' characteristic of the verb paradigm. In this light, the possibility that root-levelling in general could be seen as a 'morphomic' phenomenon is, if not conclusively demonstrated, at least worthy of serious consideration.

7. THE SYNTAGMATIC DIMENSION

In sections 3–5 we saw evidence from three separate phenomena in the history of Romance verbs for paradigmatic autonomous morphological structure as

major driving forces in morphological change and therefore, *a fortiori*, as psychologically real. They are unquestionably idiosyncratic and unique features of Romance languages, but it is not the case that autonomous morphological structure is necessarily language specific, a fact which can be revealed by looking at a type of structure observable across probably all languages – 'agglutinative', syntagmatic, concatenations of morphemes. In simple terms, it emerges that among the signata of such formatives is the purely morphological fact of being a constituent morph. The basis of this claim is exactly the type of 'coherence' and 'convergence' which also revealed the importance of morphomic structure in inflectional paradigms.

The Romance verb 'augments' (illustrated, and discussed from a paradigmatic perspective, in 5.2) are elements intercalated in some verbs between the lexical root and inflectional ending. They are classic 'empty morphs', described as 'meaningless, functionless residues', 'semantically empty, functionless morphemes', 'singularly meaningless' by Rudes (1980). Indeed there are pairs, of effectively identical meaning, where the presence or absence of an augment comports no semantic difference, e.g., Romanian fourth conjugation 3sg. *pute* 'it stinks' (without augment) vs *duhneşte* (with augment) 'id.'.

These 'empty' elements are diachronically coherent in that they react as autonomous units to morphological and phonological phenomena. Romanian non-first conjugation 2sg. imperatives end in *-e*, or *-i*. Originally, it seems that *-e* was the 2nd and 3rd conjugation ending, while *-i* characterized the 4th. However, the tendency has been for *-e* to be used with transitive verbs, and *-i* with intransitives: e.g., *scoate* 'remove!', *simte* 'feel!' vs. *dormi* 'sleep!', *râzi* 'laugh!'. Some transitive verbs take *-e* only before an enclitic pronoun, and a few are lexically specified as taking *-i* (e.g., *vezi* 'see', *auzi* 'hear!', *ai* 'have!'). However, the augment *-esc-*, independently of the transitivity or intransitivity of the verb in which it appears, or of the presence or absence of clitics, always takes *-e*: e.g., *iubeşte* 'love!', *încălzeşte* 'heat!', *zâmbeşte* 'smile!', *munceşte* 'work!', *trăieşte* 'live!'). In short, rather like *vezi* or *auzi*, the augment is treated as a 'lexical' exception to the general rules, despite its semantic vacuity.

Sometimes the augment appears in a list of elements, otherwise comprising lexical items, exceptionally susceptible, or resistant, to sound change. In effect, the vacuous augment is treated as an autonomous entity on a par with independent lexical morphemes. In Ladin, Friulian, dialects of the Veneto and Istria, and in Vegliote, the augment *-edj- becomes *-e[j]-, contrary to the otherwise completely regular development of *-dj- to -[d]z-; e.g., *ˈmɛdju > Istrian mezo; Friulian mɛs; Vegliote *mis* 'half'; there are just two exceptions, reflexes of HODIE 'today' > *ˈɔje > (aŋk)uj etc., *and the augment itself*. In the Occitan of Vinzelles, where a lexically sporadic analogical change in verbs leads to counteretymological changes in the quality of mid front vowels (/e/ > /ɛ/), Dauzat (1900) lists a number of lexical verbs in which this change fails to occur, yet included in this otherwise *lexical* list is the augment (-eʒ-) for *all* verbs which have it.

Convergence manifests itself in various ways. We have seen that Romance inherited from Latin two forms of non-first conjugation augment, *-esk- (originally from the second conjugation) and *-isk- (originally from the fourth), yet virtually all Romance languages have eliminated such 'allomorphy' by universally generalizing one at the expense of the other, with Romanian, Ibero-Romance, Catalan and Occitan preferring *-esk-, and French and Italo-Romance *-isk-. Such levelling presupposes identification of the augments as manifestations of the 'same' element, an element independent of the lexical verbs in which it happens to occur, since in most Romance varieties there are no lexical exceptions to the change. There is also convergence between the etymologically distinct 1st and 4th conjugation augments. Whereas in most Rhaeto-Romance varieties the first conjugation augment -edj- is maintained, in Engadine and Surselvan Romansch dialects, it has been *systematically* substituted by the *fourth* conjugation augment -eʃ-.[29] Discrete and absolute 'levelling' of conjugation-specific augments recurs in the Vegliote variety of Dalmatian (see Maiden 2004). Finally, there are (this time lexically sporadic) cases in sixteenth century Romanian, and modern southern Romanian dialects, of -edj- substituting -esk- or vice versa.[30]

The diachronic behaviour of the augments indicates clearly that an 'empty morph' in the structure of verbal word-forms, recurrent across hundreds of lexical verbs, is clearly identified by speakers as independent of the lexical roots which precede it, and is attributed properties of 'formal integrity' (reduction of formal variation, compact behaviour in the face of morphological and phonological change) of a kind associated with conventionally 'meaningful' morphs. Yet the only 'meaning' binding all instances of the augment is an essentially intramorphological one, which one may bluntly paraphrase as 'the element that follows the lexical root and precedes the inflectional ending', and nothing more.

It is inherently difficult to demonstrate the existence of intramorphological signata when lexical signata are also present, for any diachronic 'convergence' or 'coherence' could simply reflect anchoring of form in the 'extramorphological' meaning. But one scenario that could demonstrate the presence of an intramorphological signatum would involve *homophony*. If a given morphological change operated exclusively on a particular formative, but operated on that formative 'coherently' in *all* of the disparate meanings associated with it, without differentiation, then we could legitimately argue that the change is operating on that formative *qua* morpheme, and not in function of its extramorphological meanings. The Romance reflexes of Latin HABERE 'have' may provide such an example. This verb is polysemous, but in particular undergoes a major functional split in that it also develops as an auxiliary verb. That this is a major split, certainly beyond the bounds of mere polysemous variation,[31] is reflected morphologically in some Romance languages, such as Romanian, Occitan or Sicilian, which have special reduced forms of the verb only when it is used as an auxiliary, but not in the lexical verb. Thus Romanian *are/avem/aveţi o carte*

'he/we/you has/have a book' vs. *a/am/aţi citit o carte* 'he/we/you has/have read a book'.

In many Italian dialects there has been a change specific to continuants of habere, such that an original locative clitic form has been incorporated into the root morpheme (e.g., Tuscan clitic *ci* + *ha* 'has' > *c'ha* [ʧa] 'he has', Venetian clitic [ge] + [a] 'has' > [ga] 'has'). The semantic link between possession and locativity is well known, and in general, the incorporation of the clitic is duly sensitive to the split between possessive 'have', which takes the clitic, and auxiliary 'have', which does not (cf. Camilli 1929: 230; Rohlfs 1968: 274; Pulgram 1978). What is most significant, however, is that there are dialects, notably in the Veneto region, where lexical and auxiliary verb are affected by this change *in the same way* (cf. Marcato and Ursini 1998: 326–29), so that we have for example Venetian *el ga un libro* 'he has a book' but also *el ga fato* 'he has done'. The fact that, in general, incorporation of the clitic differentiates the two functions confirms the importance of the distinction between those functions, but also supports the conclusion that, when the clitic appears in both forms of the verb we have an example of morphological 'coherence' at a more abstract level than that of lexical or grammatical meaning: in short the signatum must be the fact that the formative in question is a (verbal) morpheme.

A final possible source of evidence for autonomous morphology beyond inflectional paradigms is 'folk etymology'. We should note the implication of the frequent observation[32] that, typically, folk etymology confers on (usually unfamiliar) words a 'pseudo-transparency', with results that can even be semantically misleading. Take Romanian *chirpici* (Hristea 1958: 512) 'type of brick made of clay, straw and dung', a loanword of Turkish origin, and quite opaque in Romanian, but which in regional varieties acquires such 'nonsensical' folk-etymological manifestations as *cîrpici* (cf. *cîrpă* 'rag'), *cipici* (cf. *cipic* 'type of slipper'), *ciupici* (cf. *a ciupi* 'pinch'), *clipici* (cf. *a clipi* 'blink').[33] What is going on is not 'making sense' of the unfamiliar word in terms of referential meaning, but making it 'structurally intelligible' (cf. Bloomfield 1935: 450) in such a way that it receives an inner morphological structure made up of known morphemes, regardless of their meaning. This implies that existing morphemes can, in effect, be extirpated from their lexical meanings and redeployed simply as 'pieces of morphological structure', and provides intriguing circumstantial evidence for a pervasive, autonomously morphological facet, of morphemes generally.[34]

8. CONCLUSION

The primary aim of this study has been simply to show that autonomously morphological structure need not be an inert, defunct, residue of an earlier *état de langue*, nor a kind of diachronic 'dead end'.[35] It can be a dynamic, pervasive, self-reinforcing factor in morphological change. If morphology, and in particular

autonomous morphology, is a 'disease' of language, it must be an extremely benign one. Indeed, so innocuous is it that speakers can actually pass up golden opportunities to align allomorphs with morphosyntactic properties (cf. the generalization of the preterite 1sg. PYTA alternant, described in 3.3), in favour of the 'morphomic' distribution. I have also sought – albeit speculatively – to suggest that the autonomously morphological may permeate phenomena which, *prima facie*, seem to be motivated by universal principles of iconic alignment between form and meaning. I proposed that complete levelling out of allomorphy – a common cross-linguistic phenomenon – could just as easily be formulated in 'morphomic' as in extramorphological terms, and that there was some evidence from Romance to suggest that such a perspective could not be excluded a priori. I have further argued that an autonomously morphological signatum, namely the very fact of being a formative, may be present even in simple, linear, concatenations of formatives, and therefore potentially present not only in any language, but indeed even in formatives which might have a lexical meaning. But the least claim I want to make is that morphologists, and especially historical morphologists, should not regard the autonomously morphological as a stagnant backwater of linguistic structure.

NOTES

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[1] See also Booij (1997), Stump (2001) and, for Italo-Romance in particular, Pirrelli (2000). Of course interest in idiosyncratic local morphological systems has a distinguished precedent, within Natural Morphology, in Wurzel's notions (e.g., Wurzel 1987) of 'system-dependent naturalness' and 'system-defining structural properties'. In Maiden (1996) and (1997) I discuss some difficulties of Wurzel's approach when applied not only to various sorts of Romance data, but even to some of his own data from Germanic. In particular, Wurzel's concept of 'system-defining' seems crucially dependent on statistical predominance, but it is far from clear that the N-, L- and U-patterns are anything like 'predominant' in the system: the 'norm' is in fact overwhelmingly invariance. The growth of 'system-defining' abstract morphological patterns are arguably the endpoint, rather than the starting point, of the type of changes I consider in Romance.

[2] There is one clear exception in Latin, namely MORI 'die' (past participle MORTUUS, but future participle MORITURUS), but what is of interest here is the mode of argumentation, and the generalization Aronoff makes is of such power that it would be absurd to abandon it. It is in any case possible that the special status of MORTUUS as an adjective, meaning the opposite of UIUUS 'alive', a word by which it appears indeed to have been analogically influenced, may offer a partial explanation of this anomaly: the loss of 'i' in the past participle may then be a purely phonological reaction to the prosodic unnaturalness in Latin of a putative form *MÓRITUUS.

[3] For the notion that items that change together are psychologically linked in synchronic grammars, see also Kiparsky (1968).

[4] Tense is certainly not a candidate. It is true that only the preterite and imperfect subjunctive survive in many Romance varieties, such as Italian, but the latter is not inherently a past tense. Unlike the preterite, it can have present and future time-reference, in counterfactual and conditional constructions (cf. Maiden 2001a).

[5] See also footnote 6 for some prominent *apparent* counterexamples from Italian.

[6] A detailed review of apparent counterexamples to this claim would be extremely lengthy, and instead I refer readers to Maiden (2000; 2001a; in press (a)). A number of these involve what are in fact elaborate refinements of the principle of coherence, rather than exceptions. A case that may occur to some readers is Italian, where the PYTA root is lacking from the imperfect subjunctive, but not from the preterite. For a demonstration that what has actually occurred is a hypercharacterization of the PYTA root as being associated with unstressed inflections, which happen usually to be absent from the imperfect subjunctive, see Maiden (2000). More problematic, but possibly susceptible of a similar explanation, is Aromanian, where the expected PYTA root is present in the preterite, but not in the (originally perfective) conditional. I am, however, inclined to the view that Aromanian may constitute the only genuine systematic counterexample to the coherence of PYTA that I have discovered (see Maiden in preparation b).

[7] I follow here the useful convention, adopted by various Romanists, of employing ** to indicate a form whose existence is denied, and * to indicate a form assumed to have existed but unattested.

[8] These are roots containing mid vowels, subject to regular assimilatory raising before the original 1sg. preterite ending *-i*.

[9] *Traer* still has the root *traj-* in the standard language. But *truj-* is very widespread in dialects.

[10] These labels are (perhaps rather fancifully) suggested by the distribution of the relevant cells of the paradigm in conventional paradigmatic distributions. Cf. the examples in (5).

[11] For the status of the 1pl. and 2pl. roots in the subjunctive, see my discussion of 'N-pattern' alternations, below.

[12] For detailed rebuttals of Fanciullo's claim (1998) that 'U-pattern' distribution of root-final consonants in Italian can be derived by *phonological* rules, see Pirrelli (2000: 79f.; 178–84) and Maiden (2001a).

[13] This is recognized by Bybee and Pardo (1981: 958, also Bybee 1985: 71–74), but nothing is explained by their unsupported assumption that a relatively 'autonomous' 1sg. serves as a base from which the subjunctive is *derived*. Appeals to the relative 'autonomy' of the 1sg. and 'derivation' therefrom of the subjunctive root yield the observed distribution of allomorphy, but say nothing about *why* it exists.

[14] The presence of the high vowel in the 1pl. and 2pl. present indicative of these verbs has an independent phonetic explanation.

[15] There are other verbs in which *both* [g] and [ʤ] have been generalized (cf. Lombard 1955: 1016–19).

[16] Cf. also Matthews (1981); Dressler (1985: 335); Vincent (1988: 297f.).

[17] In non-first conjugation verbs, the N-pattern intersects with the vocalic alternants characteristic of the L-pattern discussed above: so [e] and [o] appear in the 1sg. and throughout the present subjunctive.

[18] E.g., Maurer (1951); Rohlfs (1968: 242–44); Lausberg (1956–62: § 921–23); Zamboni (1980/81; 1982/83); Iliescu (1990); Wolf (1998).

[19] Zamboni (1982/3) argues for a residue of semantic content. If there is such content, it seems to be wholly overridden by N-pattern distribution.

[20] The 1sg forms are unaffected, probably because in each of the respective verbs these forms have an L-pattern distribution.

[21] More detailed treatments of alternative accounts of the diffusion of the N-pattern will be found in Maiden (in press; in preparation (a)).

[22] Bybee and Brewer (1980: 224) find for Spanish that the frequency marking for persons of the present tense of the verb are, in order, 3sg., 1sg., 1pl., 3pl., 2sg., 2pl. In so far as frequency is correlated with markedness, this hierarchy is patently unlike the N-pattern, for 1pl. is considerably more frequent than 2pl. and the two categories are not adjacent.

[23] To say that this alternation pattern was motivated by stress would require us to analyse *imos* etc. as containing a zero-root + stressed inflectional ending (Ø + 'imos). This analysis is counterintuitive: there is no other case of a zero-allomorph of a lexical root in Ibero-Romance. However, if we accept that [i] is a stressed root, it might then be claimed that the extension of the root *va-* in the 1pl. and 2pl. of this verb in modern Spanish supports the view that *va-* was analysed as a stressed alternant. The problem with this claim is that [i] remains in the 2pl. imper. *id*, in the impf. *iba* etc. And Portuguese has extended *va-* into the the 1pl. pres., but not the 2pl. pres.

[24] Some very common Romance verbs show special allomorphy in the 2sg. imperative (e.g., Italian 2sg. ind. *hai* 'have', *sai* 'know', *sei* 'are', Romanian *duci* 'lead', *faci* 'do', *vii* 'come', *eşti* 'are' imperatives *abbi, sappi, sii*; *du, fă, vino, fii*). And virtually all Sicilian dialects which have an N-pattern distribution of reflexes of *do'nare and *'dare 'give' yet have an imperative da, rather than *'duna (cf. Schmid 1949: 118n3), a detail which again clearly shows the independence of the N-pattern from stress.

[25] And perhaps of early Romance in general, if the N-pattern distribution of the augment occurred at a time when third conjugation verbs were still rhizotonic throughout the present.

[26] The same aperture alternation can appear in stressed vowels as a function of the height of following unstressed vowels.

[27] The initial *b-* is thought to be an incorporated form of a clitic locative pronoun. Alternatively, it reflects 'blending' with a local derivative of *'vadere. Either way, the variants are incorporated according to the N-pattern!

[28] Alternation due to yod or palatalization of velars has been widely eliminated in many parts of Italy (cf. Azaretti 1982: 191; Maiden 2001b: 47n9). Similarly in Portuguese.

[29] See Haiman and Benincà (1992: 83).

[30] Cf. Ionică (1974: 244f.); Mărgărit and Neagoe (2000: 20).

[31] On the question of polysemy and homonymy in grammaticalized morphemes, see especially Hopper and Traugott (1993: 69–72).

[32] Saussure (1968: 238; 240; Bloomfield (1935: 450); Hockett (1958: 287); Hamp (1992: 427); Blank (1997: 306); Ronneberger-Sibold (2002: 106; 116)

[33] *-ici* is already a very common suffixal ending in Romanian.

[34] Packard (2000: 116; cf. also 130n25) mentions an interesting parallel in Chinese.

[35] For an example of a productive, but not extramorphologically motivated, pattern of allomorphy in a non-Romance volume, see the comments on the Cushitic language Dhaasanac, see the article by Matthew Baerman, in this volume.

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A paradigm function account of 'mesoclisis' in European Portuguese

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1. INTRODUCTION: CLITICS AND MORPHOLOGY

In this paper we motivate a revision to the Paradigm Function Morphology model of Stump (2001) on the basis of the pronominal clitic system of European Portuguese.[1] As is general in Romance languages the clitic cluster can appear either post-verbally or pre-verbally. However, European Portuguese is unusual in that in post-verbal position the cluster shows most of the properties associated with morphological affixation to a stem, while in pre-verbal position it shows most of the properties associated with genuine clitics (i.e. the 'special clitics' of Zwicky 1977). Yet the cluster itself remains invariable in all its aspects, whatever its placement. This poses an intriguing problem for morphologically-based theories of clitics, which would treat the pronominal clitics as essentially a type of affix on the verb. Such an approach has to accommodate the fact that the enclitics receive their placement in the manner of true affixes, which the placement of the proclitics has to appeal to syntactic structures. How can this be achieved without reduplicating the statement of exponence? That is, how do we avoid generating two categorically distinct sets of elements, affixal enclitics and proclitics as lexical (syntactic) units, given that the actual clitic cluster is identical in both cases?

The influential Paradigm Function model of inflection developed by Stump (2001) doesn't accommodate an inflectional view of European Portuguese clitic pronouns in its current formulation, so one of our tasks will be to sketch an extension of that model to account for clitics. We will adopt an extension of the model recently proposed by Spencer (2000, 2003, ms.) in which principles of exponence are separated from principles of placement and linearization. This extension, which involves largely notational changes, has a number of virtues, one of which is that it removes a significant formal redundancy in the original model. In Stump's formulation of the realization rules which define an inflectional system, the rules conflate placement with exponence. But in general placement is predictable: the affixes introduced by a given 'block' of rules are generally either all prefixes or all suffixes, yet this fact is entirely accidental on the original model. Worse, there are many languages which are purely suffixing or prefixing (European Portuguese and English being examples of languages with purely suffixing inflection, for instance). This fact can't be stated in the original model. On the extended model it can easily be stated as a default linearization or placement principle inherited automatically by all inflectional rules.

In the case of European Portuguese clitics a single set of (morphological) rules generate the cluster itself and determine the linear order of its components, while a separate function determines the placement. The post-verbal

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clitics behave like affixes and so their placement is defined with respect to a morphologically defined stem, as in the case of other affixes. In this way we can also account for the so-called 'mesoclitics'. Mesoclisis is found when the normal pronominal clitic cluster intervenes between the stem and the tense/agreement suffixes in the future indicative and the conditional forms. For instance, given *mostramos* 'we show' we have the form *mostramos-lho* 'we show it to him', with the clitic complex *lho* (from *lhe-o*) attached to the right edge of the inflected word. However, given the future indicative form *mostraremos* 'we will show' cliticization gives us not **mostraremos-lho*, but *mostrar-lho-emos*. In certain contexts, defined morphosyntactically, semantically or lexically, we find proclitic placement, whether the verb is in the future/conditional or some other form: *não lho mostraremos* 'we will not show it to him'. The proclitic cluster shows the same linear order as the enclitic cluster, and this is also true of clusters which more transparently consist of two elements such as *no-lo* 'to.us-it'. Given the normal principles of linearization in realizational theories of morphology this poses a difficult problem (found more acutely in other Romance languages or in Slavic languages in which the internal structure of the cluster is richer and less opaque than the Portuguese): if each clitic is added one by one with respect to the verb as an anchor point we would expect the order of proclitics to be the mirror image of the order of enclitics. But the relative linear order remains exactly the same independently of placement.

On the extended model of PFM enclisis/mesoclisis is handled in terms of stem selection and the definition of the relative placement of two classes of formatives, the 'true' affixes and the affix-like enclitics. The placement of the pre-verbal (proclitic) cluster is determined by reference to syntactic categories. The placement function for proclitics therefore makes reference to the edges of syntactic terminals and not to the edges of morphological stems. The exponence and cluster formation rules remain the same as for enclitics, so that we account for the invariant order within the cluster (cf. Spencer 2000 on Bulgarian).

We will therefore provide an explicit account of the morphological properties of the suffixing clitic cluster, together with a less explicit treatment of the behaviour of proclitics as (phrasal) prefixes. The details of the syntactic placement are not crucial to our argument, since all that suffices is that placement be determined by reference to syntax (but see Luís and Sadler 2003). In addition, for us it is important that the morphological model be capable of defining such syntactic placement over elements which are themselves morphological. In this respect our analysis has superficial similarities to that of Crysmann (1997, 2000, 2002), who proposes that the clitic cluster be 'liberated' and ordered in the syntax within linearization-based HPSG. However, in our analysis the cluster is an inflectional element, whether enclitic, mesoclitic or proclitic, while for Crysmann the cluster is an essentially syntactic element, even when it is enclitic. Our analysis also has much in common with analyses proposed for other Romance languages generally in various theoretical frameworks. Thus, for us

the clitic cluster is a morphological element with an internal structure (Bonet 1991, Gerlach 2002, Legendre 2000), and the cliticized verb forms are inflected forms of the verb (Halpern 1995, Miller 1992, Miller and Sag 1997, Monachesi 1999). Crucially for us the proclitics are phrasal affixes, that is, affixes that happen to be positioned with respect to syntactic categories (Anderson 1992, Halpern 1995, Klavans 1985, Legendre 2000, Miller 1992).

Of course, not all students of clitics advocate a morphological analysis, and syntacticians working within a Government-Binding or Minimalist framework have generally advocated some sort of syntactic account (such accounts for European Portuguese are provided, for example, by Duarte and Matos 2000 and by Vigário 1999a, b). While morphological treatments tend to have difficulty explaining the syntactic placement of the proclitics, the syntactic and prosodic treatments tend to become stipulative or frankly inexplicit when it comes to explaining the morphological properties of the 'enclitics' (see Crysmann 1997, 2002, Luís 2003a, Luís 2004, for detailed discussion). However, the real significance of the European Portuguese case (as stressed by several authors, especially Crysmann 2002, Luís 2002, Vigário 1999b) is that one and the same cluster can exhibit both morphological behaviour and syntactic behaviour. It is therefore important for advocates of either approach to address both the morphological effects and the syntactic effects. The principal aim of this paper is to develop a reasonably explicit account within Paradigm Function Morphology which captures this patterning. To achieve this aim we will find it necessary to modify the original model in the ways just sketched.

The paper is organized as follows. In section 2 we introduce the relevant data. In section 3 we very briefly summarize some recent syntactically-inspired approaches to the problem of mesoclisis, arguing that they leave unaddressed the inflectional behaviour of the enclitics and the clitic clusters. In section 4 we present a detailed justification of our treatment of the clitics as affixes, formulated with the Paradigm Function model of Stump (2001). For this we have to introduce a variety of changes to the standard model, the most significant of which is that we separate exponence from placement. In the following section we present a brief overview of standard conjugation in our revised model. Section 6 presents the heart of the analysis, in which we show how our machinery permits a relatively straightforward and explicit account of all three types of clitic placement, integrated into the 'standard' pattern of verb inflection. We conclude the analysis in section 7 by showing how our account can also be extended to the placement of clitics within periphrastic constructions, adopting a paradigm-based approach to periphrasis. Section 8 presents summary conclusions.

2. CLITICS IN EUROPEAN PORTUGUESE

In this section we introduce the basic facts of the pronominal clitic system. The clitic cluster of European Portuguese contains only pronominal elements (not,

for instance, auxiliary verbs as Rumanian). The language distinguishes reflexive and non-reflexive clitics. The reflexives realize accusative case and the non-reflexives realize accusative and dative cases. Reflexives are identical to non-reflexives except in the 3rd person where an invariable form *se* is found. The basic pattern of morphosyntactic functions is shown in Table 1:

Table 1. European Portuguese pronominal clitics: morphosyntactic functions

	REFL	DAT	ACC
1st Sg	me	me	me
2nd Sg	te	te	te
1st Pl	nos	nos	nos
2nd Pl	vos	vos	vos
3rd (Sg/Pl)	se	lhe(s)	o(s), a(s)

At most two clitics co-occur in a cluster. Combinations whose second element is accusative 3rd person undergo idiosyncratic allomorphy, illustrated in Table 2:

Table 2. Combinations with o(s), a(s)

me	mo(s), ma(s)
te	to(s), ta(s)
lhe(s)	lho(s), lha(s)
nos	no-lo(s), no-la(s)
vos	vo-lo(s), vo-la(s)

Note that the singular/plural distinction for 3rd person dative clitics is neutralized in combination with 3rd person accusatives.

Although only two clitics can co-occur in any one cluster it may be more transparent to distinguish three position classes or slots in order to account for their combinatorics (cf. Luís in press b, in prep). The reflexive *se* always occurs in initial position and it can be followed by a dative clitic such as *me*, *nos*, *lhe* and so on. However, the dative clitics themselves are followed by the accusative 3rd person clitics: *no-lo*, *vo-las* and so on. Assuming we wish to segment the dative + accusative combinations such as *no-lo*, *lho* etc. into two position classes this means that we need to distinguish three positions or slots, to account for such orderings as *se nos* as opposed to *no-lo*. This is schematized in Table 3.

It would be possible to reduce this to a two-slot system by treating the dative + accusative combinations (*no-lo*, *lho*, etc.) as portmanteaux occupying a single slot. If we took that course we would have to complicate somewhat the statement of co-occurrence restrictions to exclude sequences such as **se no-lo*. However, for our argument little hinges on the precise analysis. All that is crucial is that there be (at least) two slots, with *se* always in initial position, and that the relative order be invariant. The three-slot analysis we present here

Table 3. Attested positions – three slots analysis

Slot I	Slot II	Slot III
se 3rd, Refl	*me*1Sg, Dat/Acc/Refl *te* 2Sg, Dat/Acc/Refl *nos* 1Pl, Dat/Acc/Refl *vos* 2Pl, Dat/Acc/Refl *lhe(s)* 3Sg/Pl, Dat	*o(s)* Masc.Sg/Pl, Acc, Non-refl *a(s)* Fem.Sg/Pl, Acc, Non-refl

allows us to present the theoretical claims of our paper more clearly, but the rules could easily be re-fashioned to accommodate a two-slot analysis.

In examples (1b) and (1d) we see that in enclitic or suffixal position the cluster is attached directly to the right edge of the inflected verb form, whether it be the main verb or an auxiliary such as *ter* 'have'. This is the default placement (note that in this respect European Portuguese differs from most other Romance languages, including Brazilian Portuguese):

(1) a. mostramos 'we show'
b. mostramos-lho 'we show it to him'
c. temos mostrado 'we have shown'
d. temos-lho mostrado 'we have shown it to him'

There are a number of idiosyncrasies associated with the clitic clusters, some of which are illustrated in these data. First, the auxiliary is treated as the host of cliticization wherever it occurs. Second, the clitics *nos/vos* trigger allomorphy of the 1pl form (*mostramos*) by deleting the final *-s* (as in *mostramo-nos* 'we show ourselves'). Such truncation is limited to just these person/number verb forms. A more general final consonant truncation is found with the 3rd person non-reflexive clitics, *o/os/a/as*, which truncates all word-final occurrences of /s/ and /r/. These clitics then acquire an initial consonant /l/ (or /n/ after a nasalized vowel): *mostramo-lo* 'we show it', *lav[ãw]-no* 'they wash him'. Third, the pattern found with pronominals that express syntactic arguments, as in (1), is also found with inherent, lexical reflexive clitics that don't correspond to any grammatical relation, as seen in examples (2) from *queixar-se* 'complain' (there is no verb **queixar*):

(2) a. queixamo-nos 'we complain'
b. temos-nos queixado 'we have complained'

A very characteristic feature of European Portuguese is the phenomenon of 'mesoclisis'. This is found in future and conditional forms in contexts where we would normally expect enclitics. The future and conditional forms are based on

a stem which is essentially identical to the infinitive form of the verb or auxiliary (3a, c). In these tense forms the clitic cluster appears immediately after the verb stem and before the tense/agreement markers, *-emos/-íamos* (3b, d, e, f). This is traditionally known as 'mesoclisis':

(3) a. mostraremos 'we will show'
b. mostrar-lho-emos 'we will show it to him'
c. teremos mostrado 'we will have shown'
d. ter-lho-emos mostrado 'we will have shown it to him'
e. queixar-nos-emos 'we will complain'
f. ter-nos-emos queixado 'we will have complained'

An interesting fact about the mesoclitic forms is that there are two lexical stresses, as seen in (4) (where a lexical stress is indicated by capitalization). This stress pattern is not found elsewhere in the Portuguese verb system:

(4) a. mostrAr-lho-Emos 'we will show it to him'
b. mostr-Ar-lho-Iamos 'we would show it to him'
c. tEr-lho-Emos mostrado 'we will have shown it to him'
d. tEr-lho-Iamos mostrado 'we would have shown it to him'

As we will see this stress pattern has formed part of the motivation for a 'syntactic' approach to mesoclisis, in which the two stresses belong to distinct words and hence syntactic terminals. We see no merit in this, however. There are a number of idiosyncrasies in the stress system of Portuguese verbs, including those of the default (regular) first conjugation. What the mesoclisis examples show is that this prosodic idiosyncrasy can be taken a stage further, so as to permit two stresses in one word. However, we are no more forced to treat the mesoclisis forms as two syntactic words than we are forced to treat double stressed words such as or *pós-clássico* 'post-classical' or *pré-escola* 'Kindergarten' as consisting of two syntactic terminals. We briefly address the accentual properties of the mesoclitic forms in Section 6.6.

A striking feature of the European Portuguese system, distinguishing it markedly from other Romance languages, is the fact that the clitics behave very much like affixes when post-verbal (hence, suffixes) but very much like phrasally attached affixes in pre-verbal position (hence, proclitics). By 'phrasal affixation' we mean a situation in which a formative which expresses functional features associated with a lexical head is realized at the edge of a phrase rather than on (the stem of) the lexical head of a phrase. Some authors distinguish phrasal affixation from edge inflection, while for others these terms seem to be synonymous (for instance, Crysmann, 2000: 134, explicitly equates these terms). We find it useful to use the term 'phrasal affixation' for those situations in which the phrasal affix is only loosely attached to its host and hence fails to trigger

idiosyncratic host allomorphy. We can then reserve the term 'edge inflection' for occasions on which the edge element appears to undergo a canonical affixation process or even non-affixational, non-concatenative morphology (the 'definitive accent' of Tongan would be an instance of this, Churchward 1953: 2f). What is important for our purposes is the assumption that the proclitics are not themselves syntactic terminals. Rather they are morphological exponents whose placement is determined (at least in part) by reference to syntactic categories. This is the sense in which the proclitics are phrasal affixes: they are affixes in the sense that they are not syntactically represented words and they are phrasal in the sense that they are placed with respect to a phrase, not a stem.

In proclitic or prefixal position the cluster is attached to the left edge of a verbal group, essentially a verb phrase. Proclisis is triggered by various syntactic contexts, including a subordinate clause, an interrogative clause, negation, a quantified subject and certain others. However, the clitic cluster can never appear in absolute clause initial position. These placement possibilities are illustrated in examples (5), in which we include verb groups formed analytically with the auxiliary *ter* 'have', and in which negation serves as a proclisis trigger:

(5) a. não lho mostraremos 'we will not show it to him'
b. não lho teremos mostrado 'we will not have shown it to him'
c. não nos queixamos 'we don't complain'
d. não nos teremos queixado 'we won't have complained

One difference commonly observed between phrasal affixation and head affixation is that of scope or domain of application: in phrasal affixation the formative may apply to the whole phrase to which it is attached, while in head affixation the formative will generally apply solely to that head. While this definition may not be universally valid (it fails for instances of 'suspended affixation' as found in a number of Turkic and Uralic languages, for instance), it works as a useful criterion in European Portuguese. An indication of phrasal affixation, then, will be those instances in which a formative scopes over a coordinated phrase. This is possible when the clitic (cluster) (6a) is a proclitic but excluded with enclitics (6b, c):

(6) a. Eu sei que a Maria me escreve cartas e envia postais
I know that the Maria 1SG.DAT writes letters and sends postcards
'I know that Maria writes me letters and sends me postcards'

b. *A Maria escreve-me cartas e envia postais
the Maria writes-1SG.DAT letters and sends postcards

c. *A Maria escreve cartas e envia-me postais
the Maria writes letters and sends-1SG.DAT postcards

Example (7) illustrates how a (portmanteau) cluster *lho* can take wide scope:

(7) Nós sabemos que a Maria
we know that the Maria
lho pediu de manhã e devolveu à noite
3SG.DAT/3SG.MASC.ACC asked-for at morning and return in-the evening
'We know that Maria asked him/her for it in the morning and returned it (to him/her) in the evening'

Further evidence that the proclitics are not attached directly to a verb stem and hence do not form a morphological unit with the verb is provided by the fact that they can be separated from their verb host by other words. Thus, it is well established in the literature that the negation element *não* can intervene between proclitic cluster and verb, as in (8) (see, for instance, Barbosa 1996, Martins 1994):

(8) Eu sei que lhe não ofereceste o livro.
I know that 3SG.DAT not gave the book
'I know that you didn't give him/her the book'

However, other elements can also intervene, including certain adverbs (*ainda* 'still', *já* 'already'), certain pronouns (1st person subject pronouns *eu* 'I', *nós* 'we') and one or two other words subject to individual and dialectal variation (Luís 2004). How exactly the grammar defines which elements are interpolated and which aren't is not the subject of this paper. The crucial point is that the proclitics are positioned to the left of the (leftmost) verb form, but they don't show any of the normal properties of morphological (stem-attached) affixes. The opposite behaviour is found with the clitics in postverbal position, in which the same clitic cluster exhibits almost no genuine clitic properties but does exhibit clearly affixal properties such as triggering idiosyncratic stem allomorphy.

The salient facts, then, are the following:

- There are two sets of forms for cliticized verbs: suffixed/enclitic and prefixed/proclitic
- The default cluster placement is suffixation to the finite inflected verb
- The cluster placement for a verb in the future/conditional is suffixation to a special future/conditional stem ('mesoclisis')
- The alternative cluster placement is (syntactically) aligned to the left edge of a projection of a syntactic V^0 category. This is valid for all tense/aspect forms, including compound (Perfect) tenses and future/conditional tenses.

In addition, we must bear in mind that the linear order of elements in the cluster is constant in both pre- and post-verb environments. This means that the pronominal cluster has a well defined internal linear ordering, but that linearization is not defined in terms of proximity to the stem/host (in other words, the stem/host does not serve as an anchor point for determining the linear ordering, as would normally be the case with affixation). The compound tenses represent true periphrasis, in that the tense is expressed by two distinct syntactic terminals (auxiliary and lexical verb form). However, the so-called 'clitic' forms are not periphrastic, but rather represent affixation, which is non-canonical in the case of the proclitic forms ('phrasal affixation').

Although the term 'clitic' is rather misleading in the case of European Portuguese we will continue to refer to the pronominal cluster as a clitic cluster and we will continue to use the term 'mesoclisis' as a descriptor. It should be borne in mind, however, that, morphologically speaking, the enclitics and mesoclitics are pure affixes (though with slightly unusual morphosyntactic functions).

3. EXCURSUS ON SOME RECENT TREATMENTS OF MESOCLISIS

A number of accounts of mesoclisis are available in a variety of descriptive and theoretical traditions. Linguists working within a lexicalist tradition generally concur with us in treating the clitics as affixes (e.g. Crysmann 1997, 2000, 2002, Luís 2004). In this section, we touch on aspects of certain recent attempts to treat the clitics as syntactic terminals. Our discussion will be very brief because we are exploring the European Portuguese data as a problem for morphological approaches, not as a problem for syntactic approaches. On the other hand, some of the recent syntactically-based proposals serve to highlight a number of the crucial problems, and we will find it instructive to look briefly at them.

The conceptual problem posed by mesoclisis for a uniform analysis of the clitics is very clear. If the tense/agreement markers of the future/conditional forms are affixes then the 'mesoclitics' must be affixes, too, and not clitics. If, however, the mesoclitics are syntactically represented (e.g. as syntactic heads or at least syntactic X^0 terminals of some kind), then this entails that the tense/agreement suffixes are also syntactic terminals rather than normal affixes (e.g. Raposo 2000: 284). The alternative is to abandon a uniform approach. Duarte and Matos (2000: 134) and Vigário (1999b) derive the future/conditional marker as an inflectional affix in the absence of clitics (9a), but as a separate prosodic word where clitics occur, as in (9b):

(9) a. $[darEmos]_{pw}$
b. $[dA\text{-}\mathbf{los}]_{pw}$ $[Emos]_{pw}$.

This type of representation provides a structure to which to attach the mesoclitic cluster. In addition, it offers an immediate explanation for the unusual double stress pattern.

There are a number of problems with this approach (see Luís 2004 for detailed discussion). First, the tense/agreement markers in the future/conditional forms (*-emos*) are indistinguishable morphologically, are always stressed, and are always at the right-periphery of the verb. Second, the future/conditional marker shows none of the properties of genuine auxiliary verbs in Portuguese, namely coordination and subject-auxiliary inversion. Apart from the mesoclisis environments, they fully respect lexical integrity. Third, the pronominal clusters behave exactly like affixes in that they both trigger and undergo idiosyncratic stem allomorphy. These facts are generally ignored in both the uniform syntactic analyses (e.g. Raposo 2000) and the non-uniform analyses (e.g. Duarte and Matos 2000).[4]

In sum, a non-uniform approach to mesoclisis is forced to say that the tense/agreement markers and the future/conditional markers are completely different in their structure depending on the presence or absence of mesoclitics. But this fails to capture the fact that in other respects the forms are identical in form and in their morphological behaviour. Given that the clitic cluster and the inflected verb have the same form in mesoclisis contexts and in other contexts, we would argue that, on balance, a uniform account is superior to one which artificially segregates the inflectional markers into two types (even though this explanation may enjoy a certain historical sanction). Since there is so little evidence that the tense/agreement markers are synchronically genuine auxiliary verbs, this leads us to treat the clitics as affixes.

4. CLITICS AS AFFIXES

4.1. The proposal

In this section we show how to generate the cluster using a recent inferential-realizational approach to inflectional morphology. In (10) we summarize the crucial morphology of the verb forms (for 'show it to him'):

(10) a. present/1Pl. dat/acc ⇒ present form + cluster
mostramos-lho

b. future ⇒ infinitive stem + *emos*
mostrar-emos

c. future/1Pl. dat/acc ⇒ infinitive stem + cluster + *emos*
mostrar-lho-emos

d. proclitic ⇒ trigger + cluster + future/1Pl.
não lho mostraremos

Our analysis is summarized as follows:

- the clitic cluster is derived as a 'disembodied' sequence of affixes
- the clitic cluster is placed independently with respect to the word or stem host
- mesoclisis is suffixation to the 'infinitival' (future/conditional) stem

4.2. Sequences of affixes in Paradigm Function Morphology

Here we briefly describe the way that position class morphology is handled in the Paradigm Function Morphology approach of Stump (2001). The crucial idea is that linear order is expressed through the order of application of (mathematical) functions which code realization rules. The realization rules take as their domain a set of features and they give as their value the affix and its place of attachment with respect to a stem.[5] Suppose we wish to generate the sequence *stem* + x + y + z, where 'x, y, z' are three suffixes. This is achieved through a set of rules, R, organized into three sequential rule blocks, indexed by Roman numeral subscripts. Let 'τx' mean 'the set of features realized by x', and let σ stand for the full set of features characterizing final word form. Then for each affix there will be a realization rule, $R_{n,\tau}$, coded as a function restricted to a rule block n and a set of features τ. This function will map the pairing $<$*stem*, σ$>$ to a *stem* + affix combination (if the set of features τ isn't actually contained in the full set, σ, then the function is undefined). This gives us the rule set in (11):

(11) $R_{I,\tau x}$(*stem*, σ) ⇒ *stem* + x
$R_{II,\tau y}$(*stem*, σ) ⇒ [*stem* + x] + y
$R_{III,\tau z}$(*stem*, σ) ⇒ [*stem* + x + y] + z

Within any rule block it is presupposed that a maximally general universal rule can apply, the Identity Function Default (IFD). This is a rule whose output is identical to the input (hence 'identity function') and it is applicable to any feature set whatsoever, i.e. everywhere at every stage of a derivation. Because it is maximally general, however, it is pre-empted by any other rule, by virtue of the Elsewhere Condition. The IFD is therefore called up whenever the feature set σ lacks any features that need to be realized by an overt affix. For instance, there is no specific rule for generating the singular form of a noun in English. If we wish to form the singular *cat* for the lexeme CAT (with root /cat/) there is, strictly speaking, no way of doing this given a grammar which only specifies a rule of plural formation. Therefore, the Identity Function Default applies, in this case specifying the root form as the form which realizes the singular number attribute value.

By virtue of the rule block index we can combine the rules in (11) by allowing each function to take the previous one in its domain:

(12) $R_{III,\tau z}(R_{II,\tau y}(R_{I,\tau x}(stem, \sigma))) \Rightarrow stem + x + y + z$

The set of realization rules applied in the appropriate order therefore constitutes a function which maps the pair $<stem, \sigma>$ to the inflected word form which occupies the cell in the word's paradigm defined by those features. In Paradigm Function Morphology this is an instantiation of the Paradigm Function (PF) for the language with respect to a given inflected form. There are other types of function which specify how a word is inflected, so in PFM the Paradigm Function can take a somewhat more general form but in our present hypothetical case, and in most of the cases discussed below, the definition of the Paradigm Function essentially amounts to the set of realization rules given in (12).

With this background we can ask ourselves what a PFM analysis of European Portuguese enclitic verb forms would look like. First we need to declare a set of features corresponding to the clitics. We will assume that clitics are marked for the feature [Reflexive] and that they distinguish accusative and dative Case. The required feature set is given in (13):

(13)

Reflexive:	{Yes, No}
Case:	{Accusative, Dative}
Person:	{1, 2, 3}
Number:	{Singular, Plural}
Gender:	{Masculine, Feminine}

The [Gender] feature is only defined for elements bearing the features [Reflexive:No], [Case:Accusative], [Person:3]. Number is not defined for [Reflexive:Yes], [Person:3]. To make the rules easier to read we shall use shorthand representations for features, in which we don't bother to name the feature itself where the name can be automatically determined from the value. In addition, we shall conflate Person and Number features. Thus, [1Pl] will serve as a shorthand for [Person:1], [Number:Plural].

In (14) we provide an appropriate grammar fragment based on Luís (2004) using a simplified version of the notation of PFM which omits all non-essential aspects of the realization rule functions and which presents the morphosyntactic features and rule block indices as values of the rule function rather than subscripts, in the interests of readability (allomorphic variants of the suffixes are indicated by the elements in parentheses):

(14) Pronominal Rule Blocks for EP enclitics in PFM:

Block I			
ia.	R{3, Refl}(X)	⇒	Xse
Block II			
iia.	R{1}(X)	⇒	Xme
iib.	R{2}(X)	⇒	Xte
iic.	R{1Pl}(X)	⇒	Xno(s)
iid.	R{2Pl}(X)	⇒	Xvo(s)
iie.	R{Dat}(X)	⇒	Xlhe
iif.	R{Pl, Dat}(X)	⇒	Xlhes
Block III			
iiia.	R{3, Acc, Non-refl}(X)	⇒	X(l)o
iiib.	R{3, Fem, Acc, Non-refl}(X)	⇒	X(l)a
iiic.	R{3Pl, Acc, Non-refl}(X)	⇒	X(l)os
iiid.	R{3Pl, Fem, Acc, Non-refl}(X)	⇒	X(l)as

The rules in Block I only apply if the verb form is specified as reflexive. For non-reflexive forms the IFD will apply in Block I and deliver a form lacking a clitic ('X ⇒ X'). The rules (iia–iid) in Block II are not specified either for the reflexive property or for case, and so will realize reflexive, dative or accusative clitics. We assume that reflexives cannot realize the dative property, so that rules (14iie, f) unambiguous refer to non-reflexive clitics. Again, the IFD will apply in Blocks II, III where the properties sets specified in the rules are not members of the total feature set, σ, to be expressed. We assume the default Person value in Block II to be 3rd, the default Gender value in Block III to be Masculine and the default Number throughout is assumed to be Singular. More specifically marked rules such as (14iiid) will pre-empt more general rules such as (14iiia, b, c) by virtue of the Elsewhere Condition (Paninian Determinism).

The rules in (14) permit a greater variety of clitic clusters than are attested. First, we could in principle have clusters of three clitics, since there are three blocks and three slots. Second, given the way the rules are written we could have combinations of two accusative clitics (where the first clitic would be 1st/2nd person and the second clitic 3rd person). To rule out unwanted combinations we can appeal to Feature Co-occurrence Restrictions (FCR's) such as those laid out in Appendix 3. One of the effects of these restrictions will be to ensure that at most two clitics co-occur. This means that the rules will realize a feature set only if it specifies at most two sets of clitic features.

A sample derivation for *mostramo-vo-lo* 'we show it to you' is provided in (15):

(15) σ = {[2Pl, Dat], [3Sg, Masc, Acc]}

Block I	mostramos	⇒	mostramos	[by IFD]
Block II	mostramos	⇒	mostramo_vo(s)	[by (14iid)]
Block III	mostramovo	⇒	mostramovo(s)_(l)o	[by (14iiia)]
Output of morphophonology		⇒	mostramovo_lo	

For convenience we take the root to be the fully inflected form *mostramos* 'we show'. We discuss how to generate that form in a later section. For the present we also ignore the allomorphy in the *-mos* ending and allomorph selection in the suffixes.

Given that the enclitic and proclitic clusters are identical we would like to be able to deploy essentially the same machinery to generate the proclitic cluster. This would mean simply rewriting rules (14) but introducing the affixes to the left of the 'X' rather than the right, as seen in (14′):

(14′) Pronominal Rule Blocks for EP proclitics in PFM:

Block I

ia.	R[3, Refl](X)	⇒	seX

Block II

iia.	R[1Sg](X)	⇒	meX
iib.	R[2Sg](X)	⇒	teX
	etc.		

Block III

iiia.	R[3Sg, Masc, Acc, Non-refl](X)	⇒	(l)oX
iiib.	R[3Sg, Fem, Acc, Non-refl](X)	⇒	(l)aX
	etc.		

However, a notational detail in PFM prevents us from doing this in a direct manner. The reason has to do with the way in which the linear order of the affixes is anchored to the root. The affix which the first rule introduces will always be closest to the root. But this will mean that the linear order of the proclitics will be the mirror image of the linear order of the enclitics. For instance, we would derive **o-vos-mostramos* 'we show it to you' instead of the correct *vo-lo-mostramos*. This shows that we can't generate the clitic cluster in a 'cyclic' fashion, as implied by the standard format of realization rules in PFM.

Following Spencer (2000) we assume that the realization rules generate the clitic cluster, whether en- or pro-clitic, without reference to the anchoring point of the root of the lexeme. We therefore split the realization rules into two parts, one to define the composition of the clitic cluster itself and the other to define its placement with respect to the host. This prompts a re-appraisal of the format for realization rules generally, including those for common-or-garden affixation.

Taking our lead from Stump (1993) we shall rewrite all realization rules so as to separate out the definition of exponence from the definition of placement. This is the topic of the next section.

4.3. Separating exponence from placement

In realizational ('Word-and-Paradigm') theories of inflection (such as Anderson 1992, Aronoff 1994, Stump 2001 and many others) affixational rules conflate the exponence of the feature set and the placement of the affix. Thus, a realization rule generating *mostra-mos* by suffixing *-mos* to realize [1Pl] might have the general (simplified) form shown in (16):

(16) R[1Pl](mostra) ⇒ mostra + mos

However, there is nothing to stop us from re-formulating such rules as in (17):

(17) R[1Pl](mostra) ⇒
a.mos exponence of affix
b.mostra < mos placement, = suffixation (right alignment) to stem

Rule (17) states 'the 1Pl affix is *-mos*, and it is right aligned to the present tense stem form *mostra* (i.e. it is placed as a suffix)'. For a very simple example like this nothing is lost or gained by this notational manoeuvre, though Stump (1993: 174f), in an alternative to his favoured analysis, applies essentially the same procedure to handle cases of 'ambifixation' in language such as Swahili and Fula. In those languages, one and the same affix may appear as suffix or prefix depending on the rest of the feature content of the word form. This is therefore an exact affixal analogue of our clitic cluster case. We have found that Stump's alternative analysis gives a neater characterization of clitic clusters. It therefore makes sense to generalize it to all affixation. The upshot is that the realization rule takes a stem form and a feature set and delivers an ordered pair consisting of an affix (exponent) and an alignment specification. We will refine this formulation later.

The separation of exponence from linearisation is reminiscent of the 'Immediate Dominance' vs. 'Linear Precedence' format ('ID/LP') of rules in Generalized Phrase Structure Grammar (Gazdar, Klein, Pullum, and Sag 1985). As in GPSG, the purpose is to allow us to state generalizations over linear order separately from generalizations about exponence. In the case of many languages, including Portuguese, the generalizations which can be stated are significant. Thus, in Portuguese (as in Romance generally and many other Indo-European languages) all inflectional affixes, other than the traditional clitics, are suffixes. Therefore, in the inflectional component of the language we just

need to state the linearisation or placement function once, and allow this to be the default for the entire language. Given this, the grammar would only include rule (17a); component (17b) would be replaced by the general principle 'root precedes affix for all rules realizing inflectional features'. Since the linear positioning of the affix is dealt with separately (by the rule indexing mechanism) we don't actually need to specify the stem form in the right hand side of the rule. We can therefore rewrite (17a) as (18):[7]

(18) R[1Pl] ⇒ mos

Again, we will refine this notation as we proceed.

Thus, when applied to normal affixation, the revised formulation of PFM permits us a considerable reduction in redundancy, which allows us to capture generalizations about inflectional paradigms in a much more streamlined fashion.

4.4. Function composition and the cluster

As we have mentioned, in standard PFM the linear order of a string of affixes is determined with respect to an anchor in the form of the word's root. Having separated exponence from placement we no longer have such an anchor point, and so we are left with the problem of exactly how to ensure that a string of clitics or affixes is generated in the right order. However, we retain the notion of rule block application and the rule block index on realization rules. This indexing, is, of course, sufficient in itself to define a linear order.

However, if we are to generate clitics/affixes separately from their host/stem then we need to use a different set of notational conventions for realization rules from those of standard PFM. This is because the standard rules operate recursively, that is, they are designed to feed each other, so that the output of one block becomes the 'stem' for the rules in the next block. But this is precisely what we are abandoning.

The answer to this question is very simple, and again is part of the formal armoury which Stump deploys elsewhere in the standard theory. We simply cash in on the fact that realization rules are functions and make use of the notion of function composition. Suppose we have two functions, f(x) and g(x) and suppose they have the same domain and range (for instance, they might be arithmetic functions over numbers). Then the value of f is itself a number and in the domain of g. Thus, we can define g over the output of f: g(f(x)). For instance, suppose that f is 'multiply by 10' and g is 'divide by 5'. Then $f(7) = 70$ and $g(70) = 14$. But we can conflate the two operations into a single operation of 'multiply by 10 then divide by 5': g(f(x)). This conflated function is the composition of the two functions, denoted 'f ∘ g'. In other words, we can say $(f \circ g)(7) =$

14. Since realization rules are functions it is a trivial matter to define the composition of a set of realization rules. Consider the hypothetical example of a Paradigm Function in (19):

(19) $PF(X, \sigma) =_{def} R_n(R_m(X, \sigma))$

Given function composition this is identical to saying:

(20) $PF(X, \sigma) =_{def} (R_m \circ R_n)\ (X, \sigma)$

Through function composition, the string of affixes/clitics is derived as a composed unit ready to be placed to the left/right of the stem.[8]

As a first approximation we give a sample grammar fragment in (21) for a single cluster (taken from Luís and Sadler, in press). We make the simplifying assumption that proclitics are simply affixed to the left edge of the verb node. In fact, the cluster is placed in the syntax (which provides further support for the approach which separates exponence from placement) but this isn't relevant to our present concerns. We also assume that the en-/pro-clitic placement is mediated at the morphological level by a special, purely formal, feature [Restricted:{Yes, No}]. The forms marked 'Restricted' give us proclitic placement and the 'Restricted' feature is then linked in the syntax to the features which are responsible for proclisis. The value [Restricted:No] is the default, and defines enclitic placement or verb forms which lack clitics altogether.

(21) European Portuguese
For σ = {{[Refl:Yes], Acc, 3Sg}, {Dat, 3Sg}}:

a. exponence rules:
$PF(X, \sigma) =_{def} (R_I \circ R_{II} \circ R_{III})\ (X, \sigma)$ = se-lhe

b. linearisation rules:
Proclitic-LR: <se-lhe, X>, if Verb form [Restricted:Yes]
Enclitic-LR: <X, se-lhe>, elsewhere

This overview of the clitic system has motivated a modest revision of the theory of Paradigm Function Morphology set forth in Stump (2001). Following Spencer (ms.) we will refer to our modification as Extended Paradigm Function Morphology (on the grounds, justified in Spencer ms., that the modifications ultimately permit us to generalize paradigm functions to derivation and other types of lexical relatedness). We continue with a brief overview of standard (non-clitic) verb inflection in Portuguese before turning to the clitic system itself.

5. PORTUGUESE CONJUGATION IN EXTENDED PFM

It is beyond the scope of this paper to provide a complete analysis of Portuguese conjugation (itself a non-trivial descriptive task), so we will just indicate roughly what such an account would look like. We limit ourselves to the first conjugation forms given in Appendix 1. Consider the illustrative forms in (22):

(22)

a.	mostr-a-mos	1Pl, present indicative
b.	mostr-e-mos	1Pl, present subjunctive
c.	mostr-á-va-mos	1Pl, imperfect indicative
d.	mostr-a-r-e-mos	1Pl, future indicative
e.	mostr-a-r-ía-mos	1Pl, conditional
f.	mostr-á-sse-mos	1Pl, imperfect subjunctive

We have distinguished as many segmentable affixes as possible (in some cases segmentations can be justified by comparison with other conjugation classes). As can be seen, it would appear that we need at least four (and probably five) position classes. However, several of the bases of inflection recur with different functions. Thus, the *mostrar* sequence in (22d, e) is also the infinitive (for the majority of verbs) and the sequence *mostra* recurs throughout the entire paradigm in one way or another.

To capture such regularities, and to simplify the inflectional rules, we will follow Aronoff (1994) in assuming that inflections are defined over a rich inventory of stem types, not just the bare root. These stems are meaningless forms ('morphomes' in Aronoff's terminology) and they have to be provided with an arbitrary index in order to identify them. As Stump (2001: chapter 6) shows in detail for Sanskrit it isn't in general sufficient to make reference solely to the phonological shape of stems because the morphologically defined stems and the phonologically defined stems don't always line up in a clear-cut fashion (Stump's Indexing Autonomy Hypothesis). The same is true of Portuguese conjugation. For a regular verb of the default (first) conjugation we will need (at least) the following stem types:

(23)

a.	root $\text{Stem}_0 = \text{X}$	=	root
b.	base $\text{Stem}_1 = \text{X} + a/e/i$	=	root + theme vowel
c.	participle $\text{Stem}_2 = \text{Stem}_1 + d$	e.g.	*mostr-a-d-*
d.	infinitive $\text{Stem}_3 = \text{Stem}_1 + r$	e.g.	*mostr-a-r*

e. future/conditional
$\text{Stem}_4 = \text{Stem}_3$

As can be seen, in the (default) first conjugation, these stems can be derived regularly from the basic stem or root. The future/conditional stem is defined as the infinitive stem. There are three irregular future/conditional stems, however, whose lexical specifications for Stem_4 will override the default mapping given in (23e) (other Romance languages tend to have a larger number of such irregular stems). This means that we still have to define an additional stem even though its default realization is almost always something already defined.

The paradigm function for any inflected form has to include a specification of the stem. In the standard theory of Stump (2001) the paradigm function is defined over the root of the lexeme. Stem selection is then handled as the operation of a realization rule in Block '0', operating before any of the inflectional rules proper (see Stump 2001: 175f). These stem selection rules are formulated as a mapping between a pairing of <root, features> and a pairing <stem, features>.[9] However, we will find it convenient to change that notational convention slightly, by reformulating the generic paradigm function. What we need to ensure is that the paradigm function has the effect of mapping a set of features for a given lexeme to a word form. In practice, this will typically mean adding a set of affixes to a stem. In many languages it is the root which functions as the default (and sometimes the only) stem. However, in languages with root-and-pattern morphology (characteristically, in Semitic languages) the root on its own is never found as a stem. Moreover, for Romance conjugation we need to define a number of stems even for a regular paradigm, and the root itself generally functions as a degenerate stem type (if it is used at all). The default stem form is Stem_1, formed from the root + theme vowel. This is the stem we need for the present tense. Thus, the form *mostramos* 'we show' is derived by suffixing *-mos* to Stem_1, while the future indicative *mostraremos* is formed by affixing *-e* then *-mos* to Stem_4 (*mostrar*), and the conditional *mostraríamos* is derived by adding *-ía-* then *-mos* to Stem_4.

The upshot is that we will often find that it is somewhat counter-intuitive to treat the paradigm function as a mapping from <root, feature> pairings, as in standard PFM. We will therefore slightly re-conceptualize the paradigm function so that it takes not a concrete root or stem form as its first value, but rather takes the lexical index of the lexeme, £: PF(£, σ). This paradigm function will then denote the function specifying the word form for lexeme '£' occupying the cell labelled with the features σ.

As in the standard theory the paradigm function is defined in terms of its realization rule set. However, instead of taking a stem and building up its affixes in a 'cyclic' fashion, rule by rule, we will define the set of affixes corresponding to a given cell in the paradigm and align these affixes with respect to the stem

appropriate to that cell. In this respect we are formalizing the common descriptive practice of writing tables of inflectional paradigms in which each cell consists of the set of affixes with a space for the stem in the format 'a-b- … -c-d'. This makes it necessary to separate out the stem selection function from the rules of exponence for the affixes.[11]

Given these modifications, the definition of the paradigm function has to change somewhat. In relatively simple cases a paradigm function will now map a pairing of lexemic index and features to an ordered set consisting of (i) the stem (ii) the string(s) of affixes (iii) an alignment function for each string telling us whether it is a suffix or prefix. As we will see this is just the simplest characterization of the alignment function and the definition of the base to which affixes are attached. There are various complications which we will not address in this article. One of these is the question of circumfixes, in which a prefix-suffix pair concomitantly realize a set of features. This is common, for instance, in the Chukotko-Kamchatkan languages. Another complication arises when the stem itself is discontinuous and has affixes interspersed between its parts, as happens in the Siberian language isolate Ket, various Daghestanian languages, and arguably Athapaskan languages (see Spencer 2003 for discussion). A particularly remarkable case is that of the Lezgic language Udi (Harris 2002), in which a clitic is syntactically placed by enclisis to the focus phrase in certain syntactico-semantic configurations but whose default position is as an infix inside a monomorphemic root. Our approach is well-placed to meet the descriptive challenge of a language such as Udi. Mesoclisis, discussed below, represents a simpler case of non-canonical alignment.

The way we will implement the redefinition of the paradigm function is as follows. Consider the simple situation in which all affixes are realized just as suffixes and prefixes. For a given lexeme, each simplex (non-portmanteau) realization rule will specify a single affix. The affixes will be grouped into prefix and suffix strings and the position of an affix relative to other affixes in its string will be read off the rule block index. Where we have both prefixes and suffixes this will generate two sets of affix strings which have to be placed to the left/right of the stem. Stem selection can be defined purely in terms of the lexemic index and the feature set, σ, of the paradigm cell. In other words, stem selection is a property of the word form as a whole and not a property of any individual realization rule. In this latter respect our formalism will differ from that of standard PFM, in which every partially constructed word form is a kind of stem. This is because the output of each rule block serves as the base of narrowest applicable realization rule of the following block. On our account there is a strict demarcation between stems, a separately defined collection of morphological objects, and completed word forms. The intermediate 'virtual' stems found in the standard model don't exist on our model.

In our model the stem selection function is part of the paradigm function, not part of the operation of the realization rule. Therefore, in the simpler cases

the realization rule itself can be defined over just the set of features which it realizes. This is shown in (24), where 'i' is the rule block index, 'τ' is the feature set which the rule realizes, and C is the set of word class features over which the rule is defined and s is the full feature set:

(24) $R_{i,\{\tau\},C}(\sigma) = \text{affix}$

The rules for a given suffix or prefix string are composed to give the composite function shown in (25), where 'I, N' are rule block indices and 'τ1, τn' are the feature sets which each rule realizes:

(25) a. $R_{I,\{\tau 1\},C}(\sigma) \circ \ldots \circ R_{N,\{\tau n\},C}(\sigma) = <\text{affix}_1, \ldots, \text{affix}_n>$, i.e.
b. $(R_{I,\{\tau 1\},C} \circ \ldots \circ R_{N,\{\tau n\},C})(\sigma) = <\text{affix}_1, \ldots, \text{affix}_n>$

To illustrate, suppose we wish to generate the cluster *no-lo* 'to.us-it'. The individual rules for each clitic are shown in (26):

(26) a. $R_{nos}(\sigma) = \text{no(s)}$
b. $R_{lo}(\sigma) = \text{(l)o}$

The composed function for *no-lo* is shown in (27):

(27) $(R_{nos} \circ R_{lo})(\sigma) = \text{no-lo}$

The paradigm function must now define an appropriate stem and affix alignment for the various realization rules that determine affixes. The general format for a paradigm function has to specify (a) the stem to which the prefix/suffix strings are attached (b) the set of affixes (c) the placement of the affixes. The function is illustrated informally in (28), where b1, b2 are possibly null and correspondingly c1, c2 may be vacuous:

(28) $PF(£, \sigma) =_{def}$

a.	stem:	stem(£, σ)
b1.	exponence:	$R_{suff}(\sigma)$
b2.	exponence:	$R_{pref}(s)$
c1.	placement:	align(R_{suff}, Right, stem(£, σ))
c2.	placement:	align(R_{pref}, Left, stem(£, σ))

The subscripts 'suff' and 'pref' stand for positive and negative values of rule block indices, so that R_I represents a slot I suffix and R_{-III} represents a slot III prefix. The alignment function is therefore really a single function sensitive to the sign of the rule block index. We separate suffixes and prefixes in (28) for expositional clarity.

Any function having the general form of (28) will be a paradigm function. The importance of this observation will become apparent when we briefly discuss proclisis.

We will discuss the fragment of Portuguese conjugation shown in Appendix 1. The feature set needed to describe this fragment is given in (29):

(29) Tense: {Present, Imperfective, Preterite, Future, Conditional}
Mood: {Indicative, Imperative, Subjunctive, Infinitive}
Agreement: {Person {1, 2, 3}, Number {Singular, Plural}}
Form: {Present Participle, Past Participle}

For Portuguese regular verbs the stem selection mapping is given in (30):

(30) a. 1Sg, Pres, Indic; 1Sg, Pret; 3Sg, Pret — $Stem_0$
b. Past Part — $Stem_2$
c. Inf — $Stem_3$
d. {Fut, Indic} Cond — $Stem_4$
e. {} — $Stem_1$

The derivation for *mostraremos* is shown in (32), showing the application of the rules in the grammar fragment given informally in (31) (where the rules relate to first conjugation verbs):[12]

(31) Block I
ia. [Cond] ⇒ ía
ib. [1/2, Fut, Indic] ⇒ e

Block II
ii. [1Pl] ⇒ mos

(32) For $\sigma = \{1Pl, Fut, Indic\}$, $PF(\textsc{mostrar}, \sigma) =_{def}$
a. stem: $stem(\textsc{mostrar}, \sigma)$
b. exponence: $R_{suff}(\sigma)$
c. placement: $align(R_{suff}, Right, stem(\textsc{mostrar}, \sigma))$

where $R_{suff} = (R_I \circ R_{II})$

The stem and suffixes are evaluated as in (33):

(33) $(R_I \circ R_{II})(\sigma) = <e, mos>$
$stem(\textsc{mostrar}, \sigma) = Stem_4(\textsc{mostrar}) = mostrar$

The final evaluation is therefore that given in (34):

(34)
$$PF(\textsc{mostrar}, \sigma) =_{def} \begin{cases} a. & stem: & mostrar \\ b. & exponence: & <e, mos> \\ c. & placement: & align(<e, mos>, Right, mostrar) \end{cases}$$

$$= <mostrar, <e, mos>> = mostraremos$$

The derivation for *mostraríamos* is shown in (35):

(35) For $\sigma = \{1Pl, Cond\}$, $PF(\textsc{mostrar}, \sigma) =_{def}$

a. stem: $stem(mostrar, \sigma)$
b. exponence: $R_{suff}(\sigma)$
c. placement: $align(R_{suff}, Right, stem(mostrar, \sigma))$

where $R_{suff} = (R_I \circ R_{II})$

$$= \begin{cases} stem_4(\textsc{mostrar}) \\ <ía, mos> \\ align(<ía, mos>, R, stem_4(\textsc{mostrar})) \end{cases}$$

$= <mostrar, <ía, mos>> = mostraríamos$

In these examples we have defined the direction of attachment explicitly. However, rightward (suffixal) placement is the default for inflections (and the only possibility for suffixal clitic inflections). To eliminate this redundancy we simply write it into the most general form of the paradigm function for European Portuguese, as shown in (36):

(36) $$PF(£, \sigma) =_{def} \begin{cases} a. & stem: & stem(£, \sigma) \\ b. & exponence: & R(s) \\ c. & placement: & align(R(£, \sigma), Right, stem(£, \sigma)) \end{cases}$$

This default will be overridden by certain clitic rules. Otherwise, we don't need to include an explicit statement of the (c) component in any concrete instantiation of the Portuguese paradigm function.

The final question to be resolved is the issue of allomorphy, which we have claimed plays an important role in diagnosing affixal as opposed to clitic behaviour. There are a number of views we could take. However, in order to simplify comparison with the standard PFM model we will follow Stump (2001: 47f) and assume a set of morphophonological rules governed by morphological metageneralizations. These will, for instance, mandate truncation of the final *-s* of the *-mos* ending under certain circumstances, and can be deployed to handle the clitic internal allomorphy discussed above. We will not formalize these here since they are tangential to our argument. All that is required is the knowledge that a decidable procedure exists for computing allomorphic variants and that this procedure can be embedded within our model (cf. Luís 2004 for illustration).

We have now developed a formalism which will allow us to represent cliticization and bone fide affixation in the same fashion, by relatively minor modifications to standard PFM. We now return to cliticization to ensure that we can achieve both types of process without mishap.

6. CLITIC PLACEMENT IN SIMPLE TENSES

6.1. The identity of the host

It is conventional to think of the verb + clitic combination as a verb form fully inflected for 'proper' inflectional features to which is attached the clitic cluster. We thus have two layers of inflection. This picture will have to be modified for European Portuguese mesoclisis, but for other instances the picture is broadly true. However, the picture can't be entirely accurate because enclitics trigger idiosyncratic allomorphy when attached to certain verb forms (but not others). In particular, when *nos*, *vos* are attached to a 1Pl verb form (ending in *-mos*) the 's' of the *-mos* suffix truncates (as we have already seen). Importantly, this doesn't happen in 2Sg forms, which also end in 's': *mostramo-vos* (**mostramos-vos*) 'we show you' vs. *mostras-nos* (**mostra-nos*) 'you (sg.) show us'. We therefore need an account which captures the fact that the clitic cluster is independently placed by the syntax in proclitic contexts, the fact that clitics and normal inflections largely form two separate layers of affixation, and the fact that, notwithstanding this layering, the clitic cluster can interact with its host/stem in the manner of a genuine affix string. The mesoclitics, however, are placed with respect to a stem which, in the general case, is not actually a completed word (in practice it is usually, but not always, homophonous to the infinitive form).

6.2. Derivation of enclisis

To reflect the broad generalization that clitic features are expressed in an 'outer' layer of affixation we divide the morphosyntactic feature set, σ, for verbs into

'clitic' features, κ, and 'inflectional features', ι (this is comparable to Root vs. Word level or Level I vs. Level II affixation). The i features (for synthetic tense/aspect/voice forms) were provided in (29) and are repeated here as (37a).[13] The κ features, given here as (37b), are those that have been stated already in (13), together with the [Restricted] feature governing enclitic and proclitic placement (we defer till a later section discussion of periphrastic constructions):

(37) a.

Mood:	{Indicative, Subjunctive, Imperative, Infinitive}
Tense:	{Present, Preterite, Imperfect, Future, Conditional}
Agreement:	{Person: {1, 2, 3}, Number: {Singular, Plural}}
Form:	{Present Participle, Past Participle}

b.

Reflexive:	{Yes, No}
Case:	{Accusative, Dative}
Person:	{1, 2, 3}
Number:	{Singular, Plural}
Gender:	{Masculine, Feminine}

Since we have made the Subject Person/Number features in (37a) into subfeatures of an Agreement feature we can distinguish the subject markers, which realize genuine agreement, from the clitic markers, which usually realize arguments directly. Again, we will not bother to give feature names where these are derivable directly from the values.

There are various co-occurrence restrictions on combinations of features. For example, there is no preterite subjunctive among the i features, and the Gender feature is only defined for 3rd person accusative clitics. Since person/number features are themselves a subfeature of the (subject) Agreement feature, it is always possible to tell when, say, '3rd Pl' refers to a clitic or a subject marker, provided explicit reference is made to the Agreement feature. Given this, the set of i features and k features can be given as an unordered list. However, nothing would change materially if we were to distinguish the two sets of features by typing them. For expositional clarity, therefore, we will later assume a feature [AffixForm:{ι,κ}].

In Section 4.3 we argued for a revision to the standard theory of PFM in which realization rules specify exponence and placement separately. The linear order of the affix/clitic string is read off the rule block indices. We now give a more explicit characterization of the clitic cluster. For mnemonic convenience we will denote the realization rules for the three clitic blocks R_I, R_{II}, R_{III} as R_{refl}, R_{dat}, R_{acc} (but bear in mind that the 'dat' block includes non-3rd person accusative pronouns). The rules are defined very straightforwardly in (38):

(38) ia. $R_{refl}\{3, Refl\}(\sigma)$ ⇒ se

iia. $R_{dat}\{1\}(\sigma)$ ⇒ me
iib. $R_{dat}\{2\}(\sigma)$ ⇒ te
iic. $R_{dat}\{1Pl\}(\sigma)$ ⇒ nos
iid. $R_{dat}\{2Pl\}(\sigma)$ ⇒ vos
iie. $R_{dat}\{Dat\}(\sigma)$ ⇒ lhe
iif. $R_{dat}\{Pl, Dat\}(\sigma)$ ⇒ lhes

iiia. $R_{acc}\{Non\text{-}refl\}(\sigma)$ ⇒ o
iiib. $R_{acc}\{Pl, Non\text{-}refl\}(\sigma)$ ⇒ os
iiic. $R_{acc}\{Fem, Non\text{-}refl\}(\sigma)$ ⇒ a
iiid. $R_{acc}\{Pl, Fem, Non\text{-}refl\}(\sigma)$ ⇒ as

Recall that we take the portmanteau forms such as *mo* (*me* + *o*), *no-las* (*nos* + *as*) and so on as regular combinations which then undergo idiosyncratic allomorphy. It would be possible to derive them as genuine portmanteaus, straddling two position classes simultaneously, as described in Stump (2001: 141), but we haven't bothered doing this here. First, there is sufficient phonological transparency to make an analysis in terms of allomorphy feasible, and second it makes it easier to generalize over the fact that the four 3rd Person accusative forms identical portmanteaux with 1/2Sg and 1/2Pl dative pronouns. In addition, the allomorphy solution is rather easier for the reader to grasp.

Given this grammar fragment we turn to the derivation of some sample cases. In (39) we see the feature characterization for *mostramos-to* 'we show it to you(sg.)':

(39) mostramos-to: $\sigma = \iota \cup \kappa = \{\{Pres, 1Pl\}, \{\{3Sg, Acc\}, \{2Sg, Dat\}\}\}$

One natural way of representing the idea that the clitics attach to a fully inflected word is to allow a fully inflected word to be the base for cliticization in the definition of the paradigm function for the cliticized form. This means splitting up the realization rules for the complete word form in (39) into two 'superblocks', a 'clitics' block and an 'inflections' block and such that the 'clitics' block attaches its clitic sequence to the output of the 'inflections' block. In other words, the 'stem' for the clitics will be the word formed by an 'inner' paradigm function corresponding to the inflected word without clitics. In effect, the paradigm function defines two layers of affixation, the second applying to the paradigm function corresponding to the non-cliticized verb form. This is shown informally in (40) (continuing to ignore the placement function):[14]

(40) For $\sigma = \{\iota \cup \kappa\}$, where $\iota = \{Pres, Indic, 1Pl\}$ and
$\kappa = \{\{3Sg, Acc\}, \{2Sg, Dat\}\}$

$$PF(\textsc{mostrar}, \sigma) =_{def} \begin{cases} \text{a. stem:} & PF(\textsc{mostrar}, \iota) \\ \text{b. exponence:} & R_{clitics}(\sigma) \end{cases}$$

where:

$$\text{PF}(\textsc{mostrar}, \iota) =_{\text{def}} \begin{cases} \text{a.} & \text{stem:} & \text{stem}(\textsc{mostrar}, \iota) \\ \text{b.} & \text{exponence:} & R_{\text{suffix}}(\sigma) \end{cases}$$

In full, the paradigm function therefore takes the form shown in (41):

(41) For $\sigma = \{\iota \cup \kappa\}$, where $\iota = \{\text{Pres, Indic, 1Pl}\}$ and $\kappa = \{\{\text{3Sg, Acc}\}, \{\text{2Sg, Dat}\}\}$

$$\text{PF}(\textsc{mostrar}, \sigma) =_{\text{def}}$$

$$\begin{cases} \text{a.} & \text{stem:} & \begin{cases} \text{a.} & \text{stem:} & \text{stem}(\textsc{mostrar}, \iota) \\ \text{b.} & \text{exponence:} & R_{\text{suffix}}(\text{s}) \end{cases} \\ \text{b.} & \text{exponence:} & R_{\text{clitics}}(\sigma) \end{cases}$$

A sample derivation is shown below for *mostramos-to*. The basic paradigm function is given in (42):

(42) $\text{PF}(\textsc{mostrar}, \sigma) =_{\text{def}}$

$$\begin{cases} \text{a.} & \text{stem:} & \begin{cases} \text{a.} & \text{stem:} & \text{stem}(\textsc{mostrar}, \iota) \\ \text{b.} & \text{exponence:} & R_{\text{suffix}}(\text{s}) \end{cases} \\ \text{b.} & \text{exponence:} & R_{\text{clitics}}(\sigma) \end{cases}$$

$$= \begin{cases} \text{a.} & \text{stem:} & \begin{cases} \text{a.} & \text{stem:} & \text{stem}(\textsc{mostrar}, \iota) \\ \text{b.} & \text{exponence:} & R_{\text{suffix}}(\text{s}) \end{cases} \\ \text{b.} & \text{exponence:} & R_{\text{clitics}}(\sigma) \end{cases}$$

$$= \begin{array}{lll} \text{a.} & \text{stem:} & \text{mostramos} \\ \text{b.} & \text{exponence:} & R_{\text{clitics}}(\sigma) \end{array}$$

$$= \begin{array}{lll} \text{a.} & \text{stem:} & \text{mostramos} \\ \text{b.} & \text{exponence:} & \text{to} \end{array}$$

$$= \text{mostramoslho}$$

6.3. Derivation of mesoclisis

In normal enclisis, we effectively generate the clitic cluster and the inflected word form separately, and then attach the cluster to the inflected word. How

then do we handle mesoclisis, in which the clitic cluster appears to attach to a bound stem form? The exponence rules for the clitics are unchanged, it is only the relative placement of the clitics with respect to the inflections which has been reversed. All we need do, therefore, is to treat mesoclisis as alignment of the clitic cluster to the inflectional stem, Stem_4. We therefore postulate a special rule, sensitive specifically to the {Future, Conditional} features, which will allow the clitic features to be applied directly to the {Future, Conditional} stem form of the verb. This rule effectively reverses the position of the suffix and the clitic realization rules:

(43) Given $\sigma = \{\iota \cup \kappa\}$ such that $\iota \subset$ {Fut} or {Cond}, then
$\text{PF}(\textsc{mostrar}, \sigma) =_{\text{def}}$

$$\begin{cases} \text{a. stem:} & \begin{cases} \text{a. stem:} & \text{stem}(\textsc{mostrar}, \iota) \\ \text{b. exponence:} & R_{\text{clitics}}(s) \end{cases} \\ \text{b. exponence:} & R_{\text{suffix}}(\sigma) \end{cases}$$

In other words, mesoclisis is the result of a type of 'metathesis' rule defined over realization rule functions.

Where there are no clitic features to realize (i.e. where k is empty) the innermost exponence function is the identity function and hence the stem for ordinary suffixation collapses to the future/conditional stem form. We leave sample derivations as an exercise for the reader.

6.4. Derivation of proclisis

This paper is not concerned with proclitic placement. However, we need to show that proclisis can be handled in our framework and that it doesn't invalidate the analysis we have presented for enclisis and mesoclisis. We will assume a formal morphological feature which divides verb forms into two classes, Restricted and Unrestricted. Those verb forms marked [Restricted:Yes] are associated with proclitics. In the paradigm function of any verb bearing this feature the placement function for the formatives which realize the clitic features will be governed by syntactic principles (see Luís 2002, Luís and Sadler in press, for concrete proposals within LFG). The morphological feature characterization of a verb indirectly determines placement by triggering either the morphologically defined placement (affixation proper) or the syntactically defined placement (phrasal affixation). The latter effectively mimicks a rule of referral.

The default alignment for both clitics and standard inflectional affixes is rightward, as stated in (36) above. This default is overridden by any form which

bears the feature [Restricted:Yes]. Let's represent the syntactically defined proclitic alignment function by the shorthand 'align(proclitic)'. This is the name of a rule of referral which allows us to define the (c) component of a paradigm function with reference to syntactic terminals rather than lexical stems. We then need the additional rule (44):

(44) Where $\sigma = \{\iota \cup \kappa\}$, for any function *stem* and any realization rule function R_κ such that there is a paradigm function of the form (i), then there is a corresponding paradigm function, (ii), for σ' exactly like s except that [Restricted:Yes] $\subset \sigma'$:

(i) a. stem(£, σ)
b. $R_\kappa(\kappa)$
c. Align (stem(£, σ), Right, R_κ(£, κ))

(ii) a. stem(£, σ)
b. $R_\kappa(\kappa)$
c. align(proclitic)

Given the observation relating to (28) above, the subfunction inside the definition of the mesoclisis forms given in (43) counts as a paradigm function for the purposes of definition (44). Therefore, the clitic sequence will be treated as a disembodied unit whether its corresponding [Restricted:No] position is enclitic or mesoclitic. Where we have a [Restricted:Yes] future or conditional form the clitic sequence will therefore be placed by the separate proclisis principle and the remaining verb form will revert to the form without clitics.

Now, the [Restricted] feature is just one of a number of technical devices one might propose in order to achieve the effect of ensuring that the clitic cluster is generated as a disembodied unit, but given our assumptions it is the most natural one. We are effectively saying that the clitic placement rules define two complementary paradigms for the verb, one with enclitics, the other with proclitics. Although these two subparadigms don't themselves directly express any feature value, they are each associated with specific collections of features and so they indirectly serve to distinguish a 'neutral' paradigm from a 'non-neutral' paradigm, in much the way that many languages divide verb conjugation into 'main clause' and 'subordinate clause' paradigms, or whatever.

It is noteworthy that our solution here doesn't require us to state the syntactic placement rule in such a way as to pre-empt a morphological placement rule. Whether this is really the correct way to do things, or whether we should rather put the syntactic placement rule in competition with the normal (purely morphological) enclisis function is an independent question. More pertinent to our concerns is the role of the [Restricted] feature with respect to default placement. Duarte and Matos (2000: 127f) present strong evidence that

the modern language treats enclisis as the default (unlike the situation in other Romance languages). This is reflected in a very direct way on our account. Proclitic placement is found solely with verb forms associated with the [Restricted:Yes] feature. That feature will then be linked to the set of lexical, syntactic and semantic contexts which trigger proclisis. Under all other circumstances we obtain enclitic/mesoclitic placement. This will be an automatic consequence if we assume that [Restricted:No] is the default feature value. This therefore directly captures the claim that enclisis is the default (and the more restricted distribution of the mesoclitic suffixes guarantee that the enclitics are the overall default exponents). Given our separation of placement and exponence and the definition of 'paradigm function' which allows us to recognise a paradigm function within another paradigm function we don't need to say anything else. The use of default reasoning therefore permits us an elegant solution to an otherwise difficult analytical problem.

6.5. Inherent (lexical) reflexives

In examples (4) above we saw that the meaningless reflexive pronoun associated with lexemes such as QUEIXAR-SE 'complain' has the morphosyntax of any bona fide clitic. Recall that there is no verb **queixar*. The reflexive clitic therefore has a totally different status from that of true reflexive verb such as LAVAR-SE 'wash oneself' (cf. LAVAR 'wash (someone, something)'). Our grammar has to be able to represent the fact that the reflexive clitic of QUEIXAR-SE is at once merely a formal appendage to the verb, lacking any syntactico-semantic interpretation (e.g. as a reflexive pronoun) while at the same time it shares the morphosyntax of genuine reflexive clitic pronouns. In other words, we need a way to be able to say that an inherently reflexive lexeme has all the formal (morphological) properties of a reflexive verb and also those syntactic properties that follow from having that morphology, without entailing any other properties.

In our system, clitics are picked out in a purely formal (morphological) fashion by virtue of realizing 'κ' features rather than 'ι' features. Therefore, we simply need to say that the lexical representation for an inherently reflexive verb has to include pre-specification as [AffixForm:k, Refl:Yes] in the morphological part of its lexical entry.[15] Given such a lexical entry the verb will be input to the clitic realization rules which will spell out the inherently specified feature set as the clitic *se*, complete with its placement, as enclitic, mesoclitic or proclitic depending on the context. Nothing more need be said about such cases.

6.6. Stress in mesoclisis

Recall that the mesoclitic forms in the future/conditional have the unusual property of showing two lexical accents. Double accent is elsewhere unattested

in conjugation and clearly indicates an incomplete degree of morphologization (cf. section 3). As we have mentioned, the existence of two accents does not in and of itself prove that we are dealing with two separate words here (in any sense of the term), since double accent is also found in prefixed nouns such as *pré-escola* 'Kindergarten' and in adverbials in *-mente*. It might be argued that those types of word, too, are derived in the syntax, but then it would be difficult to see why such a theory couldn't also derive morphologically complex words which have only a single stress. But if that route is taken then the number of stresses in a word is no longer diagnostic of syntactic derivation. What has never been established in the literature on Portuguese is the claim there is a clear one-to-one correspondence between having a lexical stress and being a syntactic terminal. It's important to stress this point, because it is the source of a fair deal of confusion.

Within Paradigm Function Morphology there are various ways of treating lexical accent. We could, for instance, associate accent with particular parts of the paradigm, effectively taking accent to be an exponent of morphological properties. Alternatively, we could give individual formatives their own accent and then define rules for transforming combinations of accent within a single word form. In addition, we could adopt the one solution for some accentual patterns and the second solution for others. Not a great deal hinges on this, however.[16] It must be stressed that the facts of double accent can only possibly be relevant to our argument if there is reason to believe either (a) that our morphological model is in principle incapable of describing a language in which a word can have more than one accent, or (b) in all languages, a single word (syntactic terminal) may only bear at most one accent. Neither of these claims can be maintained, of course.

A simple way of handling the stress facts would be to assume that all roots and most affixes (other than the enclitics) have an inherent potential for bearing accent. In a completed word form, working from left to right, we delete the potential for accent on any syllable if it is immediately followed by an accentable syllable. Some affixes, such as the /i/ of the Conditional, are not just accentable but bear a lexical accent, which has the effect of deleting all subsequent accentable positions. Finally, at the end of the derivation we assign stress to all surviving accentable positions. Now all we need to assume is that the enclitics/mesoclitics, in keeping with the ancestry as clitics, totally lack the potential for accent. This means that any accentable syllable to their left will retain its accent potential, as will any syllable after the cluster. This assumption is sufficient to account completely for the double accentuation facts. Other analyses are possible, of course.

7. CLITIC PLACEMENT AND PERIPHRASIS

Portuguese has a series of 'compound tenses', that is, Perfect Aspect tenses expressed periphrastically by means of the auxiliary verb *ter* 'have' and also has

a periphrastic participial passive voice construction with the auxiliary *ser* 'be'. Here we will concentrate on the Perfect construction. The conjugation of the auxiliary is given in Appendix 2. Examples of the construction are provided in (45):

(45) a. tenho mostrado 'I have shown'
b. tinha mostrado 'I/he/she had shown'
c. teremos mostrado 'we will have shown'
d. teriam mostrado 'they would have shown'
e. que ela tenha mostrado 'that she have shown'
f. que tivéssemos mostrado 'that we might have shown'

As a preliminary to discussion of clitic placement in the compound tenses we present a sketch of an analysis of the periphrastic Perfect, based on the approach to periphrasis given in Ackerman and Webelhuth (1998) as developed in Sadler and Spencer (2001) and Spencer (2001). The constructions exemplified in (45) can be thought of as parts of the paradigm of the verb lexeme, and in this respect we can speak of the future perfect (45c) or the past perfect subjunctive (45f) and so on. However, the perfect series is invariably expressed periphrastically in the colloquial language,[17] so that there is no single word form of the verb lexeme that ever expresses that feature. Nonetheless, there is an important sense in which the perfect series (and the participial passive) are 'part of' the paradigm of a verb.

To capture this distinction we follow Sadler and Spencer (2001) in distinguishing two types of morphosyntactic features.[18] The features which regulate the well-formedness of individual word forms are morphological features, or m-features. The features which code the distinctions which are grammaticalized by means of inflection, function words, word order or whatever are members of the set of syntactic features, or s-features. The s-features we are interested in will correspond to the features which make up the level of functional structure (or f-structure) in Lexical Functional Grammar (LFG, Bresnan 2001). We will develop in outline form an analysis which makes use of the LFG architecture, so we shall also refer to the s-features as 'f-structure features' or 'f-features'.

The list of verbal f-features for Portuguese is given in (46):

(46) TENSE: {PRESENT, IMPERFECT, PRETERITE, FUTURE, CONDITIONAL}
MOOD: {INDICATIVE, IMPERATIVE, SUBJUNCTIVE, INFINITIVE[19]}
ASPECT: {NEUTRAL, PERFECT}
VOICE: {ACTIVE, PARTICIPIAL PASSIVE, REFLEXIVE PASSIVE}

(Most of) the m-features are given in (47):

(47) Tense: {Present, Imperfective, Preterite, Future, Conditional}
Mood: {Indicative, Imperative, Subjunctive, Infinitive}
Person: {1, 2, 3}
Number: {Singular, Plural}
Form: {Present Participle, Past Participle}

As can be seen, the TENSE, MOOD s-features have direct correspondents among the m-features. However, the ASPECT and VOICE features lack direct morphological correspondents, in that both are expressed periphrastically. In addition, there are m-features for Person/Number agreement which aren't represented at all in the s-feature set for verbs, since these are features of arguments (see below). Moreover, there are no syntactic feature correspondents to the m-feature [Form]. There has to be a stated mapping between the two sets of features telling us how the s-features are realized morphologically (and telling us the syntactic function of the m-features). For the Tense, Mood, Person, Number features this correspondence is largely trivial. However, even here there are interesting twists. First, we often find that formally 3rd person forms are used with honorific second person interpretation. How exactly this is to be treated is a complex question which we won't address, noting merely that it illustrates an intriguing example of the mismatch between form and function. Second, the 1Pl and 3rd person Imperative forms are actually Present Subjunctives. Thus, we may wish to say that, for example, the m-feature set [Person: 1, Number: Plural, Mood: Subjunctive, Tense: Present] is ambiguous between interpretations [PERSON: 1, NUMBER: PLURAL, MOOD: SUBJUNCTIVE, TENSE: PRESENT] and [PERSON: 1, NUMBER: PLURAL, MOOD: IMPERATIVE]. Again, this is a complex question, but it illustrates how even the supposedly 'simple' mappings can deviate from what is expected.

Before we can propose a mapping for the syntax-morphology interface we need to discuss briefly the nature of syntactic representations in LFG. In this theory syntactic representations have two main components, a phrase structure or constituent structure (c-structure) representation and a representation of functional structure (f-structure). The latter is a collection of features expressing those properties of the verb, its arguments and various adjuncts which regulate syntactic processes and/or semantic interpretation. Lexemes are individuated by being assigned a PRED value. This is an index of the lexical meaning of the lexeme together with its basic complementation structure (e.g. what arguments it takes). In simplified form the PRED value for the ditransitive verb mostrar is that shown in (48):[20]

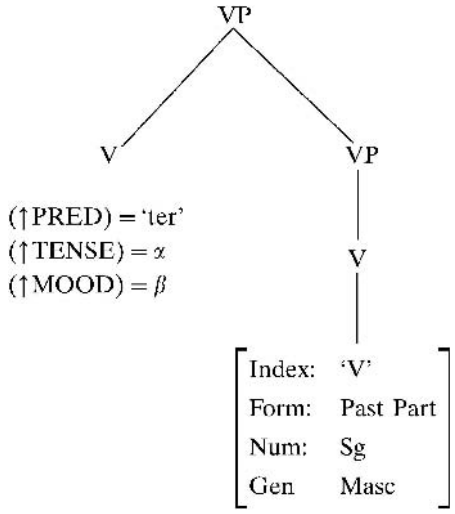
(48) PRED 'mostrar' <SUBJ, OBJ1, OBJ2>

The phrase fragment *temos mostrado* 'we have shown (something to someone)' will correspond to the partial f-structure in (49):

(49)
$$\begin{bmatrix} \text{PRED} & \text{'mostrar <SUBJ, OBJ1, OBJ2>'} \\ \text{TENSE} & \text{PRES} \\ \text{MOOD} & \text{INDIC} \\ \text{ASP} & \text{PERF} \\ \text{SUBJ} & \begin{bmatrix} \text{PRED} & \text{'PRO'} \\ \text{PER} & 1 \\ \text{NUM} & \text{PLUR} \end{bmatrix} \\ \text{OBJ1} & \\ \text{OBJ2} & \end{bmatrix}$$

In order to express the ASPECT PERFECT constructions we need to define a correspondence between the f-features and an appropriate small construction. In (50) we see an approximate characterization (which will be sufficient for present purposes):[21]

(50)
$$\begin{bmatrix} \text{PRED} & \text{'V'} \\ \text{TENSE} & \alpha \\ \text{MOOD} & \beta \\ \text{ASP} & \text{PERF} \end{bmatrix} \Rightarrow$$



Here, we treat the auxiliary as though it had a PRED value for the purposes of identifying it. Strictly speaking, however, such an element is purely a formal object with no meaning of its own, and hence no normal PRED value of its own. The PRED value here, then, is solely an index and not a meaning-bearing feature. Note that we are taking the m-features to express a function which takes the lexical index of the verb as an argument. This is just a convenient way of saying that the features are features of verb 'V'.[22]

Various details are omitted here, and alternative conceptions of the c-structure are certainly possible,[23] but the basic picture should be clear. Mapping (50) tells us that the perfect is expressed as a VP containing an inflected auxiliary and associated with the lexical verb in a non-finite, participial form. The auxiliary is here labelled as 'V', for convenience, to stress that it is a verb form and hence a possible target for proclitic placement. This construction must inherit a variety of syntactic properties from the syntax of auxiliary-participle constructions generally, so that we capture the fact that the perfect construction is invariant across various 'permutations' (see Sadler and Spencer 2001: 89f for more detailed discussion of the comparable situation in Latin).

How does the perfect construction interact with cliticization? In (51) we give the examples of (45) with enclitics (i.e. suffixal 'clitics'):

(51)	a.	tenho-to mostrado	'I have shown it to you'
	b.	tinha-to mostrado	'I/he/she had shown it to you'
	c.	ter-to-emos mostrado	'we will have shown it to you'
	d.	ter-to-iam mostrado	'they would have shown it to you'
	e.	que ela to tenha mostrado	'that she have shown it to you'
	f.	que to tivéssemos mostrado	'that we might have shown it to you'

We see proclitic placement in (51e, f) because the normal usage of the subjunctive defines a proclitic context. Notice that the proclitic is positioned on the left edge of the the auxiliary, it is never placed before the main verb form. In (51a, b) we see that the clitics appear as enclitics to the auxiliary, and in (51c, d) we see that they undergo mesoclisis with future/conditional auxiliary forms.

All of the forms in (51) involve finite auxiliary verbs. However, both lexical verbs and auxiliaries in non-finite forms (notably the infinitive form) can receive enclitics provided there is no finite verb in their clause. Some examples are shown in (52):

(52) a. É importante mostrar-to
is important show.INF-2SG.DAT/3.SG.MASC.ACC
'It's important to show it to you'

b. É importante ter-to mostrado
is important HAVE.INF-2SG.DAT/3.SG.MASC.ACC shown.PAST.PART
'It's important to have shown it to you'

Finally, examples of the participial passive in compound tenses show that it is the leftmost auxiliary which bears the enclitic, whether that auxiliary is finite (53a) or non-finite (53b):

(53) a. Tem-lhe sido mostrado
HAVE.3SG.PRES-3SG.DAT BE.PAST.PART SHOW.PAST.PART
'It has been shown to him'

b. ter-lhe sido mostrado
HAVE.INF-3SG.DAT BE.PAST.PART HOW.PAST.PART
'to have been shown to him'

Clearly, we need to expand our morphological rule battery and our syntax to morphology mapping to ensure that the leftmost auxiliary and not the participle is the locus of all three types of cliticization. First, we need to consider the s-feature correspondents of the clitics. How exactly the clitics are represented in the syntax depends on one's theory of syntax. For our purposes it doesn't greatly matter what syntactic theory is used provided it has the wherewithal to define s-features. We will therefore assume a set of pronominal s-features, including clitics, as shown in (54):

(54) REFL: {YES, NO}
CASE: {NOMINATIVE, ACCUSATIVE, DATIVE}
PERSON: {1, 2, 3}
NUMBER: {SINGULAR, PLURAL}
GENDER: {MASCULINE, FEMININE}

The mapping between such features and the clitics is trivial (though the mapping to the pronominal system as a whole is rather more complex). Where these features are expressed by a pronominal form (rather than a full noun phrase) a choice must be made between null form and full form pronoun (for subjects) and clitics and full form pronouns (for other cases). This is a matter of discourse structure which we ignore.

We are now able to see how the mapping from syntax to morphology handles periphrastic constructions with clitics. Consider the form in (55):

(55) Temos-to mostrado
AUX.PL-2SG.DAT/3.SG.MASC.ACC shown
'We have shown it to you'

The verbal f-features corresponding to (55) will be (56) (ignoring VOICE for simplicity of exposition):

(56)
$$\begin{bmatrix} \text{TENSE} & \text{PRESENT} \\ \text{MOOD} & \text{INDICATIVE} \\ \text{ASPECT} & \text{PERFECT} \end{bmatrix}$$

In addition, we need to specify the features of the arguments. These are given in (57):[24]

(57)
$$\begin{bmatrix} \text{SUBJ} & \begin{bmatrix} \text{PER1} & \\ \text{NUM} & \text{PLUR} \end{bmatrix} \\ \text{OBJ1} & \begin{bmatrix} \text{PER3} & \\ \text{NUM} & \text{SING} \\ \text{GEN} & \text{MASC/FEM} \end{bmatrix} \\ \text{OBJ2} & \begin{bmatrix} \text{PER3} & \\ \text{NUM} & \text{SING} \\ \text{GEN} & \text{MASC} \end{bmatrix} \end{bmatrix}$$

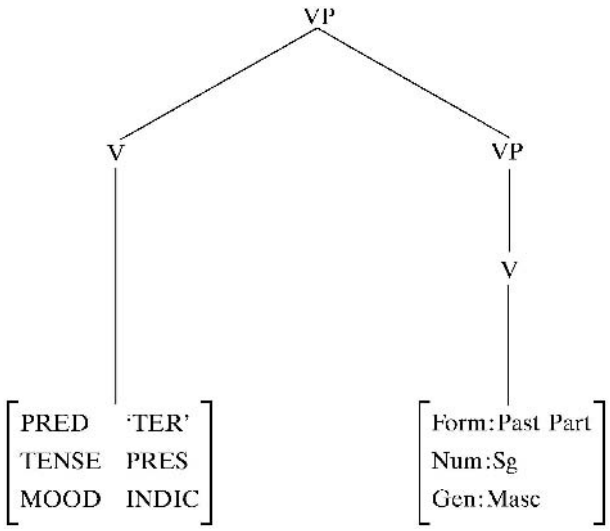
We have been using a (somewhat arbitrary) morphological feature of 'Case' to distinguish the accusative 3rd person clitics (*o, os, a, as*) from the dative clitics (*lhe, lhes*). The syntax-morphology mapping will need to include a mapping relation which states that an indirect object (OBJ1) pronoun is realized by a [Case: Dat] form while a direct object (OBJ2) pronoun is realized by a [Case: Acc] form. This mapping is illustrated in (58), where '⇒' stands for 'is realized by':

(58) OBJ1 PRED 'PRO' ⇒ [Case: Dat](Pro)
OBJ2 PRED 'PRO' ⇒ [Case: Acc](Pro)

The notation is intended to be read as stating that an OBJ1/OBJ2 pronominal attribute in f-structure has a c-structure correspondent of type/label 'Pro', which bears the [Case: Acc/Dat] m-feature.

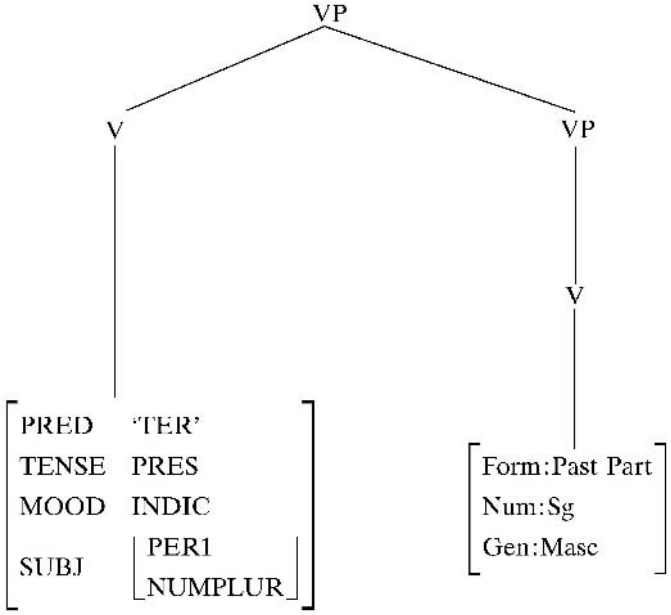
The f-feature characterization of (55) will now be the combination of (56, 57). We will build up a derivation for (55) in stages. First, we need to be able to construct the auxiliary + participle combination. This is given by a specific instantiation of (50), as seen in (59):

(59)
$$\begin{bmatrix} \text{PRED} & \text{'V'} \\ \text{TENSE} & \alpha \\ \text{MOOD} & \beta \\ \text{ASP} & \text{PERF} \end{bmatrix} \Rightarrow$$



We will assume, without comment, that there is a rule of Subject Agreement, which copies the features of the SUBJ argument onto the finite marked verb (whether auxiliary or main verb). This means that the representation delivered by (59) is enriched to (60):

(60)



Notice that the past participle component of the construction is defined in purely formal terms. In a sense, therefore, the mapping from syntactic to morphological representation is 'pre-compiled' for the lexical verb in the periphrastic construction. However, we still need to map the representation of the auxiliary on to a morphological form and that mapping gives us representation (61):

(61)
$$\begin{bmatrix} \textit{ter} \\ \text{Tense} : \text{Pres} \\ \text{Mood} : \text{Indic} \\ \text{SubjAgr} \begin{bmatrix} \text{Per} : 1 \\ \text{Num} : \text{Plur} \end{bmatrix} \end{bmatrix} \quad \begin{bmatrix} \textit{verb} \\ \text{Form} : \text{Past Part} \\ \text{Num} : \text{Sg} \\ \text{Gen} : \text{Masc} \end{bmatrix}$$

This corresponds to the required form, e.g. *temos mostrado.*

Now all we must do is to add the clitics. Recall that we have assumed a set of dedicated features for the clitic cluster. These will be mapped to the OBJ1, OBJ2 f-features in the obvious way.[27]

(62) a.
$$\begin{bmatrix} \text{OBJ1} \begin{bmatrix} \text{PRED 'PRO'} \\ \text{REFL } \alpha \\ \text{PER } \beta \\ \text{NUM } \gamma \\ \text{GEN } \delta \end{bmatrix} \end{bmatrix} \Rightarrow \begin{bmatrix} \text{Type} : \kappa \\ \text{Case} : \text{Dat} \\ \text{Refl} : \alpha \\ \text{Per} : \beta \\ \text{Num} : \gamma \\ \text{Gen} : \delta \end{bmatrix}$$

b.
$$\begin{bmatrix} \text{OBJ2} \begin{bmatrix} \text{PRED 'PRO'} \\ \text{REFL } \alpha \\ \text{PER } \beta \\ \text{NUM } \gamma \\ \text{GEN } \delta \end{bmatrix} \end{bmatrix} \Rightarrow \begin{bmatrix} \text{Type} : \kappa \\ \text{Case} : \text{Acc} \\ \text{Refl} : \alpha \\ \text{Per} : \beta \\ \text{Num} : \gamma \\ \text{Gen} : \delta \end{bmatrix}$$

By virtue of these mapping rules we can easily determine the clitic features which will express the arguments of the clause. However, we still have to ensure that it is the auxiliary and not the main verb that is the host of encliticization in compound tenses. The first distinction we need to characterize is that between

encliticization and procliticization contexts. For this we will follow Luís and Sadler (2002) and adopt a formal syntactic feature TYPE {NEUTRAL, NON-NEUTRAL} available in f-structure representations and linked to the morphological [Restricted] feature. The NEUTRAL type construction is associated with enclitics and the NON-NEUTRAL type construction governs the proclisis placement rule. We will ignore proclisis here, since we are not concerned with the syntactic issues. Therefore, we can assume throughout that the representations we discuss bear the (default) value TYPE NEUTRAL.

Clitics take as their host the leftmost verbal daughter of the VP of which they are an argument (or alternatively, the leftmost verbal daughter under I^0 within I′). There are various ways of referring to such a position depending on the details of the syntactic architecture. We will simply assume a function FIRST HEAD DAUGHTER (FHD) which picks out the leftmost verb constituent of a node. (We assume that this informal notation can easily be translated into some appropriate statement in terms of word order domains, tree fragments, c-command or whatever.)

We now wish to state a constraint whose informal effect is stated in (63):

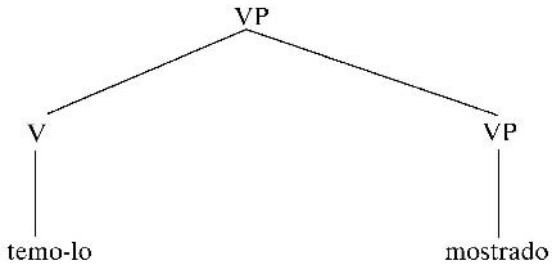
(63) If the f-structure associated with a clause contains the substructure for an object (clitic) pronominal then the first head daughter is uniquely annotated for that object's f-structure.

By 'uniquely annotated' we mean that no other node in the clause can bear such an annotation.

The constraint in (63) will now have the desired effect. It will rule in structures such as (64) but rule out the structure in (65):

The final step in the analysis is to show that the syntax-morphology mapping

(64) a.

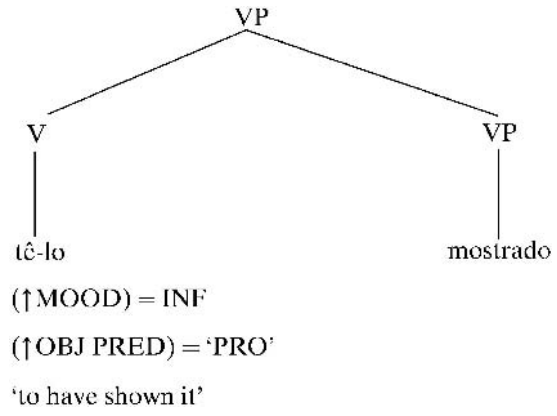


(↑TENSE) – PRES

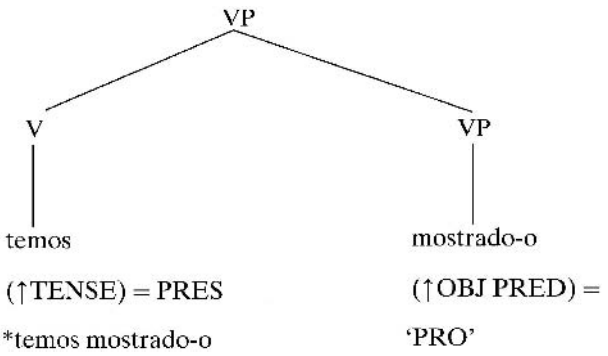
(↑OBJ PRED) = 'PRO'

'we have shown it'

(64) b.



(65)



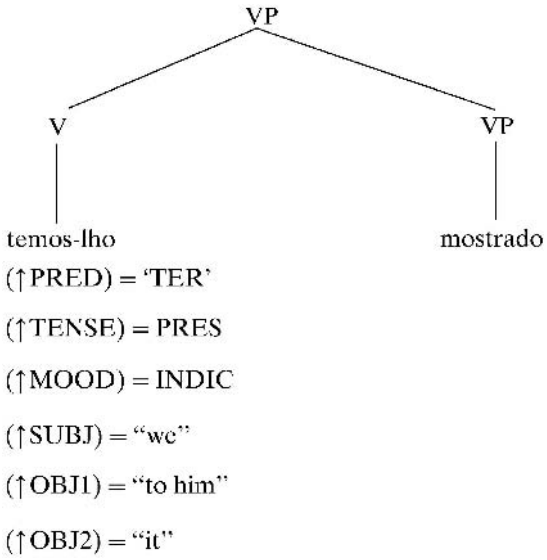
will provide the right morphological forms. We will consider the example (55), *temos-to mostrado* 'we have shown it to you'. The f-structure corresponding to this is (66):

(66)

$$\begin{bmatrix} \text{PRED} & \text{'mostrar <SUBJ, OBJ1, OBJ2>'} \\ \text{TENSE} & \text{PRES} \\ \text{MOOD} & \text{INDIC} \\ \text{ASP} & \text{PERF} \\ \text{TYPE} & \text{NEUTRAL} \\ \text{SUBJ} & \text{"we"} \\ \text{OBJ1} & \text{"to him"} \\ \text{OBJ2} & \text{"It"} \end{bmatrix}$$

The rule for Perfect Aspect (50) together with principle (63) will give us the structure (67) (incorporating the unformalized Subject Agreement rule):

(67)



In the syntax-morphology mapping the f-structure feature TYPE NEUTRAL maps to the m-feature [Restricted:No]. In fact, this mapping is indirect, since both feature values are defaults. This means that other things being equal the value for TYPE will turn out to be NEUTRAL and the value for [Restricted] will turn out to be 'No'. The mapping for the past participle form is trivial since it is defined in the Perfect Aspect rule. The rest of the mapping maps the TENSE, MOOD, SUBJ features to their correspondents in the expected fashion, and (66) will map the two OBJ feature sets to their corresponding clitic m-feature sets (the κ features). As a result, the auxiliary V node in (67) will be mapped to the representation in (68):

(68)
$$\left[\begin{array}{l} \textit{ter} \\ \text{Tense} : \text{Pres} \\ \text{Mood} : \text{Indic} \\ \text{SubjAgr} \left[\begin{array}{l} \text{Per} : 1 \\ \text{Num} : \text{Plur} \end{array}\right] \\ \left[\begin{array}{l} \text{Type} : \kappa \\ \text{Refl} : \text{No} \\ \text{Case} : \text{Dat} \\ \text{Per} : 2 \\ \text{Num} : \text{Sg} \end{array}\right] \\ \left[\begin{array}{l} \text{Type} : \kappa \\ \text{Refl} : \text{No} \\ \text{Case} : \text{Acc} \\ \text{Per} : 3 \\ \text{Num} : \text{Sg} \\ \text{Gen} : \text{Masc} \end{array}\right] \end{array}\right]$$

From this representation we can generate the form *temos-to* from the morphological rules already formulated.

8. CONCLUSIONS

The key features of our analysis can be summarized as follows.

First, our analysis can be said to be 'lexical', with cliticization being an essentially morphological process. We define cliticization in terms of operations over word forms rather than syntactic terminals. This allows us to capture the many respects in which cliticization, especially in European Portuguese, is similar to affixation. In this respect our analysis follows the tradition of lexical syntactic frameworks such as LFG and especially HPSG.

Second, our analysis incorporates what Stump (2001) calls an 'inferential-realizational' theory of morphology. This is a top-down perspective, in which morphological forms are determined on the basis of the full feature content of the word form to be realized. One important characteristic of this approach is that the morphological formatives themselves are not lexical entries with their

own feature sets or meanings. Rather, they are exponents, marks which help indicate the feature set of the whole but not necessarily in a monotonic fashion.

We have embedded this morphological approach to the clitics in an LFG syntax and sketched mapping rules telling us how to get from the LFG functional structure to morphological form.

Although our approach relies heavily on the theory of Paradigm Function Morphology, we have introduced a number of modifications to the standard theory put forth in Stump (2001). The key differences are:

(i) We separate the exponence (realization) of features from the placement (linearisation) of the exponents (morphs), so that we can generalizations over each separately. This means that we no longer generate an affix string by successive cycles of attachment of a single affix as the realization rules move through rule blocks. Rather, the indexing which serves to assign realization rules to their blocks is deployed directly to specify the linear order of exponents in the string. The string itself is then defined by the composition of the sets of realization rule functions of standard Paradigm Function Morphology.

(ii) The paradigm function is defined over an index identifying the lexeme, rather than the root of the lexeme. In addition, the paradigm function is enriched so that it characterizes the stem in a slightly more direct fashion than that adopted by Stump. The result is that it becomes easier to collapse the attachment of affixes (including pronominal clitics) to (bound) stems and the attachment of clitics to inflected word forms.

(iii) We extend Paradigm Function Morphology to the realization/placement of clitics. These are treated as affixes which have unusual placement properties. The so-called 'mesoclitics' turn out to be pure affixes.

(iv) The main difference between European Portuguese enclitics and 'true' suffixes is featural: the enclitics are assigned to a special feature type, κ, and it is exactly these clitics which have the peculiar property of being linearized in the manner of affixes when right attached, and of being linearized as phrasal affixes in the syntax when left attached. However, since we have separated exponence and placement the enclitics (including enclitics proper and mesoclitics) and proclitics are realized by exactly the same rules of exponence.

There are a number of respects in which this style of analysis can and should be extended. It would be important to ensure that other types of Romance clitic system can be accommodated in a similar fashion. The distribution of clitics in European Portuguese is about as complex as anything else in Romance (though we don't see the full variety of 'clitic climbing' found in, say, Italian or Spanish).

However, the cluster itself is relatively simple and doesn't contain problematical elements like the adverbial clitics 'y/en' of French. It would therefore be important to develop an analysis for French.

Clitics show a very considerable degree of variety in placement cross-linguistically. It is important to ensure that we can extend our treatment to Wackernagel systems such as that of Bosnian/Croatian/Serbian or the somewhat different system of Bulgarian, as well as other language types familiar from the literature on clitics, such as Polish, Kwakiutl and so on. What we have shown here, however, is that the Paradigm Function model can be successfully deployed to handle even those instances in which a clitic cluster enjoys a double like as an affix string attached in the domain of a morphological word and as a phrasal affix string attached in the domain of a syntactic construction.

NOTES

[1] Versions of this paper were presented at the 2001 Mediterranean Meeting on Morphology, Universitat Pompeu Fabra, Barcelona, the 2002 Meeting of the Chicago Linguistic Society and the 2002 Autumn Meeting of the Linguistics Association of Great Britain, UMIST, Manchester. We would like to thank Louisa Sadler and Greg Stump for helpful comments on earlier drafts of this and related work, and to two anonymous referees for picking up various infelicities, oversights and misformulations in an earlier version. Ana Luís conducted this research while in receipt of grants from the AHRB/British Academy (UK) and the FCT/Ministério para a Ciência e a Tecnologia (Portugal), and Andrew Spencer conducted part of this research under a Leverhulme/British Academy Senior Research Fellowship. We are both grateful to these bodies for their support.

[2] An important part of the argument of Duarte and Matos (2000 is that the European Portuguese clitics are "affix-like" (p. 126, 128, 129) or behave like "quasi-verb inflectional affixes" (p. 130). It is this property which permits the checking of 'strong' features on their account (p. 130). We agree with their pre-theoretic characterization of the morphology and take their observations to their logical conclusion.

[3] Raposo (2000: 284) claims that the Future auxiliary can be used independently, as in (i):

(i) Penso que ele há-de cantar
I.think that he has of to.sing
'I think that he will sing'

It is also possible to find this in the Imperfect: *Ele havia de cantar*. However, we believe that the synthetic Future and *haver de* + Infinitive are distinct constructions. They are distinct stylistically and there are subtle modal differences in the semantics. A reviewer reminds us that the verbal stem in the *haver de* + Infinitive construction is not always identical to the verbal stem in the synthetic form, e.g. *havia de fazer* 'had to do' vs. *faria* 'would do'.

[4] An anonymous reviewer attempts to defend the Duarte & Matos/Vigário approach, pointing out, for instance, that they assume that the Future/Conditional marker has become a "T-affix", that is, that is has become "lexicalized under T" (a Tense node in the syntax). However, we are unable to find a coherent interpretation of these remarks other than one which

amounts to an admission that we are dealing with an affixal inflection and not a distinct syntactic terminal. One of the general problems with evaluating syntactic treatments of this sort is that the central problem is often 'solved' in such a fashion, by re-stating it in a completely inexplicit formulation which hardly goes beyond an exercise in terminology.

[5] Strictly speaking the function is defined slightly differently in Stump (2001). We simplify Stump's account for ease of exposition. It is a trivial matter to re-cast our formulation in the technically more accurate format.

[6] In Stump's model rule (14ia) would be formulated as in (i) (where X′denotes X or any variant of X as defined by the set of morphophonological metageneralizations which determine allomorphy), and so on for the other rules of (14):

(i) $R_{I,\{PER:1,NUM:Sg,REFL:Yes\},V}(<X, \sigma>) \Rightarrow <X'me, \sigma>$

[7] More formally $R_{II,\{1Pl\},V}(\sigma) \Rightarrow mos$

[8] See Spencer 2000 for application of this idea to the clitic cluster placement of Bulgarian and Macedonian.

[9] But recall that we are ignoring the repetition of the feature set in the output of the mapping.

[10] Effectively we are incorporating Stump's L-indexing (2001: 44) into the definition of the paradigm function. By this means we automatically solve the problem of lexical homophony for which L-indexing is required and therefore we can dispense with the principle of Persistence of L-indexing (2002: 45).

[11] One issue which has not been addressed in this framework is how to handle cases of reduplication, particularly when the reduplication process is allowed to operate over a base consisting of the root and the first affix added by the realization rules. This is as much a problem for standard PFM as for our revision, and we will not explore the matter here, merely noting it as a problem for future research. A variety of proposals might be made, all of which would depend on exactly how we handle the phonology of reduplication.

[12] More formally, (31ia) would be (i):

(i) ia. $R_{I,\{MOOD:Cond\},CLASS:1stConj}(\sigma) \Rightarrow$ ía

[13] The choice of inflectional features and the way they are distributed is somewhat arbitrary and designed for expositional purposes. A full account might make slightly different analytical choices.

[14] This definition is pre-empted where s contains [Restricted:Yes]. The alignment/placement function is then defined by the syntax. We briefly touch on this later.

[15] In the next section we will see that [AffixForm:k, Refl:Yes] are morphological features (or m-features), whose role is solely to govern the construction of word forms. The features which define a reflexive pronoun as a syntactic reflexive will be called syntactic or s-features. The distinction between m-features and s-features allows us to represent a commonly occurring situation such as this one very straightforwardly.

[16] Despite the false beliefs of two of our reviewers. It is a commonly held misconception that the existence of two stresses in cases of mesoclisis demonstrates that we are dealing with two syntactic words. We must stress that there has never been any serious justification of this assumption, and since it is a false assumption in the domain of nouns and of adjectives/adverbs it should not be too surprising to find that the assumption is equally false for verbs.

[17] There is a synthetic Secondary Pluperfect most found in the literary register, which we ignore in this paper.

[18] The distinction is very close to the distinction drawn in Stump (2002) and Ackerman and

Stump (forthcoming) between morphological and syntactic paradigms, and for present purposes these could be taken to be referring to the same phenomenon.

[19] The characterization of the Infinitive as a Mood is traditional, but arbitrary. Note that the Conditional patterns like a tense form even though its meaning goes beyond simple time reference.

[20] This is simplified in the sense that it lacks the f-feature metavariables that tell us that the SUBJ etc. functions refer to features of the higher f-structure in which the lexical entry is placed.

[21] Gender is not given as a verbal feature, either s-feature or m-feature. This is because it is a purely nominal feature. The reason that the participle bears a value for this feature is that the participle is categorially an adjective. It therefore inherits the Gender feature from the set of inflections associated with adjectives. We will not discuss how this happens, but see Sadler and Spencer (2001) for discussion of similar facts in Latin.

[22] The m-feature characterization of the verb in (50) is not to be confused with the LFG f-structure, of course. The two types of feature structure are kept apart formally by the simple device of typing. This is represented graphically in (50) and subsequently by our notational convention under which f-features are given in capitals and m-features in lowercase with initial capital.

[23] In particular we could treat the auxiliary verb as a dependent of a functional co-head, I, selecting a VP complement (Bresnan 2001: 99). This would complicate the exposition needlessly, however.

[24] It is very easy to translate the informal notation we use here into the formally precise notation of LFG. We will not do this, however, in order to avoid unnecessary expositional complications which would distract from the argument. We draw the reader's attention, however, to the fact that the LFG architecture lends itself particularly well to expressing the syntax-morphology mappings that we are interested in.

[25] One of the interesting phenomena that a full account would have to take into consideration is the Person/Number inflected Infinitive of Portuguese.

[26] We have clarified the morphological feature design slightly adding an index, *ter* and *verb*, respectively, to keep track of the lexical item whose features are being expressed.

[27] We assume without comment that OBJ2 is interpreted as the default object when there is only one OBJ function.

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APPENDICES

Appendix 1

Fragment paradigm for 1st conjugation verb *mostrar* 'show'. The + sign separates stem-forming suffixes while the – sign separates genuine inflections.

	present indicative	present subjunctive	preterite
1Sg	mostr-o	mostr + e	mostr-ei
2Sg	mostr + a-s	mostr + e-s	mostr + a-ste
3Sg	mostr + a	mostr + e	mostr-ou
1Pl	mostr + a-mos	mostr + e-mos	mostr + a-mos
2Pl	mostr + a-is	mostr + e-is	mostr + a-stes
3Pl	mostr + a-m	mostr + e-m	mostr + a-ram

	imperfect indicative	imperfect subjunctive	future	Conditional
1Sg	mostr + a-va	mostr + a-sse	mostr + a + r-ei	mostr + a + r-ia
2Sg	mostr + a-va-s	mostr + a-sse-s	mostr + a + r-á-s	mostr + a + r-ia-s
3Sg	mostr + a-va	mostr + a-sse	mostr + a + r-á	mostr + a + r-ia
1Pl	mostr + á-va-mos	mostr + á-sse-mos	mostr + a + r-e-mos	mostr + a + r-ía-mos
2Pl	mostr + á-ve-is	mostr + a-sse-is	mostr + a + r-e-is	mostr + a + r-íe-is
3Pl	mostr + a-va-m	mostr + a-sse-m	mostr + a + r-ão	mostr + a + r-ia-m

Appendix 2

ter 'have': auxiliary used for forming compound (perfect) tenses, with *-ado* participle, e.g. *tenho mostrado* 'I have shown'

	present indicative	present subjunctive
1Sg	tenho	tenha
2Sg	tens	tenhas
3Sg	tem	tenha
1Pl	temos	tenhamos
2Pl	tendes	tenhais
3Pl	têm	tenham

	imperfect indicative	imperfect subjunctive	future	conditional
1Sg	tinha	tivesse	terei	teria
2Sg	tinhas	tivesses	terás	terias
3Sg	tinha	tivesse	terá	teria
1Pl	tínhamos	tivéssemos	teremos	teríamos
2Pl	tínheis	tivésseis	tereis	teríeis
3Pl	tinham	tivessem	terão	teriam

Appendix 3

Feature Co-occurrence Restrictions operative over the clitic clusters.

Given the feature set in (13), restrictions 1–4 apply:

1. A well-formed feature set is at most
   {{[Reflexive:α1], [Case:α1], [Person:γ1], [Number:δ1], [Gender:ε1]},
   {[Reflexive:α2], [Case:β2], [Person:γ2], [Number:δ2], [Gender:ε2]}}
2. If [Gender] is defined, then [Person:3]
3. *{ … { … [Case:a] … }, { … [Case:a] … } … }

The restriction to two clitics in the cluster is a direct consequence of restriction 1. We may ultimately wish to link this to syntactic co-occurrence restrictions of some kind, but we leave that question open subject to further investigation.

Syncretism and iconicity in Icelandic noun declensions: a Distributed Morphology approach*

GEREON MÜLLER

1. INTRODUCTION

The main goal of this paper is to provide a reasonably comprehensive account of the core system of noun inflection in Icelandic. The analysis will make crucial use of principles developed in Distributed Morphology (see Halle and Marantz (1993), Harley and Noyer (2003)).

A conspicuous property of Icelandic noun inflection is that a small set of inflection markers is used to generate a large number of inflection classes (or declensions). Constant re-use of inflection markers implies that there is syncretism in abundance. Such syncretism comes in two varieties. First, there may be two (or more) cases that share a single marker; I will refer to this (standard) kind of syncretism that holds within a given inflection class as intra-paradigmatic syncretism. Second, there may be two (or more) inflection classes that share a single marker; and I will refer to this kind of syncretism that holds across inflection classes as trans-paradigmatic syncretism.[1] I will argue that a substantial number of these instances of syncretism can (and should) be derived systematically. This makes it necessary to refer to natural classes of cases and inflection classes, respectively. Such natural classes result from decomposing standard case features (like [nom], [acc]) and inflection class features (like [class 1], [class 2]) into more primitive features: Cross-classification of these features yields full specifications representing cases and inflection classes. Underspecification with respect to these features gives rise to natural classes of cases and inflection classes that inflection markers can then refer to.

Furthermore, the set of inflection markers that I propose for Icelandic noun inflection will be shown to meet an iconicity requirement, to the effect that the form of an inflection marker (more specifically, its position on the sonority hierarchy) and its function (more specifically, the degree of specificity of its feature make-up) correlate.

In addition to accounting for instances of syncretism and iconicity, the present analysis is designed to capture certain general properties and recurring patterns that the system of Icelandic noun declensions exhibits, and that do not seem to be accidental. It is at this point that the specific choice of morphological theory becomes relevant: Whereas feature decomposition and underspecification are devices that can be (and, in fact, are) used in many other morphological theories, Distributed Morphology is unique in assuming the operations of *impoverishment* (see Bonet (1991) and *fission* (see Noyer (1992)), which will be argued to be responsible for the emergence of systematic patterns in Icelandic noun declensions.

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I will proceed as follows. Section 2 lays out the system of Icelandic noun declensions, addressing weak declensions, strong feminine declensions, strong masculine declensions, and the strong neuter declension in turn. Section 3 identifies generalizations emerging from the empirical evidence presented in section 2 that a morphological analysis should account for. These generalizations concern syncretism, iconicity, and seven language-specific systematic patterns. Section 4 then presents an analysis in terms of Distributed Morphology that is based on (i) the formation of natural classes of cases and inflection classes, (ii) the application of impoverishment and fission, and (iii) vocabulary insertion determined by the Subset Principle. Finally, section 5 contains concluding remarks.

2. ICELANDIC NOUN DECLENSIONS

Icelandic has four cases (nominative, accusative, dative, genitive) and two numbers (singular, plural). Noun stems combine with fusional, suffixal inflection markers. Choice of the correct inflection marker for a given noun stem depends on (a) case, (b) number, and (c) the inflection class that the noun stem belongs to. Icelandic exhibits a substantial number of inflection classes. Pétursson (1992) and Rögnvaldsson (1990), e.g., assume sixty and fifty-five declensions, respectively. However, if one is willing to abstract away from interfering factors like stem alternations, lexical idiosyncrasies, systematic morpho-phonological variation, and the like, and focusses on the core system of Icelandic noun inflection, the number of separate noun inflection classes can be assumed to be considerably smaller (even though it is still larger than in languages like Russian, Greek, or German). Based essentially on the system of declensions in Kress (1982) (also compare Guðfinnsson (1957), summarized in Hrafnbjargarson (2003), I will assume that there are twelve basic noun inflection classes in Icelandic; and I will focus on these in what follows, disregarding the above-mentioned factors that increase complexity of the overall system.[2] Each inflection class is inherently tied to a specific gender: There are five masculine classes, five feminine classes, and two neuter classes. A first basic distinction is between weak and strong declensions. Let me begin with the former.

2.1. Weak Declensions

As shown in table 1, there are three weak declensions in Icelandic, one for each gender: Mw, Nw, and Fw represent the masculine, neuter, and feminine weak declensions, respectively.[3]

Table 1: Weak inflection classes

	Mw *penn* ('feather')	Nw *aug* ('eye')	Fw *húf* ('cap')
nom sg	penn-i	aug-a	húf-a
acc sg	penn-a	aug-a	húf-u
dat sg	penn-a	aug-a	húf-u
gen sg	penn-a	aug-a	húf-u
nom pl	penn-ar	aug-u	húf-ur
acc pl	penn-a	aug-u	húf-ur
dat pl	penn-um	aug-um	húf-um
gen pl	penn-a	aug-n-a	húf-a

There are only three distinct inflection markers in the weak declensions in the singular: First, /i/ is the nominative marker in the weak masculine declension. Second, /u/ is the marker for all non-nominative cases in the weak feminine declension. Finally, /a/ emerges as the default inflection marker for all cases in all weak declensions (i.e., the elsewhere case); it shows up whenever there is no more specific marker for a given morpho-syntactic function.[4] Thus, there is massive syncretism in the singular of the weak declensions, both of the intra-paradigmatic type (with /u/ and /a/) and of the trans-paradigmatic type (with /a/). Furthermore, without going into the details of the morphological analysis yet, we can already note that the distribution of singular markers in table 1 reveals an interesting pattern: The more specific a marker's function is (i.e., the more limited its distribution is), the less sonorous is its form. Thus, the default marker /a/ is least specific and most sonorous, the highly specific marker /i/ is least sonorous, and /u/ is in between in both respects. I would like to suggest that this pattern is not accidental but reflects a meta-grammatical iconicity restriction that underlies not only the weak singular declension but, as I will argue below, other domains of Icelandic noun declension as well.

In contrast to what is the case with the singular markers, the plural markers and their patterns of distribution in the weak declensions are similar to those found with strong inflection classes, and I will turn to them later.[5] That said, let me now address the strong inflection classes for feminines, masculines, and neuters, in that order.

2.2. Strong Feminine Declensions

I assume that that there are four main strong inflection classes for feminines. Following standard practise, these can be referred to as the a-declension (Fa), the i-declension (Fi), and consonantal declensions 1 and 2 (Fc1, Fc2); see table 2.[6]

Table 2: Strong feminine inflection classes

	Fa *vél* ('machine')	Fa′ *drottning* ('queen')	Fi *mynd* ('picture')	Fc1 *geit* ('goat')	Fc2 *vík* ('bay')
nom sg	vél-Ø	drottning-Ø	mynd-Ø	geit-Ø	vík-Ø
acc sg	vél-Ø	drottning-u	mynd-Ø	geit-Ø	vík-Ø
dat sg	vél-Ø	drottning-u	mynd-Ø	geit-Ø	vík-Ø
gen sg	vél-ar	drottning-ar	mynd-ar	geit-ar	vík-ur
nom pl	vél-ar	drottning-ar	mynd-ir	geit-ur	vík-ur
acc pl	vél-ar	drottning-ar	mynd-ir	geit-ur	vík-ur
dat pl	vél-um	drottning-um	mynd-um	geit-um	vík-um
gen pl	vél-a	drottning-a	mynd-a	geit-a	vík-a

The four inflection classes are very similar in the singular: First, the genitive marker is /ur/ (Fc2) or /ar/ (all remaining classes). Second, the non-genitive cases have no overt marker at all. There is but one exception to the second generalization: In a subclass of Fa (here called Fa′), an inflection marker /u/ shows up in accusative and dative contexts. Fa′ primarily contains stems ending in *ing* or *ung* (often abstract nouns). However, singular /u/ is often absent even with these stems, especially in accusative contexts. The stems then follow Fa fully (see Kress (1982: 66)).

Given that the strong feminine inflection classes are nearly (or, in the case of Fa, Fi, and Fc1, completely) identical in the singular, it is clear that the differences that motivate these inflection classes in the first place must lie in the plural. The markers for dative and genitive plural contexts (/um/ and /a/, respectively) do not yet fulfill this expectation: Not only do they fail to vary across the strong feminine inflection classes; they are in fact uniform across *all* inflection classes and all genders (with the above proviso concerning /n/ in genitive plural contexts of weak feminine and neuter declensions). Thus, these markers fall outside the basic inflectional system (much like the Russian markers /am/, /ami/,

and /ax/ for dative, instrumental, and locative plural contexts, respectively, and the Greek marker /on/ for genitive plural contexts).

However, there is variation across inflection classes with the markers for nominative and accusative plural. Class Fa has /ar/ as the inflection marker for nominative and accusative plural; class Fi has /ir/ in these two contexts; and classes Fc1 and Fc2 have /ur/ here (as does the weak feminine declension Fw in table 1, which is thus identical to Fc in the plural). Thus, the nominative and accusative plural forms of a noun stem can be viewed as *Kennformen* (leading forms) (see Wurzel (1984, 1987); also see Blevins (2003)) that help to indicate inflection class, and that are thereby ultimately responsible for the name allotted to the inflection classes in table 2.[7]

2.3. Strong Masculine Declensions

Consider next strong masculine declensions. Again, four distinct classes can be identified: As with feminines, there is an a-declension (Ma), an i-declension (Mi), and a consonantal declension (Mc). In addition, there is a u-declension (Mu) that does not have a counterpart in the feminine domain.[8] The four strong masculine declensions are shown in table 3.

Table 3: Strong masculine inflection classes

	Ma *hest* ('horse')	Mi *stað* ('place')	Mu *fjörð* ('fjord')	Mc *fót* ('foot')
nom sg	hest-ur	stað-ur	fjörð-ur	fót-ur
acc sg	hest-Ø	stað-Ø	fjörð-Ø	fót-Ø
dat sg	hest-i	stað-Ø	firð-i	fæt-i
gen sg	hest-s	stað-ar	fjarð-ar	fót-ar
nom pl	hest-ar	stað-ir	firð-ir	fæt-ur
acc pl	hest-a	stað-i	firð-i	fæt-ur
dat pl	hest-um	stöð-um	fjörð-um	fót-um
gen pl	hest-a	stað-a	fjarð-a	fót-a

Again, differences between the four classes are minimal in the singular: The nominative is uniformly marked by /ur/; the accusative is without overt marking throughout. All strong masculine declensions have /i/ in the dative singular,

except for Mi, which has no overt marker in this context. Finally, the marker for genitive singular is either /ar/ (Mi, Mu, Mc) or /s/ (Ma). In the plural, the dative and genitive markers (/um/ and /a/, respectively) are the same as before; as noted, these markers are invariant across inflection classes. The nominative and accusative markers in all strong declensions except for Mc show an interesting pattern: Whereas there is a single marker for both these cases in the plural in the feminine declensions (viz., /ar/, /ir/, or /ur/), and also in Mc (viz., /ur/), the respective markers for nominative and accusative plural in Ma, Mi, and Mu vary, but in a principled way: The nominative and accusative markers have identical vowels, but the nominative has an additional /r/. Thus, Ma has /ar/ in the nominative plural and /a/ in the accusative plural (the same goes for the weak masculine declension, which is identical to Ma in the plural); Mi has /ir/ in the nominative plural and /i/ in the accusative plural; and Mu also has /ir/ in the nominative plural and /i/ in the accusative plural. As with the strong feminine declensions, the nominative and accusative plural markers thus provide leading forms that can also be held responsible for the names given to the declensions.[9]

There is some variation in these classes, particularly with respect to the genitive singular markers (/s/ vs. /ar/). Mc, which is a small inflection class comprising only six noun stems, exhibits variation in this context, as well as in the nominative and accusative plural (which may remain without overt marking with some of the members of this class). However, I take it that, by and large, table 3 accurately depicts the situation in the strong masculine inflection classes.

2.4. Strong Neuter Declension

There is only one strong neuter declension, viz., Na in table 4. Nominative and accusative are identical in the singular and in the plural; this is a general Indo-European phenomenon with neuters.[10] These contexts remain without overt marking in the strong neuter declension in Icelandic (making this the only instance in the Icelandic noun inflection system where the plural of a weak declension is not identical to the plural of a strong declension of the same gender; compare the /u/ in Nw of table 1). The dative and genitive singular markers of Na (/i/ and /s/) are the same as those of Ma.[11] The dative and genitive plural markers of Na are, as in all the other declensions, /um/ and /a/.

3. PROPERTIES OF THE INFLECTION SYSTEM

3.1. General Properties: Syncretism and Iconicity

Severing the inflection markers from their stems in the above paradigms, we end up with the system of noun inflection classes in Icelandic shown in table 5.

Table 4: Strong neuter inflection class

	Na *borð* ('table')
nom sg	borð-Ø
acc sg	borð-Ø
dat sg	borð-i
gen sg	borð-s
nom pl	borð-Ø
acc pl	borð-Ø
dat pl	borð-um
gen pl	borð-a

Table 5: Icelandic noun inflection classes

	1 Ma	2 Na	3 Fa(′)	4 Mi	5 Fi	6 Mu	7 Mc	8 Fc1	9 Fc2	10 Mw	11 Nw	12 Fw
nom sg	ur	Ø	Ø	ur	Ø	ur	ur	Ø	Ø	i	a	a
acc sg	Ø	Ø	Ø (u)	Ø	Ø	Ø	Ø	Ø	Ø	a	a	u
dat sg	i	i	Ø (u)	Ø	Ø	i	i	Ø	Ø	a	a	u
gen sg	s	s	ar	ar	ar	ar	ar	ar	ur	a	a	u
nom pl	ar	Ø	ar	ir	ir	ir	ur	ur	ur	ar	u	ur
acc pl	a	Ø	ar	i	ir	i	ur	ur	ur	a	u	ur
dat pl	um	um	um	um	um	um	um	um	um	um	um	um
gen pl	a	a	a	a	a	a	a	a	a	a	(n)a	(n)a

Here, the grouping of strong declensions is not based on gender anymore. Rather, it is based on the traditional division of inflection classes into four types (see Kress (1982)): a-declension, i-declension, u-declension, and consonantal declension. As we have seen, these names are mainly motivated by the form of

the accusative plural markers in Old Norse (or even the theme vowels of Ancient Nordic). However, the declensions in each class in this taxonomy still show striking similarities, especially in the plural. The revised grouping of the twelve declensions in table 5 reflects this.

Table 5 shows that the system of noun inflection in Icelandic exhibits a high degree of syncretism. First, there are instances of intra-paradigmatic syncretism, i.e., homonymy of two or more inflection markers within a single inflection class. For instance, the inflection marker /u/ shows up in accusative, dative, and genitive singular contexts of Fw (class 12); the inflection marker /ar/ shows up in nominative and accusative plural contexts of Fa (class 3); and so on. Second, there are also many instances of trans-paradigmatic syncretism, i.e., homonymy of two or more inflection markers across inflection classes. To name just a few examples: The inflection marker /i/ shows up in dative singular contexts of Ma, Na, Mu, and Mc (classes 1, 2, 6, and 7); the inflection marker /ar/ shows up in genitive singular contexts of Fa, Mi, Fi, Mu, Mc, and Fc1 (classes 3–8); and the inflection markers in dative plural and genitive plural contexts (/um/ and /a/) are identical for all inflection classes. As a guiding meta-principle for morphological analysis, I will assume (1):

(1) *Syncretism Principle:*
Identity of form implies identity of function (within a certain domain, and unless there is evidence to the contrary).

I take the Syncretism Principle to be the null hypothesis for the child acquiring a language as well as for the linguist investigating it. In both respects, (1) plays an important role outside morphology, e.g., in syntax and semantics. The two qualifications in (1) are minimal and virtually unavoidable.

First, the restriction to a certain empirical domain ensures that, e.g., German inflectional endings of the form /en/ as they show up in, say, an accusative singular context of the weak masculine declension (compare *Planet-en* ('planet')), and in third person plural present tense indicative contexts of the verbal conjugation (compare *betracht-en* ('view')), do not have to be assumed to exhibit systematic syncretism, i.e., identity of function. Such a view would plainly be untenable. With respect to the case at hand, I assume that the system of Icelandic noun declensions has three domains in the sense of (1): the singular of the strong declensions, the singular of the weak declensions, and the plural.

There should be independent evidence for these domains that is available for a child acquiring such a system. I would like to suggest that homophonous inflection markers are assumed to belong to separate morphological domains in this sense when a different semantic or syntactic function is detectable that underlies the marking. This is straightforward in the case of number, which carries semantic information: Two homophonous inflection markers cannot be part of the same domain (i.e., exhibit systematic syncretism) if one shows up on

a singular word form and the other one on a plural word form because the marker difference invariably signals a difference in meaning. Hence, "trans-number" syncretism will not be classified as systematic. The situation is different with inflection class and case (at least in Icelandic, which does not exhibit 'semantic cases'), which do not carry meaning. Therefore, trans-paradigmatic and intra-paradigmatic syncretism can be classified as systematic from this point of view.[12]

The next question then is: How can the existence of the strong and weak singular domains be independently motivated, where there is no semantic difference? The key to a solution is provided by the observation that strong and weak noun declensions have (similar, but not identical) counterparts in the adjectival domain (primarily the a-declensions in the strong case). However, with adjectives, the difference between strong and weak declensions is not merely a morphological phenomenon. Rather, the use of a strongly or weakly inflecting adjective signals a different syntactic function: Essentially, strong inflection serves to express case-marking, whereas weak inflection, which is typically dependent on the presence of case-marked D elements, serves to express NP-internal agreement; see Kress (1982: 179–183). (In line with this, the difference between strong and weak inflection can ultimately be traced back to a categorial distinction of 'pronominal' vs. 'adjectival' inflection in Germanic.) This difference in syntactic function motivates the postulation of two separate domains of strong and weak adjectival inflection; and, once established, these two domains can plausibly be taken to be obligatorily extended by the language learner to the system of noun inflection, with its similar set of markers. In contrast, *within* each of the three domains thus derived, the identity of markers across inflection classes does not signal a difference in syntactic function; and the same goes for the identity of markers across cases (which share a common syntactic function, viz., that of case-marking).[13,14]

The second qualification in (1) envisages the possibility that positive counter-evidence may make an analysis of a specific instance of syncretism as systematic impossible. This qualification is arguably also unavoidable, especially in inflectional morphology, where it seems clear that historical accidents and other non-systematic factors play some role in shaping the form of paradigms (see, e.g., Lass (1990) and Aronoff (1994)). Still, I believe that there is much less evidence against assuming instances of syncretism to be systematic than is sometimes made out (see, e.g., Carstairs (1987), Zwicky (1991), and Williams (1994)). More generally, then, the Syncretism Principle in (1) brings about a shift of perspective from much recent work in inflectional morphology, in that the burden of proof is not on considering a given instance of syncretism as systematic, but on considering it to be accidental.

Thus, we end up with three domains in Icelandic noun inflection. The goal will then be to account for all instances of intra- and trans-paradigmatic syncretism within these domains in a systematic manner.

Recall next from section 2.1 that the singular of the weak declensions exhibits another interesting property: There is iconicity in addition to syncretism, such that inflection markers which have a more specific function (resulting in a more restricted distribution) seem to have a less sonorous form. I assume that this correspondence of form and function is not accidental but reflects the presence of a second meta-principle guiding morphological analysis (of both the child and the linguist). This meta-principle can be formulated as in (2); like the Syncretism Principle, it has (implicitly or explitly) informed much recent work in morphology.[15]

(2) *Iconicity Principle*
Similarity of form implies similarity of function (within a certain domain, and unless there is evidence to the contrary).

Given (2), the task will be to show exactly how it is active in the singular of the weak declensions, and that it also underlies the two remaining domains in table 5 (singular of the strong declensions, plural).

Syncretism and iconicity seem to be general properties of nominal inflection systems involving fusional markers.[16] Adherence to the meta-principles of Syncretism and Iconicity radically narrows down the class of possible inflectional systems (given a set of markers), and can plausibly be assumed to enhance learnability of inflectional systems.

In addition to syncretism and iconicity, the discussion in sections 2.1–2.4 also reveals less general, but still highly systematic, properties of the system of noun declensions in Icelandic given in table 5.

3.2. Language-Specific Properties

A list of systematic properties of the system of Icelandic noun declensions is given in (3).[17]

(3) *Language-specific properties*

a. Strong declensions (except for Fa′) do not have an overt marker in accusative singular contexts.

b. Strong feminine declensions (except for Fa′) do not have an overt marker in non-genitive singular contexts.

c. Neuter declensions have identical markers for nominative and accusative in both singular and plural contexts; these markers never end in /r/.

d. Weak declensions never use /r/ in the singular.

e. Feminine declensions have identical markers in nominative and accusative plural contexts; these markers begin with a vowel and end in /r/.

f. Masculine declensions (except for Mc) have a marker beginning with a vowel and ending with an /r/ in nominative plural contexts; the accusative plural marker equals the nominative plural marker without the /r/.

g. All declensions have the same markers for dative plural and genitive plural contexts.

These generalizations do not appear to be spurious. They impose severe restrictions on the system of noun inflection in Icelandic, and this should be reflected in the analysis. Hence, a theory of inflectional morphology is called for that allows generalizations such as those in (3) to be expressed as restrictions on the possible shape of declensional systems (as opposed to merely stating the generalizations as properties that can be read off existing paradigms). With impoverishment and fission, Distributed Morphology has two devices designed to accomplish such a task.

4. ANALYSIS

4.1. Background Assumptions

Let me begin with sketching some background assumptions (see Halle and Marantz (1993), Harley and Noyer (2003)). Assume that a noun stem (*N*) is a terminal node in the syntax. There is some controversy within Distributed Morphology approaches whether noun stems have phonological content in the syntax or not; following Chomsky (2001: 11), I will assume that they do. Noun stems are inherently equipped with fully specified gender and inflection class features (see below on what these features look like); in contrast, noun stems per se do not bear case or number features. Suppose furthermore that, at least in fusional languages of the type currently under consideration, a noun stem is accompanied in syntax by a case/number morpheme (*cn*). A *cn* head is phonologically empty; it is inherently equipped with fully specified case and number features. For present purposes, it does not matter whether *N* and *cn* form a complex head to begin with, or project a phrase each and combine via head movement of *N* to *cn*. What is important is that syntax ultimately provides a representation like (4), with *N* phonologically overt and *cn* phonologically empty.

(4) [N-cn]

I assume that the gender and inflection class features of *N* are copied onto the *cn* morpheme (this assumption is not crucial, though; it is made here mainly to simplify exposition). A case/number morpheme *cn* with a full set of gender, class, case, and number features must then be spelled out post-syntactically; it is spelled out by insertion of an appropriate inflection marker. An inflection marker is a *vocabulary item* that pairs phonological information and (possibly underspecified or absent) morpho-syntactic (gender, class, case, and number) features as its insertion context. Insertion of a vocabulary item follows the Subset Principle in (5) (see Kiparsky (1973), Anderson (1992), Lumsden (1992), Williams (1994), Halle (1997), Noyer (1992), Frampton (2002), Gunkel (2003) for various versions of this principle, often with different names).

(5) *Subset principle*:
A vocabulary item *V* is inserted into a functional morpheme *F* iff (i) and (ii) hold:

(i) The insertion context of *V* is a subset of the set of the morpho-syntactic features of *F*.
(ii) *V* is the most specific vocabulary item that satisfies (i).

(5-i) ensures that an inflection marker can only be inserted into a *cn* morpheme if it does not have any (gender, class, case, or number) features that are incompatible with the feature specification on *cn*. Insertion contexts of inflection markers will often rely on underspecified (or absent) feature specifications. This implies that there will often be more than one inflection marker that could in principle be inserted into *cn* in accordance with (5-i). The resulting competition is resolved by (5-ii), which ensures that only the most specific matching vocabulary item can be inserted. Specificity of vocabulary items is defined in (6).

(6) *Specificity of vocabulary items*:
A vocabulary item V_i is more specific than a vocabulary item V_j iff there is a feature class $\Im$ such that (i) and (ii) hold.

(i) The insertion context of V_i has more features in $\Im$ than the insertion context of V_j.
(ii) There is no higher-ranked feature class $\Im'$ such that the insertion contexts of V_i and V_j have a different number of features in $\Im'$.

(6) is reminiscent of the standard definition of optimality in Optimality Theory (see Prince and Smolensky (1993)). It presupposes an organization of similar features into feature classes, and a ranking of feature classes. For now, I will presuppose the following hierarchy, which identifies three different feature classes (but see (11) below; also see Harley (1994)).

(7) *Hierarchy of feature classes*:
Gender, class ≫ case

Simplifying a bit, it follows from (6) and (7) that the more higher-ranked features a vocabulary item has, the more specific it is (where quality takes preference over quantity).

So far, nothing has been said about the nature of all these features. As argued in the following section, there is reason to assume that both case and inflection class features are highly abstract items.

4.2. Natural Classes and Feature Decomposition

Instances of intra-paradigmatic syncretism, where two or more cases correspond to a single marker in an inflection class, suggest that cases form natural classes. The question then is how these natural classes of cases can be formally captured. An elegant and simple way to achieve this can be traced back to foundational work by Jakobson (1962) (based on Russian) and Bierwisch (1967) (based on German). The idea is that standard (privative) case features like "nominative," "accusative" and so forth, can be decomposed into combinations of more primitive, abstract case features. Full specification with respect to these features encodes the standard cases; underspecification with respect to these features captures natural classes of cases. In the Jakobsonian tradition (which has influenced much work in Slavic linguistics), these primitive case features are semantics-based; in contrast, Bierwisch's proposal (which is arguably predominant in work on Germanic languages) assumes that the primitive case features are syntactically defined. I will adopt the latter view here, and suggest a decomposition of the four Icelandic cases into combinations of the three features [±n(ominal)], [±v(erbal)], and [±obl(ique)], as in (8).[18]

(8) *Decomposition of cases*: [±n], [±v], [±obl]

nominative:	[−n, −v, −obl]
accusative:	[−n, +v, −obl]
dative:	[−n, +v, +obl]
genitive:	[+n, +v, −obl]

On this view, the feature [±n] separates the genitive, which is a case that can be assigned by nouns, from the nominative, accusative, and dative, which are not assigned by nouns. The feature [±v] distinguishes between the accusative, the dative, and the genitive on the one hand, which can be assigned by verbs, and

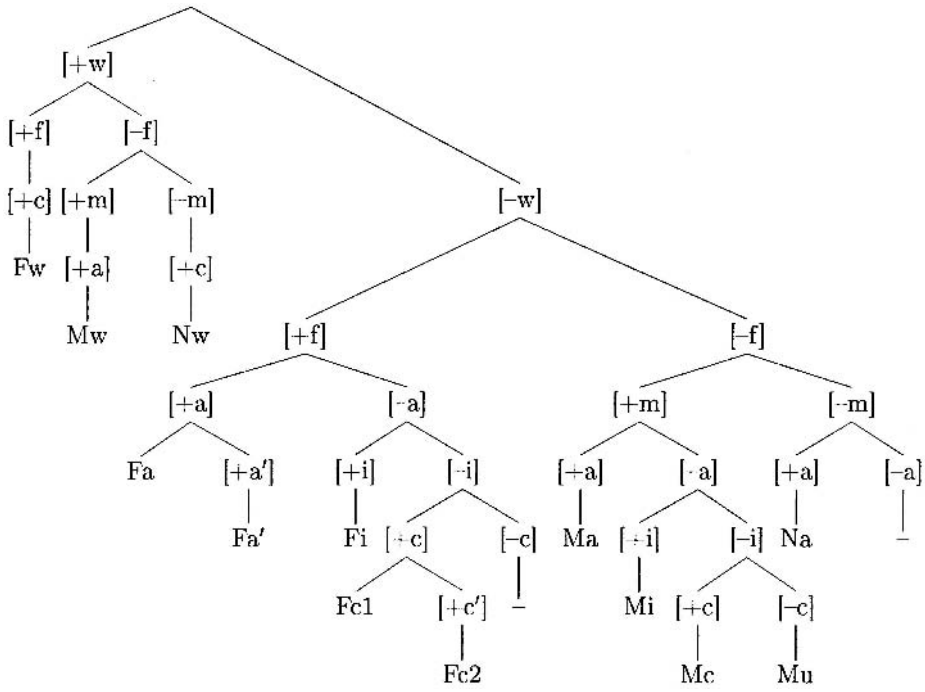
the nominative on the other hand, which is typically not assigned by verbs, but by the T(ense) node (the occurrence of nominative objects with certain verbs in Icelandic being an exception that proves the rule). Finally, the feature [±obl] singles out the dative as the basic non-structural case; the nominative and the accusative are typically structural (although they can also be lexically determined in some contexts), and the genitive is structural within the nominal domain.[19] Of the natural classes of Icelandic cases that are thus defined, the following ones will figure in the analysis:[20]

(9) *Natural classes of cases*:
   a. {nominative, accusative, dative} → [−n]
   b. {nominative, accusative, genitive} → [−obl]
   c. {nominative, accusative} → [−n, −obl]
   d. {accusative, dative, genitive} → [+v]
   e. {accusative, dative} → [−n, +v]

In the same way that intra-paradigmatic syncretism can be accounted for by natural classes of cases, trans-paradigmatic syncretism can be traced back to natural classes of inflection classes (see McCreight and Chvany (1991), Halle (1992), Oltra Massuet (1999), Wiese (2003), Alexiadou and Müller (2004), and Müller (2004)). As with cases, I will therefore not assume that inflection classes are encoded on *N* stems (thus on *cn* morphemes as a result of copying) as privative inflection class features (like [Ma], [Na], etc., or [class 1], [class 2], etc.); rather, inflection classes emerge as combinations of more abstract, binary features. I would like to suggest that the features used to define inflection classes in Icelandic comprise two types of binary features, viz., (i) gender features, and (ii) pure class features. The gender features are [±masc] and [±fem], where [−masc, +fem] defines feminine declensions, [+masc, −fem] defines masculine declensions, and [−masc, −fem] defines neuter declensions (see Bierwisch (1967), among many others). The abstract inflection class features adopted in the present approach are [±weak], [±a-type], [±i-type], and [±c-type] (the latter three classes will also be referred to as α-type classes). What is important here is not the fact that these features can be motivated diachronically (and, to some extent, synchronically, given that they play a role in identifying leading forms); it is the fact that they permit a reference to natural classes of inflection classes that are not determined by – indeed, cross-cut – gender distinctions.

Closer scrutiny reveals that the gender and pure class features that play a role in characterizing inflection classes in Icelandic are organized hierarchically; they follow the general pattern [weak/strong > gender > α-type]. The basic organization of the classes underlying Icelandic noun inflection can be illustrated by the tree in (10).[21]

(10) *Decomposition of inflection classes*:



The main dividing line in (10) is between weak and strong inflection classes; the next one between feminine and non-feminine inflection classes; then, between masculine and non-masculine inflection classes; next, between inflection classes that belong to the a-type and those that do not; after that, between i-type and non-i-type classes; and finally, between c-type and non-c-type classes. Crucially, this order of features is invariant. I would like to suggest that the hierarchy in (10) also determines a somewhat more fine-grained hierarchy of features as required for determining specificity of vocabulary items (see (6)); thus, (7) can be extended as shown in (11).

(11) Hierarchy of feature classes (extended):
Weak/strong ≫ gender ≫ α-type ≫ case

A further property emerges: Given the basic weak/strong split, an inflection class can only be defined by at most one further positively specified class (i.e., α-type) feature.[22] Most declensions (in fact, all but Mu) also pick at least one positively specified α-type feature (including the three weak declensions, where

[+c] is used to define Fw and Nw, and [+a] is used to define Mw).[23] Still, I would like to contend that (11) does not yet properly define the existing inflection classes, which, as it stands, would be underspecified in almost all cases (the only exceptions would be Mc and Mu, which are fully specified for all six features in (10)). Rather, an inflection class is defined by combining (i) the (positively or negatively specified) features assigned to it in (10) with (ii) *negatively* specified instantiations of all the remaining features, resulting in a full specification comprising six features. In other words: If an inflection class is not explicitly characterized by a (gender or pure class) feature in (10), it exhibits a negative value for that feature. This means that a class like, say, Fw, is encoded on *cn* as [+weak, +fem, −masc, −a-type, −i-type, +c-type]; a class like Ma as [−weak, −fem, +masc, +a-type, −i-type, −c-type]; etc. Here is the full list.[24]

(12)
Inflection classes:

1	Ma:	[−weak]	[−fem]	[+masc]	[+a-type]	[−i-type]	[−c-type]	
2	Na:	[−weak]	[−fem]	[−masc]	[+a-type]	[−i-type]	[−c-type]	
3	Fa(′):	[−weak]	[+fem]	[−masc]	[+a-type]	[−i-type]	[−c-type]	([+a′-type])
4	Mi:	[−weak]	[−fem]	[+masc]	[−a-type]	[+i-type]	[−c-type]	
5	Fi:	[−weak]	[+fem]	[−masc]	[−a-type]	[+i-type]	[−c-type]	
6	Mu:	[−weak]	[−fem]	[+masc]	[−a-type]	[−i-type]	[−c-type]	
7	Mc:	[−weak]	[−fem]	[+masc]	[−a-type]	[−i-type]	[+c-type]	
8	Fc1:	[−weak]	[+fem]	[−masc]	[−a-type]	[−i-type]	[+c-type]	
9	Fc2:	[−weak]	[+fem]	[−masc]	[−a-type]	[−i-type]	[+c-type]	[+c′-type]
10	Mw:	[+weak]	[−fem]	[+masc]	[+a-type]	[−i-type]	[−c-type]	
11	Nw:	[+weak]	[−fem]	[−masc]	[−a-type]	[−i-type]	[+c-type]	
12	Fw:	[+weak]	[+fem]	[−masc]	[−a-type]	[−i-type]	[+c-type]	

Natural classes of inflection classes are then defined by underspecified feature combinations, as shown above for the four cases (e.g., [+fem] defines a natural class comprising Fw, Fa, Fa′, Fi, Fc1, and Fc2; [−weak, +masc, −i-type] defines a natural class that consists of Ma, Mc, and Mu; and so on).

Given these assumptions about natural classes of cases and inflection classes in Icelandic, I now turn to an analysis of the system of Icelandic noun inflection that accounts for syncretism and iconicity in the three domains recognized above, and that furthermore acknowledges the regularities listed in (3).

4.3. Impoverishment and Fission

To the extent that the regularities in (3) reflect general restrictions on noun declensions in Icelandic, rather than accidental states of affair, they should be

taken to follow from general, system-defining constraints, rather than from the individual make-up of vocabulary items. Impoverishment rules are operations designed to achieve this in Distributed Morphology (see Bonet (1991), Noyer (1992, 1998), Halle and Marantz (1993), Bobaljik (2002), and Frampton (2002), among others). An impoverishment rule applies to a syntactic output representation and deletes morpho-syntactic features before vocabulary insertion into functional morphemes takes place. Impoverished insertion contexts lead to neutralization effects and thereby account for instances of syncretism and, more generally, recurring patterns in inflectional paradigms in a systematic way, independently of the actual specification of insertion contexts of inflection markers in a language's vocabulary. I would like to suggest the following five impoverishment rules, which apply to *cn* morphemes in Icelandic before vocabulary insertion starts.[25]

(13) *Impoverishment operations in cn:*

a. $[-\text{obl}] \rightarrow \emptyset$ / {[−pl,[−n,+v]} __
b. $[\pm\text{obl}] \rightarrow \emptyset$ / {[−pl],[+fem],[−n]} __
c. $[\pm\text{v},-\text{n},-\text{obl}] \rightarrow \emptyset$ / {[−masc,−fem]} __
d. $[\pm\text{obl}] \rightarrow \emptyset$ / {[−pl],[+weak]} __
e. $[-\text{obl}] \rightarrow \emptyset$ / {[+pl],[+masc,−c-type],[−n,+v]} __

The first thing to note is that the impoverishment rules in (13) already depend on natural classes of cases and inflection classes created by decomposing case, gender, and pure class features. All impoverishment rules involve deletion of [−obl] (plus, in some cases, other features). (13-a) deletes [−obl] in all accusative singular contexts; it will turn out that this rule underlies an account of regularity (3-a). (13-b) requires deletion of [±obl] in non-genitive singular contexts with feminine declensions; this rule will be essential in deriving (3-b) (including its exception for Fa′). According to (13-c), if the features [±v], [−n] and [−obl] co-occur on a *cn* morpheme (as they do in the nominative and in the accusative), they are all deleted in the singular and in the plural of all neuter declensions (if only a subset of these features shows up, as in the dative and the genitive, (13-c) does not apply). This implies that impoverishment leaves no case features in nominative and accusative neuter contexts, which will be shown to underlie (3-c). The fourth impoverishment rule, (13-d) will emerge as the reason behind (3-d). Finally, (3-e) and (3-f) will be covered by (13-e), which deletes [−obl] in accusative plural contexts of most masculine declensions.[26]

After the impoverishment rules in (13) have applied, the morpho-syntactic feature specifications in *cn* that vocabulary insertion can operate on look very different from the original, fully specified syntactic contexts. This is shown in table 6, which lists the morpho-syntactic contexts for insertion of an inflection marker for all cases, numbers, and inflection classes.[27]

Table 6: Feature specifications on *cn* after impoverishment

	1 Ma	2 Na	3 Fa(')	4 Mi	5 Fi	6 Mu	7 Mc	8 Fc1	9 Fc2	10 Mw	11 Nw	12 Fw
nom sg	[−n−v−o]		[−n−v]	[−n−v−o]	[−n−v]	[−n−v−o]	[−n−v−o]	[−n−v]	[−n−v]	[−n−v]		[−n−v]
acc sg	[−n+v]		[−n+v]	[−n+v]	[−n+v]	[−n+v]	[−n+v]	[−n+v]	[−n+v]	[−n+v]		[−n+v]
dat sg	[−n+v+o]	[−n+v+o]	[−n+v]	[−n+v+o]	[−n+v]	[−n+v+o]	[−n+v+o]	[−n+v]	[−n+v]	[−n+v]	[−n+v]	[−n+v]
gen sg	[+n+v−o]	[+n+v−o]	[+n+v−o]	[+n+v−o]	[+n+v−o]	[+n+v−o]	[+n+v−o]	[+n+v−o]	[+n+v−o]	[+n+v]	[+n+v]	[+n+v]
nom pl	[−n−v−o]		[−n−v−o]	[−n−v−o]	[−n−v−o]	[−n−v−o]	[−n−v−o]	[−n−v−o]	[−n−v−o]	[−n−v−o]		[−n−v−o]
acc pl	[−n+v]		[−n+v−o]	[−n+v]	[−n+v−o]	[−n+v]	[−n+v−o]	[−n+v−o]	[−n+v−o]	[−n+v]		[−n+v−o]
dat pl	[−n+v+o]	[−n+v+o]	[−n+v+o]	[−n+v+o]	[−n+v+o]	[−n+v+o]	[−n+v+o]	[−n+v+o]	[−n+v+o]	[−n+v+o]	[−n+v+o]	[−n+v+o]
gen pl	[+n+v−o]	[+n+v−o]	[+n+v−o]	[+n+v−o]	[+n+v−o]	[+n+v−o]	[+n+v−o]	[+n+v−o]	[+n+v−o]	[+n+v−o]	[+n+v−o]	[+n+v−o]

The impoverishment rules are formulated in a maximally general way. This means that they overlap to some extent (like the generalizations in (3)). In most instances, this is innocuous since the overlapping impoverishment rules have identical effects. However, in one case, the issue of rule ordering arises: If either (13-a) or (13-d) applies before (13-c), [±v] and [−n] will not be deleted in accusative singular contexts of the two neuter declensions (Na, Nw). Given the list of vocabulary items in (14) below, this would not actually make different empirical predictions; but it would not be a system-inherent property anymore that Icelandic neuter declensions must always have identical markers for nominative and accusative. I will therefore assume that impoverishment rules are ordered according to specificity in the same way that the insertion of vocabulary items is (see (6)), where specificity of an impoverishment rule is determined by the feature specification that is deleted by the rule (not by the context). Consequently, (13-c) applies before (13-a) and (13-d), and [−n] is deleted in accusative singular contexts of neuter declensions, as shown in table 6.[28]

In addition to impoverishment, fission applies in the Icelandic *cn* morpheme of *N*. The basic idea underlying fission is this (see Noyer (1992) and Frampton (2002), among others; but see Halle and Marantz (1993), Halle (1997) for a different conception): Normally, vocabulary insertion can only apply once to a functional morpheme, even if the vocabulary item is underspecified (i.e., if the morpho-syntactic features of the vocabulary item's insertion context form a *proper* subset of the morpho-syntactic features in the functional morpheme). With a fissioned morpheme, things are different: If a vocabulary item matches only some of the features in the functional morpheme, these features are discharged by vocabulary insertion, but the remaining features remain accessible for further vocabulary insertion. Thus, vocabulary insertion stops only when there is no feature in the functional morpheme left that can be matched by a vocabulary item. As before, all potential cases of conflict are resolved by the specificity requirement of the Subset Principle.

The underlying rationale behind postulating fission of *cn* is that there is good evidence for distinguishing a first (vocalic) and a second (consonantal) part in endings like /ar/, /ir/, and /ur/. Perhaps the most obvious reason for this comes from considering the subtraction effect in accusative vs. nominative plurals of most masculine declensions (see (3-f)): /ar/ alternates with /a/, /ir/ alternates with /i/, and /ur/ alternates with /u/. Hence, an important generalization would be lost if an ending like /ar/ were taken to be primitive; the alternation effect clearly suggests that it must be broken up into one marker /a/ followed by another marker /r/. Such a presence of two markers in one functional morpheme can then be captured straightforwardly by assuming fission.[29,30]

4.4. Vocabulary Insertion

Now we can finally address the vocabulary items and the (typically underspecified) morpho-syntactic features that make up the insertion contexts associated

with them. The list of the vocabulary items used in Icelandic noun declensions is given in (14).[31] There are four different groups of vocabulary items. II, III, and IV directly correspond to the three domains of Icelandic noun inflection identified above (singular of strong declensions, singular of weak declensions, and plural). In contrast, group I has a single, domain-independent marker: /r/ is a highly general marker that can be inserted in all contexts in which a [−obl] feature shows up that has not yet been matched by a more specific marker.[32]

(14) *Vocabulary items*:

I	/r/	↔	{[−obl]}
II	/a/	↔	{[−pl],[−weak],[+n]}
	/u/	↔	{[−pl],[−weak,−fem],[−v]}
	/i/	↔	{[−pl],[−weak,−fem,−i-type],[+obl]}
	/s/	↔	{[−pl],[−weak,−fem,+a-type],[+n,−obl]}
	$/u/_2$	↔	{[−pl],[−weak,+fem,+c′-type],[+n]}
	$/u/_3$	↔	{[−pl],[−weak,+fem,+a′-type],[−n,+v]}
III	/a/	↔	{[−pl],[+weak]}
	/u/	↔	{[−pl],[+weak,+fem],[+v]}
	/i/	↔	{[−pl],[+weak,+masc],[−n,−v]}
IV	/a/	↔	{[+pl],[−n]}
	/u/	↔	{[+pl],[−a-type]}
	/i/	↔	{[+pl],[−a-type,−c-type]}
	/um/	↔	{[+pl],[−n,+v,+obl]}
	$/a/_2$	↔	{[+pl],[+n,+v,−obl]}

Let me now discuss the three domains, beginning with domain II: the singular of the strong declensions.

4.4.1. Syncretism and Iconicity in the Singular of Strong Declensions

Table 7 combines feature specifications in the *cn* morpheme after impoverishment in the singular strong declensions (see table 6) and the inflection markers that are selected under the Subset Principle for each specification (see table 5).

The vocabulary items that are a priori compatible with a nominative specification [−n,−v,−obl] in domain II are /r/ in (14)-I and /u/ in (14)-II. All the other markers in (14)-II have an incompatible case specification; and the markers in (14)-III and (14)-IV have an incompatible class or number specification

Table 7: Vocabulary insertion in the singular of strong declensions

	1 Ma	2 Na	3 Fa(')	4 Mi	5 Fi	6 Mu	7 Mc	8 Fc1	9 Fc2
nom sg	[−n−v−o] u-r	Ø	[−n−v] Ø	[−n−v−o] u-r	[−n−v] Ø	[−n−v−o] u-r	[−n−v−o] u-r	[−n−v] Ø	[−n−v] Ø
acc sg	[−n+v] Ø	Ø	[−n+v] Ø (u)	[−n+v] Ø	[−n+v] Ø	[−n+v] Ø	[−n+v] Ø	[−n+v] Ø	[−n+v] Ø
dat sg	[−n+v+o] i	[−n+v+o] i	[−n+v] Ø (u)	[−n+v+o] Ø	[−n+v] Ø	[−n+v+o] i	[−n+v+o] i	[−n+v] Ø	[−n+v] Ø
gen sg	[+n+v−o] s	[+n+v−o] s	[+n+v−o] a-r	[+n+v−o] a-r	[+n+v−o] a-r	[+n+v−o] a-r	[+n+v−o] a-r	[+n+v−o] a-r	[+n+v−o] u-r

([+weak] and [+plural], respectively). However, impoverishment has modified the original nominative specification in *cn* in the case of neuters, which are now unspecified for case, and in the case of feminines, which are now specified [−n, −v]. The marker /u/ cannot be inserted in feminine contexts in the first place, and it cannot show up in neuter contexts as a result of impoverishment (see generalization (3-c)). Consequently, it is inserted only in masculine contexts, discharging the [−v] specification there, but leaving the [−obl] feature accessible for further insertion, given fission. Hence, in masculine contexts, /r/ is next inserted, in accordance with the Subset Principle, creating a composite inflection marker /u/-/r/. Insertion of /r/ must follow insertion of /u/ because the latter is more specific, due to the class/gender features in its insertion context. Still, something needs to be said about the linear order of two vocabulary items inserted in fissioned morphemes; i.e., it must be ensured that the correct outcome is /u/-/r/ rather than /r/-/u/. For present purposes (and with all relevant inflection marking suffixal), we can simply assume that insertion in fissioned morphemes always takes place to the right of material inserted earlier.[33]

In all non-masculine contexts, there is no matching marker and hence, no inflection for case/number (signalled by Ø).

Consider next accusative contexts in table 7. The original accusative specification [−n, +v, −obl] is reduced to [−n, +v] throughout, and to nothing in neuter contexts, by impoverishment. The only marker that is compatible with a [−n, +v] specification in (14)-I-II is /u/$_3$, which, however, is restricted to a single feminine subdeclension, viz., Fa′ (and which is given its index 3 so as to distinguish it from the two other markers /u/ and /u/$_2$ in (14)-II). Impoverishment has made insertion of /r/ impossible throughout; consequently, there is no marker for any of the non-Fa′ declensions (see generalization (3-a)).[34]

Dative contexts are initially (syntactically) defined by the feature specification [−n, +v, +obl]. These contexts are impoverished only in the feminine declensions (by deletion of [+obl], which ensures that there can be no [+obl]-marked vocabulary item for feminine declensions in the singular, a subcase of generalization (3-b)). The only markers that fit into dative singular contexts of strong declensions are /i/ and /u/$_3$ in (14)-II (note that /r/, which is marked [−obl], never fits in dative contexts). The highly specific marker /u/$_3$ can only be used with Fa′; /i/ can only be used with non-feminine classes, viz., Ma, Na, Mu, and Mc (but not with Mi, which is the only non-feminine [+i-type]-marked class and therefore incompatible with /i/'s [−i-type]-specification). All other declensions remain marker-less.

There is no impoverishment in genitive contexts. Vocabulary items that match the [+n, +v, −obl] specification are /a/, /s/, and /u/$_2$ in (14)-II, and /r/ in (14)-I. /u/$_2$ is a highly specific marker, and is therefore chosen in the only context in which it fits, viz., the genitive singular of Fc2. Next, /s/ is also highly specific; it is selected in the two non-feminine [+a-type] declensions that match its insertion context. Since /s/ is marked [+n, −obl], it discharges all features in *cn*

except for [+v], thereby blocking subsequent /r/ insertion. Finally, /a/ is essentially just a genitive marker without inflection class restriction; it is therefore chosen wherever /u/$_2$ and /s/ do not match the *cn* specification (thereby providing a default marker for the genitive). Since insertion of both /u/$_2$ and /a/ leaves [−obl] accessible for further insertion, /r/ is also inserted in these contexts.

Thus, most of the instances of syncretism in the singular of strong declensions are accounted for systematically. There is only one marker where identity of form does not imply identity of function, viz., /u/: In addition to the "regular" /u/, the present approach recognizes /u/$_2$ and /u/$_3$. This may reflect either an imperfection of the analysis, or an imperfection of the inflectional system under consideration. There is evidence pointing in the latter direction: First note that both /u/$_2$ and /u/$_3$ occur with marginal feminine sub-declensions, viz., Fc2 and Fa′, respectively, that do not differ in any respect from their regular counterparts Fc1 and Fa, except for this very marker. Second, recall that /u/$_2$ only occurs with certain and, for the most part, arguably independently – i.e., phonologically – definable [+a-type] stems; in fact, it would not strike me as completely impossible to argue that /u/$_2$ is not a regular morphological inflectional ending at all, but a segment added by a phonological rule applying later.[35] Third, with respect to /u/$_3$, diachronic evidence might suggest that it is to be treated differently from /u/: Whereas /u/ in /u/-/r/ of the nominative singular of masculine declensions was not yet present in Old Norse (where only a bare /r/ occurred, see above), /u/$_2$ in /u/$_2$-/r/ of the genitive singular occurred in Fc in Old Norse (and there was still a bare /r/ in the nominative/accusative plural of Fc). Compare, e.g., Old Norse *móð-ur* ('mother', genitive singular, Fc) with Old Norse *mæð-r* ('mother', nominative/accusative plural, Fc) and Old Norse *nið-r* ('relative', nominative singular, Ma) (see Kristoffersen (2002: 915/912)).

In addition to syncretism, the system exhibits iconicity. If we abstract away from the unresolved syncretism with the highly specific markers /u/$_2$ and /u/$_3$ and concentrate on the remaining four vocabulary items in II, it turns out that there is a correlation between the phonological form of the marker and its function in the system: The higher a vocabulary item is on the sonority hierarchy (see Hankamer and Aissen (1974)) – i.e., the less consonantal it is –, the less specific it is according to (6). Thus, the order determined by the sonority hierarchy is [/a/ > /u/ > /i/ > /s/], and the same order is also determined by specificity.[36] This correspondence of form and function is probably not accidental. By assigning similar forms similar types of insertion contexts (e.g., /a/ is closer to /u/ than to /i/ with respect to both form (sonority) and function (feature specification)), the sub-system of Icelandic noun declensions in II meets the demands of the Iconicity Principle.

4.4.2. Syncretism and Iconicity in the Singular of Weak Declensions

Table 8 illustrates the feature specifications in *cn* morphemes after impoverishment has applied in the singular of weak declensions, and lists the vocabulary items selected for each specification.

Table 8: Vocabulary insertion in the singular of weak declensions

	10 Mw	11 Nw	12 Fw
nom sg	[−n−v] i	 a	[−n−v] a
acc sg	[−n+v] a	 a	[−n+v] u
dat sg	[−n+v] a	[−n+v] a	[−n+v] u
gen sg	[+n+v] a	[+n+v] a	[+n+v] u

The relevant vocabulary items are those in (14)-III. Vocabulary items from (14)-II and (14)-IV do not fit because they are marked [−weak] or [+pl], which clashes with the [−pl, +weak] specification on a *cn* in the singular of weak declensions. Impoverishment has removed all [−obl] specifications; hence, /r/ can never show up in the singular of the weak declensions (see (3-d)). The most general vocabulary item is /a/, which does not have gender, class (except for the feature [+weak]), or case specification, and can thus occur in all contexts. It is blocked by the more specific marker /u/ in the non-nominative (i.e., [+v]) cases of the weak feminine declension; and by the most specific marker /i/ in the nominative singular of the weak masculine declension. All instances of syncretism in this domain are thus accounted for, as required by the Syncretism Principle; and the domain fully respects the Iconicity Principle, with the sonority-based hierarchy [/a/ > /u/ > /i/] reflected in increasing specificity of the markers (which corresponds to their distribution in table 8, where /i/ is confined to one context, /u/ shows up in three contexts, and /a/ is the elsewhere case).

4.4.3. Syncretism and Iconicity in the Plural

Finally, table 9 shows how vocabulary insertion takes place in plural contexts (of strong and weak declensions).

Impoverishment has removed the feature bundle [±v, −n, −obl] in neuter contexts, and the feature [−obl] in the accusative of all masculine declensions but Mc. Focussing on nominative and accusative environments for now, the three markers /a/, /u/, and /i/ in (14)-IV are compatible with both these contexts. /i/ is most specific; it is selected in [−a-type, −c-type] declensions in the nominative and in the accusative, i.e., in Mi, Fi, and Mu. Insertion of /i/ leaves a possible [−obl] feature accessible for further insertion of /r/. Such a [−obl]

Table 9: Vocabulary insertion in the plural

	1 Ma	2 Na	3 Fa(′)	4 Mi	5 Fi	6 Mu	7 Mc	8 Fc1	9 Fc2	10 Mw	11 Nw	12 Fw
nom pl	[−n−v−o] a-r	Ø	[−n−v−o] a-r	[−n−v−o] i-r	[−n−v−o] i-r	[−n−v−o] i-r	[−n−v−o] u-r	[−n−v−o] u-r	[−n−v−o] u-r	[−n−v−o] a-r	u	[−n−v−o] u-r
acc pl	[−n+v] a	Ø	[−n+v−o] a-r	[−n+v] i	[−n+v−o] i-r	[−n+v] i	[−n+v−o] u-r	[−n+v−o] u-r	[−n+v−o] u-r	[−n+v] a	u	[−n+v−o] u-r
dat pl	[−n+v+o] um	[−n+v+o] um	[−n+v+o] um	[−n+v+o] um	[−n+v+o] um	[−n+v+o] um	[−n+v+o] um	[−n+v+o] um	[−n+v+o] um	[−n+v+o] um	[−n+v+o] um	[−n+v+o] um
gen pl	[+n+v−o] a	[+n+v−o] a	[+n+v−o] a	[+n+v−o] a	[+n+v−o] a	[+n+v−o] a	[+n+v−o] a	[+n+v−o] a	[+n+v−o] a	[+n+v−o] a	[+n+v−o] (n)a	[+n+v−o] (n)a

feature shows up in the nominative of non-neuter declensions throughout, but not in the accusative of Mi and Mu (due to impoverishment). Hence, the three declensions uniformly have /i/-/r/ in the nominative, and Fi also has /i/-/r/ in the accusative, but Mi and Mu have only /i/ in the accusative (see (3-e), (3-f)).

Next on the specificity scale is /u/, which can be used by all declensions that are characterized as [−a-type], i.e., Mi, Fi, Mu, Mc, Fc1, Fc2, Nw, and Fw. As we have just seen, the first three of these select the more specific marker /i/, which leaves Mc, Fc1, Fc2, Nw, and Fw; and /u/ does indeed show up in the nominative and accusative plural of these inflection classes.[37] All these declensions (including Mc) then insert /r/ for an otherwise unchecked [−obl] feature in both the nominative and the accusative, except for Nw, where [−obl] has been deleted by impoverishment in both cases.

The remaining declensions receive the marker /a/, provided that at least [−n] is present in the *cn* specification. This is the case with Ma, Fa(′), and Mw. As before, the feminine declension inserts /r/ in the nominative and in the accusative; the masculine declensions do so only in the nominative, due to impoverishment in the accusative. Finally, consider Na. Impoverishment has removed all case features in *cn* in this class. Hence, there is no matching marker in (14)-IV. Since there is no matching marker in (14)-III or (14)-II either, there is no marker that fits in nominative and accusative plural contexts of Na.

This leaves only dative and genitive plural contexts to be accounted for. As noted, the respective markers /um/ and /a/$_2$ have a different status, in the sense that they show no sensitivity to inflection class (see (3-g)). I would therefore like to contend that they lie outside the core of the system of Icelandic noun inflection: They are the only markers with fully specified case information, and they simply do not interact with other markers in terms of specificity (i.e., they cannot be blocked by another plural marker even if it is equipped with (higher-ranked) class features). Given this proviso, we can again note that the Syncretism Principle and the Iconicity Principle are fully respected in the plural domain: There is only one entry each for /a/, /u/, and /i/, which accounts for all cases of intra-paradigmatic and trans-paradigmatic syncretism; and the sonority-based order of the markers is the same as the specificity-based order. Thus, the core system of Icelandic noun declensions is accounted for in its entirety.[38,39]

4.5. Alternatives

It goes without saying that the system developed here does not represent the only possibility to account for Icelandic noun declensions in a simple way. There are alternatives that may have properties that do not characterize the present approach, and that one may find initially attractive. Let me discuss two such properties here: maximal underspecification of insertion contexts, and absence of impoverishment rules.[40] As a background to this discussion, it may be useful

to take a step back, outline the system developed in this paper from a somewhat broader perspective, and sketch an abstract acquisition scenario. The alternatives can then be evaluated against this background.

First, on the basis of the empirical evidence, three domains must be identified by a child acquiring the system: plural, weak singular, and strong singular; this can be done by invoking the semantic and syntactic functions that the markers are involved in. Second, natural classes of cases and inflection classes (as well as genders) must be identified, and decomposition must take place so as to capture these natural classes. Third, generalizations of the type in (3) must be extracted from the data, and these generalizations must be encoded by appropriate impoverishment operations; one of these generalizations concerns the subtraction effect in the plural, which is sufficient to signal fission of the *cn* morpheme and the special role of /r/. Fourth and finally, the child proceeds on the assumption that the inflectional system obeys the Syncretism Principle and the Iconicity Principle, and constructs insertion contexts for inflection markers accordingly whenever possible; deviations are necessary only for /u/$_2$ and /u/$_3$ in (14)-II, and for /a/$_2$ in (14)-IV. Crucially, then, the resulting system is shaped by the overarching requirements imposed by the Syncretism and Iconicity Principles, and by the language-specific generalizations in (3). These three types of requirements constrain the hypothesis space and narrow down the class of possible analyses. Therefore, I would like to contend that a principled adherence to these three kinds of requirements is a possible criterion against which alternative approaches can be evaluated ("a possible criterion" because I do not want to claim that it is the only conceivable evaluation criterion).

4.5.1. Maximal Underspecification of Insertion Contexts

The insertion contexts of vocabulary items in (14) are a first case in point. In contrast to what is the case in some other approaches that rely on underspecification (e.g., Anderson (1992)), there are markers in (14) which are not *maximally* underspecified: Some markers have features in their insertion contexts that are strictly speaking redundant for the purpose of unambiguously identifying the environment in which they can show up. In the core system, there are two such markers with redundant case features: /i/ in (14)-III, which has a redundant [−n] specification (nominative is unambiguously identified by [−v]), and /s/ in (14)-II, which has a redundant [−obl] specification (genitive is unambiguously identified by [+n]).[41] What happens if these additional features are dispensed with? The consequences are not dramatic, as far as the correct determination of markers for morpho-syntactic contexts is concerned: /s/ in (14)-II and /i/ in (14)-III will continue to surface in the right environments; /s/ will now cease to block subsequent insertion of /r/, but a composite inflection marker /s/-/r/ (with or without epenthesis) could plausibly be assumed to be blocked by general constraints on the shape of inflection markers in Icelandic.

Why, then, do these these redundant features show up in (14)? The answer is that the system thus respects the Iconicity Principle in a more transparent way than would otherwise be the case (at least as long as all case features are considered as specific to the same degree, an assumption that might eventually not be correct; see, e.g., Wiese (1999)). This does not imply that iconicity is artificially imposed on the system: As noted in section 2.1, iconicity can pre-theoretically be read off the system of Icelandic noun inflection, by simply comparing the respective distributions of markers (ranging from extremely narrow to unrestricted) with their shape; in addition, I take the ease with which the system fits into a fully iconic pattern once a few redundant features are added to be suggestive. (In contrast, even abstracting away from issues of linguistic plausibility, it would be quite difficult to construe a fully anti-iconic system that has otherwise similar properties, e.g., with respect to the Syncretism Principle.)[42]

If maximal underspecification is not an option in the present approach, one might think that *minimal* underspecification could be. Minimal underspecification of an insertion context of a vocabulary item would imply that the feature specification is as close to being complete as possible, given the Syncretism Principle (or, more generally, a minimization of marker entries). Consider, e.g., the plural domain in (14)-IV. A minimally underspecified insertion context of /a/ would consist of the features {[+pl],[+a-type,−i-type,−c-type],[−n,−obl]} instead of {[+pl],[−n]}; for /u/, the context would be {[+pl],[−a-type, −i-type,+c-type],[−n,−obl]} instead of {[+pl],{[−a-type]}; and for /i/, {[+pl],[−weak,−a-type,−c-type],[−n,−obl]} instead of {[+pl],[−a-type, −c-type]}. In the weak singular domain in (14)-III, /a/ would have the insertion context {[−pl],[+weak,−i-type]} instead of {[−pl],[+weak]}; /u/ would have {[−pl],[+weak,+fem,−masc,−a-type,−i-type,+c-type],[+v]} instead of {[−pl],[+weak,+fem],[+v]}; and /i/ would have {[−pl],[+weak,−fem, +masc,+a-type,−i-type,−c-type],[−n,−v]}. In the strong singular domain in (14)-II, /a/ would have the insertion context {[−pl],[−weak],[+n,+v,−obl]} instead of {[−pl],[−weak],[+n]}; /u/ would have {[−pl],[−weak,−fem, +masc],[−n,−v]} instead of {[−pl],[−weak,−fem],[−v]}; /i/ would have {[−pl],[−weak,−fem,−i-type],[−n,+v,+obl]} instead of {[−pl],[−weak, −fem,−i-type],[+obl]}; and /s/ would have {[−pl],[−weak,−fem,+a-type, −i-type,−c-type],[+n,+v,−obl]} instead of {[−pl],[−weak,−fem,+a-type],[+n,−obl]}. Finally, in (14)-I, /r/ would remain [−obl], as before.

Iconicity would be respected in many cases (even if some distinctions would be blurred because of identical specificity), but it would be violated with /u/ vs. /i/, /s/ in (14)-II. Irrespective of this issue, however, I would like to conclude that, in the absence of compelling arguments in support of minimal underspecification, the system developed above is more economical, and hence preferable. The present system relies on maximal underspecification to the extent that it is

permitted by the Syncretism Principle, the Iconicity Principle, and the generalizations in (3) .

4.5.2. Absence of Impoverishment

Consider an alternative system (suggested by a reviewer) that does without impoverishment; instead of fission, two separate morphemes (or rule blocks) are postulated (see footnote 29). Cases are decomposed in the way suggested above. Gender decomposition works slightly differently, though, in that neuter is not assumed to be [−masc,−fem], as in the traditional (and pre-theoretic) understanding of the term, but rather a primitive: masculine = [−neuter, −fem], feminine = [−neuter,+fem], and neuter = [+neuter]; this way, masculine and feminine form a natural class. Inflection classes are also decomposed, in a way that is similar but not identical to the decomposition in (10) above (for reasons of space, the relevant tree is given in labelled bracketing):

(15) [4 [$_A$ 5 6 [$_B$ 7 8 9 [$_C$ [$_D$ 1 2 3(′)] [$_E$ 10 [$_F$ 11 12]]]]]]

Finally, (16) lists the revised set of vocabulary items with their insertion contexts:[43]

(16) a. *Morpheme 1*:

/ur/ ↔ {[−pl],[−neut,−fem],[−n,−v]}
/u/ ↔ {[−pl],[−n,+v],[+3′]}
/i/ ↔ {[−pl],[−fem],[+obl],[+A,−E]}
/ar/ ↔ {[−pl],[+n],[−E]}
/s/ ↔ {[−pl],[−fem],[+n],[+D]}
/ur/ ↔ {[−pl],[+n],[+9]}

/i/ ↔ {[−pl],[−neut,−fem],[−n,−v],[+10]}
/a/ ↔ {[−pl],[+E]}
/u/ ↔ {[−pl],[+v],[+12]}

/a/ ↔ {[+pl],[−neut],[−n,−obl],[+C,−F]}
/i/ ↔ {[+pl],[−n,−obl],[−B]}
/u/ ↔ {[+pl],[−n,−obl],[−2]}
/um/ ↔ {[+pl],[+obl]}

b. *Morpheme 2*:
/r/ ↔ {[+pl],[−neut],[−n,−obl]}
/Ø/ ↔ {[+pl],[−neut,−fem],[−n,+v,−obl],[−7]}
/a/ ↔ {[+pl],[+n]}

As can easily be verified, this approach derives the correct markers for all contexts in Icelandic noun declensions. The analysis shares a number of fundamental insights with the approach I have developed above, most notably the assumption that case and class features should be decomposed (thereby generating natural classes of cases and inflection classes which insertion contexts of markers can refer to) in order to account for intra- and trans-paradigmatic syncretism. As can be seen by the partioning into three domains in (16-a), the analysis accounts for syncretism in much the same way that the approach above does (i.e., within the strong singular, the weak singular, and the plural). However, the analysis in (16) is different in three fundamental respects. First, it does not respect the Iconicity Principle. Second, it does not recognize the generalizations in (3) as system-defining properties of Icelandic noun inflection; rather, these generalizations emerge as accidental properties resulting from the individual make-up of inflection markers. And third, there is no uniform entry for /r/ (i.e., markers with /r/ in the singular are not considered composite, despite the system-internal and diachronic evidence that these markers are to be treated as composite in both the singular and the plural). This, it seems, is the price that must be paid if impoverishment is dispensed with.

Interestingly, closer scrutiny reveals that there is one case where the system embodied in (16) does in fact account for a generalization in (3) in a systematic way, and that is the subtraction effect in the nominative vs. accusative plural of masculine declensions (see (3-f)). This effect is captured by assuming a morpheme 2 which can be filled by /r/ and an empty marker /Ø/ (plus, irrelevantly for present purposes, by genitive plural /a/). /Ø/ is a marker that finds no analogue in the list in (14), and this is so for a good reason: It turns out that the sole function of /Ø/ is to make insertion of /r/ in morpheme 2 impossible in accusative plural contexts of all masculine declensions except for Mc, and thereby derive the subtraction effect. Crucially, this role of /Ø/ in the system in (16) is not only equivalent to the role of the impoverishment rule (13-e) in the system I have developed above; as has been shown by Trommer (1999, 2003), such a use of highly specific /Ø/ markers is in fact a way to systematically encode impoverishment operations in general. This means that the abandonment of impoverishment in the alternative approach currently under consideration is only apparent, and there is no principled reason why other highly specific /Ø/ markers could not also be invoked to capture other regularities in (3). More specifically, and for the case at hand, we can venture the hypothesis that a systematic account of the subtraction effect in the plural will have to rely on some form of impoverishment.[44]

Thus, for the time being, I would like to conclude that, even though the alternative system just sketched may well have its virtues, there are principled reasons for maintaining the system developed in this paper, and they are related to meta-theoretical syncretism and iconicity requirements, and to the generalizations in (3).

5. CONCLUDING REMARKS

Let me draw a conclusion. I have presented an analysis of noun inflection in Icelandic that centers around three main assumptions. First, case and inflection class features are decomposed into more primitive binary features, so that natural classes of cases and inflection classes are created that can be referred to by inflection markers. Second, impoverishment rules apply to the Icelandic *cn* morpheme after syntax and before inflection marker insertion. And third, the Icelandic *cn* morpheme is subject to fission. Given these assumptions, it has proven possible to account for most instances of both intra-paradigmatic and trans-paradigmatic syncretism within the three basic domains identified for the Icelandic noun declension system (singular of strong declensions, singular of weak declensions, and plural) in a systematic way that acknowledges certain system-defining regularities. In addition, it has turned out that all three domains obey iconicity – the more sonorous the phonological form of an inflection marker is, the less specific is its morpho-syntactic function. A further interesting property of the system of Icelandic noun declensions is the constant re-use of inflection markers: The markers employed in all three domains are mainly drawn from a small set comprising /a/, /u/, /i/, and /r/. By thus maximizing syncretism and iconicity, and minimizing the set of separate inflection marker forms, the system arguably comes close to optimal design.[45]

Such design considerations also play a role in the analyses of the Icelandic strong feminine declensions developed in Wurzel (1987) and Carstairs-McCarthy (1991, 1994) (the remaining declensions are not considered by either Wurzel or Carstairs-McCarthy). Interestingly, though, the conclusions reached there are quite different from the ones reached in the present paper. To end this paper, I will briefly address these alternative conceptions.

The account in Wurzel (1987) strives to minimize the assumptions needed to predict for each stem the correct inflection markers chosen in different cases and numbers. The analysis relies on Paradigm Structure Conditions, which have the status of default implications that are in turn based on the identification of leading forms. For instance, Wurzel notes that the nominative/accusative plural marker /ar/ suffices to predict all other markers in the domain of strong feminine declensions (see table 2), and that it is therefore possible to assume that only this marker with its insertion context (accusative/nominative plural) must be stipulated on a noun stem in the lexicon; the marker thus comes close to acting as a class feature for Fa. On this view, the (unmarked) declension Fi does not need any lexical specification (i.e., class feature); Fc1 needs /ur/ for nominative/accusative plural as a lexical specification; and Fc2 has /ur/ for genitive singular as a lexical specification (i.e., the genitive singular form is the leading form of this class).

In contrast, the analysis in Carstairs-McCarthy (1994) is based on the No Blur Principle (a successor to his earlier Paradigm Economy Principle, which

Icelandic noun inflection raises problems for, for reasons discussed in Carstairs-McCarthy (1991)). According to the No Blur Principle, no more than one inflection marker can fail to unambiguously identify inflection class within a set of competing markers. With respect to the strong feminine declensions shown in table 2, there is indeed at worst one inflection marker for any given case/number specification that fails to unambiguously encode inflection class: in nominative, accusative, and dative singular contexts, there is no marker, hence, no marker variation; /ar/ fails to do so in genitive singular contexts (but /ur/ does); /ur/ fails to do so in nominative and accusative plural contexts (but /ir/ and /ar/ do); and No Blur is trivially satisfied in dative and genitive plural contexts.

In a nutshell, both Wurzel (1987) and Carstairs-McCarthy (1994) are concerned with identifying leading forms in paradigms, based on the assumption that the existence of such forms makes inflectional systems more economical than they would otherwise be. Both times, the underlying idea is that there are leading forms that encode inflection class; however, the kinds of leading forms envisaged by the two authors are not identical. In Wurzel's case, a leading form is sought on vertical axes of an inflectional paradigm; in Carstairs-McCarthy's case, only one non-leading form can be tolerated on horizontal axes of an inflectional paradigm.

However, it seems to me that the system of Icelandic noun declensions, when considered in its entirety (rather than with a focus on a small part of it), does not necessarily support theories that rely on leading forms as identifiers of particular inflection classes (as opposed to natural classes of inflection classes). Thus, plural forms like /ar/, /ir/, and /ur/ cease to predict inflection class when strong masculine/neuter declensions and weak declensions are also taken into account. Similarly, if one looks at the system of noun declensions as a whole (see table 5), all case/number specifications apart from dative and genitive plural exhibit more than one marker that fails to unambiguously identify inflection class (e.g., in the nominative plural, /ar/ belongs to Ma, Fa(′), and Mw; /ir/ belongs to Mi, Fi, and Mu; and /ur/ belongs to Mc, Fc1, Fc2, and Fw). Of course, these problems can in principle be solved by reducing the domains in which the leadings forms must be sought. This is in fact explicitly done by Carstairs-McCarthy (1994: 744) (in the context of discussing noun inflection in German); the assumption there is that there is no interaction between markers across genders. The same would then have to be assumed for the weak/strong distinction (otherwise, both /ar/ and /ir/ would fail to unambiguously identify inflection class in nominative plural contexts of the masculine domain).

Still, such an approach does not strike me as entirely unproblematic. One reason is that the domains that would be needed to make the search for leadings forms successful do not correspond to the domains identified above, on the basis of considerations involving syncretism and iconicity. For instance, there is no doubt that masculine and feminine, strong and weak declensions can interact

in the plural (compare the distribution of syncretism in nominative and accusative plural contexts in table 5), which implies that they belong to the same domain.

More importantly, however, the search for inflection markers that act as leading forms in Icelandic noun declensions is at variance with what I have argued to be the most conspicuous property of the system: the constant re-use of inflection markers. Accordingly, only very few of the core inflection markers in the list of vocabulary items in (14) identify a single inflection class. I would therefore like to contend that economy and optimal design are indeed prevalent properties of the system of Icelandic noun declensions; but it is in the interaction of the inflection markers rather than in the inflection markers themselves that these properties become manifest.

NOTES

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[1] Throughout, I assume that paradigms do not exist as such, as objects that constraints of grammar can refer to, or that meta-grammatical generalizations can hold of. Rather, paradigms are considered as mere epiphenomena, as generalizations that must be derived from more basic assumptions.

[2] The view that stem alternation is an interfering factor that falls outside the core system of noun inflection can be disputed; see Cameron-Faulkner and Carstairs-McCarthy (2000), Carstairs-McCarthy (2001), and references cited there. It seems reasonable to assume that stem variation may in principle affect the core of inflectional systems. However, I believe that no such case can be made for Icelandic noun declensions, and that, therefore, the gist of the account of noun inflection in Icelandic to be developed below would not have to be changed significantly in a fuller treatment that integrates stem alternations. See in particular Kress (1982) on stem alternation in Icelandic; and Braunmüller (1984) on why this might be such a wide-spread phenomenon in Icelandic, emerging as actually more typical than stem rigidity within paradigms.

the masculine, neuter, and feminine weak declensions, respectively.[3]

[3] Here and henceforth, the examples given in paradigms often do not involve umlaut or other instances of stem alternation. As just noted, phenomena like these are quite widespread, but they are not inherently related to the choice of inflection marker. They are therefore often suppressed in paradigms by choosing appropriate stems in order to increase overall perspicuity.

[4] Throughout, inflection markers are rendered in the / / notation. This is to emphasize that they have the status of abstract, underlying items that may undergo further phonological changes.

[5] The bare /u/ in the nominative and accusative plural of Nw is an exception; I will address this issue below. Another exception is the occurrence of /na/ instead of /a/ in the genitive

plural of Nw (see *aug-n-a*), and of some noun stems belonging to Fw (compare, e.g., the genitive plural forms of the two weak feminine noun stems *húf* ('cap') and *tung* ('tongue'): *húf-a* vs. *tung-n-a*). Such a marker /na/ is hardly ever present in strong declensions. The initial segment in /na/ is the very same /n/ that shows up in the German weak noun inflection in the non-nominative cases and in the plural (compare *Planet-en* ('planet(s)'). It occurs in all weak declensions in Old Norse (= Old Icelandic and Old Norwegian); however, its distribution was already limited with masculines; see, e.g., Noreen (1903: §§389–401), Kristoffersen (2002: 914–915). The consonantal segment has disappeared to varying degrees in modern Icelandic – almost completely with masculines, to some extent with feminines (where its "use … is often arbitrary," as Kress (1982: 79) puts it), and least of all with neuters, of which there aren't many in the first place. (Pétursson (1992: 70) remarks that "in the genitive plural of some of these [weak neuter nouns], an /n/ can be inserted before the genitive ending /a/," which suggests that /n/ can be optional even with neuters; but this does not seem to be the case – /n/ is either obligatory or impossible with weak neuters.) In what follows, I will have nothing insightful to say about the /na/-/a/ alternation in the genitive plural, and will presuppose that it involves a lexically conditioned stem alternation, with /a/ assumed to be the sole proper inflection marker in these contexts.

[6] This is in line with Wurzel (1987) and Carstairs-McCarthy (1991, 1994). Kress (1982: 75–77) postulates three feminine declensions, with Fc1 and Fc2 viewed as subclasses of a single Fc class.

[7] This is immediately obvious in the case of /ar/ in Fa and /ir/ in Fi, perhaps less so in the case of /ur/ in Fc1 and Fc2. These latter classes are dubbed Fc rather than Fu because of the slightly different situation in Old Norse (see Noreen 1903: §§402–412), Kristoffersen (2002: 914–915)): Whereas /ar/ and /ir/ are present in the nominative and accusative plural of the Fa and Fi classes of Old Norse already, it is a bare consonantal marker /r/ rather than a marker /ur/ that shows up in the original Fc class; i.e., from a diachronic point of view, /u/ in the nominative/accusative plural marker /ur/ of class Fc is an epenthetic vowel. – Note incidentally that, in contrast to Fc, Fw already has a /ur/ marker in these contexts in Old Norse.

[8] Interestingly, whereas Fi (and not, e.g., Fa) is the unmarked, dominating, and most productive inflection class among the strong feminine declensions (see Wurzel (1987)), it is Ma that has this status among the strong masculine declensions.

[9] Thus, Mi qualifies as the i-declension by virtue of having /i(r)/ in nominative and accusative plural contexts (even though it is in fact the only strong masculine declension that does *not* have /i/ in the dative singular); similarly for Ma. Mu does not have /u/ in the nominative/accusative plural in modern Icelandic. The name of this declension can be traced back to its predecessor: The Old Norse masculine u-declension had /u/ in the accusative plural. Still, there was an /ir/ (as with the i-declension) in the nominative plural, whose vowel then spread onto accusative contexts and replaced the original /u/. (Note incidentally that this means that it is only the accusative plural, not the nominative plural, that acts as a leading form in Old Norse.) Finally, the reason for classifying the remaining declension Mc as consonantal is the same as with its counterparts in the strong feminine domain: An original bare /r/ was later accompanied by an epenthetic /u/.

[10] There are a few exceptions in Russian, though. See, e.g., Corbett and Fraser (1993), Krifka (2003).

[11] This is the synchronic reason for classifying the strong neuter declension as an a-declension. From a diachronic perspective, a theme vowel /a/ was present in Ancient Nordic (the predecessor of Old Norse) in the strong neuter declension.

[12] On the non-systematic nature of trans-number syncretism (as opposed to trans-paradigmatic and intra-paradigmatic syncretism), see also the discussion of noun inflection in Russian in Müller (2004), in Greek in Alexiadou and Müller (2004), and from a general, cross-linguistic perspective in Baerman et al. (2002). Also compare Stump (2001: 214) on homophonous forms of 1.SG and 3.PL in Rumanian verb inflection.

[13] Arguably, traces of the different syntactic functions of strong and weak declensions can even be observed with nouns in German. See Müller (2002: 140–142), based on observations concerning 'case-marker drop' in Gallmann (1998) (also cf. Spencer (2003)). A syntactic difference between strongly and weakly inflecting nouns motivates two morphological domains without further ado.

[14] In principle, there might then be four domains, with the plural of weak declensions emerging as a domain in its own right; however, as noted above, the plural of weak declensions does not involve a separate system of markers but is parasitic on the plural of strong declensions.

[15] Note in particular that the Syncretism Principle and the Iconicity Principle are versions of the meta-principles for morphological structure-building IV and V in Wurzel (1984: ch. 5).

[16] See, e.g., Shapiro (1969), Plank (1979), Wiese (2003), and Müller (2004) on noun inflection in Russian; Wiese (2001) on noun inflection in Latin; Wiese (1996), Wiese (1999), Bittner (2002), and Müller (2002) on pronominal inflection in German; and Wurzel (1984) and Carstairs (1987) for more general remarks.

[17] See Pétursson (1992: 70–71) and Thráinsson (1994: 154). Note that some of these 'language-specific' properties (or 'system-defining structural properties', in the terminology of Wurzel (1984: 82)) may in fact be more somewhat more general. This holds, e.g., for the generalization about neuters, a part of which reflects a basic principle of Indo-European.

[18] The decomposition here freely draws on work by Bierwisch (1967), Wunderlich (1997, 2002), Wiese (2001), and others. I will leave open the question whether positive vs. negative feature values can or should be construed as reflecting marked vs. unmarked instantiations of the features; nothing in what follows hinges on this. Note that a more ecomonical system might recognize only two primitive binary case features in Icelandic, whose cross-classification would suffice to yield four cases. However, such a procedure would be at variance with the fact that three cases can form a natural class in Icelandic. The only way to express this in a system relying on two binary features would then be to assume that complements of natural classes also form natural classes. This has in fact sometimes been proposed (see Zwicky (1970)), and it does not strike me as unreasonable (for reasons laid out in Müller (2002)); but I will not pursue this strategy in the present paper (even if this implies that four of the eight possible cases derivable from cross-classifying the three binary case features in Icelandic must remain unused).

[19] The genitive is typically non-structural in the verbal domain; initially, it could therefore also be classified as [+obl]. One might speculate that languages have a choice as to whether the genitive is classified as [+obl] or [−obl] (assuming a feature inventory along these lines to be non-language-specific), with languages like German, Russian, and Greek opting for the former; see Alexiadou and Müller (2004).

[20] Also see Plank (1991: 184). Plank has three additional natural classes: one that contains all four cases; one containing only the accusative and the genitive; and one that comprises the nominative and the genitive. The first class is trivially defined by the absence of case features in the present system. However, I do not see evidence for the latter two classes in the domain of Icelandic noun inflection (and whereas an accusative/genitive class could be captured by

the specification [+v,−obl], a nominative/genitive class cannot be defined by combining the primitive case features adopted here).

[21] For reasons of space, the features are abbreviated in (10): [±w(eak)], [±m(asc)], [±f(em)], [±a(-type)], [±i(-type)], [±c(-type)].

[22] An obvious proviso must be made here for Fa′ and Fc2, which have an additional subclass specification ([+a′] and [+c′], respectively) that accompanies the [+a] and [+c] specifications they inherit by virtue of their position in the hierarchy.

[23] Depending on how exactly the fixed order requirement for α-type features is understood, more structure involving branching [±a-type] and [±-i-type] could be assumed between [+fem]/[−masc] and [+c] in the weak domain in (10); but this additional structure would be vacuous.

[24] Note in passing that there is an interesting interaction of (i) the confinement to at most one positively specified α-class feature, and (ii) an inherent (albeit so far implicit) restriction to three genders (i.e., at most one positively specified gender feature – [+masc,+fem] is not a legitimate combination). Together, (i)–(ii) significantly reduce the set of possible inflection classes that can be generated by a set of given binary class/gender features in a given language. This makes up for the fact that an a priori more parsimonious (but linguistically less plausible) analysis might be conceivable that adopts only four binary class/gender featues giving rise to $2^4 = 16$ potential inflection classes, where the present analysis in terms of six binary class/gender features (abstracting away from the special features [+a′] and [+c′]) initially gives rise to $2^6 = 64$ potential inflection classes. Given (i)–(ii), this number is reduced to 24 (most of the additional options for further inflection classes would arise under the [+weak] and [−weak,−fem,−masc] nodes in (10)).

[25] Given that *cn* heads bear fully specified case, number, class, and gender information (in the two latter cases because of copying from *N*), the rules are to be understood as follows: A feature specification to the left of the arrow → is deleted in *cn* in the presence of the set of features to the right of the arrow, which provides other features present in *cn* that make up the application context of the deletion rule. The fact that this context shows up to the left (rather than to the right) of __ in the rules has thus no significance. Note that the [±obl] notation in (13-b), (13-d) is to be understood in such a way that a [−obl] feature is deleted in the respective contexts, and that a [+obl] feature is also deleted in these contexts. The notation is thus merely a shorthand for a more complex (disjunctive) rule formulation; in no way should this be construed as an extension of the simple binary feature system adopted throughout. (Similarly for [±v] in (13-c).)

[26] What about the last regularity in (3) , viz., (3-g) , which concerns the uniformity of dative and genitive plural markers? This generalization will not be treated by invoking impoverishment; see below.

[27] For reasons of space, an abbreviation is used again: [±n], [±v], [±o(bl)]. For the same reason, gender, class, and number features are not explicitly listed here. For instance, the cell in the upper left corner in table 6 has the full specification {[−pl],[−weak,−fem,+masc, +a-type,−i-type,−c-type],[−n,−v−obl]}.

[28] As it turns out, of the three rules in question, (13-c) also has the most limited distribution, being confined to eight cells in table 6 (as opposed to twelve cells each for (13-a) and (13-d)); this might provide a viable alternative to the one in the text for measuring specificity of impoverishment rules.

[29] An alternative would be to assume two separate morphemes for vocabulary insertion (equivalently, two rule blocks in the sense of Anderson (1992), Stump (2001)). This is done by

Halle (1994) for Russian noun inflection. I will not adopt this assumption here for the following reasons: First, it would imply a proliferation of phonologically empty morphemes. (A similar problem shows up with Russian noun inflection in Halle's approach, where he assumes that both morphemes are actually always filled by overt markers in the morphological component, one of which then undergoes deletion in phonology in most contexts.) Second, the alternative approach would ceteris paribus bring with it a complication of syntactic structure for which there is no evidence. Third, it would impose an agglutinative-like structure on the system of Icelandic noun inflection that does not seem to be empirically supported because there is no corresponding principled difference in feature types: As we will see, the two positions of a composite marker do not encode case and number, respectively; rather, both encode case information. And fourth, it will turn out that the situation can arise where a 'second-position marker' must be able to crucially interact with a 'first-position marker'; such interaction is impossible if the two positions correspond to two morphemes, but it is expected if the two positions correspond to a single fissioned morpheme.

[30] Stump (2001: 156–166) calls into question the concept of fission in general (and argues for a rule block/multiple morpheme approach) on the grounds that fission faces problems with the phenomenon of "extended exponence," i.e., cases where it seems as though a feature specification is realized by more than one marker, as in German past participles like *gesprochen* ('spoken'), which is "distinguished as a past participle both by its stem vocalism and by its affixes" (Stump (2001: 4)): If features in a fissioned morpheme are discharged by insertion of a vocabulary item in whose insertion context they occur, there is nothing that might trigger subsequent insertion of another vocabulary item with the same features. As shown by Noyer (1992), this problem can be addressed in a fission approach by distinguishing between primary and secondary exponence (on which also see Carstairs (1987)), such that a feature specification may serve as the primary insertion context of one marker, and as the secondary insertion context (noted in parentheses) of some other marker (which then also has a primary insertion context; also see Frampton (2002), Harley and Noyer (2003)). However, Stump (2001: 162) argues that such an approach is conceptually problematic, and can lead to a dilemma because there are cases where it seems that a single marker must act as the primary exponent of some feature specification in one case, and as a secondary exponent of the same feature specification in another case. Now, there may or may not be a systematic way to overcome such problems in a pure fission approach, but this issue does not really affect the case at hand: Extended exponence is certainly not an obvious property of the system of Icelandic noun declensions, and will in any event not play a role in the analysis developed below; but with extended exponence not at issue, there is no argument against a fission approach to Icelandic noun declensions. (Of course, the question remains how extended exponence should be handled in Distributed Morphology. One possibility would indeed be a multiple morpheme approach, which, as such, is fully compatible with the simultaneous postulation of fissioned morphemes in other domains of a grammar (or other languages). However, for reasons similar to those that led me to abandon a multiple morpheme approach to Icelandic noun inflection, I think that extended exponence might in fact best be addressed by a post-syntactic feature copying operation that takes place before vocabulary insertion. For reasons of space and coherence, I cannot pursue this topic here, though.)

[31] Strictly speaking, the insertion contexts would have to be accompanied by category features, to ensure that the vocabulary items can only be inserted in *cn* morphemes of *N* heads. This is tacitly presupposed in (14).

[32] The order of the vocabulary items in each domain corresponds to increasing specifity from

top to bottom. This deviates from standard practise so as to highlight the core of each domain, and to separate it from what I take to be more marginal markers (like /u/$_2$, /u/$_3$ in II).

[33] Note that the nominative singular of the strong masculine classes had a bare /r/ marker in Old Norse (see Noreen (1903), Kristoffersen (2002)), in the same way that the nominative/accusative plural of the Fc class originally had a bare /r/ marker (see footnote 7); /u/ is epenthetic from a diachronic point of view. In fact, Anderson (1969: 56–57) argues that /u/ in the nominative singular marker /u/-/r/ is introduced by a late phonological epenthesis rule, and thus does not act as (part of) a morphological marker, even from a synchronic perspective (also see Anderson (1985)). He takes this approach to be supported by the fact that nominative singular /u/ cannot trigger u-umlaut, in contrast to, say, the dative plural marker /um/ (see, e.g., *stað-ur* vs. *stöð-um* in table 3, the assumption being that the /u/-epenthesis rule applies after the u-umlaut rule); and by the observation that /u/ does not show up in nominative singular contexts if the masculine stem ends in a vowel (compare *lækni-r* vs. **lækni-ur* ('doctor')). The analysis developed in this article would in principle be compatible with such a view (leaving out /u/ in the marker inventory in (14)-II and adopting an appropriate epenthesis rule would suffice to accomodate it). However, following Kress (1982: 44), I will continue to assume that synchronically, /u/ is a proper marker in nominative singular contexts, and that u-umlaut effects are to be explained diachronically. One reason for doing so is that the assumption that u-umlaut is a synchronic process in Icelandic leads to extremely abstract analyses: For instance, the umlaut in *börn-Ø* (Na, nominative plural) vs. *barn-Ø* (Na, nominative singular) is traced back to an abstract lax /u/ in Anderson (1969: 57) that is obligatorily deleted after triggering umlaut. However, the abstract /u/ posited here would not be confined to modern Icelandic; it would also have to be present in Old Norse already, where there is also no overt /u/ in nominative plural contexts of Na, and where u-umlaut shows up in the same way (see Noreen (1903: §347)). Thus, not only can u-umlaut fail to occur in the presence of /u/; u-umlaut can also occur in the absence of /u/.

Deletion of /u/ with masculine stems ending in a vowel must then be effected in one way or the other (by invoking a deletion rule, or, in optimality-theoretic terms, a faithfulness violation incurred in order to respect a higher-ranked markedness constraint against hiatus). The view that absence of /u/ is the special case rather than the norm is reinforced by the observation that Icelandic speakers often treat forms like *lækni-r* (nominative singular) as pure stems without an ending, and consequently produce substandard forms like $^{\#}$*læknir-s* (genitive singular) or $^{\#}$*læknir-ar* (nominative plural) (see Kress (1982: 59)). This can be taken to indicate that /r/ is not the sole marker in nominative singular contexts of strong masculine declensions – if it were, we would not expect nominative singular forms with /r/ and without /u/ to be considered marker-less by speakers.

[34] Without impoverishment in accusative singular contexts, we might thus expect /r/ to be the sole marker, other things being equal, which then might or might not trigger vowel (schwa) epenthesis. (Recall the remarks in footnotes 7, 33.)

[35] Incidentally, this is the reason why I have been hesitant to assign full inflection class status to Fa′ in tables 2 and 5.

[36] See, e.g., Matthews (1974: 113–114), Ross (1980: 42), and Crosswhite (2000) for independent motivation of this partial sonority hierarchy based on external sandhi in Greek, binomial formation in German, and sonority-driven reduction in Bulgarian and Catalan, respectively.

[37] Note that the grouping of Nw and Fw with the strong consonantal classes in the nominative and accusative of the plural forms the rationale behind classifying these weak declensions as [+c-type] in (10).

[38] The next obvious step would be to extend this analysis to the system of (strong and weak) adjective declensions in Icelandic, which, as noted, is similar in some respects, and different in others (see Kress (1982: 84–92)). A Distributed Morphology analysis of adjective inflection in Icelandic has in fact been developed in Sauerland (1996: 31–33). However, the impoverishment rules and insertion contexts of adjective inflection markers given there are quite different from what has been suggested here for noun inflection markers. A unified approach to the two systems will have to remain outside the scope of the present paper.

[39] Icelandic noun inflection markers consist of maximally a single [VC] sequence. A reviewer contends (i) that this generalization should be assumed to have the same status as the systematic properties of the declensional system listed in (3); (ii) that it cannot be derived in a principled way if fission is assumed (the reason being that it is only a conspiracy of the make-up of the individual vocabulary items in (14) that ensures that markers are at most two-segmental and not, say, three-, four-, or n-segmental); and (iii) that assuming two morphemes (or rule blocks) without fission (rather than one morpheme with fission), as envisaged in footnote 29, would account for the restriction to two segments straightforwardly. It is unclear to me whether (i) is valid, given that, e.g., the related system of adjectival declension in Icelandic has markers with more than two segments. More importantly, (iii) is correct only if it is stipulated that all Icelandic noun inflection markers must be mono-segmental, an assumption that can hardly be maintained in view of the dative plural marker /um/, which cannot plausibly be split up into two markers. Thus, even under a two-morpheme approach (or, for that matter, a one-morpheme approach), the question arises why Icelandic noun inflection markers do not have more than two segments. Finally, concerning this last question (hence, (ii)) I would like to suggest that the tendency to minimize segments in inflection markers may ultimately be traced back to the fact that /a/, /u/, and /i/ are the only vowels that can show up in unstressed syllables in Icelandic; that the consonantal marker inventory is extremely small to begin with (basically, /r/ and /s/); and that the Syncretism Principle drastically restricts the free re-use of segmental markers within a given domain.

[40] Thanks are due to two reviewers for suggesting these two alternatives.

[41] As noted, the markers /um/ and /a/$_2$ in (14)-IV do not interact with other markers; hence, the issue of redundancy in insertion contexts does not come up in the first place.

[42] Note in passing that, like the case features just discussed, some of the [$\pm$weak] class features in (14) would emerge as redundant in an approach that dispenses with the Iconicity Principle. The same would go for some [$\pm$pl] number features, given that number features are integrated into the feature hierarchy in (11).

[43] A marker like the second /i/ would also fail to comply with maximal underspecification.

[44] The question arises of whether the impoverishment rules adopted above could all be formulated in Trommer's terms, as insertion contexts of highly specific /Ø/ markers. This may be the case, but I will refrain from attempting it here because (a) it seems to me that such a procedure would illegitimately mix two operations (impoverishment and vocabulary insertion) that are conceptually quite distinct, and (b) highly specific /Ø/ markers strike me as a dubious concept, all the more so in view of iconicity-related considerations.

[45] As briefly noted above, inflectional systems that respect the Syncretism Principle reduce the number of possible inflection classes; and the smaller the number of markers, the stronger the reduction effect. See Müller (i.p.).

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A constraint on interclass syncretism

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1. INTRODUCTION

A partition of the vocabulary of a language into arbitrary inflectional classes is very often complicated by stems which seem to belong to two or more classes at once; often such stems belong to one class but appear to 'borrow' affixes from another class. Inflection class mixture of this sort ranges along a continuum where at one extreme there may be a small set of irregular items each with its own unique exceptional pattern, while at the other extreme there may be a coherent SYSTEMATIC MIXED INFLECTION CLASS whose inflectional forms are only partly syncretized with those of another class.[1] In this paper I examine the formal mechanisms within the theory of Distributed Morphology (DM) which produce mixed inflection class behavior, the most important being DEFAULT SPELL-OUT and rules of IMPOVERISHMENT. Default spell-out allows interclass syncretism to occur whenever the affix shared by several classes is a default form. This mechanism may be said to figure in some fashion in all theories of morphology, but impoverishment is more particularly associated with DM. As I will show, when impoverishment rules apply to inflection class features, the result is that the affected form will behave inflectionally as if 'moved' into a default inflectional class. Given this restriction on impoverishment, it is predicted that affixes which are 'shared' by more than one inflectional class must either be default spell-outs OR the spell-out of a default inflectional class.

1.1. Idiosyncratic versus Systematic Mixed Inflection

To begin it will be essential to distinguish two types of mixed class phenomena, which we may term IDIOSYNCRATIC and SYSTEMATIC. These types correspond, in essence, to the difference between grammatical facts that result from listing and those that result from the application of general rules. I discuss each type in turn.

1.1.1. Idiosyncratic Mixed Inflection or Heteroclisis

Idiosyncratic mixed inflection often occurs when an item of vocabulary has two or more stem allomorphs belonging to distinct inflectional classes. For example in the Greek of Herodotus the word for 'tree' has three possible forms: a neuter *o-stem *déndr-o-n*, a neuter *o-stem *déndre-o-n*, and finally a neuter *-es/os-stem *déndr+os-Ø*. The first stem occurs only in the nom.acc.sg., in variation with the other two; elsewhere in the sg. Herodotus uses only the second stem.

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In the plural the third stem is used in the dat.pl. *déndr+e(s)-Ø-si*, and the remaining pl. cases are ambiguous between coming from the second or from the third stem. In later Attic prose the second stem is lost, and the first stem becomes usual in both the sg. and pl., with the exception that the dat.pl. continues normally to be formed from the third stem.[2]

This pattern of variation and mixed behavior characterizes 'tree' specifically and does not generalize to a group of stems. In such cases it appears highly unlikely that the language learner will construct a specific inflectional class with a single member; rather, the vocabulary item *dendr+* must be entered on certain lists of exceptions in the rules of spell-out. For example, in Attic prose – the simplest case – only the dat.pl. *dendr+e(s)-Ø-si* will require special mention. In this category, the stem extension *-es-* must be added to the root, the nominal theme must be spelled as *-Ø-* instead of as *-o-* and the desinence as *-si* instead of as the expected *-is*. Each such rule (or vocabulary item) has a regular domain of application; besides this the rules/vocabulary items in question must include *dendr-* on a LIST of additional, idiosyncratic contexts of application, for example:

$$(1)\quad si \;\leftrightarrow\; \begin{bmatrix} -\text{genitive} \\ -\text{direct} \\ \text{plural} \end{bmatrix} \Big/\; [-\text{thematic}] \text{ OR } \{dendres\text{-}, \ldots\} + \_\_\_$$

Here the vocabulary item *si* is inserted into the dative plural case ending position after non-thematic (i.e. [−thematic]) stems and after a set of listed exceptions, including *dendres-*. Mixture of this type is traditionally referred to as HETEROCLISIS or METAPLASM; here I will use 'heteroclisis' to mean any such instance of idiosyncratic inflection class mixture.

1.1.2. Systematic Mixed Inflection

In the second type, which will be of interest here, a subclass of stems from one inflectional class 'shares' an affix (or affixes) with another inflectional class.[3] This situation is represented schematically below:

(2) Schema for Systematic Mixed Inflection

	class I	class I [+F] 'special'	class II	class III
case 1	*a*	*a*	*w*	*w*
case 2	*b*	*b*	*x*	*v*
case 3	*c*	*y*	*y*	*y*

In the schema illustrated here, we suppose that affix *c* is the normal spell-out for CASE 3 for nouns of inflectional class I. However, a specific subset of

'special' nouns in class I, defined by the feature [+F] let us say, has the spell-out *y* for CASE 3, where *y* is also the spell-out for CASE 3 in another inflection class or classes (classes II and III). In such cases I will speak of SYSTEMATIC MIXED INFLECTION CLASS.

Table 1. Some Gothic Declensions

	O m.	A f.	I m.	I f.	U m.f.	T f.
nom.sg.	*-s*	*-a*	*-s*	*-Ø-s*	*-u-s*	*-s*
gen.sg.	*-is*	*-ōs*	*-is*	*-ái-s*	*-áu-s*	*-s*
dat.sg.	*-a*	*-ái*	*-a*	*-ái-Ø*	*-áu-Ø*	*-Ø*
acc.sg.	*-Ø*	*-a*	*-Ø*	*-Ø-Ø*	*-u-Ø*	*-Ø*
nom.pl.	*-ōs*	*-ōs*	*-ei-s*	*-ei-s*	*-ju-s*	*-s*
gen.pl.	*-ē*	*-ō*	*-Ø-ē*	*-Ø-ē*	*-iw-ē*	*-ē*
dat.pl.	*-am*	*-ōm*	*-i-m*	*-i-m*	*-u-m*	*-im*
acc.pl.	*-ans*	*-ōs*	*-i-ns*	*-i-ns*	*-u-ns*	*-s*
Example	*stáin-* m.' 'stone'	*wamb-* f. 'womb'	*arm-* m. 'arm'	*waúrt-* f. 'root'	*fōt-* m. 'foot'	*brust-* f. 'breast'

For a concrete example, examine in Table 1 the declension of some of the inflectional classes of the noun in Gothic (Wright 1910: 84 ff.). Class O contains historically 'thematic' masculine (and neuter) *o-stems, whereas class A contains the thematic feminines in *-ā. The remaining classes shown are old 'athematic' stems; classes I and U were originally characterized by a predesinential stem alternation *i ~ *ei̯ (*i-stems) or *u ~ *eu̯ (*u-stems). Reflexes of *ei̯ and *eu̯ can be seen in the gen. and dat.sg. of class U and in the feminines of class I. But in the masculines of class I, the declension of the singular no longer follows the expected pattern for class I. Rather, the old masculine *i-stems have 'borrowed' the endings of the (masculines) of class O. This is most conspicuous in the gen. and dat.sg., where in the masculines of class I we find *-is, -a*, just as in class O, as opposed to the expected *-ái-s, -ái-Ø*, which appear only in the feminines of class I.

In descriptive literature the distinction between sporadic heteroclisis and systematic mixed inflection class is not usually discussed, especially since the former sometimes leads to the latter. For our purposes the essential difference is that while heteroclisis is limited to the exceptional behavior of individual items of vocabulary (and therefore often shows a large degree of variation in speakers' productions or textual records), systematic mixed inflection class represents a pattern applicable to all vocabulary items of a certain general type. In other words, for mixed inflection to become systematic in the sense employed here, the set of forms displaying the exceptional behavior must be sufficiently numerous and the phenomenon sufficiently invariant for the learner to abstract an inflectional class feature to define these forms.[4] For example, in the Gothic

declension the masculine stems of class I occupy a well-defined niche in the inflectional system; they decline exactly as do the feminines in the plural, and bear close resemblance, with substitution of *-i* for *-u*, to the masculines (and feminines) of class U. In such a situation, the pattern of systematic mixed inflection diagnoses an innovation in the morphological rule system. In contrast, heteroclitic stems such as Greek *dendr-* 'tree' are listed exceptions and do not provide evidence for rule innovation.

1.2. The Grammatical Expression of Systematic Mixed Inflection

Distributed Morphology (DM; Halle and Marantz (1993, 1994), Harley and Noyer (1999) et. seq.) provides three distinct grammatical mechanisms to encode systematic mixed class inflection, each of which will be illustrated in this paper. The first of these, PHONOLOGICALLY-CONDITIONED SPELL-OUT, figures in all theories of morphology. In this case the phonological environment determines the phonological variants of stems or affixes, or may in fact control the introduction of suppletive affixal variants (Carstairs 1988, Carstairs-McCarthy 1990). So if the distribution of $c \sim y$ in (2) is predictable on phonological grounds, we have no mixed inflection class in reality, just two variants of the spell-out of CASE 3 irrespective of class.

The second and third mechanisms both involve the use of defaults in the grammar. A mixed inflection may involve the 'borrowing' of either the DEFAULT AFFIX for a given category, or of a non-default affix of a DEFAULT INFLECTIONAL CLASS.[5]

Default spell-out rules introducing default affixes are employed by all theories of morphology that may be termed 'realizational' (Matthews (1972), Anderson (1982), Stump (2001)): here the inflection 'borrowed' in the mixed subclass is simply a default inflectional form that spreads when conditions on the appearance of the replaced inflection become more restricted. In our schema this would require that affix *c* be conditioned specifically by the nouns of class I which are *not* in the special class; affix *y* is then the elsewhere spell-out of CASE 3. This grammar is feasible provided that the set of nouns in the 'non-special subclass' can be specified in some way, as for example below by the feature [−F]:

(3) *Mixed Inflection by Default Spell-Out*

a. $c \leftrightarrow [\text{CASE } 3] \;/\; \begin{bmatrix} \text{class: I} \\ -\text{F} \end{bmatrix} + \_\_$

b. $y \leftrightarrow [\text{CASE } 3]$ *(elsewhere)*

In both phonologically-conditioned allomorphy and default spell-out the mixing of inflectional classes arises historically as a result of changes in spell-out rules which alter the distribution of allomorphs in various ways.

Consider now a variation of the earlier schema (2), in which the affix *c* expresses CASE 3 in both inflection class I and in inflection class III, as shown below in (4). This will mean that *y* cannot be a general default. Or, suppose that the 'non-special' subclass of inflection class I stems does not form any natural class to which the grammar may refer (e.g., there is no feature [−F]):

(4) Schema for Impoverishment

	class I	class I [F] 'special'	class II	class III
case 1	*a*	*a*	*w*	*w*
case 2	*b*	*b*	*x*	*v*
case 3	*c*	*y*	*y*	*c*

In either situation, the grammar will require more than simply a default spell-out rule. Here DM makes use of a type of rule specific to that theory, namely IMPOVERISHMENT, which has been studied chiefly as a means of expressing syncretisms within (rather than ACROSS) inflectional classes (Bonet 1991, Harris 1994, Noyer 1997, 1998). An impoverishment rule deletes a feature value of a morpheme in certain contexts, making the morpheme behave as a less marked category for the purposes of spell-out. When impoverishment operates on inflection class features of a stem, it has the effect of 'moving' that stem into the default inflectional class of its type.

For the schematic example under discussion, an impoverishment deletes the inflection class feature in the special class I stems in CASE 3; these are then converted to class II by an inflection class redundancy rule:

(5) *Mixed Inflection by Impoverishment*

a. $\begin{bmatrix} \text{class: I} \\ \text{F} \end{bmatrix} \rightarrow \emptyset \;/\; \_\_\_ + [\text{CASE 3}]$

b. [ ] → [class: II]

The combined action of impoverishment (5a) plus redundancy rule (5b) causes the special [+F] class I nouns to behave as if they were class II nouns in CASE 3. Of course this will only be possible if class II is a default inflectional class of some type, that is, if rule (5b) is independently part of the grammar (on which, see section 1.3.1 below).

The mixed inflection of the masculine class I stems in Gothic provides a concrete illustration of the schematic derivation in (5):

(6) *Gothic Impoverishment*

a. $\begin{bmatrix}\text{class: I}\\ +\text{masc}\end{bmatrix} \rightarrow \text{Ø} \;/\; \_\_\_ + [+\text{sing}]$

b. $[+\text{masc}] \rightarrow [\text{class: O}]$

Specifically, the 'special', i.e. masculine, nouns of class I undergo impoverishment of the inflection class feature [class: I] in the singular (6a). A redundancy rule (6b) inserts the feature [class: O] on masculine nouns which are unmarked for inflection class. The cumulative result is that masculine (but not feminine) class I nouns inflect as if class O in the singular, as required.

1.3. The Interclass Syncretism Constraint

Both default spell-out and impoverishment share the property that they lead to the replacement of marked entities – inflectional class features or specific affixes – by default ones. This generalization gives rise to the principal hypothesis to be defended and elaborated here, stated as follows:

(7) *Interclass Syncretism Constraint*

> Let *A* and *B* be distinct inflection classes, where the morphosyntactic feature [±F] partitions the set of stems in *A* into two subclasses. If only the [+F] stems in class *A* share an affix α with the stems in class *B*, then either: (i) α is a default affix, or (ii) *B* is the default inflectional class for [+F] stems.

The fact that default affixes as well as affixes from default classes are diachronically the most stable (and hence most likely to 'spread' across classes) has been observed by other researchers, most notably Wurzel (1989). The present paper aims at deriving this effect directly from the formal properties of morphological rules and not through an independent stipulation about grammars or historical changes. Thus, I must stress at this point that the Interclass Syncretism Constraint (ISC) is not an axiom of the proposed theory; rather it is DERIVED here as a formal consequence of the types of morphological rules that are available.

1.3.1. Unexpected Patterns

To establish a counterexample to the ISC it must be shown that a 'borrowed' affix is neither a general default nor an affix from a default class. To show the former, it suffices to show only that another affix must be the default; such

scenarios are trivial to construct. For example, returning again to the schema in 4, it is clear that *a* cannot be a general default since *w* must be, given that *w* appears in both classes II and III.[6]

To show that an affix does not belong to a default class one must have evidence regarding what the default classes in fact are. In the examples to be discussed in this paper the condition for insertion of a default class property is the gender of the stem in question; the default class associated with a particular gender is determined by the usual inflection class of adjectives, since, by hypothesis, adjectives ordinarily lack inherent inflection class features, but are assigned gender by syntactic agreement and then assigned into the default inflectional class for that gender.[7] For example, rule (6b) maps masculine stems unmarked for inflection class to class O in Gothic. This rule is needed not only as part of the impoverishment of inflection class in the masculine stems of class I, but is also independently required to map into class O those adjectives that receive masculine gender by agreement.[8]

A hypothetical counterexample to the ISC can be constructed simply by switching the labels of the left two columns in table 1.

(8) 'Pseudo-Gothic'

	A f.	O m.	I m.	I f.	U m.f.	T f.
nom.sg.	*-s*	*-a*	*-s*	*-Ø-s*	*-u-s*	*-s*
gen.sg.	*-is*	*-ōs*	*-is*	*-ái-s*	*-áu-s*	*-s*
dat.sg.	*-a*	*-ái*	*-a*	*-ái-Ø*	*-áu-Ø*	*-Ø*
acc.sg.	*-Ø*	*-a*	*-Ø*	*-Ø-Ø*	*-u-Ø*	*-Ø*
	etc.					

In this 'pseudo-Gothic' the masculine stems of class I 'borrow' inflections from the class A FEMININES. Assuming that rule (6b) is still required for masculine adjectives, it will be impossible for impoverishment to 'move' class I masculines into class A.[9]

1.3.2. Prospectus

It should now be clear that the ISC has predictive power only to the extent that the notion 'default inflectional class' or 'default affix' can be independently justified. Moreover, because phonologically conditioned allomorphy and default spell-out can give rise to superficially similar patterns of identity of exponence across inflection classes, it will be essential to distinguish carefully among these when evaluating putative counterexamples of the Interclass Syncretism Constraint.

The remainder of the paper is organized as follows. In section 2 I illustrate the mechanism of impoverishment in an analysis of the allomorphy of the

instrumental case in Old Russian. Then in section 3.1 I present a fairly detailed study of several analogical changes in various dialects of Greek as a test case for the Interclass Syncretism Constraint. Phonologically-conditioned allomorphy, default spell-out and impoverishment are each required depending on the circumstances. I conclude in section 4 with a brief comparison of the Interclass Syncretism Constraint with a related proposal about inflectional defaults, namely the No Blur Principle of Carstairs-McCarthy (1994).

2. IMPOVERISHMENT IN THE RUSSIAN INSTRUMENTAL

The nominal declension of Old Russian provides several examples of impoverishment and will therefore be a convenient introduction to the issues of interest here. As in Modern Russian, most of the inflectional classes in Old Russian show some allomorphy based on whether the final consonant of the base is palatalized ('soft') or plain/velarized ('hard'). Where this occurs, I will indicate the soft allomorph in parentheses after the hard one. The symbols ь, ъ denote the short/lax high vowels [ĭ, ŭ] traditionally called 'yers'; the symbol [ě] denotes a low front vowel, phonetically approximately [æ]. Table 2 illustrates the inflectional patterns of the various stem types in certain case-number combinations which invite special attention.

Table 2: Old Russian Declension (partial)

type	nsg.	gsg.	isg.	npl.	apl.	ipl.	example
*(j)ā m.f.	a, i	y (ě)	o(e)-ju	y (ě)	y (ě)	a-mi	*žen-* 'wife'
*(j)o m.	ъ (ь)	a	o(e)-mь	i	y (ě)	y (i)	*stol-* 'table'
*(j)o n.	o (e)	a	o(e)-mь	a	a	y (i)	*lět-* 'year'
*u m.	ъ	u	ъ-mь	ow-e	y	ъ-mi	*syn-* 'son'
*i m.	ь	i	ь-mь	ij-e ∼ i	i	ь-mi	*put-* 'way'
*i f.	ь	i	ь-ju	i	i	ь-mi	*kost-* 'bone'
*C m.	y	e	ь-mь	e	i	ь-mi	*kam-en-* 'stone'
*C n.	o	e	ь-mь	a	a	y	*slow-es-* 'word'
*C f.	i	e	ь-ju	e ∼ i	i	ь-mi	*mat-er-* 'mother'

Old Russian nouns are usually divided into five major inflectional classes falling into two major groups. The first group consists of the stems ending in non-high vowels, i.e. the (j)ā-stems (class A) and *(j)o-stems (class O). The second group collects the remaining types, the *u-stems, *i-stems and consonantal stems (*C-stems).

As can be seen in Table 2, the gen.sg. form is distinct for each of the classes and is the principal diagnostic of class membership. Case-number endings consist of a thematic vowel plus a desinence, but in most cases shown in the table,

the underlying theme vowels do not surface owing to a general rule deleting a vowel before another vowel (at a morpheme boundary). The theme vowel *a* for class A and a front or back yer for the *u-, *i- and (non-neuter) *C-stems can be seen most clearly in the inst.pl. where the consonant-initial desinence *-mi* allows the theme to surface; for class O and the neuter *C-stems where *-mi* does not occur, the theme vowel can be seen in the inst.sg. form instead.

Because the masc. *u-stems and *i-stems exhibit paired hard/soft endings (provided that *u* is understood to have *i* as its soft counterpart), these two classes can be combined together into a single class; the fem. *i-stems can also be included in this class since gender can be used to condition the differences these show from the masculine *i/*u-stems (there are no fem. *u-stems). Furthermore, the *i/*u-stems and the consonantal stems also have certain common properties suggesting that they are subclasses of a more general type (historically the athematic or 'consonantal' stems). For example, masculines of both classes have nom.pl. *-e* and both classes have predesinential yer, where permitted phonologically. I will call this entire group of historically athematic forms the 'yer-stems' or class Y, and assume that the *i/*u-stems are distinguished from the consonantal stems through means other than their major inflectional class feature.[10]

The rule of pre-vocalic vowel deletion creates some surface homophonies which were to have important consequences in the development of modern Russian. The nom.sg. ъ of the masculine *o-stems, underlyingly *-o-ъ*, coincides with that of the *u-stems, which is underlyingly *-ъ-Ø*; the nom.sg. of ь of the masc. *(j)o-stems likewise coincides with that of the masc. *i-stems. In addition, the nom.acc.sg. *-o* of the neuter *o-stems (<*-o-m) is in Old Russian the same as the nom.sg. of neuter *s-stems (<*-os-Ø).

Partly owing to these coincidences, masculine class Y stems typically became class O stems by early modern Russian. The masculine *i-stems, with the single exception of *putь* m. 'way', adopted the inflection of the masculine *jo-stems or, in a few instances, changed to feminine *i-stems (OR *gъrtanь* 'larynx' > R *gortánь*, OR, R *pečátь* 'seal, stamp' (Kiparsky 1967: 29)). The masculine *u-stems and C-stems likewise adopted the inflectional pattern of the *o-stems, as did neuters in *s and *nt, while feminine C-stems adopted the *i-stem pattern (the modern Russian third declension). Aside from *putь* then, the only non-feminines which retain third declension behavior in modern Russian are neuters in *en such as *plam-en-* n. 'flag', modern Russian *plam^{j}-a*, gsg. *plam-en-i.*

Harbingers of the eventual conversion of the masc. class Y stems into class O occur as early as the 12th cent. For example, *ogьn-* 'fire', originally an *i-stem (cf. Lat. *ign-i-s*, Ved. *agn-i-ḥ*), is recorded with gen.sg. *ognja* as early as 1119, and the 'defection' of the *i-stems continued throughout the 13th to 16th centuries (Kiparsky 1967: 29). Confusion of *u-stems and *o-stems also began early; for example, instances of *u-stems with the *o-stem nom.pl. *-i* instead of *-e* are

in use by the late 14th cent. (*syn-ow-i* 'sons', *posl-ow-i* 'envoys', *storož-ew-i* 'watchmen' (Kiparsky 1967: 44)). This confusion was particularly pronounced in the inst.sg. (Matthews 1960: 105–6), which will be one of the main subjects to be discussed here.

2.1. Instrumental Singular

The inst.sg. desinence has two allomorphs in Old Russian: *-mь* and *-ju*. The distribution of these allomorphs has some important peculiarities. As Table 2 shows, *-mь* occurs in the *o-stems, *u-stems and in the masculines and neuters only of the *i-stems and *C-stems. The allomorph *-ju* occurs for feminine *i-stems, *C-stems and for the *(j)ā-stems. As Kiparsky (1967: 102) points out, the restriction of *-mi to the NON-feminine *i-stems and C-stems is a proto-Slavic innovation not shared by Baltic. For example, in Lithuanian fem. *i-stems such as *ak-ì-s* 'eye' or *šird-ì-s* 'heart' have isg. *ak-i-mì*, *šird-i-mì*. Similarly, fem. *r-stems in Lithuanian such as *sesuõ* 'sister' and *duktẽ* 'daughter' also have the *-imi* allomorph (at least optionally): *seser-imì, dukter-imì*.

This new distribution of *-ju* on the basis of gender is however not exact, because the set of class A nouns, although predominantly feminine, also includes masculines such as *slug-a* 'servant', *junoš-a* 'youth', *wojewod-a* 'general', and *djadj-a* 'uncle'. Some of these masculine class A nouns, including *slug-a* and *junoš-a*, are also known from Old Church Slavonic, and decline similarly with the inst.sg. desinence *-ju* (Lunt 2001). Thus the restriction of isg. *-mi to non-feminines in Old Russian does not predate the existence of masculine *(j)ā-stems.[11] Because masculine *ā-stems are not very numerous, the first attestations of the inst.sg. I have been able to locate in Old Russian are all from the 14th century, but in each case show the expected class A allomorph *-o(e)-ju*:

(9) inst.sg. of *wojewod-a* 'general' (Sreznevskij 1989: 280)

a. sъ wojewod-o-ju
'with (the) general' (Novgorod Chronicle, after 1333)

b. sъ moj-i-mь wojewod-o-ju
'with my general' (Contract, Basil I with his uncle Vladimir, c. 1389)

c. podъ tě-mъ wojewod-o-ju
'under this general' (Statute, Basil I and Metropolitan Kiprian, c. 1392)

d. podъ mitropolič-i-mъ wojewod-o-ju
'under the metropolitan general' (ibid.)

e. podъ moj-i-mъ wojewod-o-ju
'under my general' (ibid.)

(10) inst.sg. of *djadj-a* 'uncle' (Avanesov 1990:174, v.3)

a. z djad-e-ju (Contract, Dmitri Donskoj with Prince Vladimir
'with uncle' of Serpukhov, c. 1367)

b. s naš-i-mъ djad-e-ju
'with our uncle' (*idem*, 25th March 1389)

Several of these examples (9b–e and 10b) clearly show the masc. *ā-stem with isg. *-ju* collocated with a modifier with the expected 'masculine' inst.sg. suffix *-mь* (>*-mъ*), such as *mitropolič-i-mь* 'metropolitan', *tě-mь* 'this', and *naš-i-mь* 'our.' It should be clear then that the grammar of Old Russian cannot condition the *-ju* ~ *-mь* alternation solely on the basis of gender.

What then are the formal conditions on the inst.sg. allomorphy? One possibility, of course, is that the conditions for spelling out *-ju* are simply disjunctive: *-ju* occurs with class Y feminines OR with class A stems regardless of gender. Alternatively, one might hope to avoid this disjunctive condition by treating *-ju* as the default for the inst.sg., but this will require that the stems having *-mь* can be characterized as a natural class. This appears impossible, because if, for example, *-mь* occurs in the [−feminine] stems, the masculines of class A will incorrectly receive *-mь* instead of *-ju*.[12]

As mentioned above, however, the status of class Y masculines and neuters (except those in *en) had already become tenuous in Old Russian, with evidence appearing quite early for a shift into class O. But at the same time, a very general conflation of the inst.sg. forms in *-mь* took place. In place of expected *(j)o-stem variants *-o(e)-mь* class O nouns in Old Russian quite frequently have the class Y variants *-ъ(ь)-mь* (Matthews 1960: 105–106), for example isg. *gněw-ъ-mь* m. 'anger', *otc-ь-mь* m. 'father', *čisl-ъ-mь* n. 'number' and *lož-ь-mь* n. 'bed' (Kiparsky 1967: 33). According to Kiparsky (1967: 32), this conflation is in fact so early and so extensive that it cannot even be determined with certainty that *-o-mь* and *-e-mь* were the original forms of the class O instr.sg. rather than artificialities due to Old Church Slavonic influence. Already in what is probably the oldest significant Old Russian text, *Ostromir's Gospel Book* (beginning of the 11th cent.), there are at least 100 occurrences of *o-stems with instr.sg. *-ъ-mь*, such as *glas-ъ-mь* 'voice' and *prorok-ъ-mь* 'prophet' (Sokolova 1962: 108). Indeed, on the basis of developments in Ukrainian and Russian dialects Kiparsky concludes that *-ь-mь* and *-ъ-mь* are probably the more archaic variants.[13] In any event, regardless of how early the replacement of the class O instr.sg. forms was, authorities appear to agree that the *i-stem variants *-ъ-mь* and *-ь-mь* were normal for class O nouns in Old Russian (Schmalstieg 1995, Možejko and Ignatenko 1978, Ivanov 1964: 281).

Let us suppose then that Kiparsky is correct that the *(j)o-stem form *-o(e)-mь* had been lost from Old Russian at an early date and reintroduced only later under the influence of Old Church Slavonic. The usual explanation for the

loss of *-o(e)-mь* is said to be 'analogy' to the *u-stems in particular: by analogy to the *u-stem nom.sg. *-ъ* and inst.sg. *-ъ-mь*, the *o-stems, also having a nom.sg. in *-ъ*, develop *-ъ-mь* in place of *-o-mь* . But this view does not explain why neuter *o-stems should also be affected, since these have nom.sg. in *-o*, not *-ъ*; moreover it is not clear on this view why the inst.sg. changes, but the other forms of the *o-stems which have a thematic vowel, such as the dpl. *-o-mъ*, dat.loc. dual *-o-mi* and loc.pl. *-ě-xъ*, are able to resist changing under the influence of the *u-stem forms *-ъ-mъ, -ъ-mi* and *-ъ-xъ* respectively.

Consider again however the underlying forms involved. If we are correct in supposing that the *o-stem nom.sg. has underlying *-o-ъ* surfacing as *-ъ* by prevocalic vowel deletion, it is equally reasonable to suppose that when *-ъ-mь* appears in the inst.sg. of *o-stems it derives from *-o-ъmь* by the same process. Put differently, the change involves a resegmentation of the inst.sg. desinence from *-mь*, with the preceding vowel being thematic and part of the stem, to *-ъ(ь)mь*, with the vowel now analyzed as part of the desinence:

(11)	stage	*o-stems	*u-stems
	pre-Old Russian	o + mь	ъ + mъ
	early Old Russian	o + ъmь → ъmь	ъ + ъmь → ъmь

If this is correct of course we must ask why the inst.sg. ending was resegmented but not the dat.pl., for example, giving rise to an *o-stem form **-ъmъ* from underlying *-o-ъmь* . I suggest that the answer to this question is in fact tied closely with the problem of the distribution of the *mь vs. *ju allomorphs of the instr.sg.

At this juncture, an approach involving impoverishment presents itself. Specifically, once *-ъ(ь)mь* became the inst.sg. desinence not only for non-feminine class Y stems but also for class O, it then becomes the spell-out for the default inflectional class for masculine and neuter stems (as I will argue shortly), as required by the Interclass Syncretism Constraint. The impoverishment rule below provides the first step in mapping class Y stems to class O:

$$(12)\quad [\text{class: Y}] \rightarrow \emptyset \;/\; \begin{bmatrix} -\text{fem} \\ \_\_\_\_ \end{bmatrix} + \begin{bmatrix} \text{instr} \\ \text{sg} \end{bmatrix}$$

Rule (12) deletes the class value Y from masculine and neuter stems in the instrumental singular. This does not have the immediate effect of merging them with class O, but this further change will occur automatically through the gender-to-class redundancy rules, as shown below:

(13) a. [+ fem] → [class: A]
b. [ ] → [class: O]

Because adjectives and demonstratives, which lack gender inherently, decline according to the class O pattern when masculine or neuter, but according to the class A pattern when feminine, I will assume that a rule such as (13) must be part of the grammar of Old Russian.[14] Examples have already been given above in (9) and (10), but the phenomenon can be seen even more clearly in the 'short' adjective declension, which mirrors that of the O and A classes directly, as shown in the following examples from modern Russian:

(14) a. Páp-a gotóv-(ъ)
daddy.MASC.A ready-MASC.O
'Daddy is ready.'

b. óčered-ь dlinn-á
line.FEM.Y long-FEM.A
'The line is long.'

As can be seen above, a short form adjective agrees in gender with the noun it is a predicate of, but does not necessarily agree in inflection class. Since adjectives obtain their gender by agreement they cannot have this property inherently; and because inflectional class depends on gender it cannot be inherent to adjectives either.

The gender-to-class redundancy rules in (13) supply the appropriate class values to adjectives after they obtain gender by syntactic agreement. In the same manner, a masculine or neuter inst.sg. noun impoverished for inflectional class by rule (12) will also be supplied with a default inflectional class, in this case, class O:

(15)

put + [inst, sg]	*im-en* + [inst, sg]	
[−fem, +masc, class: Y]	[−fem, −masc, class: Y]	
[−fem, +masc, class: –]	[−fem, −masc, class: –]	Impoverishment (12)
[−fem, +masc, class: O]	[−fem, −masc, class: O]	Redundancy Rule (13b)

The conditions on the spell-out of the inst.sg. are now considerably simplified:

(16) *Instrumental Singular*

a. $\begin{bmatrix}\text{inst}\\ \text{sg}\end{bmatrix} \leftrightarrow$ *ъmь* (∼*ьmь*) / *class: O*

b. $\begin{bmatrix}\text{inst}\\ \text{sg}\end{bmatrix} \leftrightarrow$ *ju* (elsewhere)

The status of *-ju* as the default affix (and not 'feminine' per se) is further supported by the appearance of *-ju* in the inst.sg. of personal pronouns *mъno-ju* 'me', *tobo-ju* 'you,' and *sobo-ju* 'self'. These pronouns obviously cannot be inherently [+feminine] nor will they be assigned feminine gender by agreement.

Finally, the behavior of neuter *C-stems in the inst.sg. in Old Russian provides some interesting support for this idea. According to Kiparsky (1967: 68), neuters with stem extension *es appear to have lost this extension in the inst.sg. earlier than in other the cases. So *es*-less isg. forms such as *neb-omъ* 'sky', *drěw-omь* 'tree', *slow-ъmь* 'word', *těl-ъmь* 'body' and *čjud-ъmь* 'miracle' are all known from as early as the 11th cent. Impoverishment offers a potential explanation for this peculiarity: if the stem-extension *-es-* can be inserted only for consonantal stems having the class value Y, then if rule (12) deletes Y, the forms without the extension are produced.

The impoverishment analysis of the inst.sg. syncretism has the advantage of explaining why only the inst.sg. in *-mь* changed for the *o-stems, while the dat.pl. in *-mъ* did not, even though these desinences differ only in the quality of their final vowel. In the dat.pl. all inflectional classes have *-mъ*; along with dpl. *stol-o-mъ* for a masc. of class O there is *žen-a-mъ* for a fem. of class A. The same generality is found for dat.loc. dual *-mi* and loc.pl. *-xъ*, which are the only other consonant-initial desinences appearing in class O where a change like that of the inst.pl. could have occured.

2.2. The Instrumental Plural

Returning now to Table 2 one can see another anomalous pattern of allomorphy, this time in the inst.pl. (rightmost column of suffixes). There are two distinct expressions of this morpheme. In class O and also in the neuter stems of class Y the form *-y (-i)* is used, while in all other types one finds a form with desinential *-mi*. Again, the distribution of the special allomorph *-y (-i)* is disjunctive: it occurs in EITHER class O OR in neuters (of any class). This special suffix disappeared as a normal form in Russian by the end of the 17th cent., being

replaced by *-a-mi* in the general levelling of class distinctions in the plural. But numerous examples indicate that *-y* occured with neuter C-stems as well as with O-stems: ipl. *wrem-en-y* 'times' (12th cent.), *čud-es-y* 'miracles', *uč-es-y* 'eyes' (both mid-14th cent.), *pism-en-y* 'letters, characters' (c. 1400), *slow-es-y* 'words' (16th cent.) (Kiparsky 1967: 78). Old Church Slavonic has the same pattern, showing that this situation is fairly old (Lunt 2001).

The appearance of the class O ipl. *-y* in the neuter consonant stems is a second instance of inflectional class impoverishment:

$$(17)\quad [\text{class: Y}] \rightarrow \emptyset \;/\; \begin{bmatrix} -\text{fem} \\ -\text{masc} \\ \text{\_\_} \end{bmatrix} + \begin{bmatrix} \text{instr} \\ \text{pl} \end{bmatrix}$$

Again, once the class value Y is deleted from neuters in the instrumental plural, the gender-to-class redundancy rule (13) inserts the default class value O. The rules spelling out the instrumental plural desinence are then simply:

(18) *Instrumental Plural*

a. $\begin{bmatrix} \text{inst} \\ \text{pl} \end{bmatrix} \leftrightarrow y\ (\sim i) \;/\; \textit{class: O}$

b. $\begin{bmatrix} \text{inst} \\ \text{pl} \end{bmatrix} \leftrightarrow mi$ (elsewhere)

As expected the default ipl. *-mi*, just like the default isg. *-ju*, occurs with the personal pronouns *na-mi* 'us', *wa-mi* 'you'. Because rule (17) is a generalization of rule (12) for the neuters (they undergo class impoverishment in both the singular and the plural) the appearance of *-y* for this small class is not an isolated phenomenon but rather is connected directly with the anomalous distribution *-mь* ~ *ju* in the singular.

3. GREEK SUBSTANTIVES

A final illustration of the proposal can be taken from the substantival declension of Greek. I will begin with a general discussion of the situation in Attic in the 5th cent. BC, and then consider dialect differences as well as subsequent developments in the Koine.[15]

3.1. The Greek Declensional System

Greek nouns and adjectives are divided into two main classes, thematic stems (with an overt vocalic theme morpheme preceding the desinence proper) and athematic stems (lacking any overt theme). The thematic stems are further subdivided into *ā-stems (called here declension CLASS I) and *o-stems (declension CLASS II) by the principal expression of the theme morpheme. (Owing to sound change in Attic-Ionic, the *ā-stems frequently have a fronted theme *ē*.[16]) These are to be distinguished from athematic stems, which comprise declension CLASS III:

(19) a. $\begin{bmatrix} +\text{thematic} \\ \text{class: I} \end{bmatrix}$: *ánem-o-s* m. 'wind', *pter-ó-n* n. 'wing'

b. $\begin{bmatrix} +\text{thematic} \\ \text{class: II} \end{bmatrix}$: *kep^{h}al-ḗ* f. 'head', *krit-ḗ-s* m. 'judge'

c. [−thematic]: *klîmak-s* f. 'ladder', *t^{h}ṓrāk-s* m. 'breastplate', *stóma(t)-* n. 'mouth'[17]

It will also be useful to introduce explicitly the morphosyntactic features by which I propose to define the case categories. The table below shows the values assigned to the cases for the proposed features [accusative], [vocative], [direct] and [genitive]:

(20)

case category	[accusative]	[vocative]	[direct]	[genitive]
nominative	−	−	+	−
vocative	−	+	+	−
accusative	+	−	+	−
genitive	−	−	−	+
dative	−	−	−	−

The precise nature of these features is not of great importance to the present argument: any set of features might be substituted provided that they also define the DIRECT cases (nominative, vocative and accusative) as a natural class opposed to the OBLIQUE cases (genitive and dative), and within the [+direct] cases the nominative and vocative as a class [−accusative].

Examples of the most typical patterns of inflectional endings are shown in Table 3 (Smyth 1920, Chantraine 1945).[18]

3.2. System of markedness for inflectional classes

As in Russian, adjective stems in Greek lack gender specifications in their stored form, receiving gender values through agreement, but unlike in Russian,

Greek adjectives can be inherently either [+thematic] or [−thematic]. Thematic adjectives when assigned masc. gender or neut. gender inflect like declension II nouns, but when assigned fem. gender inflect as declension I nouns. The grammar thus contains the inflection class assignment rules in (21), which map gender to a default inflectional class:

(21) a. $\begin{bmatrix} +\text{thematic} \\ \text{fem} \end{bmatrix} \rightarrow$ [class: I]

b. [+thematic] → [class: II]

These rules should be understood to be ordered with the more specific (21a) preceding the more general (21b), by normal assumptions. The effect of these rules can be stated in general terms as defining declension I as the default class for feminine thematic stems and declension II as the general default. This second rule will in practice apply to all non-feminine thematic stems, including adjectives assigned masculine or neuter gender syntactically.

Rule (21b) functions not only to assign gender to adjectives which lack inherent gender but in addition makes the specification [class: II] redundant for second declension stems which are inherently masculine or neuter. Moreover, because thematic substantives are the most numerous and productive type it is not unreasonable to postulate that [+thematic] is a default value as well:

(22) [ ] → [+thematic]

Thus the stored forms of the stems in (19) require at most:[19]

(23) a. *krit-* $\begin{bmatrix} \text{masc} \\ \text{class: I} \end{bmatrix}$

b. *anem-* [masc]

c. *pter-* [neut]

d. *kep^{h}al-* [fem]

e. *klīmak-* $\begin{bmatrix} -\text{thematic} \\ \text{fem} \end{bmatrix}$

f. *t^{h}ōrāk-* $\begin{bmatrix} -\text{thematic} \\ \text{masc} \end{bmatrix}$

e. *stomat-* $\begin{bmatrix} -\text{thematic} \\ \text{neut} \end{bmatrix}$

The redundancy rules in (21, 22) are limited to filling in feature values and cannot change feature values already specified. Thus (21) will be unable to apply to an entry such as *krit-* which is underlyingly specified [class: I], but this stem will receive the default value [+thematic] by (22). No redundancy rule applies to *klīmak-*, *t^{h}ōrāk* or *stomat-* since they are all [−thematic]. The remaining nouns *kep^{h}al-*, *anem-* and *pter-* are subject to both (21) and (22), becoming [+thematic] and receiving that declension class which is unmarked for their inherent gender, that is, class I for fem. and class II otherwise.

3.3. Adjectival Inflection

In adjectives the situation is the reverse of nouns: adjectives may be underlyingly specified for inflectional class, but not for gender. Among thematic adjectives there exists a subclass traditionally referred to as 'two-termination stems': these inflect as class II only, showing the 'masculine' forms even when agreeing with feminine nouns:

(24)

a. *two-termination thematic adjective*

agnôt-a	p^{h}ōn-ὲ-n	bárbar-o-n	kektēménē
unknown-ACC.SG	speech-ACC.SG	foreign-ACC.SG	possess.PF.MID.PART

'possessed of an unknown and foreign speech' Aesch. Ag. 1051

b. *three-termination thematic adjective*

katà	t-ὲ-n	Attik-ὲ-n	t-ὲ-n	palai-ὰ-n	p^{h}ōn-ἔ-n
in	the-ACC.SG	Attic-ACC.SG	the-ACC.SG	old-ACC.SG.	speech-ACC.SG

'in the old Attic pronunciation' Plato Crat. 398d

As shown in (24a) a two-termination thematic adjective such as *bárbar-o-s* 'barbarian, foreign' has a class II theme and desinence even when modifying a feminine class I noun such as *p^{h}ōn-ḗ* 'voice, speech, language.' In (24b) the normal pattern generated by redundancy rule (21a) is shown with the three-termination thematic adjectives *Attik-ó-s* 'Attic' and *palai-ó-s* 'old, ancient'. To derive the behavior of these two-termination adjectives it suffices to assume that they have the inherent specification [class: II]. As such, they are exempt from the feature-filling effects of (21a) and can never decline as class I, even when assigned [fem] by agreement. In this way, it becomes clear that class II is not *per se* associated with masculine and neuter gender specifically; rather, class II is the default thematic class, as rule (21b) expresses directly.[20]

In addition to adjectives limited to class II, there also exist adjectives which inflect as athematic (class III) stems in the masc. and neut., but as class I when fem. One such type is stems in *-u-*, with f. *-ei-ᾰ̆* (< m.n. *-(e)u., f. *-(e)u̯-i̯-ᾰ̆) such as *glukú-s* 'sweet'. Singular forms are given below to illustrate:

(25) *Mixed Class Adjective*: glukú-, glukéi-ă̆-

	masc. (neut.)	fem.
nom.sg.	u-s (u-Ø)	ei-a-Ø
voc.sg.	u-Ø	ei-a-Ø
acc.sg.	u-n (u-Ø)	ei-a-n
dat.sg.	eu̯-i [ei̯]	ei-ā-ai [ei.āi̯]
gen.sg.	eu̯-os [e.os]	ei-ā-s

The mixed behavior of such adjectives can be derived straightforwardly by a rule impoverishing the value [−thematic] in the feminine:[21]

(26) *Mixed Adjective Impoverishment*

$$[-\text{thematic}] \rightarrow \emptyset \;/\; \begin{bmatrix}\text{fem}\\ \_\_\end{bmatrix} \quad \textit{stems in *u, *en, *an, *nt}$$

Once rule (26) has applied, rules (22) and (21) supply the default inflectional class for a feminine stem unmarked for inflectional class. In this way *glukú-(s)* obtains the values [+thematic] and [class: II] in exactly the same manner as does a normal class II feminine noun stem such as *kep^{h}al-(-ḗ)* 'head', which also lacks inflectional class information in its underlying form (23d):

(27)

kep^{h}al-	*gluku-*	
[fem]	[−thematic]	underlying form
[fem]	$\begin{bmatrix}\text{fem}\\ -\text{thematic}\end{bmatrix}$	agreement
[fem]	[fem]	Impoverishment
$\begin{bmatrix}\text{fem}\\ +\text{thematic}\end{bmatrix}$	$\begin{bmatrix}\text{fem}\\ +\text{thematic}\end{bmatrix}$	rule (22)
$\begin{bmatrix}\text{fem}\\ +\text{thematic}\\ \text{class: I}\end{bmatrix}$	$\begin{bmatrix}\text{fem}\\ +\text{thematic}\\ \text{class: I}\end{bmatrix}$	rule (21)

*3.4. Masculine *ā-stems*

The masc. *ā-stems present a more restricted but perhaps more interesting instance of inflection class impoverishment. As can be seen in Table 3, a first declension masc. noun such as *krit-ḗ-s* differs from a fem. such as *kep^{h}al-ḗ* only

Table 3: Greek Declensions

	kep^{h}al-ḗ I f.	*krit-ḗ-s* I m.	*ánem-o-s* II m.	*pter-ó-n* II n.	*klîmak-s* III m.f.	*stóma(t)-* III n.
nom.sg	ē-Ø	ē-s	o-s	o-n	s	Ø
voc.	ē-Ø	a-Ø (∼ē-Ø)	e-Ø	o-n	Ø (∼s)	Ø
acc.	ē-n	ē-n	o-n	o-n	a (∼n)	Ø
gen.	ē-s	o-o [o̯]	o-o [o̯]	o-o [o̯]	os	os
dat.	ē-ai [ēi]	ē-ai [ēi]	o-ai [oi̯]	o-ai [oi̯]	i	i
nom.voc.pl.	a-i	a-i	o-i	a	es	a
acc.	a-es [ās]	a-es [ās]	o-es [o̯s]	a	as	a
gen.	a-ōn [ōn]	a-ōn [ōn]	o-ōn [ōn]	o-ōn [ōn]	ōn	ōn
dat.	a-is	a-is	o-is	o-is	si	si

in the nom., voc. and gen.sg. The gen.sg. ending *-o-o* for the masc. noun is identical to that of declension II, and the nom.sg. *-ē-s* of the masc. noun differs from that of the fem. noun in having a final *-s* as in declensions II and III. The voc.sg. is also special in having the theme vowel *a* – in a subset of masc. forms – but the absence of any (overt) desinence here is equally characteristic of the other classes and so does not bear directly on the issue of mixed inflectional class.[22]

3.4.1. Genitive Singular in -ō

The least interesting analysis of the distribution in Table 3 would treat the syncretism between the masculine first declension stems and declension II as simply accidental: noun stems must be memorized as belonging to one of the three types in (19), but the choice of allomorph in declension I would in some instances be determined by the gender feature of the stem. On this view, the sets of inflectional affixes assigned to each class are strictly non-overlapping, and the coincidence of *-o-o* in both declension I masc. nouns and declension II nouns is treated synchronically as a chance homophony, as is the appearance of final *-s* in the nom.sg. of both stem stypes (as well as in declension III non-neuters).

Given the system of inflection class markedness established above, however, the inflection of the masc. *ā-stem is not particularly surprising. Consider first the spell-out of the Theme morpheme:[23]

(28) *Theme*

a.	a	↔	Theme	/	[class: I]	+	____	+	[+pl]
b.	ē	↔	Theme	/	[class: I]	+	____		
c.	o	↔	Theme	/	[class: II]	+	____		
d.	Ø	↔	Theme		*elsewhere*				

In the gen.sg. declension I masculine stems inflect AS IF they were declension II stems; and by (21b) declension II is the default class for masculine thematic stems. Rule (28b) must not apply in, for example, gsg. *krit-ó-o* 'judge'; instead the theme *o*, which is normally restricted to declension II by rule (28c), must be inserted. This syncretism can be obtained in terms of impoverishment: if the underlyingly marked property [class: I] is deleted in the gen.sg. of masculine stems, they will no longer be subject to rule (28b):

(29) *Masculine class I Impoverishment*

$$[\text{class: I}] \rightarrow \emptyset \;/\; \begin{bmatrix} \text{masc} \\ \_\_\_ \end{bmatrix} + \text{THEME} + \begin{bmatrix} +\text{gen} \\ +\text{sg} \end{bmatrix}$$

The redundancy rule (21b) applies to the output of (29) (just as it does to thematic adjectives which are assigned masculine gender in the syntax). The result is that in the gen.sg. all masc. thematic nouns have the default inflection for masc. thematic nouns, regardless of whether the noun in question is specially marked as belonging to declension class I or not.

As illustrated in Table 3, the gen.sg. desinence is spelled *-os* for class III (athematics), *-s* for class I, and *-o* elsewhere, that is, in class II:

(30) *Genitive Singular Desinences*

a. os ↔ [+gen] / [class: III] + THEME + ____
b. s ↔ [+gen] / [class: I] + THEME + ____
c. o ↔ [+gen] *elsewhere*

The rule of impoverishment prevents *s* from being inserted by rule (30b) because the feature [class: I] has been replaced by [class: II]. As a default for the gen.sg., rule (30c) inserts *-o* instead. An example derivation is shown below:

(31) a.

krit	+ THEME + DESINENCE	
[+thematic, masc, class: I]		[+gen, +sg]

b.

krit	+ THEME + DESINENCE		
[+thematic, masc, class: –]		[+gen, +sg]	Impoverishment (29)

krit + THEME + DESINENCE

c. $\begin{bmatrix} +\text{thematic} \\ \text{masc} \\ \text{class: II} \end{bmatrix}$ $\begin{bmatrix} +\text{gen} \\ +\text{sg} \end{bmatrix}$ Redundancy Rule (21b)

krit + *o* + *o*

d. $\begin{bmatrix} +\text{thematic} \\ \text{masc} \\ \text{class: II} \end{bmatrix}$ $\begin{bmatrix} +\text{gen} \\ +\text{sg} \end{bmatrix}$ Spell-Out: (28c, 30c)

3.4.2. Diachronic Perspective

The historical genesis of the masc. *ā-stem impoverishment is of some interest, both as an explanation of how such a rule may arise diachronically as well as an illustration of dialect differences and the formal differences that the present approach imputes to such variation.

Historically the masc. *ā-stems are thought to have had the same gen.sg. as the fem. *ā-stems, but only a few remnants of masc.gen.sg. *-ā-s* survive in other dialects (principally North West Greek and Boeotian) as witnesses of the original declension (Chantraine (1945: 41), Buck (1928: 87), Szemerényi (1956: 195–96)). Obviously such an anterior grammar lacks the impoverishment rule (29) but in other relevant respects is isomorphic to the grammar already discussed.

In dialects other than Attic, *-ā-s* did not change to *-o-o* but to *-ā-o*. Szemerényi (1956) dates this change to the Mycenean period, with *-ā-o* resulting by regular sound change from *ā-i̯o, where *i̯o represents the desinence borrowed from the older class II gen.sg. form *o-i̯o (> *o-o* in Attic). The gen.sg. in *-ā-o* occurs abundantly as an Aeolic dialect form in Homer, as *in Atre.íd-ē-s* 'son of Atreus', gsg. *Atre.íd-ā-o* (Il. 1.7, 1.203), as well as contracted to *-ā* in Doric.

So outside of Attic and perhaps as early as the Mycenean period, only the desinence *-o* (< *i̯o) spreads to the masc. forms, whereas the class I theme vowel *-ā-* is not replaced by the class II theme *-o-*.[24]

This change cannot be an impoverishment: if the feature [class: I] is deleted rule (28b) will not insert the proper theme vowel *-ā-*. So in order for the desinence *-o* to appear in such forms, the distribution of gen.sg. *-s* must have been specifically restricted to feminine stems. In other words, the other dialects

differ from Attic not only in lacking the impoverishment rule but also in requiring a slightly more complicated distribution of the *-s* genitive. The grammar of these dialects must contain the rule below in place of (30b) above:

(32) $\text{s} \leftrightarrow [+\text{gen}] \;/\; \begin{bmatrix}\text{class: I}\\ \text{fem}\end{bmatrix} + \textsc{theme} + \_\_\_\_$

Because rule (32) applies only when the stem is [fem], it will not apply to a masc. stem such as *Atre.íd-* m. 'son of Atreus.' The default gen.sg. desinence *-o* must be inserted instead (rule 30c).[25]

The Ionic dialect, which shows many common properties with Attic and is generally held to be part of the same dialect continuum, differs from the other dialects in having a general fronting rule *ā > ē, as well as so-called Quantitative Metathesis, whereby the second mora of *ē* is transferred to a following vowel in hiatus. Thus the outcome of what emerged in Aeolic as *-ā-o* is in Ionic *-e-ō*, the normal form in Herodotus (Rosén 1962: 60). Contraction of *-e-ō* to *-ō* in Attic produced a gen.sg. form differing very little from the class II ending *-o̱* (Szemerényi 1956). However, although the two forms are indeed close phonetically, regular sound change could not have yielded *-o̱* from *-ō*, so this final change in Attic must be due to a transfer from the class I masc. stems (Chantraine 1945: 42).[26] This confusion is the historical pre-condition for impoverishment (29), and provides an explanation for why such a specific and idiosyncratic rule should be present in the grammar of Attic.[27]

3.4.3. Nominative Singular in -ē-s

Let us now return to the nom.sg. of the masc. class I stems, which, unlike the fem. class I stems have a final desinence *-s*. This will provide an example of default spell-out rather than impoverishment.

I propose the following spell-out rules for desinences in the direct singular:

(33) *Desinences*

a. $\text{a} \leftrightarrow \begin{bmatrix}+\text{accusative}\\ +\text{direct}\end{bmatrix} \;/\; \begin{bmatrix}\dots\ \text{C}\\ [-\text{thematic}]\end{bmatrix} + \textsc{theme} + \_\_\_$

b. $\text{Ø} \leftrightarrow \begin{bmatrix}+\text{vocative}\\ -\text{accusative}\\ +\text{direct}\end{bmatrix}$ under specific phonological conditions[28]

c. $\text{Ø} \leftrightarrow \begin{bmatrix}-\text{accusative}\\ +\text{direct}\end{bmatrix} \;/\; \begin{bmatrix}\text{fem}\\ \text{class: I}\end{bmatrix} + \textsc{theme} + \_\_\_$

$\text{s} \leftrightarrow \begin{bmatrix}-\text{accusative}\\ +\text{direct}\end{bmatrix}$ (elsewhere)

$$\text{d.}\quad \begin{array}{ll} \emptyset \leftrightarrow [+\text{direct}] & \Big/ \begin{bmatrix} \text{neuter} \\ -\text{thematic} \end{bmatrix} + \textsc{theme} + \_\_\_ \\ \text{n} \leftrightarrow [+\text{direct}] & \text{(elsewhere)} \end{array}$$

The theme of a masc.nom.sg. class I stem such as *krit-* is spelled *-ē-* by (28b), and then its desinence is subject to the elsewhere clause of spell-out rule (33c), which inserts *-s.* Crucially, the zero desinence of the fem. class I stems does not appear, because this desinence is inserted only on stems marked [fem].

As in the case of the Aeolic gen.sg. in *-ā-o*, here again we do not have inflection class mixture in virtue of impoverishment, but rather through the restriction on the conditions of allomorphy for a spell-out rule.

Some evidence suggests that the zero nom.sg. desinence was not always limited to fem. nouns in Greek. A number of inscriptions, chiefly Boeotian, preserve traces of a masc.nom.sg. in *-ā-Ø* in names such as *Mogé-ā*, *Olumpioník-ā*, *Nestíd-ā* and so forth; Szemerényi (1956) reconstructs this as the archaic form which was replaced by *-ās* in pre-Mycenean times. In such a grammar, (33c) simply lacks the feature [fem] and so the zero desinence occurs in masculines of class I.

The analysis of the mixed inflection of *kritḗ-s* proposed here requires that the desinence spell-out rules (33) treat the default realizations of the direct categories as *-s* and *-n.* The following sections introduce evidence in support of this idea.

3.4.4. Default -s

Consider first the distribution of the desinence *-s.* As we have seen, class I masculines have *-s* in the nom.sg. and so must be differentiated from feminines of class I with zero desinence. This *-s* cannot be specifically conditioned by [masc], since it also appears in class III, which includes masculine as well as feminine stems such as *klîmak-s* f. 'ladder'. Moreover, two-termination adjectives such as *bárbar-o-s* discussed above inflect with *-s* even when assigned [fem] by agreement. Finally, some class II nouns are in fact feminine, such as *pártʰen-o-s* 'maiden' or *nḗs-o-s* 'island', and others can be either masculine or feminine, such as *tʰe-ó-s* m. 'god', f. 'goddess.'

Likewise *-s* cannot be associated specifically with nominative case, since masc. and fem. class III stems ending in an obstruent have *-s* in the vocative as well (e.g. nom. or voc.sg. *pʰúlak-s* 'guard'). As a result *-s* must be a default affix conditioned by at most the features [−accusative] and [+direct].

3.4.5. Default -n

The pervasive pattern of direct case syncretism in neuter forms points to *-n* as

the default spell-out of [+direct]. As is typical of archaic Indo-European languages, neuter substantives never differentiate among the direct cases. This systematic syncretism motivates an impoverishment rule which deletes the contrast encoded by the feature [accusative]:

(34) [α accusative] → Ø / [neuter] + THEME + ____

By deleting any value for [accusative] on a neuter stem, rule (34) prevents the application of (33b) (inserting a zero vocative desinence) as well as (33c) (inserting default *-s*), as both of these rules spell only desinences specifically marked [−accusative]. As shown in (33d), the desinence of a neuter stem in the direct cases is spelled *-n* if the stem is thematic (*pter-ó-n*), or -Ø if the stem is athematic (*stóma-Ø*). It is clear that *-n* cannot be specifically associated with the accusative, since *-n* also appears in the nominative (and vocative) of class I neuters: thus *-n* must be a default direct case desinence.

Moreoever, *-n* occurs as the default spell-out of acc.sg. in class III nouns. Rule (33a) introduces *-a* as the desinence for a non-neuter athematic stem ending in a nonsyllabic segment, as in *klī́mak-a* or *t*^{h}*ṓrāk-a.* But default *-n* can be seen in barytone athematic stems ending in a (high) vowel or vocoid, such as asg. *póli-n* 'city' and *gráùn* 'old woman.'

*3.5. Reanalysis of *es-stems*

The variable treatment of masc. *es-stems, particularly in later Greek, presents further evidence in favor of default *-n.* The reanalysis of *es-stems as vowel-final will also illustrate a scenario in which heteroclitic inflection arises not from impoverishment explicitly but rather from reanalysis of underlying forms. Table 4 illustrates the behavior of (masc.) *es-stems as compared with masc. stems already considered.

Historically intervocalic *s underwent deletion by regular sound-change (Lejeune 1972). Although certain morphophonological alternations [s ∼ Ø] remained common in Attic, explicit evidence for a synchronic rule of s-deletion diminished over time. One important consequence is that stems in *-es were reanalyzed as vowel-final. As shown in column 'III m.' in Table 4, prior to reanalysis the final *-s* of such stems surfaced only in the nom.sg., voc.sg. and dat.pl. Crucially the nom.sg., which shows a morphophonological lengthening of stem-final *-es* to *-ēs*, is identical in surface form to the nom.sg. of class I masc. stems (column 'I m.').

Although the original acc.sg. in *-ea* (uncontracted) is the norm in the early Ionic dialect of Herodotus (Rosén 1962: 71), the replacement of the asg. *-ē* ← *-es-a* by *-ēn* began very early for nouns in Attic.[29] In Attic inscriptions, *-ē* is almost entirely absent from *es-stem nouns, and *-ēn* is certainly preponderant by the

Table 4: Reanalysis of *es-stem

	I m.	II m.	III m.	III m. *es
nom.sg.	ē-s	o-s	s	ēs-s [ēs] ≫ ē-s
voc.	a-Ø (∼ē-Ø)	e-Ø	Ø (∼s)	es-Ø ≫ e-s ∼ ē-Ø
acc.	ē-n	o-n	a (∼n)	es-a [ē] > e-a [ē], ≫ ē-n
gen.	o-o [o̯]	o-o [o̯]	os	es-os [o̯s] > e-os [o̯s] ≫ o-o [o̯]
dat.	ē-ai [ēi̯]	o-ai [oi̯]	i	es-i [ei̯] > e-i, ≫ ? e-ai [ēi̯] ∼ e-i
nom.pl	a-i	o-i	es	es-es [ēs]
acc.	a-es [-ās]	o-es [o̯s]	as	es-es [ēs]
gen.pl	a-ōn [ōn]	o-ōn [ōn]	ōn	es-ōn [ōn]
dat.pl	a-is	o-is	si	es-si [esi]

late 5th cent., becoming the only form in use by the 4th cent. with only a few dubious exceptions (Threatte 1996: 138 ff.). The textual tradition reflects this change, but less evenly, probably owing to artificial restoration of *-ē*.[30] But in many cases *-ēn* is clearly the norm, so while the gen.sg. of *Sōkrát-ēs* 'Socrates' is *Sōkrát-o̯s* as expected for an *es-stem, Xenophon for example regularly has acc.sg. *Sōkrát-ēn*.

The change seems to have originated in proper names, which, lacking a plural inflection, had no dat.pl. in *-e(s)-si* to give evidence of stem-final *-s*. In contrast, adjectival *es-stems resisted the change until well past the Hellenistic period, although the originally deadjectival nouns *triḗr-ē-s* 'trireme' and *tetrḗr-ē-s* 'quadrireme' do vacillate in Attic inscriptions between the *-ēn* form and the *-ē* form (Chantraine 1945: 62), and the form in *-ē* may in many instances simply be an abbreviation (Threatte 1996: 174).[31]

The other cases were also affected, but neither as early nor as widely as the acc.sg. The change in dat.sg. forms is very difficult to evaluate because the diphthong *ēi̯* was monophthongized, perhaps as early as the early 4th cent. (Bubeník 1989: 214), and the orthographic confusion between *ei* [ē̯], *ēi̯*, and *ē* makes the interpretation of the written materials very hazardous (Threatte (1996: 138 ff.), Mayser (1926: 3, 39)). The phonological merger of front vowels continued so that by 250 BC, according to Teodorsson (1977: 252), *ēi̯* and *ē* had merged with *ī* as [ī] in Egyptian Koine.

One exception is that some evidence suggests that the merger of ē with *ē̯* occured later in Asia Minor than elsewhere, perhaps being completed only in the first or second century AD (Bubeník 1989: 238). It is of some interest to note then that in Magnesian inscriptions, the spelling *-ē* is always used in dat.sg. of masc. *es-stems (Nachmanson 1904: 51–52), which may suggest an early replacement of this ending. In Lycian inscriptions *-ē* and *-ē̯* both occur, while the two examples known from Priene (both 1st cent. BC) have only *-ē̯* (Stein 1915:

113). However, in all three dialects the acc.sg. is always *-ēn*, except for one instance of *-ē* in Magnesia from the Roman era (Nachmanson 1904: 137). Therefore to the extent that we can discern a difference in the timing of the change, the evidence points to the acc.sg. changing first, and the dat.sg. only later.

Outside of the acc.sg. and possibly the dat.sg. in Asia Minor Koine, then, the principal witness to the change from class III to class I for the masc. *es-stems comes from the gen.sg., with older *ọ̄s ← o(s)-os* being replaced by innovative *ọ̄*. In Attic, while asg. *-ēn* has replaced *-ē* nearly everywhere from the earliest inscriptions, gsg. *-ọ̄* is rare before the later 4th cent. and cannot be said to be normal until at least 330 BC (Threatte 1996: 134). The same delay in the change of the gen.sg. can be seen (although less conclusively) in the dialects of the Koine spoken in Asia Minor and Ptolemaic Egypt, as shown in the table below. (Data for Priene from Stein (1915: 111–13) and for Attic from Threatte (1996: 138, 154), otherwise from the summary in Gignac (1981: 69). All data is from inscriptions except Egyptian, taken from papyri; * indicates uncertainty owing to phonological merger):

(35) *Change in inflection of masc.* *-es *stems*

	gen.sg.	dat.sg.	acc.sg.
Attica	-ọ̄ *usual* 330+	*	-ēn *usual* 400+
Pergamon	-ọ̄s (*offical lg.*) *varies* 250+ (*popular lg.*)	*not reported*	*varies*
Magnesia	-ọ̄ *usual* 200+	-ē	-ēn (*late hapax -ē*)
Lycia	*varies*	*varies*	-ēn
Priene	-ọ̄ *usual* 200+	-ẹ̄ (2x)	-ēn
Ptolemaic Egypt	-ọ̄ *predominant* 200+	*	-ēn (*sporadic* -ē)

The data above show that the gen.sg. in *-ọ̄* becomes the usual or predominant variant in Attica and in Egypt only after *-ēn* becomes the norm for the acc.sg. In Magnesia and Lycia variation is still seen in the gen.sg. while *-ēn* is the only acc.sg. form in use. The data from Pergamon are a little more complicated, but it suffices to note that while variation in the acc.sg. in always present, variation in the gen.sg. emerges only in non-official inscriptions and only in the mid 3rd cent.[32] We can conclude that in all these dialects, the acc.sg. changed first, the gen.sg. completing its change only later. The time of change for the dat.sg. remains uncertain owing to phonological merger, but the data from Magnesian inscriptions suggests an earlier change for the dat.sg. than for the gen.sg. at least in that dialect.[33]

This then appears to be a classic instance of borrowing by one inflectional class from another (Smyth 1920, Blass and Debrunner 1961, Gignac 1981), but seemingly not a borrowing from the default inflectional class. For we have already established that class I is not a default class for masculine stems; on the contrary, class II must be the default. For a masculine gender subclass of class III to borrow from class I, a default class only for feminines, appears to directly contravene the Interclass Syncretism Constraint. Nevertheless, once we examine more carefully the morphological system as a whole, it becomes clear that the appearance of acc.sg. *-ēn* in *es-stems is not a borrowing of *-ēn* as a whole from class I, but rather an extension of the independently required rule spelling out *-n* as the default desinence in the acc.sg.[34]

Consider first the precise nature of the reanalysis that *es-stems underwent. The basic premise is that the existence of underlying *-s* became opaque, leading the learner to postulate an underlying stem form lacking *-s*. If so, then the appearance of surface *-s* in the nom. and voc.sg. can no longer be due to an underlying *s* in the stem, but must instead be provided by the desinence. Thus:

(36) a. -ēs-s ≫ -ē-s nom.sg.
b. -es-Ø ≫ -e-s voc.sg.

The desinence *-s* of course is already present in the system as a default, so the learner has ample reason to postulate a desinential *-s* in these forms as well. The only other case-number combination in which historical *s surfaces is the dat.pl. in *e(s)-si*, but, as mentioned previously, the reanalysis that we are considering began with proper names which lacked a plural inflection.

The question that now arises is the morphological status of the pre-desinential vowel following the reanalysis in (36). The traditional view suggests indirectly that the predesinential vowel *-ē-* in the nom.sg. is identified directly with the theme vowel of the class I masc. nouns. This then leads to the borrowing of the acc.sg. in *-ēn* as a whole.

If this were indeed so, why was the acc.sg. the first to be affected? In other words, given only the reanalysis in (36a), all cases ought to be equally subject to replacement by the masc. class I inflections. The differences in susceptibility of the cases to replacement is not explained.

These shortcomings point towards an alternative analysis. The predesinential vowel *-ĕ̄-* in the *es-stems cannot immediately have been reanalyzed as an expression of the theme. Rather, I analyze the change in these stems in the simplest fashion possible: historical *s was dropped from the underlying forms of *es-stems, but these stems remained formally [−thematic]. In other words, the predesinential vowel was analyzed (at least initially) as part of the stem itself, and not as a theme. What was originally underlying *Sōkratĕ̄s-* simply became *Sōkratĕ̄-*.

Before explicating the advantages of such a view, I will first illustrate the expected consequences of this reanalysis. Consider first the situation as presented to the learner who has no s-deletion rule as part of his or her grammar. Prior to reanalysis the acc.sg. *-ē* is analytically ambiguous: its underlying source may be either *-e-a* or *-ē-a* or *-ē-Ø*, since all these yield surface [ē]. The alternation in the length of the stem-final vowel is therefore subject to one of the following two conditions:

(37) a. -ē- (nom. sg.), -ĕ- (elsewhere) *or*
b. -ē- (nom. sg. and acc. sg.), -ĕ- (elsewhere)

The first alternative (37a) replicates the inherited stem allomorphy eventuating from Szemerényi's Law (Mayrhofer 1986). The second alternative (37b) is an innovation which will produce acc.sg. *-ēn* via the intermediate analysis *-ē-Ø*.

I will now establish that this innovation is a natural outcome of the loss of underlying *s and not the product of borrowing from another declension in any simple sense. First, recall that prior to loss of *s the acc.sg. is underlyingly *-es-a*, with the expected *-a* allomorph of the desinence after a consonant-final stem (33a), as in *klîmak-a.* Once *s is lost as an underlying segment, the *es-stems come to be vowel-final, and should not have *-a* but rather the default desinence *-n.*

Given that *-a* is deleted on the surface, the evidence for underlying desinential *-a* in acc.sg. *-ē* is in any case quite minimal. A reanalysis as *-ē-Ø* with zero desinence is just as reasonable as a complication of rule (33a) to idiosyncratically include stems in *-e.* The stem allomorphy rule (37a), which must be included in the grammar in any event, need then only change to (37b).

To make sense of this change in the rule of stem allomorphy we must look beyond the *es-stems to the inflection of other athematic stems at the time when the change originated (5th cent. BC). First, in (most) barytone athematic stems ending in a high vowel plus final coronal obstruent, such as *órnīt^h*- 'bird', a stem allomorphy rule had developed which deletes the final coronal in the sg. direct cases. This can be detected by the fact that they show acc.sg. in *-n*, as in *órnīn*, because *-n-* will be inserted only if the stem is vowel-final (cf. rules (33a) and (33d)). The stem allomorphy rule does not apply in the gen.dat.sg., in which case the underlying coronal surfaces, as in gsg. *órnīt^{h}os.* Oxytone coronal-final stems however do not undergo the alternation, hence gsg. *elpíd-os* 'hope', asg. *elpíd-a.* So in the surface pattern that the learner is presented with the nom. and acc.sg. stems of barytones are both vowel-final and both distinct from the gen.sg. stem, while in oxytones the acc.sg. stem does not differ from the gen.sg. stem.

The same pattern is seen in stems ending in diphthongs: barytones have matching stems in the nom.acc.sg. while oxtyones do not (at least in surface forms);[35] similarly all barytone *i-stems and *u-stems have the same coincidence of nom. and acc. stem allomorphs. The table below summarizes the distribution:

(38) Barytones in *-(ĕ)i̯-, -(ĕ)u̯, -ă̆w-, -I(T)-*

type	nom.sg.	voc.sg.	acc.sg.	gen.sg.	dat.sg.	example
-(ĕ)i̯-	i-s	i-Ø	i-n	ēi̯-os [eōs]	ei̯-i [ei̯]	póli-s ‘city’
-(ĕ)u̯-	u-s	u-Ø	u-n	ēu̯-os [eōs]	eu̯-i [ei̯]	pêk^{h}u-s ‘forearm’
-ă̆u̯-	au̯-s	au̯-Ø	au̯-n	āu̯-os [ā.os]	āu̯-i [ā.i]	gráu̯-s ‘old woman’
-I(T)-	I-s	I-Ø	I-n	IT-os	IT-i	órnī-s ‘bird’

(39) Oxytones in *-ĕ́-, -ÍT-*

type	nom.sg.	voc.sg.	acc.sg.	gen.sg.	dat.sg.	example
-ĕ́u̯-	éu̯-s	éū-Ø	é-ā	é-ōs	é-i	basiléu̯-s ‘emperor’
-ÍT-	ÍT-s [Í-s]	ÍT-Ø [Í]	ÍT-a	ÍT-os	ÍT-i	elpí(d)-s ‘hope’

Returning to the *es-stems, it should now be clear why the innovated acc.sg. of *es-stems has a long predesinential vowel. The reason is *not* a wholesale borrowing of the class II theme vowel, as traditionally believed. Rather, the predesinential *-ē* is borrowed from the nom.sg. of the same inflectional class by a change in the stem allomorphy rule from (37a) to (37b) so as to conform to the pattern of other barytone vowel-final athematic stems as in (38), in which the acc. and nom.sg. have identical stem allomorphs.

Likewise, desinential *-n* is not borrowed from class II masc. stems *per se*, but is in fact simply the default desinence for the direct cases. One might equally well assert that desinential *-n* in the *es-stems was borrowed from pre-existing barytone athematic acc.sg. forms such as *póli-n* or *ōrnī-n*.

Finally, we can now explain why the gen.sg. does not change from *ōs* ← *e-os* to **-*ē-os*. This change would require long predesinential *-ē* to be extended to all the cases, not merely the [+direct] cases. But there is no pressure to do so, since allomorphy of stems conditioned by [±direct] remains abundantly visible to the learner in the behavior of other stem types. Only later, given the phonological merger of the two dat.sg. endings, the reanalysis of the gen.sg. as *-ǭ* signals a complete transfer into class I for these stems.

In Aeolic, which lacked the masc. *a-stem gen.sg. impoverishment rule, this transfer eventuated as expected in gen.sg. forms in *-ē-Ø* (gsg. *-Ø* < *-o-*) with the class II desinence but class I theme vowel (Lesbian gsg. *T^{h}eogenē* ‘Theogenes’ (Chantraine 1945: 62)).

*3.6. Reanalysis of *ō-stems*

A final argument for default *-n* comes from the reanalysis of athematic *ō-stems such as *^{h}ḗrō-s* m. ‘hero’, usually assumed to originate from historical *ōu̯-stems.

Like *s, *u̯ was deleted intervocalically by regular sound change, so that while such stems originally ended in a high vocoid they came to be vowel-final in *-ō*:

(40) Class II Stems in *ōu̯

nom.voc.sg.	-ōu̯-s [-ōs] ≫ -ō-s
acc.sg.	-ōu̯-a [-ō.a] ≫ Hdt. -ō-n ~ -ō-a, Att. -ō
gen.sg.	-ōu̯-os [-ō.os] ≫ Att. -ō-o [-ō])
dat.sg.	-ōu̯-i [-ō.i] > -ōi̯

Plural forms of such stems are consistently declined as class III stems, hence *hḗrōsi* (instead of a class II form such as ***hḗrōis*) is the only form of the dat.pl. in inscriptions and is normal in all classical texts.

Analysis of this change is vexed by a number of complications. First, the number of such stems in use in prose is very limited: aside from *ʰḗrō-s* 'hero' there are only *pátrō-s* 'father's brother' and *mḗtrō-s* 'mother's brother,' and all are quite rare after 300 BC. Second, our texts of Herodotus (mid-5th cent. BC) have some instances of acc.sg. in *-n*, but variants in *-a* also occur.[36] The asg. occurs once Attic inscriptions as *ʰḗrō*, but never as *ʰḗrō-n* (Threatte 1996: 268 ff.), and I know of no instances of *ʰḗrō-n* in Attic literary texts. Third, Herodotus does not reanalyze the gen.sg.; the two instances (6.69, 9.25) are both *hḗrō-os.* However, although the data is scant, it appears that *hḗrō* was the normal Attic form of the gen.sg., being attested four or five times in inscriptions, the earliest probably 5th cent. BC (and also from Demosthenes 19.248, mid-4th cent.) while artifically archaic *ʰḗrō-os* appears in inscriptions only from 350 BC, with most instances from over a century later (Threatte 1996: 270).[37]

For Herodotus – to the extent that our texts are reliable – we can attribute the innovative asg. *hḗrō-n*, *pátrō-n* to extension of the desinence *-n* just as in the masc. *es-stems. Because the gsg. remains unchanged, as well as the plural forms, there is no evidence for a shift in class membership. This provides further evidence for a default desinence *-n* for the direct cases.

In Attic the situation is more complicated. Threatte (1996: 269) concludes that prior to 350 BC *ʰḗrō-s* is truly heteroclitic in Attic, showing the class I gsg. in *-o* (← *-ō-o)* but the class III asg. in *-ō* ← *-ō-a.* This is unexpected, so it would seem, given that the acc.sg. in *-n* spreads to class III *es-stems much earlier than the gen.sg. in *-o.* But the Attic data are complicated by another change affecting class I nouns with Quantitative Metathesis, such as *nē-ó-s* → *neṓ-s* 'temple' (the so-called 'Attic declension'). On the authority of the grammarians such nouns are usually said to have asg. *-n*, as expected for class I: *neṓ-n.* But according to Threatte (1996: 39), in Attic inscriptions the acc.sg. with *-n* is 'poorly attested' for nouns of this type, while the acc.sg. without *-n* has eclipsed the older form by 350 BC, perhaps on the model of the s-stem asg. *ʰéō* < **ḗ-os-a* 'dawn.' To this may be added a number of other instances of asg. *-a* (→ -Ø by contraction) after

final surface *-ō*: (1) the asg. *s-stem variants of class III n-stems such as *Apóllō* < *-os-a 'Apollo'; (2) comparative adjectives such as m.f. asg. *beltī́-ō* < *-os-a 'better', always the normal form in early Attic inscriptions (Threatte 1996: 311); and (3) numerous feminine personal names in *ŏi̯, occuring in inscriptions almost universally with asg. *-ṓ* ← *o-a* (Threatte 1996: 261). In all these forms the acc.sg. has *-a*, which was later reanalyzed as a zero desinence owing to its disappearance through surface contraction. The early extension of this n-less acc.sg. to even class I nouns such as *ne-ṓ-s* in the inscriptions shows that the asg. *hḗrō* was not in fact irregular; rather a new phonologically conditioned allomorphy had developed according to which stems in *-o* – whatever their historical source – conditioned acc.sg. in *-a* > *-Ø*.

In sum, in Herodotus the asg. desinence *-n* appears sometimes in *ōu̯-stems, as we expect if *-n* is the default for the [+direct] cases and *-a* is limited to post-consonantal position. However, in Attic there is evidence that while *-n* remained the default desinence, *-a* or its zero reflex by contraction became the norm for stems in *-ō*, thus ousting *-n* from some class I stems (the 'Attic declension') as well as from *hḗrō-*.

4. CONCLUSION

A detailed comparison of the present approach and that of other studies cannot be offered here. However, before concluding it will be instructive to consider points of contact between the Interclass Syncretism Constraint proposed here and the No Blur Principle of Carstairs-McCarthy (1994) and related work.

4.1. The No Blur Principle

The No Blur Principle requires every affix that expresses a particular group of morphosyntactic properties to be either a CLASS-IDENTIFIER or a general default for that group of properties. A class-identifying affix is limited to a single inflectional class (or subclass of that class determined by a property such as gender) and is therefore diagnostic of that class. Class-identifiers are very useful for learning a system of arbitrary inflectional classes, because whenever the learner encounters a novel stem with a class-identifying affix, the inflectional class of the stem can immediately be recognized. Returning to the Greek gen.sg., one can see below that the forms comply with No Blur because *-s* uniquely identifies feminines of class I, *-os* uniquely identifies class III, and *-o* is a general default.

(41)

	I f.	I m.	II mfn.	III mfn.
gen.sg.	s	o	o	os

On the analysis of the gen.sg. forms in this paper, the sharing of *-o* by class II and the masculine subclass of class I arises in two different ways depending on the dialect of Greek considered. Those dialects preserving *-ā-o* (or its reflex) for masculines of class I treat *-o* as the general default (30c); in this way the analysis converges with that required by No Blur. For Attic, however, I have proposed that masculines of class I are impoverished in the gen.sg. and thereby mapped to the default class for masculine stems, class II. In this case the Interclass Syncretism Constraint does not require that *-o* necessarily be a default affix (although it may be); *-o* may instead represent the spell-out of the default inflectional CLASS.

It is here that one important distinction emerges between No Blur and the Interclass Syncretism Constraint. The Old Russian instrumental plural provides a clear example of this difference:

(42)		*o mn.	*u m.	*ā mf.	*i mf.	*C mf.	*C n.
	inst.sg.	y	ъ-mi	a-mi	ь-mi	ь-mi	y

Because the desinence *-mi* is the general default for the Old Russian inst.pl., *-y* must be a class-identifier by No Blur. Yet because *-y* appears both for masc. and neut. *o-stems and for neut. *C-stems, it is not a class-identifier and so No Blur is violated.

The Interclass Syncretism Constraint, however, does not rule out this distribution because although *-y* is not the general default, it is the spell-out of the default inflectional class for neuters, that is, class O (the *o-stems). Imagine instead, for example, a different grammar in which the neuter *C-stems happen to syncretize only with an allomorph particular to the feminine *i-stems. Such a grammar would be equally in violation of No Blur, but would differ from actual Old Russian in also violating the ISC.[38]

From this example it can be seen that the ISC is more selective than No Blur, that is, it rules out fewer languages. Prima facie this might appear to suggest that the ISC is somehow otiose, given No Blur. In comparing the two approaches, however, it is essential to consider their differing theoretical status, and what precisely is meant by 'violation' of the constraint in each case.

No Blur is not intended to be an inviolable constraint on grammars per se; rather, it is an empirical claim about a strong tendency of patterning seen in the observed sample of languages. An explanation for this tendency is referred to general principles of learnability which shape the range of grammars which are most typically seen observationally (Carstairs-McCarthy 1998b). One consequence of this approach is that No Blur does not in fact categorically rule out any particular grammar; put simply, it is not intended as a constraint on grammars as generative devices. Thus, when speaking of a grammar which generates a language with a 'violation' of No Blur we are speaking of a grammar which, while formally possible, is unlikely to appear observationally. Put differently,

when evidence is sufficiently robust the learner can acquire a grammar which generates a moderate amount of blur, but because such an organization of inflectional classes is not supported by as much informational redundancy (in the form of class-identifiers) it should be more susceptible to change. In this way, it may be more felicitous to view No Blur as a kind of evaluator of markedness: grammars which produce violations of No Blur are unexpected, difficult to learn, and unstable historically.

The ISC on the other hand is not concerned with markedness or tendency; rather it follows automatically from a fundamental constraint on grammars as generative devices, namely the interaction of impoverishment and redundancy rules. In other words, the ISC does not restrict (extensional) languages directly, but rather indirectly by controlling the types of rule systems which are available for generating languages in the first place. Thus, among all possible surface structural descriptions evaluated as marked by No Blur, the ISC asserts that some are ungenerable while others are generable.[39]

So while No Blur and the Interclass Syncretism Constraint are both concerned with the distribution of defaults, they differ in important respects: the former represents an evaluation of markedness while the latter expresses the consquences of a formal restriction on grammars. Logically conceivable surface distributions can accordingly be divided into three categories: (a) generable and not contravening No Blur, (b) generable and contravening No Blur, and (c) ungenerable and (moreover) contravening No Blur. The contribution of No Blur is to divide (a) from (b, c), while that of the ISC is to divide (c) from (a, b). While a language in (b) represents a marked option, a language in (c) – to the extent that any occur at all – represents a truly exceptional state of affairs and invites carefuly scrutiny of the grammar involved.[40]

4.2. Closing Remarks

The examples discussed in this paper make clear that inflection class systems which show the effects of 'analogy', 'blur', or 'borrowing' by one class from another are quite heterogeneous. Among cases of true systematic mixed inflection, I have identified three types: phonologically-conditioned allomorphy, as in the Greek asg. *-n* ∼ *-a*; default spell-out, as in Aeolic Greek gsg. *-o*; and finally impoverishment, in which the borrowed affix need not be the general default, as in the Old Russian isg. *-mь* or ipl. *-y*.

Finally I should again stress that the Interclass Syncretism Constraint is not an axiom of the theory, but follows automatically from the more general formal restriction that impoverishment rules can never insert feature values, although by deleting marked values they can permit independently required default rules to apply, moving a representation to a less marked state. To the extent that this

hypothesis can be maintained, it shows that even though inflection classes partition the vocabulary of a language arbitrarily, learners nevertheless extract from this partition a set of rules which define certain inflection classes as defaults and others as marked. These rules not only assign class to those morphemes which have none underlyingly (including adjectives in some languages) but also restrict the range of systematic homonymies across inflection classes.

NOTES

[1] The term *syncretism* is used here to denote identity of inflectional affixes, rather than coincidence of whole words, as occurs when two or more morphosyntactic categories show the same expression within an inflectional class, as in Latin *nautae* 'sailor', ambiguously gen.sg., dat.sg., nom.pl. or voc.pl.

[2] Instances of the o-stem dpl. *déndrois* are not unknown in Attic and later Greek (Schmid 1964: 584), but are never very common.

[3] In this paper I discuss only the partitioning of the vocabulary into classes based specifically on affixal allomorphy. Following Carstairs (1988) I will assume that allomorphy of affixes and that of stems form at least partly distinct subsystems in the morphology and that constraints on the distribution of the former do not necessarily carry over to the latter. See also Marantz (1993) and Noyer (1997) for discussion of the distinction between 'pieces' and stem readjustment rules.

[4] I do not offer in the present paper any conjectures about the specific threshold of evidence required for the learner to postulate an inflectional class property, as distinct from a set of listed forms. However, I take it as fairly uncontroversial that a distinction does exist between facts which are encoded by rules referring to inflection class features and those which make reference to lists of items. The historical development and disintegration of inflection classes, as well as studies of learnability, may offer some evidence on this matter, but I leave such concerns aside for now.

[5] The distinction between 'class-default affixes' and 'default classes' is also made explicit in, for example, Carstairs-McCarthy (1994).

[6] Crucially, of course, it must be the case that classes II and III do not share some common featural property. In general I will assume that inflection classes are atomic, although non-class properties such as gender or phonological form may in some instances structure the set of inflectional classes; compare the discussion of 'macroclasses' in Carstairs (1988).

[7] Gender and inflection class are often closely correlated, meaning that many stems do not require underlying specification for both properties. In such cases there are clearly two alternatives: either declension class is derived from underlying gender – as suggested here – or gender is derived from underlying declension class. Within the model of grammar assumed here, adjectives cannot have underlying gender; rather, they are assigned gender by syntactic agreement rules and are then (in the default instance) assigned to a declension class on that basis. Because such rules deriving declension class are thus independently required in the grammar, they are free to apply for nouns as well. A grammar in which gender is derived from inflection class for nouns would require additional rules and would be more complex. For this reason, rules deriving declension class from gender are typically postulated in DM analyses, as for example in Halle (1991, 1992) for Latvian and modern Russian and by Harris (1992,

1994, 1995) for Spanish and Catalan. Nevertheless, if different assumptions are made about the nature of adjectival agreement, the above argument loses some of its force. For example, Fraser and Corbett (1995) argue for formal rules in Russian which derive gender from declensional class.

[8] Masculine adjectives in Gothic inflect as class O only when definite; the default class for indefinite adjectives is that of the earlier *n-stems. In addition, certain innovations have occurred in the declension of definite adjectives, but these do not affect the general point made here.

[9] One might imagine a rule which makes class A the default inflectional class for masculine *nouns*, while still maintaining rule (6b) for masculine adjectives. But such a rule is clearly spurious inasmuch as no independent evidence exists in the grammar to support it; in particular one may note that in 'pseudo-Gothic' there are no masculine stems which inflect like class A feminines except those in class I.

[10] For example, the consonantal stems are formed with a suffix such as *-en*, *-es*, *-er*, which is deleted in the nom.sg., hence: *kam-y* 'stone', *slow-o* 'word' and *mat-i* 'mother'. (Alternatively, as an anonymous reviewer points out, these suffixes could be treated as stem-extensions inserted by stem allomorphy rules in all cases except the nom.sg.) The *i/*u-stems have no such suffixes, although there are some instances of allomorphy of the theme itself (e.g. thematic *-ow-* in the nom.pl. of *u-stems). One possibility, then, is that the consonant-stem forming suffixes contain an additional diacritic property that singles them out as a 'special' species of yer-stem.

[11] Masculine *ā-stems occur in other Indo-European languages, including Lithuanian (*dẽd-ė* 'uncle', *vaidil-à* 'heathen priest') as well as Latin and Greek (see section 3), and are probably of pre-Slavic origin.

[12] As an anonymous reviewer has pointed out, the argument advanced here depends crucially on the assumption that disjunctive conditions of the type 'class Y feminines or class A stems' are to be avoided. Carstairs-McCarthy (1998a) however has proposed that certain types of disjunctive conditions are permitted while others are not; moreover, he argues that admitting such disjunctive descriptions renders the mechanism of impoverishment superfluous. There are in fact certain similarities between these approaches: both are designed to limit the types of affix distributions which are not natural classes. I leave a detailed comparison of these approaches for another occasion; for further details, see also Carstairs-McCarthy (2001).

[13] This problem is all the more complicated by the fact that *ъ-mь* and *o-mь* have the same outcome in modern Russian, since ъ lowers to *-o-* when the following syllable contains a yer. The same is true for *-ь-mь* , -e-mь . Final *-mь* is replaced by *-mъ* beginning as early as the end of the 13th cent. (Matthews 1960: 163), giving the modern Russian form *o(e)-mъ* .

[14] The relation of natural gender to semantic gender is also frequently an important source of informational redundancy. For example, Harris (1991: 51) includes in his analysis of Spanish a rule supplying the grammatical gender 'f' (feminine) to female humans in the default instance; for extensive discussion of the Slavic situation as well as that in other languages, see Corbett (1991).

[15] The following coventions will be used for transcription of Greek vowels, where ambiguity may arise: $\varepsilon = e$, $o = o$, $\eta = \bar{e}$, $\omega = \bar{o}$; the long tense mid vowels arising from contractions and spelled as diphthongs will be represented: $\varepsilon\iota = \bar{e}$ $(\leftarrow e + e)$, $o\upsilon = \bar{o}$ $(\leftarrow o + o, e + o)$. The following contractions also arise by phonology: $e + a$, $a + e$, $a + \bar{e}$ (η), $o + a$, $a + o$, $a + \bar{o} \rightarrow \bar{o}$ (ω). Vowels (unless part of a diphthong) that are marked with circumflex accent are to be understood as necessarily long.

[16] In Attic *ā has normally fronted to *ē* unless preceded by [a, i, r], with some exceptions. Class I stems with a fronted theme show a morphologically conditioned alternation in the theme vowel: *ē* in the singular and *a* in the plural.

[17] Final obstruents except *s* are deleted phonologically.

[18] Underlying *-es* in the apl. is historically *ns. By the 5th cent. in Attic the nasal origin of this suffix had become synchronically opaque; the learner was then free to reanalyze apl. *-ō̱s* as arising from underlying *-o-es.* A distinct apl. in *-as* for class III stems continued in Attic in the classical period, but in Hellenistic Greek was eventually eliminated in favor of *-es*, the default plural for all declensions.

[19] Certain inessential details are set aside here. The stem *krit-* is very likely bipartite, consisting of the root *krῐ̄-* 'judge' followed by the nominalizing suffix *-t-(ē-s)*. Underlying indications of accent have also been suppressed.

[20]Compound adjectives such as *á-log-o-s* 'not-rational', i.e. 'irrational,' are nearly always two-termination adjectives. The manner in which this generalization is expressed in the grammar is not clear, but presumably the inherent specification of class II is supplied in the derivation of the compound stem.

[21] Historically adjectives of this type did not have specific fem. forms. The corresponding *i- and *u-stems of Sanskrit show clear evidence of having innovated a specialized feminine form (Mayrhofer 1978: 38); the Greek fem.adj. stem was derived by the class I suffix *-i̯(-ā)-; loss of *u̯ in *-eu̯-i̯-ā- led to the Attic situation in which the fem. has stem allomorph in *-ei-*. Suffixation of *-i̯-ā to stems in *nt (some participles and a small set of adjectives) yielded a pattern of stem alternation with the same distribution as in (25).

[22] The voc.sg. ending *-ă-Ø* occurs with (1) masc. class I stems which otherwise retain theme *-ā* in the singular; (2) compound stems; and (3) stems formed with the nominalizing suffix *-t-(ē-s)*, including *kritḗs* (Smyth 1920: 52). Otherwise, the voc.sg. is either identical to the nominative or, for certain athematic nouns, the same as the 'bare stem', i.e. the stem followed by desinence *-Ø*. (See footnote 28 for details.) Neuter stems of class II have voc.sg. *-n*, owing to a general syncretism of all direct cases. (This rule deletes the values of [accusative] and [vocative] in neuters, with the result that they exhibit an identical form for all the [+direct] cases.)

[23] In a fuller treatment, the vocative theme *a* in certain class I masculines presents an exception to the rules in (28); see also fn. 22. The voc.sg. of such stems exhibits a shortened theme vowel; when *ā > Att. *ē* the alternation *ă* ∼ *ē* resulted. Either a special voc.sg. theme *-a-* must be introduced into (28) or else the synchronic phonology must include a fronting rule [ā] → [ē] applying after a morphophonological shortening of the theme vowel in the voc.sg. The choice among the various synchronic analyses that might be offered does not however bear on our central concern here.

[24] According to Szemerényi (1956: 200) the older gen.sg. in *-ā-s* is a relic of the language of the 'post-Mycenean invaders' who eventually adopted the innovative Mycenean *-ā-o*.

[25] Of course, this rule is not impossible in Attic as well, it is simply that the restriction of *-s* to [fem] is not required given the rule of impoverishment. Interestingly, as Seiler (1958: 52 ff.) shows, beginning in the Roman period *-s* came to be reanalyzed as the gen.sg. of feminines in general, while zero became the marker of masculines. Thus there emerged gen.sg. forms in *-ē-Ø* for masc. *ā-stems with nsg. *-ēs*, such as *Pasikrát-ē* (Roman period), while new fem. gsg. forms with *-s* are also encountered in the later Roman period. In Modern Greek this became the norm: nsg. *fíl-o-s* m. 'friend', gsg. *fíl-u*, but nsg. *mitér-a* f. 'mother', gsg. *mitér-a-s.*

[26] I would like to thank Don Ringe for pointing out the relevance of the Ionic form.

[27] The inflection of masculine foreign names in *-ās* is frequently seen with *-ā* as a Doricism

in later Attic, but as Threatte (1996: 82–83) makes clear, prior to 150 BC when such names became more common among Athenians the norm in Attic inscriptions is *-ō̩* even for foreign names.

[28] An anonymous reviewer objects to the presence of three zero affixes in the spell-out rules for the direct case desinences, in particular, the Ø suffix of the vocative. The alternative is to view Ø as the default desinence, a move which is impossible on the current analysis, which requires that *-n* be the default [+direct] desinence.

However, I find further evidence in favor of a special Ø suffix for the vocative. Aside from neuters, whose vocative is never distinct (see footnote 22), and participles, which never have a specific vocative form, the conditions for the *-Ø ~ -s* allomorphy in the vocative are largely phonological, with a few exceptions. The *-Ø* desinence occurs in a particular set of environments, while the *-s* desinence for the voc.sg. occurs elsewhere. Specifically, 'bare stem' or *-Ø* vocative occurs (1) after [−cons] segments, including (a) all thematic stems and (b) athematic stems ending in high vocoids (*-i, -u*), such *as póli-* 'city', *basileû-* 'king', *ik^{h}t^{h}ű-* 'fish', *Sapp^{h}oî-* 'Sappho' (except for monosyllabic stems ending in *-ī*: *kī́* 'weevil'), and (2) for four other classes of athematic nouns, as follows: A. Barytone stems ending in a short vowel plus sonorant consonant, e.g., *r^{h}êtor-* 'rhetor', *daîmon-* 'spirit', *tálan-* 'suffering', *mákar-* 'blessed', *ék^{h}t^{h}ion-* 'hostile'; and, exceptionally, in four oxytone stems of the same shape and three stems ending in a long vowel plus sonorant (with shortening of the vowel in the voc.sg.). All these exceptions become barytone in the voc.sg.: *patḗr*, *pâter* (nom., voc.) 'father', *anḗr*, *áner* 'man', *dāḗr*, *dâer* 'brother-in-law', *Poseidôn*, *Póseidon* 'Poseidon', *Apóllōn*, *Ápollon* 'Apollo', *sotḗr*, *sōter* 'savior'. B. Stems ending in *-iT* (T = a coronal obstruent), including: (a) oxytone stems in *-íT* (underlying stem in parentheses): *turanní* (*turanníd-*) 'monarchy', *elpí* (*eplíd-*) 'hope', *paî* (*paid-*) 'slave, boy'; and (b) barytone stems in *-iT*, where the stem-final consonant is deleted by a general stem allomorphy rule in the direct cases of the singular: *Ártemi-* 'Artemis' (cf. acc.sg. *Ártemi-n*, but oblique stem *Artemid-*); similarly, *neâni-* (*neānid-*) 'maiden', *órnī* (*órnīt^h-*) 'bird'. C. Barytone stems ending in sonorant plus coronal obstruent (in practice *-nt*, *-rt*). The final coronal is deleted word-finally: *géron* (*géront-*) 'old man', *Aîan* (*Aiant-*) 'Ajax', *k^{h}aríen* (*k^{h}arient-*) 'graceful, beautiful', *dámar* (*damart-*) 'lady, wife' (voc. sg. at Eur. Hipp. 339). D. Stems in *-es*: *Sṓkrates-* 'Socrates', *alēt^{h}és-* 'true'.

The voc.sg. is identical to the nominative in all remaining cases: 1. Stems ending in a long vowel plus sonorant: *t^{h}ḗr* (< *t^{h}ḗr-s*) 'beast', *Salamī́-s* (< *Salamī́n-s*) 'Salamis'. 2. Oxytone stems ending in a short vowel plus sonorant: *poiḗn* (*poimén-*) 'shepherd'. 3. Stems ending in *-VT*, where V is any vowel except *i* and T is a coronal obstruent (voc. examples where V = *u* are unattested): *t^{h}ḗ-s* (*t^{h}ēt-*) 'serf', *érō-s* (*erōt-*) 'love' (voc. at Plat. Phaed. 257a), *p^{h}ṓ-s* (*p^{h}ōt-*) 'man', *pṓs* (*pod-*) 'foot'. 4. Stems ending in non-coronal obstruents, i.e. (a) labial obstruents, *klṓp-s* 'thief', and (b) dorsal obstruents, *sark-s* 'flesh', *aík-s* (*aig-*) 'goat'. (Exception: occasionally in poetry *ána* 'lord' voc.sg., cf. nom.sg. *ának-s*.) 5. Oxytone stems ending in a sonorant plus coronal obstruent: *odṓs* (*odónt-)* 'tooth'.

Note that of the 'remaining cases' all are clearly 'elsewhere' in nature. Conditions 1 and 2 represent the class of stems ending in a sonorant consonant once the more specific set in A is removed. Likewise, conditions 3 and 4 refer to stems which are not covered by the more specific conditions B, C and D for the *-Ø* desinence. If the *-Ø* vocative is not treated as a special case, but rather construed as exhibiting the default lack of *-s*, then the (elsewhere) *-s* vocatives must be picked out specifically in order to be impoverished into the nominative (by deletion of [+vocative], for example). On the present analysis, the opposite holds: the bare

stem vocatives are picked out as the special class, while the remaining vocatives automatically obtain the default [− accusative + direct] desinence *-s*.

[29] Rosén (1962: 71–74) discusses in some detail a group of masculine *ā-stems which in Herodotus vaccilate between declension in class I and declension in class III, e.g. *Pérs-ē-s* '(a) Persian', *akinák-ēs* 'type of Persian sword.' By undergoing a transfer into class III, a non-default class, such forms appear to counterexemplify the Interclass Syncretism Constraint. However, this is a sporadic change, largely confined to Herodotus and not attested in all manuscripts. For the Attic dialect, Threatte (1996: 23) shows that almost all transfers into class III of this type are based on misinterpretations of the epigraphic evidence.

[30] In the Roman period there was considerable confusion about the 'correct' acc.sg. form for the *es-stems. Schmid (1964: 582–83) observes that among the Atticizing writers of the 2nd cent. AD, Flavius Philostratus, Dio Chrysostomus and Lucian almost always use *-ēn*. But second century grammarians were not sure which form was truly Attic, and Aristides, Strabo (except once) and Polybius always use *-ē*. Still later grammarians surmised that *-ēn* was properly Attic. Under such circumstances corruption of the texts must have been nearly inevitable.

[31] Schwyzer (1900: 256) notes six instances of asg. *-ē* in Attic defixiones dating up to 200 BC, as against four instances of *-ēn*. But Threatte (1996: 174–75) concludes that nearly all of these involve abbreviatory absence of final *-n*, as Schwyzer had originally surmised.

[32] See Bubeník (1989: 247–48) for discussion of the Atticizing influence on the royal chancellery at Pergamon. Magnesian documents do not in general contain Atticisms. Bubeník suggests that the influence of literary Attic was also greater on the Koine of Pergamon than on the Koine of Magnesia. In this regard it is interesting to note that the first example of gsg. *-o̯* in Magnesia, from the 4th cent. BC Nachmanson (1904: 136), predates the first in Pergamon by over a century.

[33] For Attic Threatte (1996: 173) hesitates to make a firm conclusion for the dat.sg. change, but does note that *-ēi* is attested in two inscriptions from ca. 400–410, perhaps indicating an early change for the dat.sg. as well as for the acc.sg. But other data are contradictory and ambiguous inasmuch as *ēi* is sometimes written for *ei* = [ē] in general, so no firm conclusion can be drawn.

[34] This point of view is also adopted by Seiler (1958: 49 ff.), who also discusses the extension of *-n* to class III forms already marked for acc.sg. by *-a*, as in *ándr-a-n* 'man'; cf. also Rix (1976: 152). But such forms are on the whole much later, and common in Attic only in the later Roman period. They signal the final breakdown of the thematic/athematic distinction and are outside the scope of discussion here.

[35] Stems in *-ēu̯-* such as *basiléu̯-s* 'emperor' have Quantitative Metathesis in the gen.sg. and acc.sg., hence asg. *basiléu̯-a* 'king' surfaces as [basiléā], while in the nom.sg. they undergo closed syllable shortening before coda *-s* but retain the underlying glide.

[36] The forms from Herodotus are: *ʰéērō-a* 2.143, 6.69, but *héērō-n* 1.167; *pátrō-n* 4.76, 9.78; *méētrō-a* 4.80.

[37] Writers of the Roman period normally have gsg. *héērō-os*, e.g. Strabo Geog. 6.3.2, 6.3.9, 10.1.3, 10.3.6 (late 1st cent. BC to early 1st cent. AD), Plutarch Thes. 26.5 (early 2nd cent. AD). Pausanias (c. 150 AD) has both forms of the gen.sg., *héērō* (10.4.10), but *héērōos* (1.3.1).

[38] By the same token, the Old Russian inst.sg. desinences also violate No Blur: neither *-(ъ)mь* nor *-ju* is a class identifier, and neither has the surface distribution of a general default.

As explained in section 2.1, however, this pattern is entirely consistent with the ISC because *-(ɤ)mʁ* is the allomorph of the default class for masculines.

[39] The term 'structural description' is included here intentionally. Clearly any surface pattern whatsoever within a finite system can be generated simply by listing; even to compare the predictions of No Blur and the ISC one must make certain assumptions as to structural description, such as for example whether two affixes are to be construed as accidentally or systematically homophonous.

[40] An anonymous reviewer has drawn my attention to an interesting potential example of type (c) in the inflection of dual direct case forms in Vedic and classical Sanskrit (Mayrhofer 1978). Leaving inessential details aside, we can divide Vedic noun stems into three basic classes much as in Old Russian: historical *o-stems, (non-root) *ā-stems, and athematics, consisting of *i/*u-stems and the remaining athematics:

	*o	*o	*ā	*i/*u	*i/*u	athematic	athematic
	masc.	neut.	fem.	m.f.	neut.	m.f.	neut.
nom.sg.	*-a-s*	*-a-m*	*-ā-Ø*	*-s*	*-Ø*	*-s* ~ *-Ø*	*-Ø*
dir. dual	*-āu* < *-a-āu*	*-e* < *-a-iH*	*-e* < *-ā-iH*	*-V*	*-iH*	*-āu*	*-ī* < *-iH*

First it should be observed that this pattern violates No Blur, since the desinence *-iH* along with neuter gender is not a class-identifier (such a stem could be either athematic or an *o-stem), implying that *-iH* must be the default. Yet desinence *-āu* along with masculine gender is also not a class-identifier (such a stem could also be either athematic or an *o-stem).

The peculiarity of this pattern appears to lie with the dual *-iH* of the (feminine) ā-stems, which in all respects appears to be the same as that of the neuters in general (that is, both *o-stem and athematic neuters). There appears to be a violation of the ISC: *-iH* of the feminine *ā-stems is not a general default (provided that *-āu* is the default); moreover *-iH* does not express the dual in the default class for feminines, provided that this class is the athematics.

On the other hand, the problematic distribution can instead be approached by asking not "why do the feminine *ā-stems share dual *-iH* with the neuters?" but rather "why do the feminine athematics share *-āu* with the masculines?" Here the historical development of the Vedic pattern becomes quite relevant. It is commonly assumed that early Proto-Indo-European did not have a three-way inflectional opposition for nominal gender; rather, the original system opposed masculine and feminine on the one hand and neuter on the other (Brugmann 1897, 1904). This state of affairs is reflected in later attested languages such as Greek in which masculine and feminine athematics decline alike. (Where differences do exist, as in for example the Vedic *i-stems, they represent an innovation.) Specific feminine FORMS produced by suffixation of *-eh$_2$ (>*-ā*) originally denoted various abstractions and were formally similar or identical to neuter collectives also in *-eh$_2$ (> Ved. neut. nom.acc. pl. *-ā*), which, while originally agreeing as singulars, ultimately came to represent the plurals of neuter *o-stems. Although precise details of the development remain uncertain, the appearance of dual *-iH* for both these stems types surely reflects this earlier more intimate connection between the stem types.

Suppose then that *-iH* is not specifically a neuter dual desinence per se, but rather a [−masculine] dual desinence. On this view, the problematic case is the unexpected appearance of *-āu* in the feminine athematics (and *-V* in the feminine *i/*u-stems) Here the archaic lack of opposition between masculine and feminine in the athematics survives. Grammatically this can be expressed by impoverishing [masculine] in the dual of athematic stems, leaving only

the opposition between neuter and non-neuters. The following spell-out rules complete the analysis:

(1) a. *iH* ↔ [dual] / [−masculine] + ____
b. *V* ↔ [dual] / *i- and u-stems* + ___
c. *āu* ↔ [dual] / *elsewhere*

Feminine ā-stems, on this view, inflect with dual *-iH* because such stems are in fact opposed to masculine thematics and in this sense merit the value [−masculine]. The athematic feminines – in the dual at least, and originally everywhere – are not formally opposed to the masculines, and have their value for [masculine] deleted; they then escape insertion of *-iH* and receive the default dual desinence *-V* or *-āu* instead.

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Itelmen plural diminutives: A belated reply to Perlmutter 1988

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Perlmutter (1988) notes that Yiddish plural diminutives present prima facie counter-evidence to a version of the *Split Morphology Hypothesis* (SMH, cf. Anderson 1982, which predicts that inflectional morphology (including plural marking) should always be peripheral to derivational morphology (including diminutives) within a word. Some classes of Yiddish nouns display an order predicted to be impossible, specifically, root-plural-diminutive. Perlmutter notes that this morpheme order arises only with non-productive plural forms, and suggests treating these as instances of suppletion. He then defends a version of the SMH in which the prediction about morpheme order is restricted to productive inflectional morphology, calling for a view of morphology which treats regular and irregular affixes quite differently. In this squib, I demonstrate that even the weaker version of the SMH advanced by Perlmutter is untenable. Itelmen displays exactly the same problematic morpheme order as the Yiddish nouns, but in Itelmen, this order arises with fully productive regular morphology.

The cases of interest in Yiddish are examples in which plural marking is internal to (closer to the root than) the diminutive. Two such cases are illustrated in (1), from Perlmutter (1988: 80).

(1)

	Singular	Plural	Plural Diminutive
'child'	kind	kinder	kinderlex
'body'	guf	gufim	gufimlex

Basic segmentation suggests the structure of the plural diminutive forms is, for example, *guf-im-lex* 'body-PL-DIM'. As Perlmutter observes, this is problematic for the claim that derivational morphology (which he takes diminutive formation to instantiate) is necessarily peripheral to inflectional morphology (which he takes the plural to instantiate). This claim about ordering in turn he derives as a central prediction of the SMH. Both the claim that diminutives are unambiguously derivational and the SMH itself have been challenged (see Scalise (1984) and the papers in Booij and van Marle (1996)), but as my aim here is to address the specific argument from Yiddish, we may accept these premises for the sake of argument.

Perlmutter argues that the force of the apparent counter-examples disappears, once it is recognized that the *-er* plurals and the *-im* plurals form restricted (though not negligible) classes (the latter being Hebrew/Aramaic loans). For both types, Perlmutter argues that the plural forms are listed in the lexicon (pp. 84, 91) and do not involve productive inflectional affixes. In particular,

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Perlmutter denies the synchronic segmentation of the *-im* plurals, claiming "[t]here is no reason to posit a suffix *-im*" (p. 91). (Perlmutter also discusses ablauting plurals, which require a slightly more complex treatment, but one that does not affect the points made in Perlmutter's article or here.)

In sum, Perlmutter's conclusion is that the SMH can be retained, and with it the prediction that a diminutive suffix cannot follow a plural suffix, so long as this prediction is restricted to productive inflectional morphology, leaving a large amount of redundancy within suppletive rules.

The facts of Diminutive formation in Itelmen (Chukotko-Kamchatkan), illustrated in (2), refute that prediction.[1]

(2)

	Singular	Plural	Sg. Dim	Pl. Dim
'morsel'	ansx	ansx-aṅ	ansx-čaχ	ansx-aṅ-č
'house'	kist	kist-eṅ	kist-čaχ	kist-eṅ-č
'pond'	kəɬɸ	kəɬɸ-eṅ	kəɬɸ-čaχ	kəɬɸ-aṅ-č
'hut'	mem	mem-eṅ	meme-čχ	meme-ṅ-č
'woman'	mimsx	mimsx-eṅ	mimsx-čaχ	mimsx-əṅ-č
'girl'	lʲaŋe	lʲaŋe-ṅ	lʲaŋe-čχ	lʲaŋe-əṅ-č

Like Yiddish, the diminutive suffix in Itelmen has (partially) distinct singular and plural forms.[2] In addition, the Itelmen singular diminutive shows allomorphy for consonant-final and vowel-final stems. Unlike Yiddish, however, the diminutive and, more importantly, the plural morpheme in (2) are both productive. The only nouns that do not form a plural with glottalized *n* are native nouns ending in *-l* in the singular, which form their plural with glottalization of the *-l*. All other nouns, including borrowings, form their plural with the suffix in (2). Even in the extreme (and possibly nonce) formation in (3), involving a Russian lexical diminutive suffix *-uška* on a root of Koryak origin, the productive Itelmen morphology surfaces in the order in (2).

(3) ekolʲ-uske-ṅ-č
girl-DIM-PL-DIM
'girls'

Since Itelmen plural formation is entirely productive, there is no way to argue for an account in terms of suppletion and lexical listing. And since listedness is not at issue, the prediction of the SMH, even weakened to apply only to non-listed forms, is falsified.

NOTES

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[1] The facts are originally presented in Volodin (1976: 130–133). Examples are supplemented with data from Volodin and Khaloimova (1989) and from my own field notes (1993–2001). The plural morpheme is a glottalized *-n*, with an epenthetic vowel of variable and often indistinct quality after consonant-final stems.

[2] The Yiddish forms are singular: *-l*, *-ele*, plural *-lex*, *-elex* (Perlmutter 1988: p. 91)

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Book Notices

R. Harald Baayen and Robert Schreuder (eds.), ***Morphological Structure in Language Processing***. Berlin–New York: Mouton de Gruyter, viii + 521 pp. (Trends in Linguistics, Studies and Monographs 151).

This volume contains 16 articles on morphological processing written by leading researchers in the field of morphology and psycholinguistics. The languages discussed are Germanic, Romance, and Slavic languages. The central issues in these articles are the balance between storage and computation of complex words and the related issue of how this may affect the processing of words in different modalities (auditory and visual comprehension, and writing).

As to storage, detailed investigations are reported as to frequency effects in the processing of different kinds of inflectional form. For instance, in the work by Baayen and colleagues, it is shown that regular plural nouns of Dutch exhibit a surface frequency effect, which shows that such forms are stored in the mental lexicon. Verbal inflectional forms of Dutch behave somewhat differently in this respect, which may reflect the difference between inherent and contextual inflection.

The distinction between inflection and derivation may be reflected by a difference in frequency effects. Whereas related inflectional forms exhibit cumulative frequency effects in lexical decision tasks, it is the size of the morphological family, that is, the number of related word types, which appears to be a good predictor of differences in response latencies. This family size effect is discussed in a number of articles in this volume.

In their contribution to this volume, Clahsen and colleagues argue on the basis of experiments with speakers of German that inflection and derivation are different with respect to storage. Regular inflectional forms produce full priming effects, and no word-form frequency effect. Irregular inflectional forms and derived words, on the other hand, always have their own entry, and thus always exhibit surface frequency effects, and reduced priming effects. This then leads to a revised form of Pinker's well known Dual Mechanism theory of morphological processing.

The role of frequency in morphological processing is dealt with in a number of other studies in this volume, with data from languages such as Dutch, English, French, Italian, and Polish.

If morphologically complex words can be stored, this raises the question to which extent such words are still decomposed in language processing. This is a central issue in this domain of psycholinguistic research, and a number of articles contribute to the debate. For instance, Davis et al. argue that the facts of Dutch inflection that have been adduced by Baayen and colleagues to defend a dual route model (the Race model in which the whole word access route and the decomposition route compete) can also be accounted for in a connectionist model, in which no distinction is made between rules and representations.

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Another important psycholinguistic issue in the domain of morphology is acquisition: how do children generalize from individual complex words that they encounter to morphological rules or schemas? Dressler and colleagues deal with this issue on the basis of data of some French and German speaking children.

Finally, frequency properties of complex words also appear to play a role in writing those forms of regular verbs of Dutch that have related homophonous forms.

In sum, this volume gives an excellent survey of present issues and findings in the domain of morphological processing.

Geert Booij

George Smith, *Phonological Words and Derivation in German*. Hildesheim: Olms, xiii, 236 p. ISBN 3–487–11939–0. Euro 29,80. (Germanistische Linguistik Monographien, 13).

This book is the revised edition of a dissertation defended in 2000 at the University of Potsdam. The first part (the first four chapters) presents a well-organized historical survey of the theoretical discussion of the notion 'phonological word' (also called 'prosodic word') as defended by Selkirk, Nespor and Vogel, Booij, and Wiese. The basic insight is that there is no isomorphy between the morphosyntactic and the phonological word. A morphosyntactic word may consist of more than one phonological word. The inverse situation also applies: more than one morphosyntactic word may correspond to just one phonological word, as may be the case for word + clitic combinations. Smith's study focuses on the relation of prosodic structure to the morphological structure of words, and the way in which this relation is dealt with in frameworks such as Lexical Phonology and Optimality Theory.

The second part of the book, Chapter 5, focuses on the phonological properties of German words, and on the prosodic properties of German affixes. The basic generalization is that German underived words consist of either a monosyllabic foot, or a disyllabic foot, with the weak, unstressed syllable at the end. Words with initial weak syllables are much rarer, and are often loans or words that originated as prefixed words. Smith also makes astute observations on the phonotactic and prosodic differences between affixes and lexical morphemes.

Smith provides a detailed discussion of the class of non-cohering affixes in German, that is, those affixes that form their own domain of syllabification, independently from the stem domain. A well-known criterion for considering an affix non-cohering is the possibility of its being omitted in coordination, as in *verwert- oder verwendbar*, where the suffix *-bar* has been omitted in the first derived adjective. Smith claims that, unlike what Booij and Wiese claimed for

Dutch and German, the crucial condition for the admissibility of this kind of gapping is not that the deleted part forms a phonological part of its own, but that the remnant of the partially gapped word must be a phonological word of its own. For instance, in the coordination of the prefixed verbs *be- und entladen* this gapping is only possible if the prefix *be-* is not pronounced with a schwa, but with a full vowel [e] that can bear stress.

This latter observation is certainly to the point, and it is clear that phonological word status of the deleted word part is not a sufficient condition for gapping leading to well-formed results. However, I think it is a necessary condition, because we cannot delete cohering suffixes, even if the remnant can function as a phonological word, as in **Berat- und Verwaltung* where the cohering suffix *ung* has been deleted, and *Berat* would stil form a prosodic word. Smith is certainly right, however, that semantic and pragmatic factors are involved as well, and that the remnant must comply with the minimal phonological requirements on phonological words.

Smith deplores the fact there are not many detailed language-specific studies on the phonological word as a domain of phonological rules. However, there are certainly more such studies than Smith mentions, for instance Peperkamp (1997) for Italian, and, more recently (but too late for being mentioned in Smith's book), Vigario (2003).

In sum, this book is a very useful summary of the debate on the phonological word, and adds interesting points to the debate on the proper analysis of gapping in German complex words.

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