

GRAMMATICALLY CONDITIONED ALLOMORPHY, PARADIGMATIC STRUCTURE, AND THE ANCESTRY CONSTRAINT

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Abstract

When inflectional allomorphy is grammatically conditioned, are there any constraints on the direction of conditioning (inward or outward)? Claims made by Bobaljik (2000) and Carstairs (1987) are compared with respect to data from Hungarian, Itelmen and Latin. An answer is suggested that exploits the notion of direct ancestry (relationships between (grand)mothers and (grand-)daughters) in word-structure trees, and the notion of blur avoidance in paradigmatic structure (Carstairs-McCarthy 1994). Implications for Stump's (2001) theory of paradigm structure are briefly discussed.¹

1. Introduction

¹ For comments on earlier drafts I am grateful to Jonathan Bobaljik, Jim Blevins and an anonymous referee. Faults that remain are my responsibility.

This paper addresses an important question about inflectional morphology that has received attention only intermittently over a number of years, and on which there is no consensus. When an affixal alternation is conditioned grammatically, rather than phonologically or lexically, is there any general requirement that the source of the conditioning should lie either closer to the root or further from it? Or is it that morphology is as messy as most linguists still think it is, so that both directions of conditioning can operate?

I will propose an answer that can be expressed neatly in terms of the kind of branching tree widely used for representing the internal structure of inflectionally complex wordforms. My answer will also suggest a link between the kind of syntagmatic relationship at issue here and the kind of paradigmatic relationship evidenced in inflection class systems. What I say here is based on evidence from only three languages (Latin, Itelmen, and Hungarian), so is eminently vulnerable to disconfirmation. On the other hand, it gains some plausibility from the fact that it fits in with already-published suggestions about connections between the learning of inflectional morphology and of ordinary lexical items (Carstairs-McCarthy 1994; 1998).

The focus on grammatically conditioned allomorphy means that nothing will be said here about allomorphy that is conditioned phonologically. This implies that I am using ‘allomorphy’ in a wide sense, such that (for example) affixal allomorphy is exhibited not just by the phonologically conditioned alternants [s], [z] and [ɪz] in *cats*, *dogs* and *horses* but also by the lexically conditioned ones [s], [ən] and [ɪm] in *cats*, *oxen* and *cherubim*. This also implies that the two kinds of allomorphy are sufficiently independent so that no serious distortion results from treating the grammatical kind by

itself. This assumption may turn out to be mistaken, but in the present state of morphological inquiry it is (I think) uncontroversial.

2. Possible expectations about grammatically conditioned allomorphy

In respect of some syntagmatic grammatical relationships, experienced linguists are likely to have clearcut expectations about what is likely to be found in a given language and what is not. For example, if we are told that in some language there is concord between adjectives and nouns, we expect to hear that it is the adjective that agrees with the noun (in gender, for example), not the noun that agrees with the adjective. In respect of other such relationships, we know enough to have no such clearcut expectations. For example, if we are told that in some language the relationship between a nominal head and a nominal modifier (a possessor, for example) is expressed morphologically, we will not immediately assume either that the morphological marking must be on the head or that it must be on the modifier, because we know that both ‘head-marking’ and ‘dependent-marking’ languages exist and are widespread (Nicholls 1986). But, in respect of some aspects of inflectional allomorphy, there is no consensus of either kind, as I will illustrate.

Consider a word with the following superficial structure, where A, B and C stand for inflectional suffixes:

(1) Root + A + B + C

(The word ‘superficial’ is intended to indicate that the representation at (1) does not preclude a hierarchical analysis, such as [[[Root A] B] C], at a more abstract level.)

What expectations do experienced linguists bring to bear on possible relationships between the affixes A, B and C? I will mention two kinds of expectation, involving what I will call ‘closeness’ and ‘direction’.

Expectations involving closeness have been widely discussed. Various versions of the Bracket Erasure Condition (Pesetsky 1979) and the Adjacency Condition (Siegel 1978; Allen 1979) predict that, at least in a language whose inflectional morphology is ‘layered’ (Simpson and Withgott 1986; Stump 1997), affix C at (1) may be affected by affix B (for example), or perhaps vice versa, but C cannot be affected by affix A. This is because, in some sense, C and A are not close enough, so as to be mutually ‘invisible’. However, closeness is not the focus of this article.

Expectations involving direction have received less attention. In (1), is it more likely that C should affect B (let us call that ‘inward conditioning’, equivalent to ‘outward sensitivity’), or vice versa (‘outward conditioning’, equivalent to ‘inward sensitivity’)? Plausible *prima facie* motivations can be envisaged for both. Outward conditioning is what we will expect to observe if we assume that an affix such as B can be sensitive to (or can ‘see’) material that has already been added to the root, such as A, but cannot ‘see’ what has not yet been added, such as C. Inward conditioning is what we will expect to observe if we assume that an affix such as B can be sensitive to a morphosyntactic feature (or property) whose principal exponent in the wordform, namely the affix C, is yet to come, and which is therefore still available to influence affix choice, as opposed to a morphosyntactic feature whose principal exponent, namely the affix A, has already occurred, and which is therefore ‘used up’ or fully ‘discharged’.

Expressions like ‘already added’ and ‘used up’ are of course metaphorical. The point is that both metaphors have about the same degree of initial plausibility. Which of them, then, do the facts conform to -- or do the facts conform perfectly to neither, so that both inward and outward conditioning is possible (what we may call ‘bidirectional conditioning’)? The absence of any consensus on this question is clearly illustrated by the contrasting views of Stump (2001), Carstairs (1987) and Bobaljik (2000), to which we now turn.

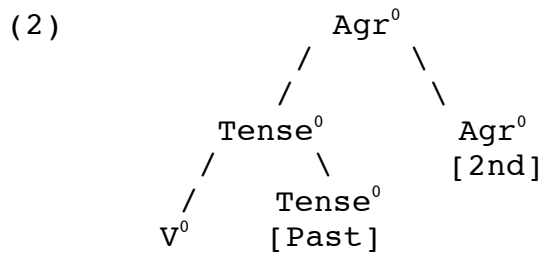
My use of the terms ‘principal exponent’ and ‘grammatical conditioning’ presupposes that, in respect of a morphosyntactic property Q, one can distinguish between an affix X that unambiguously realises Q (a ‘principal exponent’ of Q) and an affix B whose main function is to realise some other property P, but is selected because Q has the principal exponent X elsewhere in the wordform (so that B as an exponent of P displays ‘grammatical conditioning’ by Q) (Carstairs 1987: 151). Inasmuch as Q supplies the context in which B is chosen to realise P, B may be said to realise Q as well as P; but it does so only as a secondary, not a principal, exponent. Stump (2001: 10, 163) rejects the distinction between principal and secondary exponents, and also any distinction between those morphosyntactic properties that an affix realises directly (what he calls ‘properties of content’) and those that merely condition its choice as an exponent of something else (what he calls ‘properties of context’). If Stump is right, then the search for interesting generalisations about either inward or outward conditioning must fail. However, the evidence discussed here will tend to show that Stump is too pessimistic, and that the principal-secondary distinction is important for stating certain constraints on how inflection works.

Carstairs (1987) argues that morphosyntactic categories, such as Number, Case and Tense, and morphosyntactic properties, such as Plural, Accusative and Past, affect allomorphy differently. (This use of the terms ‘category’ and ‘property’ is taken from Matthews (1991), as is the convention of using initial capitals in their names.). He argues that both categories and properties can condition outwards, but only categories can condition inwards. I will explain what this means in terms of the schema at (1), before discussing some relevant examples in sections 3 and 4. Let us suppose that B is a Past Tense suffix and C is a 2nd Person affix, in a language that distinguishes Future, Present and Past in the category of Tense, and 1st, 2nd and 3rd in the category of Person. According to Carstairs (1987), the Past Tense suffix can require the use of a special 2nd Person suffix (conditioning outwards), that is a 2nd Person suffix different from that found in other Tenses; on the other hand, the 2nd Person suffix cannot require the use of a special Past suffix (conditioning inwards), different from that found with other Persons.

Now let us suppose that the root is a noun, that C is a suffix marking 2nd Person Possessor on nouns, and that B is a noun Plural suffix. According to Carstairs, B may be a special Plural suffix, different from the one found on nouns without Possessor marking, only if this same special Plural suffix is found with all Possessor suffixes, not just the 2nd Person one. In other words, a Plural suffix at B may be sensitive to inward conditioning by the entire category of Possessor (realised at C), but not to an individual property within that category. However, Carstairs (1987) has nothing of substance to say about why inward conditioning should be permitted in just this restricted circumstance.

Bobaljik, working in the Distributed Morphology framework (2000), makes claims almost exactly contrary to those of Carstairs. He assumes that affixes are inserted

into morphological structures that are hierarchically organised in binary branching structures containing morphosyntactic information. For the hypothetical 2nd Person Past Tense example discussed above, the structure into which the affixes B and C are inserted would be something like this:



Crucially, the terminal nodes get replaced cyclically, from the lexical category position (here V^0) outward, by vocabulary items (roots and affixes) that are maximally compatible with whatever morphosyntactic information remains. Cyclicity of vocabulary insertion means that, at the point when the affix B replaces [Past] in (2), the remaining morphosyntactic information consists of not only [Past] but also [2nd], because, at the node occupied by [2nd], it has not yet been replaced by affix C. It is possible, therefore, for B to be influenced by [2nd] as well as [Past], hence displaying outward sensitivity. However, when C is inserted, the remaining morphosyntactic information consists only of [2nd], because [Past] has by now been replaced by affix B. The only information about affix B that is now ‘visible’, so as potentially to affect subsequent affix choice, is its phonological shape, not its morphosyntactic content.

3. Outward sensitivity

In this section and section 4, I will cite evidence from Latin and Hungarian to suggest that both Bobaljik and Carstairs are wrong, their claims being insufficiently restrictive in

some respects and too restrictive in others. The alternative that I will propose in section 5 exploits the kind of binary-branching tree structure over which morphosyntactic information is distributed in Bobaljik's approach, and does so in a way that explains Carstairs's hypothesis that outward sensitivity involves whole categories, in the Matthewsian sense, rather than individual properties. This explanation exploits the notions 'screeve' and 'screeveshape' that have proved useful elsewhere in relating the organisation of inflection class systems to the general issue of inflectional content (Aronson 1982; Carstairs-McCarthy 1998). The resulting proposal certainly needs much more empirical testing; but, from the theoretical point of view, it seems to offer a way of combining insights from rather different morphological perspectives.

The sort of evidence that led Carstairs (1987) to posit that outward sensitivity can only be to whole categories, not to individual properties, can be illustrated by noun Plural formation in Hungarian, and how it interacts with suffixation for Possessor. I will mention first two aspects of Hungarian inflection that will be ignored here. Firstly, Hungarian has vowel harmony, and both Plural and Possessor suffixes show up in shapes that reflect the values of stem vowels for [back] and sometimes also [round]. Secondly, among both back-harmonic and front-harmonic nouns, there are arbitrary inflection class distinctions, involving the choice of theme vowel (low or mid). These complexities are irrelevant for the purpose of this paper. It is relevant to note, however that, with roots or partially inflected stems which end in a vowel, vowelless versions of the suffixes appear. I will illustrate my argument by reference to only one noun, *dal* 'song', which is vowel-harmonically back, ends in a consonant, and selects a mid theme vowel. Its pattern of Plural marking is shown in (3), and part of its pattern of Possessor marking in (4) (though

the segmentation indicated there will be amended when Hungarian is further discussed in section 6):

- | | | |
|-----|------------|-------------------------|
| (3) | Singular | <i>dal</i> ‘song’ |
| | Plural | <i>dalok</i> |
| (4) | Possessor: | Singular |
| | 1 Singular | <i>dal-om</i> ‘my song’ |
| | 2 Singular | <i>dal-od</i> etc. |
| | 3 Singular | <i>dal-a</i> |
| | 1 Plural | <i>dal-unk</i> |
| | 2 Plural | <i>dal-otok</i> |
| | 3 Plural | <i>dal-uk</i> |

The realisation of Plural is different, however, when it is followed by a Possessor suffix:

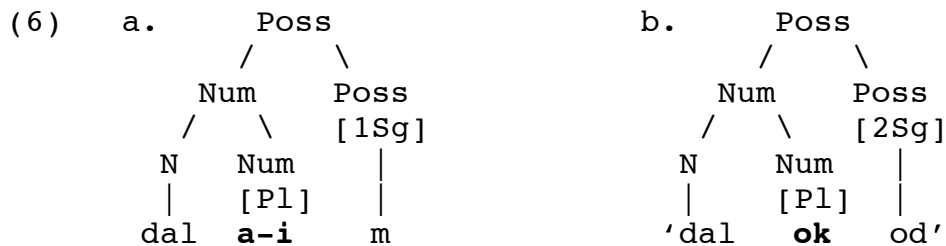
- | | | |
|-----|------------|-----------------------------|
| (5) | Possessor: | Plural |
| | 1 Singular | <i>dal-a-i-m</i> ‘my songs’ |
| | 2 Singular | <i>dal-a-i-d</i> etc. |
| | 3 Singular | <i>dal-a-i</i> |
| | 1 Plural | <i>dal-a-i-nk</i> |
| | 2 Plural | <i>dal-a-i-tok</i> |
| | 3 Plural | <i>dal-a-i-k</i> |

Here, instead of the expected *-k*, preceded by the theme vowel *-o-*, there appears consistently the suffixal material *-a-i*, where a special Possessed Plural suffix *-i* is added to a base which (in accordance with a near-universal Hungarian pattern) is homonymous

with the form meaning ‘his/her song’. (More will be said about this homonymy in section 6.) This is not because there is anything phonologically odd in Hungarian about a hypothetical form such as **dalokod* instead of *dalaidd* for ‘your (singular) songs’; indeed, **dalokod* is phonologically very close to *dalokot*, which is the actual form for ‘your (singular) songs (Accusative)’. The alternation between *-ok* on the one hand and *-a-i-* on the other is therefore an instance of grammatically conditioned allomorphy of precisely the kind that interests us.

The aspect of the Plural pattern in (5) that Carstairs (1987) draws attention to is its uniformity. Plural is realised by the *-a-i-* suffix complex in all Possessor contexts, not just some. This is consistent with the claim that grammatically conditioned allomorphy can be sensitive outwards to a whole category (in this instance, Possessor), but not to an individual property (such as 2nd Singular). Therefore, a hypothetical Pseudo-Hungarian in which Plural is realised as *-a-i-* only in some Possessor contexts, but as *-ok-* in others (for example, just before the 2nd Singular suffix *-od*) should be impossible.

In Bobaljik’s framework, by contrast, the sort of Pseudo-Hungarian just described, with non-uniform realization of Plural, is perfectly permissible. In his branching tree notation, the Pseudo-Hungarian forms *dalaidd* ‘my songs’ and ‘*dalokod*’ ‘your songs’ would be represented roughly as in (6a) and (6b) respectively (compare (2)):

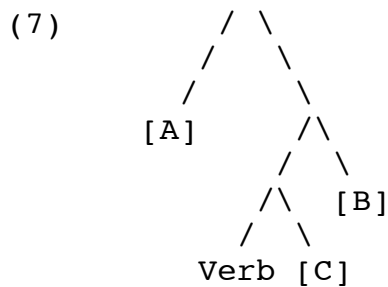


Here, the realisation of Plural is permitted to be sensitive to the Possessor, [1Sg] or [2Sg], because vocabulary insertion takes place in a cyclical fashion, outwards from the root,

and, at the point when the Plural affix is inserted, the morphosyntactic features [1Sg] and [2Sg], not yet having been discharged, are still available to influence which affix is chosen.

Is there any evidence that Bobaljik's framework is correct in permitting outward sensitivity to individual properties? In other words, do patterns of allomorphy relevantly similar to (6) actually exist? If so, then the pattern of uniformity exhibited in Hungarian must be merely accidental from the point of view of morphological theory, however disappointing this conclusion may be. Bobaljik does indeed cite a relevant instance of outward sensitivity from the Chukotko-Kamchatkan language Itelmen. The data are complex; however, his crucial datum is of questionable relevance, as we will see.

Transitive verbs in Itelmen fall into one of two arbitrary inflection classes, Classes I and II. Of these, Class II is much the smaller, limited to some sixteen verbs. Class II verbs carry a suffix located at position C in the word-structure diagram at (7) (Bobaljik 2000):



The affixes at positions B and C are both said to show outward sensitivity, as follows:

(8)	Position	Exponent of:	Sensitive to:
(i)	A	SUBJ-AGR	—
(ii)	B	OBJ-AGR	A
(iii)	C	CLASS	A and B

Insofar as this sensitivity is to particular Object-Agreement and Subject-Agreement properties (or features), rather than to the categories of Object-Agreement and Subject-Agreement as a whole, then Bobaljik's view of outward sensitivity is supported. However, two considerations weaken this apparent support. Firstly, the sensitivity exhibited at C is not sensitivity in the realization of a morphosyntactic property (2nd Person, say); rather, it is sensitivity in the realization of an arbitrary lexical property (membership of inflectional Class II). The allomorphy exhibited at C is therefore outside the scope any theory specifically concerned with the realization of inflectional properties, though it may fall within the scope of a theory of the distribution of stem alternants (e.g. Cameron-Faulkner and Carstairs-McCarthy 2000; Carstairs-McCarthy 2001). Secondly, the only putative Object-Agreement property at B which is sensitive to material at A is the 3rd Person; and, as Bobaljik (2000: 41) himself says, citing Benveniste (1956), there is a 'not unfamiliar assumption' that '3rd "person" objects lack person features'. If so, what occupies position B in '3rd Person Object' forms is not a realization of the Person of the object but rather a discontinuous realization (along with the prefix at A) of the Person of the subject, perhaps combined with a realization of the Number of the object. Thus neither the allomorphy at C nor that at B is unequivocally parallel to the allomorphy displayed in the realization of 2nd Singular in Pseudo-Hungarian above. Moreover, Itelmen supplies the sole purported instance of outward sensitivity to an individual morphosyntactic property that Bobaljik discusses in any detail.² It therefore seems

² Bobaljik also mentions a purported Bulgarian instance, citing Stump (1997).

However, Stump's analysis relies on positing a zero suffix as one of the outwardly-sensitive alternants. It is hardly a clearcut example of the phenomenon, therefore, since

legitimate to set the Itelmen data to one side, and continue exploring the hypothesis that the uniformity of Plural marking exhibited in actual Hungarian Possessor-marked forms is not accidental.

4. Inward sensitivity

A canonical example of inward sensitivity, cited by Carstairs (1987), involves the Person-Number suffixes of the Perfective Present Active Indicative in Latin (traditionally called the ‘perfect’). In nearly all Latin verbs, Perfective Aspect is expressed unambiguously by a suffix such as *-u*³ or *-s-* immediately after the stem (*ama:-u-* ‘have loved’ from *ama:-*, *scri:p-s-* ‘have written’ from *scri:b-*), or by a uniquely Perfective stem alternant (e.g. *e:g-* ‘have driven’ from *ag-*, *momord-* ‘have bitten’ from *morde:-*). Any further signalling of Perfective Present Indicative by means of Person-Number suffixes after the Perfective suffix or stem alternant will therefore be an instance of ‘pure’ inward sensitivity, in the sense of Carstairs (1987). This pure sensitivity is demonstrated in the Person-Number forms shown at (9), where suffixes peculiar to the Perfective Present Indicative are contrasted with those that appear in other Active non-Imperative contexts:

the affixal material could be analyzed at least as plausibly, if not more plausibly, as involving simultaneous exponence of the ‘inner’ and ‘outer’ properties. The sensitivity involved is therefore not ‘pure’ in the relevant sense.

³ Latin examples are cited in the standard orthography but with a colon to indicate vowel length. The symbols *i* and *u* may represent either glides ([j] and [w]) or vowels ([i] and [u]).

(9)	Perfective Present Indicative	Elsewhere
1st Singular	-i:	-o:, -(i)m
2nd Singular	-isti:	-(i)s
2nd Plural	-istis	-(i)tis
3rd Plural	-e:re, -e(:)runt	-(u)nt

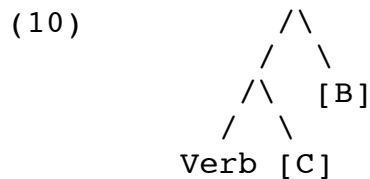
The analysis implied in the ‘Elsewhere’ column is justified as follows (Carstairs-McCarthy 1998: 17). The suffixes *-m*, *-s*, *-tis* and *-nt* are accompanied by a vowel *i* or *u* except when the preceding suffix realising Tense or Mood terminates in a vowel, or when there is a ‘theme vowel’ indicating arbitrary inflection class, as in the Imperfective Present Indicative. Thus, for example, the 2nd Singular Imperfective Future Indicative *ama:-b-is*, with *-is*, contrasts with the 2nd Singular Imperfective Past Indicative, or ‘imperfect’, *ama:-ba:-s*, the 2nd Singular Perfective Past Subjunctive *ama:-u-isse:-s*, and the 2nd Singular Perfective Present Subjunctive *ama:-u-eri-s*, all of which have *-s*. The precise phonological analysis does not matter for present purposes; what matters is that there is no motivation for more than a single ‘elsewhere’ exponent of Person-Number except in the 1st Singular.

In Bobaljik’s framework, inward sensitivity such as this, to a property (Perfective) that has already been realized or ‘discharged’, is impossible. But, in view of these Latin facts, his framework is clearly too restrictive.⁴ Consider how the Latin situation looks in

⁴ It is natural to ask whether Bobaljik (2000) has an alternative analysis to propose for these well-known Latin facts; but he chooses not to discuss them. Instead, he criticizes Carstairs’s (1987) analysis of a superficially similar phenomenon in Turkish. But, even if

terms of the sort of schematic presentation that Bobaljik uses for Itelmen at (7) and (8).

There is no prefixal position A, but for ease of comparison we may continue to use B and C to label two suffixal positions. Ignoring Tense and Mood for the moment, the analysis is as follows:



The affixes at positions B and C are both show inward sensitivity, thus:

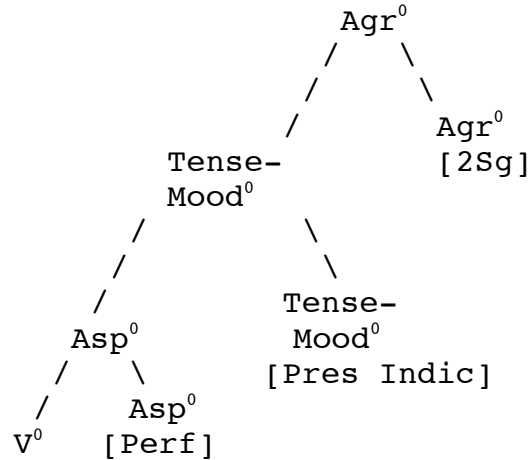
(11)	Position	Exponent of:	Sensitive to:
(i)	(A is absent in Latin)		
(ii)	B	PERS/NUM	C
(iii)	C	ASPECT	Verb root

Sensitivity on the part of the Perfective suffix at C to the verb root is lexical rather than morphosyntactic, and therefore permitted in Bobaljik's framework. On the other hand, the kind of sensitivity that Person-Number affixes at B display towards the Perfective aspect realized (typically) by suffixes at C is forbidden.

A more precise picture, incorporating Tense and Mood, can be presented in terms of the sort of tree diagram illustrated at (2) and (6). The morphosyntactic structure of a form such as the 1st Singular Perfective Present Indicative *ama:-u-isti*: 'you have loved' can be represented as follows:

this criticism is valid (an issue that I will leave on one side here), it does not affect the argument in relation to Latin.

(12)



Here the choice of *-isti* as the realisation of 2nd Singular is influenced both by Perfective (contrast the 2nd Singular IMPERFECTIVE Present Indicative *ama:-s*) and by Present Indicative (contrast the 2nd Singular Perfective Present SUBJUNCTIVE *ama:-u-eri-s* and the 2nd Singular Perfective PAST Indicative, or ‘pluperfect’, *ama:-u-era:-s*).⁵

This kind of inward sensitivity to individual properties is consistent with Carstairs’s (1987) framework. However, while Bobaljik’s framework is insufficiently permissive here, Carstairs’s may be too permissive, as we will see directly in section 5.

5. Sensitivity between ‘ancestors’ and ‘descendants’: a Latin illustration

While Bobaljik’s framework fails to fit the facts, being too permissive in respect of outward sensitivity and too restrictive in respect of inward, it has a merit that Carstairs’s (1987) account clearly lacks: it seeks to explain, rather than merely describe, what is

⁵ I have not teased Tense and Mood apart here, because there is no morphological evidence in Latin to place one higher in the tree than the other. The issue is not important for present purposes.

going on. In this section I will suggest an approach that respects the empirical accuracy of Carstairs's observations while suggesting an explanation for them that, though different from Bobaljik's, exploits the sort of morphological tree structure, inspired by Distributed Morphology, that he favours.

As a first step towards this explanation, I need to present more information about Person-Number suffixes in Latin. Among the limited data presented at (9) are three 1st Singular suffixes and two suffixes each for 2nd Singular, 2nd Plural and 3rd Plural. Let us refer to the set of Person-Number suffixes used in any one Aspect-Mood-Tense combination as a *screeveshape*.⁶ The theoretical maximum number of *screeveshapes* consistent with the data in (9) is therefore 24 ($3 \times 2 \times 2 \times 2$), and if information were included on the 3rd Singular and 1st Plural (absent from (9)), the maximum could well be higher. However, the number of *screeveshapes* that actually occur in Latin Active verbforms is only three, as illustrated at (13):

⁶ This term, introduced by Carstairs-McCarthy (1998), is derived from the term 'screeve' adopted by Aronson (1982), following Georgian grammatical terminology, to denote a set of verbal forms that share all morphosyntactic characteristics except those of Person and Number. Traditionally the term 'tense' is sometimes used loosely in this sense; but it is obviously not ideal to refer to (say) the Present Indicative and the Present Subjunctive as distinct 'tenses'. Notions analogous to 'screeveshape' can clearly be envisaged outside verbal morphology: for example, a set of adjectival forms that share all morphosyntactic properties (e.g. of Comparison, Gender and Number) except those of Case. However, within the confines of this article I will restrict the discussion to *screeveshapes* in the verbal sense.

(13)		i-shape	m-shape	o-shape	
	Sg	1	-i:	-(i)m	-o:
		2	-isti:	-(i)s	-(i)s
		3	-(i)t	-(i)t	-(i)t
	Pl	1	-(i)mus	-(i)mus	-(i)mus
		2	-istis	-(i)tis	-(i)tis
		3	-e:re, -e(:)runt	-(u)nt	-(u)nt

The affixes for each of the six paradigmatic cells in (13) fall into two categories: those (in boldface) that are peculiar to one screeveshape and can therefore serve to identify it ('screeveshape-identifiers'), and those that occur in all screeveshapes except ones containing a screeveshape-identifier ('screeveshape-defaults'). What we do not observe is a third conceivable category: affixes that are neither screeveshape-identifiers nor screeveshape-defaults, and which are therefore 'blurred' in the terminology of Carstairs (1994). I have argued elsewhere (Carstairs-McCarthy 1998) that this striking gap supports extending the notion of 'blur avoidance' outside the domain of inflection classes, and thus confirms the importance for morphological theory of paradigmatic relationships between wordforms. Screeveshapes, like inflectional classes, are not mere accidental byproducts of how individual affixes are distributed, but play a central role in linguistic competence as it affects inflectional allomorphy.⁷

⁷ One might argue that, given the role of theme vowels in inflection class identification (Carstairs-McCarthy 1994), a fourth screeveshape needs to be added at (13), differing according to inflection class. For example, for the first conjugation, this extra screeveshape would consist of *-o:*, *-a:s*, *-at*, *-a:mus*, *-a:tis*, *-ant*. But that would not affect the

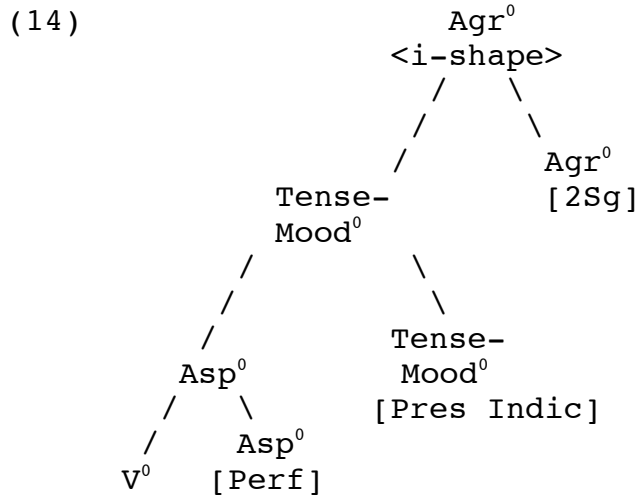
The relevance of this to the Latin situation is as follows. Nothing in Carstairs's (1987) account requires that the individual Person-Number suffixes that show sensitivity inwards to Perfective should belong to a pattern of screeveshapes with the blur-avoiding characteristics of (13). For example, Carstairs's account is consistent with possibility that the repertoire of screeveshapes in Latin should include a fourth screeveshape, exactly like the m-shape of (13) except in having *-isti:* instead of *-(i)s* as the realization of 2nd Singular. In this Pseudo-Latin, just as in actual Latin, the realization of 2nd Singular in *ama:-u-isti:* 'you have loved' would involve inward sensitivity to the Perfective Aspect, as illustrated in the tree structure at (12). Indeed, in a description of Pseudo-Latin, nothing in (12) would need to be changed. However, Pseudo-Latin would violate the expectation of blur avoidance, because *-isti:*, shared by the i-shape and the new hybrid screeve-shape, would be shared by two screeve-shapes, just like *-(i)s*, shared (still) by the m-shape and the o-shape.

It seems, then, that the representation at (12) omits a crucial factor. It is not that the 2nd Singular on its own is sensitive to Perfective; rather, it is that Perfective contexts (more precisely, Perfective Present Indicative contexts) require the selection of a whole screeveshape, namely the i-shape. Yet a screeveshape is not an affix, or, in Distributed Morphology terms, a vocabulary item. In a tree such as (12), one cannot insert the whole i-shape at the terminal node labelled [2Sg], where one might insert the individual suffix *-isti:*. But that does not mean that there is no node in (12) with which the i-shape can naturally be associated. In fact, its natural link is with the parent of the [2Sg] node, argument, because all these suffixes except *-o:* would be screeveshape-identifiers, and *-o:* would be a screeveshape-default.

namely the upper of the two Agr^0 nodes, at the root of the tree. The effect of linking this upper Agr^0 node with the i-shape is to predict that what the Perfective Present Indicative imposes is not merely an idiosyncratic realization for an individual Person-Number combination (or individual value of Agr^0), such as 2nd Singular, but rather a pattern of realization for all Person-Number combinations in terms of just one of the small repertoire of screeveshapes that Latin turns out to have, as illustrated at (13). And this prediction is correct.

The idea of inserting not an affix at a terminal node but rather a screeveshape (or set of morphosyntactically related affixes) at a preterminal node is new. It represents a departure from convention in terms of all currently familiar approaches to morphology: ‘bottom-up’ approaches, where the meanings of individual affixes percolate upwards so as to fill in plus and minus values in a categorial signature (Lieber 1992), or ‘top-down’ approaches, where individual morphosyntactic property combinations are spelled out by word formation rules (Anderson 1992; Stump 2001), or hybrid approaches, such as the Distributed Morphology that Bobaljik favours, where an individual morphosyntactically specified terminal node is filled by the affix whose morphosyntax provides the closest available fit. What all these approaches have in common, despite their evident differences, is captured by the word ‘individual’ that recurs in my summaries of them. But, if the paradigmatic relationships between elements within a screeveshape are as important as I have suggested, it will not be surprising if a need emerges for representations of syntagmatic structure in morphology, such as the trees at (2), (6) and (12), to be linked to screeveshapes.

At (14) is a revised version of (12) in which the i-shape is associated with the upper Agr⁰, as suggested.



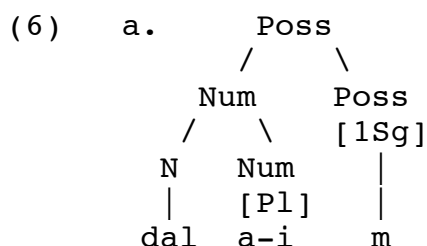
The angle brackets enclosing <i-shape> here are a device to draw attention to the fact that ‘i-shape’ is neither a morphosyntactic node label, like Agr⁰, nor a combination of morphosyntactic properties (or feature values), like [2Sg]. What is important about (14) is that it suggests a fundamental similarity, in terms of ‘ancestry’ or dominance, between how inward sensitivity operates in the Latin Perfective forms and how outward sensitivity operates in the Hungarian Plural Possessed forms.

Notice in (14) the structural relationship between the node with which <i-shape> is associated and the nodes at which Perfective and Present Indicative are located. The former dominates the latter, in that the Agr⁰ node is the ‘great-grandmother’ of Perfective and the ‘grandmother’ of Present Indicative. Contrast this with the structural relationship that Perfective and Present Indicative have with the [2Sg] node: [2Sg] is not a direct ancestor of either, but is rather an ‘aunt’ or ‘great-aunt’. If, as I have argued, Perfective and Present Indicative do not impose the [2Sg] realization *-isti*: directly but only indirectly, via its membership in the i-shape, then the Latin data are consistent with

saying that grammatical conditioning of allomorphy operates only in terms of direct ancestry ('(grand)mother-(grand-)daughter' relationships), not in terms of collateral relationships (between '(great-)aunts' and '(great-)nieces').

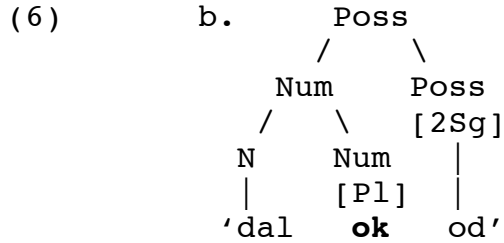
6. Sensitivity between 'ancestors' and 'descendants': a Hungarian illustration

The proposed constraint involving ancestry is compatible with Hungarian too, but not with the Pseudo-Hungarian that Bobaljik's framework permits, as discussed in section 3. In actual Hungarian, it will be recalled, the usual Plural suffix *-ok* is replaced by *-a-i-* when any Possessor suffix follows, as shown in (5). At (6a) I illustrated in terms of a Bobaljik-style tree the structure of the form *dal-a-i-m* 'my songs', thus:



Notice now what can and cannot affect the realization of Plural here, in terms of our proposed constraint about ancestry. Plural is permitted to be sensitive to its 'grandmother' Poss(essor), but it cannot be sensitive to its 'aunt' [1Sg]. In other words, our constraint predicts that, if the realization of Plural displays outward sensitivity in any Possessor context, it must display the same sensitivity in all such contexts.

Consider now the tree at (6b), which represents not the actual Hungarian form *dal-ai-d* 'your songs' but a Pseudo-Hungarian form '*dal-ok-od*', preserving the usual Plural suffix *-ok*:



Let us continue to assume that in Pseudo-Hungarian, as in actual Hungarian, the form for 'my songs' is *dal-a-i-m*; that is, the replacement of *-ok* by *-a-i-* occurs in only some Possessor contexts, not others. In Pseudo-Hungarian, therefore, by contrast with actual Hungarian, we cannot attribute the choice of *-ai-* in *dal-ai-m* to its grandmother Possessor; instead, it must be due to its aunt [1Sg]. But that is precisely what our proposed constraint on ancestry in relation to grammatical conditioning forbids. If correct, therefore, our constraint (unlike Bobaljik's framework) supplies a reason why things should be as they are in actual Hungarian rather than Pseudo-Hungarian.

There is a further aspect of the Hungarian data that at first sight seems to count against the analysis proposed here, but on closer examination appears neutral or even supportive. Comparison of the forms at (4) ('my song', etc.) and (6) ('my songs', etc.) shows that the Possessor suffixes are identical (subject to allomorphy conditioned by a preceding vowel), except in the 3rd Singular Possessor forms. On the strength of *dal-a* meaning 'his/her song', we might expect the form for 'his/her songs' to be **dal-a-i-a*. (There is nothing phonologically odd about such a string of vowels in Hungarian, which tolerates a six-syllable word such as *barátjaiéi* 'ones belonging to his friends'.) However, the actual form is *dal-a-i*, with (apparently) no overt suffix realizing 3rd Person Singular.

One possibility is that the realization of 3rd Person Singular displays inward sensitivity: zero in Plural contexts, *-a* elsewhere. But this kind of inward sensitivity,

displayed by an individual property rather than by a whole category, is precisely the kind that should not occur—at least on the basis of my discussion of Latin in section 5. But there is a second possibility: that there is no overt realization of 3rd Singular Possessor with nouns in any context, whether Plural or Singular. In that case, the *-a* of *dal-a* ‘his/her songs’ must be analysed as meaning not ‘3rd Singular Possessor’ but something like ‘unspecified Possessor’. At first sight, this may look like a trick with no independent motivation to protect my claim about inward sensitivity from disconfirmation. But a fact that we have already noticed supplies some independent motivation for it. If the *-a* of *dal-a* indeed realizes ‘unspecified Possessor’ (interpreted as 3rd Singular by default), then its appearance in the Plural Possessed forms *dal-a-i-m*, *dal-a-i-d* etc. becomes less mysterious. Something still needs to be said about why ‘unspecified Possessor’ is expressed in all the Plural Possessed forms but in only one of the Singular ones: perhaps a rule of referral or ‘take-over’ needs to be invoked (Zwicky 1985; Carstairs 1987), replacing in Plural Possessed contexts a plain nominal node (such as the N dominating *dal* in (6a)) by a node with an unspecified Possessor as its sister. It is noteworthy, perhaps, that such a referral would not need to refer to any morphosyntactic information outside the chain of ancestors and descendants. For present purposes, however, what matters most is that this complication does not tend to favour Bobaljik’s approach over mine.

7. Conclusion

The appeal to tree structure in sections 5 and 6 supplies a natural and, I think, satisfying explanation for why inward sensitivity should be to individual properties while outward sensitivity should be only to whole categories. Inward sensitivity is sensitivity to ‘descendants’, which include terminal nodes at which individual properties reside; on the other hand, outward sensitivity is to ‘ancestors’, which by definition cannot include nodes that are terminal. Equally, however, inward sensitivity cannot be displayed by terminal nodes, which have no descendants; instead, it must be displayed by nonterminal nodes, whose realization is necessarily described in terms of screeveshapes (or their non-verb equivalents) rather in terms of individual affixes. We will therefore expect the operation of inward sensitivity to respect everywhere constraints on screeveshape organization (in particular, blur avoidance), just as it does in Latin.

There is one further difference to be noted between the Latin forms at (14) and the Hungarian forms at (6a). In (6a), only one kind of conditioning operates, namely ‘downward’ from Possessor to its grand-daughter Plural. In (14), however, two kinds of conditioning operate: ‘upward’ from Perfective and Present Indicative to the nonterminal Agr (or Person-Number) node, imposing the choice of the *i*-shape to realize it, and ‘downward’ from Person-Number to 2nd Singular, inasmuch as the stipulation <*i*-shape> imposes the choice of *-isti:* rather than *-(I)s*. Inward sensitivity is thus, in a sense, a more complex phenomenon than outward—but, thanks to the efficiency with which languages distribute inflectional material among blur-avoiding inflection classes and screeveshapes, this complexity is obscured.

This article began by posing the question: does grammatical conditioning operate outward, or inward, or sometimes in one direction and sometimes in the other? As often

happens, the conclusion that we have reached does not answer that question in so many words. Instead, constraints on the direction of conditioning emerge as byproducts of constraints on ‘ancestry’, as follows:

(14) Ancestry Constraint on inflectional sensitivity:

The inflectional realization associated with a given word-structure node can be sensitive to inflectional characteristics associated with ‘ancestors’ and direct ‘descendants’ of that node, but not to characteristics associated with collateral nodes (‘sisters’, ‘aunts’, ‘nieces’).

The phrase ‘inflectional characteristic’ is chosen to embrace both morphosyntactic categories and properties, like Possessor or [2Sg], and screeveshapes, such as <i-screeveshape>. The phrase ‘inflectional realization associated with a given word-structure node’ is chosen to allow for the possibility both of the familiar kind of realization, whereby a single morphosyntactic property or combination of properties is linked at a terminal node with a single affix, and of a less familiar kind, whereby a non-terminal node is linked to a set of affixes (e.g. a screeveshape). At first sight, these two realizational possibilities may seem to render the Ancestry Constraint consistent with an undesirably large range of conceivable inflectional behaviour. However, the constraints that blur avoidance imposes on inflection class systems and on screeveshapes turn out to contribute to quite precise, and therefore falsifiable, expectations about what should and should not happen in the domain of syntagmatic inflectional conditioning too. This is especially welcome because inquiries into the syntagmatic and paradigmatic dimensions of inflectional morphology have too often tended to proceed independently. This is certainly true of my own earlier work (Carstairs 1987), where there is little cross-

reference between the chapters on paradigm structure and those on syntagmatic constraints.

If the analysis proposed here is broadly correct, we must reject one aspect of Stump's (2001) framework for inflectional morphology: his denial of word-internal hierarchical structure of the kind expressed here by means of tree diagrams. That does not mean, however, that we must go to the opposite extreme of treating all morphology as a kind of syntax, as Lieber (1992) does. Stump's objection to this, on the ground that it cannot be readily reconciled with multiple exponence, remains strong. What we have to recognize, however, is that capturing what can and cannot happen in inflectional morphology is likely to be impossible in any theoretical approach that places a high value on homogeneity.

Mention of syntax makes it natural to ask how the Ancestry Constraint, as a structural restriction, relates to the more familiar structural relations that appear in syntactic discussions, such as c-command. Interestingly, there appears to be no close parallel. In particular, relationships between aunts and nieces, such as (in Government-and-Binding terms) that between the specifier of a phrase and its head, are extremely prominent in syntax. Should that lack of parallelism discourage us? I think not. Human language has evolved to possess two substantially different kinds of grammatical structure, syntactic and morphological, and paradigmatic relationships in particular play a more prominent role in the latter than the former. Why this should be so is a mystery that deserves high priority on the research agenda of linguists in the twenty-first century.

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