

TENSE AS A NOMINAL CATEGORY

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Abstract

Recent work in morphology in LFG (Nordlinger 1998, Sadler 1998, Barron 1998) has highlighted the fact that NPs in some languages inflect for the traditionally verbal categories of tense, aspect or mood (henceforth TAM). This phenomenon is extremely problematic for head-driven approaches such as HPSG, which assumes that clause-level information will be associated with clausal heads, and not with nominal arguments or adjuncts. In this paper we show first that the phenomenon of TAM-inflected nominals is well established and not typologically marginal. We discuss data from a range of typologically diverse languages and show that such data cannot simply be reanalysed to fit head-driven approaches, but demand an analysis in which clause-level information such as TAM is directly contributed by nominal arguments. We then go on to show how the correspondence architecture of LFG, and particularly the constructive morphology approach currently being developed within it (Nordlinger 1998, Sadler 1998, Barron 1998, Sells 1998, Lee 1999, Sharma 1999) permits a simple and natural analysis of these data, which are extremely problematic for other formal approaches. This approach not only provides an explanatory account for the cross-linguistic phenomenon of tense as a nominal category, but also highlights one of the strengths of LFG in contrast with head-driven frameworks.

1 Introduction

¹ Recent work in morphology in LFG (Nordlinger 1998, Sadler 1998, Barron 1998) has highlighted the fact that NPs in some languages inflect for the traditionally verbal categories of tense, aspect or mood (henceforth TAM). For example, in the Kayardild examples in (1) an argument of the embedded clause, *mala*, is inflected for TAM information (Evans 1995, Nordlinger 1998). The cases glossed M.PROP and M.LOC function as markers of tense and mood interacting with the verbal marking, as shown by the meaning contrast between (1a) and (1b), despite the fact that the verbal affix remains the same.

- (1) a. Ngada kurri-nangku mala-wu balmbi-wu.
 1.SG.NOM see-NEG.POT sea-M.PROP morrow-M.PROP
 'I won't be able to see the sea (tomorrow).' (Evans 1995:404, ex. 10-12)
- b. Ngada kurri-nangku mala-y barruntha-y.
 1.SG.NOM see-NEG.POT sea-M.LOC yesterday-M.LOC
 'I could not see the sea (yesterday).' (ibid., ex. 10-13)

A similar phenomenon is exemplified by the English example in (2), in which the non-syllabic reduced auxiliary is incorporated into the subject pronoun, which therefore contributes tense information to the clause (Sadler 1998):

- (2) You'll be leaving tomorrow.

Data such as these show clearly that nominal elements may define the clause level TAM information typically associated with verbal elements: in other words, they exemplify a particular type of mismatch between featural information content and syntactic category. This phenomenon is extremely problematic for theories which postulate a rigid relationship between syntactic form and featural content.

¹We are grateful to subscribers to the LINGTYP list for their input and also to Joan Bresnan, Ida Toivonen and Andy Spencer for discussion and comments.

Interestingly, it is also problematic for the head-driven approach of HPSG to accommodate both heads which morphologically incorporate into dependents (2) and cases in which dependents express clausal (head) information (1). The very architecture of HPSG builds in the assumption that clause-level information will be associated with clausal heads, and not with NP arguments and adjuncts, thus requiring this type of phenomenon to be reanalysed as involving head-dependent agreement or pronominal incorporation into auxiliary heads.

In this paper, we show first that the phenomenon of TAM-inflected nominals is well established and not typologically marginal, contrary to the claim made in (Bender and Sag 1999) that the phenomenon of subjects projecting tense is unattested cross-linguistically. We discuss data from a range of typologically diverse languages and show that such data cannot simply be reanalysed to fit head-driven approaches, but demand an analysis in which clause-level information such as TAM is directly contributed by nominal arguments. We then go on to show how the correspondence architecture of LFG, and particularly the constructive morphology approach currently being developed within it (Nordlinger 1998, Sadler 1998, Barron 1998, Sells 1998, Lee 1999, Sharma 1999) permits a simple and natural analysis of these data, which are extremely problematic for other formal approaches. This approach not only provides an explanatory account for the cross-linguistic phenomenon of tense as a nominal category, but also highlights one of the strengths of LFG in contrast with head-driven frameworks.

This paper is structured as follows. In section 2 we survey this phenomenon in a range of typologically diverse languages. In sections 3 and 4 we discuss the analysis that can be given to such data within the LFG model of constructive morphology, and the problems that these data pose for the head-driven framework HPSG. Finally in section 5 we address these differences more specifically through the discussion of Sadler's (1998) LFG analysis of reduced non-syllabic auxiliaries in English and the counter-analysis proposed by Bender and Sag (2000) in HPSG.

2 General Survey of the Phenomenon

The encoding of clause-level TAM information on dependent nominals, while having been virtually ignored by linguistic theory, is reasonably prevalent cross-linguistically, appearing in a variety of forms across typologically diverse and unrelated languages. In this section we demonstrate this with data from languages such as Sopyire (Niger-Congo), /Gui (Khoisan), Chamicuro (Arawak) and Pitta Pitta (Pama-Nyungan). While the details may differ, all of these languages share the property of morphologically encoding information about the tense, aspect or mood of the clause on dependent nominals (both arguments and non-arguments).

There are a number of other ways in which TAM information can come to be associated with nominals and nominal categories. For example:²

- (i) A language may have TAM clitics which can attach phonologically to nominals. This situation is found in Garrwa (Australia) (E. S Furby and C. E. Furby 1977) and Apurina (Arawak, Brazil) (da S. Facundes in progress).
- (ii) TAM affixes may appear on nominals to encode semantic features of the NP, e.g. chair-PAST means 'a former chair', chair-FUT means 'a future chair', etc. This use is found in some Amazonian languages, for example, such as Tariana (Aikhenvald 1999).
- (iii) Pronominal elements may incorporate into a tensed auxiliary. This can give the appearance of tense-

²We would like to thank the many LINGTYP readers who provided much of the language data on which this summary is based. In particular, we are grateful to Matthew Dryer for first identifying and distinguishing these different types of TAM-inflected nominals.

inflected pronouns while actually being a verbal category simply inflected for pronominal features of subject and possibly other arguments. This situation is found in Hausa and other Chadic languages, for example (Burquest 1986).

However, these possibilities do not pose the theoretical problems that we are interested in here. In the case of (ii), the TAM category is relevant only to the NP, and not to the whole clause, thus the fact that it is encoded on the NP is entirely appropriate. As for (i) and (iii), in neither of these situations is a dependent nominal inflected for TAM: in (i), the TAM marker is a clitic, a distinct syntactic element, which just happens to be realised phonologically on the dependent nominal; and in (iii) the tensed element is actually a verbal category which is inflected for the pronominal features of its subject. Thus, while these are all cases of nominals bearing TAM information, in none is the nominal actually inflected for the TAM category of the clause.

We have already seen in (1) two examples of dependent nominals inflected for clausal TAM. The Kayardild data is discussed in detail in Nordlinger (1998) (also (Evans 1995)) and so won't be discussed further here. The English data will be discussed in more detail in section 5. Many other languages of the world exhibit similar and related phenomena, as we will now see.

In the Niger-Congo language Supyire (Carlson 1994), first and second person pronouns have two distinct forms depending on whether the mood of the clause is declarative or non-declarative. The two sets of forms are shown in the table below (taken from Carlson 1994:152, 154).

	DECL.	NON-DECL.
1.SG	mìi	na
2.SG	mu	ma
1.PL	wùu	wu
2.PL	yìi	yi

The distinction between these two pronoun sets is shown in the following examples. Note that in (4b) and (4c) the distinction in mood is shown by the pronouns alone.

- (3) a. mìi ŋ~kùùŋi
my chicken.DEF
'my chicken' (Carlson 1994:152, ex. (1a))
- b. Mii à pa.
I PERF come
'I have come.' (ibid. ex. (1b))
- c. Mu a mìi kánhá.
You PERF me tire
'You have annoyed me.' (ibid, ex. (2b))
- (4) a. Ma ∅ pa.
you.NONDECL SUBJUNC come
'Come' (polite command). (Carlson 1994: 154, ex. (6a))
- b. Na wii.
me.NONDECL look.at
'Look at me.' (imperative) (ibid., ex. (7a))
- c. Na cevoo ŋ~kùu, taá ma kε-ε-gé ke?
my.NONDECL friend chicken where you.NONDECL go.IMPV LOC.Q
'My friend chicken, where are you going?' (ibid., ex. (7c))

In (3) we see the declarative pronouns in possessor, subject and object functions. In (4) we see the equivalent pronouns in the same functions in non-declarative sentences. While declarative pronouns can sometimes appear in non-declarative clauses, the reverse is not true: it would be totally ungrammatical for the first singular pronoun *na*, for example, to appear in one of the declarative clauses in (3). Furthermore, in examples like (4b), it is only by virtue of the pronoun that we know the clause is non-declarative at all. It is quite clear, therefore, that these pronouns carry (non-declarative) mood information for the clause.

A similar situation is found in /Gui [g|ui], a Central Khoisan language spoken in Botswana. In /Gui subject pronouns are usually in the nominative case (5), except for in imperative clauses, in which case they must appear in the distinct imperative form (6). As is clear in the contrast between (5) and (6), the verb remains in the same form in both sentence types: the imperative mood of the clause is encoded by the subject pronoun alone (Hitomi Ono, pc):

(5) Cire !koõ
1.SG.NOM go
'I go.'

(6) Da !koõ.
1.SG.IMP go
'Let me go.'

In Chamicuro, an Arawak language spoken in Peru, clausal tense information is encoded on the definite article which must usually accompany (definite) nominal subject and object arguments (Parker 1999). There are two forms of the definite article: *na*, used in present and future tenses, and *ka* which marks past tense. These articles do not bear stress, and Parker shows that they cliticize phonologically to C final, but not to V final, preceding words, a behaviour which is completely predictable on purely phonological grounds. These phonological enclitics semantically modify the following nominal (e.g. (9)).

(7) I-nis-kána na čamálo.
3-see-PL THE bat
'They see the bat.' (Parker 1999:552, ex. (2))

(8) Y-alíyo ka ké:ni.
3-fall THE(PAST) rain
'It rained' (the rain fell). (ibid., ex. (3))

(9) U-ʔ-yéʔ=na Pámpa Hermosa-šana.
1-go-FUT=THE Pampa Hermosa-LOC
'I will go to Pampa Hermosa.' (ibid., p. 554 ex. (9))

The tense contrast between these two forms is shown most clearly by the following pair of sentences, in which there is no independent tense marker on the verb. Thus, the tense contrast is encoded by the definite article alone.

- (10) a. P-aškalaʔt-ís=na čamálo.
2-kill-2.PL=THE bat
'You (plural) are killing the bat.'
- b. P-aškalaʔt-ís=ka čamálo.
2-kill-2.PL=THE(PAST) bat
'You (plural) killed the bat.' (Parker 1999:553, ex. 7, 8)

That these are indeed definite articles and not part of the verbal complex is shown by the fact that they appear within NPs:³

- (11) anáʔ=na čmešóna
 this=THE man
 ‘this man’ (ibid., p. 554, ex. (13))
- (12) Y-ahkašamustá-wa ka maʔpóhta ka maʔnáli
 3-scare-1.OBJ THE(PAST) two THE(PAST) jaguar
 ‘The two jaguars scared me.’ (ibid., ex. (14))

Thus, it is clear that these definite articles in Chamicuro, while belonging syntactically to dependent NP constituents, encode clause-level tense information.

Another variation on this same general phenomenon is found in the Australian language Pitta Pitta (Blake 1979), in which the case suffixes obligatorily attached to nominals in the clause additionally encode tense information. Furthermore, the case marking system differs dependent on the tense category encoded, as shown in the following table (taken from (Blake 1987): 59, see also (Nordlinger 1998) for discussion with the LFG framework).

	S	A	O	Inst
Non-Future	-∅	-lu	-nha	-lu
Future	-ngu	-ngu	-ku	-ngu

Thus, in future tense the case marking makes a nominative-accusative distinction, with subjects marked with *-ngu* and objects marked with *-ku* (which is also the dative case). In non-future tenses (past and present), on the other hand, there is a three way opposition between intransitive subject (*-∅*), transitive subject (*-lu*) and object (*-nha*). Note that this tense distinction is also encoded in the case suffixes of instrumental NPs, so it is not purely a property of core grammatical functions.

Examples illustrating the case alternations on subjects (13-14) and objects (15-16) include the following: ⁴

- (13) Ngamari karnta-ya ngartu-nga kankari-marru.
 mother(NOM) go-PRES nardoo-PURP knife-having(NOM)
 ‘Mother’s going for (to get) nardoo with a knife.’ (ex. 4.11)
- (14) Ngamari-ngu karnta ngartu-nga kankari-marru-ngu.
 mother-NOM.FUT go nardoo-PURP knife-having-NOM.FUT
 ‘Mother will go for (to get) nardoo with a knife.’ (ex. 4.13)
- (15) Ngamari-lu ngunytyi-ka ngali-nha mangarni-marru-nga-nha kathi-nha.
 mother-ERG give-PAST we.DU-ACC bone-having-GEN-ACC meat-ACC.
 ‘Mother gave us the doctor’s meat.’ (ex. 4.12)
- (16) Ngamari-ngu ngunytyi ngali-ku mangarni-marru-nga-ku kathi-ku.
 mother-NOM.FUT give we.DU-ACC.FUT bone-having-GEN-ACC.FUT meat-ACC.FUT.
 ‘Mother gave us the doctor’s meat.’ (ex. 4.14)

³In (12), the definite article appears twice within the NP: once before the numeral and once before the head noun, as is typical for Chamicuro NPs containing numerals and demonstratives (Parker 1999: 554).

⁴These examples are taken from Blake (1987: 59-60).

The contrasts between (13) and (14) and again between (15) and (16) show very clearly the interaction of case marking in Pitta Pitta with tense. In the future tense clauses in particular, in which the verb carries no tense inflection at all, it is only the form of the case markers that specify the tense of the clause.

In this section we have presented data from a wide range of typologically diverse languages demonstrating the fact that dependent NPs, including subjects, can and do provide TAM information directly to the clause. In fact, the languages that we have discussed constitute only a small portion of the total number of languages which exhibit this phenomenon. Other languages which space considerations prevented us from discussing here include: Lardil (non-Pama-Nyungan, Australia) (Hale 1997), Gurnu (Pama-Nyungan, Australia) (Wurm and Hercus 1976), Yag Dii (Niger-Congo, Cameroon) (Bohnhoff 1986), Sahidic Coptic (Egyptian) (Lambdin 1983), Gusiilay (Niger-Congo) (Raible to appear), Iai (Oceanic) (Tryon 1968), Tigak (Oceanic) (Elena Filimonova, pc) and Guaymi (Chibchan, Costa Rica and Panama) (Tom Payne, pc). The sheer number and typological diversity of languages in which this phenomenon is found argue strongly that it is by no means marginal. Rather the possibility that TAM information is directly contributed to the clause by dependent nominal arguments, must be accounted for within any theory of universal grammar.

3 LFG Analysis

The use of nominals to encode clause-level information, such as we saw at length in the preceding section, is dealt with simply and naturally within LFG's model of constructive morphology. Constructive morphology makes use of inside-out constraints (e.g. Halvorsen and Kaplan 1988, Dalrymple 1993, see also Andrews 1996:41-43) associated with the lexical elements or morphological processes to enable nominal constituents to define the larger syntactic (f-structure) context in which they are embedded. For example, the /Gui imperative subject pronoun in (5) would have associated with it the inside-out constraint in (17):

$$(17) \quad da \left((\text{SUBJ } \uparrow) \text{ MOOD} \right) = \text{IMP}$$

The inside-out designator (SUBJ \uparrow) in this constraint defines an f-structure containing a SUBJ attribute whose value is the f-structure of the pronominal (i.e. that designated by \uparrow). In other words it creates a larger f-structure within which the pronominal's f-structure is embedded as the SUBJ:

$$(18) \quad \left[\text{SUBJ} \left[\begin{array}{cc} \text{PRED} & \text{PRO} \\ \text{PERS} & 1 \\ \text{NUM} & \text{SG} \end{array} \right] \right]$$

Furthermore, this constraint also stipulates that the larger f-structure (that denoted by (SUBJ \uparrow)) has a MOOD attribute whose value is IMP. Thus, the complete f-structure constructed by the imperative subject pronoun *da* is that in (17).

$$(19) \quad \left[\begin{array}{cc} \text{MOOD} & \text{IMP} \\ \text{SUBJ} & \left[\begin{array}{cc} \text{PRED} & \text{PRO} \\ \text{PERS} & 1 \\ \text{NUM} & \text{SG} \end{array} \right] \end{array} \right]$$

Note that the MOOD information contributed by the subject pronoun has been unified into the outer f-structure, namely the f-structure for the whole clause. Thus, this model accurately captures the fact that such TAM information associated morphologically with (pro)nominals is, in fact, *clause-level* information, and not information relevant to the nominal host.

Although, as we will see below, an account can in principle be given of these cases of TAM inflected nominal arguments by postulating otherwise unmotivated nominal features and concord requirements, it seems to us that a more adequate account of these data is available in a theory whose description language includes inside-out statements. While inside-out function application is well-established in LFG through work in such areas as quantifier scope (Halvorsen and Kaplan 1988), anaphoric binding (Dalrymple 1993), internally-headed relative clauses (Culy 1990), Russian genitive of negation (King 1995), Urdu case (Butt 1995), case in Australian Aboriginal languages (Nordlinger 1998), and topicalization (Bresnan 2000), it is not generally assumed in HPSG (although both Breckenkamp (1996) and Koenig (1998) explore phenomena which lend themselves most naturally to inside-out formulations, and provide sketches of how they may be accommodated in specific description languages for HPSG). As Koenig (1998) shows, this rules out versions of the Kasper Rounds logic for HPSG since what is required is a description language in which you can refer to feature structures.

4 Problems for Head Driven Grammars

In contrast to the ease with which LFG's model of constructive morphology captures the encoding of clause-level TAM properties on subject and non-subject NPs, the expression of head properties on a dependent, especially on a subject, is highly problematic for HPSG. This is because the theory is strongly head-driven, and adopts what is essentially a constituent based theory of headedness. This means that it is committed to a single notion of syntactic head, grounded in the notion of categorial similarity. Under this view, heads can control for local properties of the elements which they subcategorise or otherwise select, and themselves uniquely determine the HEAD features of their mother, while dependents do not place constraints on the heads they combine with or the constructions within which they appear⁵. For example, a typical case of concord and index agreement within N might be treated by providing each (agreeing) element with its own intrinsic features, which are then shared or identified, either by specification in the lexical entry for the head, which can see into the dependent which it selects (as exemplified below), or, in principle, at the level of the construction or ID schemata.

⁵Where dependents select or co-select their syntactic heads, additional features are introduced: for example, adjectival modifiers will select nominal heads via a special MOD feature, and determiners co-select their heads via a SPEC feature: the general point, however, remains valid.

(20)

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Such an approach is reasonable in the (hypothetical) case where a nominal dependent of a verbal head is marked to agree with some TAM feature of the verbal head, but positing intrinsic TAM features for nominal dependents of verbal heads does not capture the intuition concerning the data discussed here, in which the nominal elements directly co-describe or constrain the TAM values of the clause (or verbal projection) within which it appears. In LFG, as we saw above, this can be achieved without positing TAM features within the f-structure of the nominal itself, an important facet of the analysis proposed in work on this phenomenon in LFG.

In the Supyire data of section 2 the choice of first and second person pronouns depends on the mood of the clause (see examples (3) and (4) above). To view this in a head-driven fashion, we must first assume a declarative/nondeclarative distinction inherent to the pronominal system, expressed either in the signature (by recognising subtypes of the type *noun* or in the theory by reference to specific (dedicated) feature, for example, DECL. For concreteness, we suppose the latter.⁶ Then the head must be specified to share its own DECL feature with that of its dependents: this can be expressed in a lexical entry similar to that in (20) above. However there are two further issues. Firstly, although the distinction is *only* relevant to pronominal arguments, as a consequence of the feature sharing or concord analysis along the lines shown above, all nominal arguments must be provided with a DECL feature (and given that the distinction is not always marked in the verbal element, the requirement that linguistic objects be totally well-typed and sort-resolved seems to necessitate also the declaration of a default value for DECL). Secondly, examples such as (4c) show that within a clause the arguments of arguments of the verbal head (here, the possessor within NP) also code clausal distinctions of mood, if pronominal. This requires a significant degree of feature percolation on the head-driven, concord based view of the phenomenon: as well as being shared between verbal heads and their arguments, the HEAD feature DECL must be shared between nominal heads and their arguments.

In sum, then, an HPSG analysis of this phenomenon appears to require the postulation of (a) a HEAD feature DECL on (at least) nominal and verbal heads, including those heads for which the distinction is not signalled by any morphology; (b) an assumption that DECL defaults to + (or -); (c) explicit encoding in lexical entries of DECL concord (by feature sharing) within NP and within the clause.

This is somewhat clumsy, although clearly workable in principle. More importantly, it misses the point, which is that the pronominal element directly contributes clausal information which we do not want to associate with the nominal projections. It is not yet clear to us whether in Supyire distinctions of mood are

⁶For the purposes of illustration, we assume that the shared feature is a syntactic feature, that is, one which would be represented in the CAT value rather than the CONTENT values. Nothing hangs on this detail.

ever made on the verbal head. If they are, then this at least potentially motivates the feature DECL as a verbal HEAD feature. However, the /Gui data in (5) and (6) illustrate further why a concord analysis along these lines is less than satisfactory. In this language, the verb itself does not code the distinction between declarative and imperative, which is encoded by choice of *subject* pronoun alone.

With the Kayardild data in (1), the feature passing approach is even more problematic. In this data, certain TAM features are verbally marked and a complementary set are nominally marked. Together they define the TAM properties of the clause. Under a feature passing/sharing view we are committed to treating distinctions which are never verbally introduced as though they might be.

Finally, we should also mention the analytic difficulties posed by the existence of TAM marking on a variety of adjunct nominals. This is illustrated for Kayardild in (1), and is also found in Pitta Pitta. True adjuncts are not visible to heads. It is not easy to see how any plausible argument could be made that the full range of adjuncts, whether syntactically selected or not, and including those such as *balmbi*- “tomorrow” and *barruntha*- “yesterday” in (1), should be taken to be complements (and therefore visible to heads on the COMPS and ARG-ST lists), rather than adjuncts. TAM marking on adjuncts is therefore problematic for a head-driven approach to the phenomenon.

Given the difficulties posed for HPSG in providing a natural and explanatory account of the marking of clausal head properties on dependent nominals, it is not surprising that recent work within the framework has attempted to claim that such phenomena are not attested empirically (Bender and Sag 1999).⁷ In contrast, we showed in section 2 that, although virtually ignored in the theoretical and typological literature, this phenomenon is in fact well-attested cross-linguistically, appearing in a number of typologically and genetically diverse languages. In the languages discussed so far, the nominal TAM marking takes the form of a distinction in the pronominal system, a case marker attached to the nominal or nominal group or a distinction in the form of the article. We have shown that a concord-based approach, such as is available within HPSG, fails to capture the central insight (direct and independent contribution by the dependent nominals of clausal properties), and leads to the postulation of otherwise unnecessary distinctions (such as the distinction between DECL+/- nonpronominals in Supyire). It is therefore legitimate to ask why the analysis of this well-attested, though little studied, phenomenon is problematic in HPSG, while relatively straightforward in LFG.

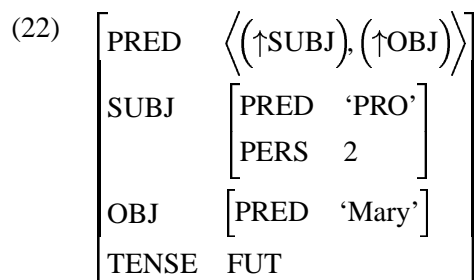
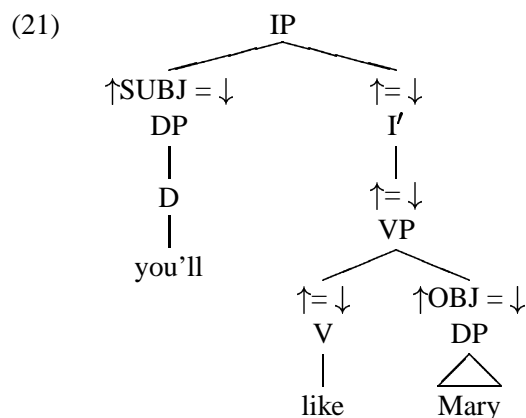
There are several fundamental distinctions between LFG and HPSG. In HPSG, constituent structure (or tectogrammatical structure) has a centrality which it does not occupy in LFG. While LFG relativises the notion of head to the level of linguistic description, in HPSG it is largely the case that the constituent structure head is the head of the construction. Furthermore, the notion of syntactic head is fundamental to much of the mechanics of HPSG - principles such as the Head Feature Principle and the Subcat Principle (Pollard and Sag 1994) and more recent additions such as the set of Lexical Amalgamation principles depend on a constituent structure based notion of syntactic head for their operation. This means that the notion of categorially defined syntactic head is much more important in HPSG than LFG.

The centrality of headedness is seen, for example, in the head-driven approach to concord above. In this view of the world, heads can see and constrain their arguments, but arguments cannot directly constrain their heads, or the constructions in which they occur. However, as we saw in the LFG analyses in section 3, this is exactly what is required for an accurate account of TAM-inflected nominals, suggesting that the descriptive metalanguage of HPSG must be extended to permit dependents to constrain their heads/constructions.

⁷Bender and Sag (1999) argue that all apparent instances of this phenomenon can be reanalyzed as either head-dependent agreement, or pronominal incorporation. In fact, none of the examples we present in this paper could be reanalyzed in this way without substantially altering or skewing the empirical facts.

5 English Reduced Auxiliaries and Head Driven Grammars

A more radical challenge to head driven grammatical models is provided by recent LFG analyses of English reduced auxiliaries in Sadler (1998) and Barron (1998) as tense-inflected pronominals. These analyses follow the insight of Spencer (1991) who argues on morphological and phonological grounds that nonsyllabic reduced auxiliaries (such as *you'll*, *we've*) form a morphological unit with the pronominal form to which they are attached. Accepting these arguments, Sadler (1998) provides an analysis of such morphologically complex, tense-inflected pronouns in LFG (and Sadler's analysis is adopted in Barron (1998), who gives further arguments for the conclusion that nonsyllabic reduced auxiliaries are pronominal inflections, and shows how the lexicalist analysis accounts for facts taken by Radford (1998) to argue in favour of a movement analysis). The lexical entry for e.g. *you'll* involves an inside-out constraint as shown below, and the constituent structure lacks an I node:



- (23) *you'll*: ($\uparrow \text{PRED}$) = 'PRO'
 ($\uparrow \text{PERS}$) = 2
 ((SUBJ \uparrow) TENSE) = FUT

The inflected pronoun contributes constraints over both the f-structure corresponding to the entire sentence, and the SUBJ f-structure. This analysis is possible in LFG because the mapping between c-structure and f-structure is defined in such a way as to accommodate divergences in headedness between functional and constituent structures.

Motivated primarily by the difficulties we have already seen for HPSG in adopting a similar analysis of this data - namely, an analysis which treats these auxiliaries as tense-inflected pronominals - Bender and Sag (2000) argue against Sadler's (1998) approach, and present an alternative analysis that fits more readily into the head-driven framework of HPSG.

Bender and Sag accept the arguments that these forms are morphologically derived, and thus constitute single syntactic atoms or *words*. Under their HPSG analysis, however, these elements are verbs which incorporate pronominal arguments, rather than pronominals which incorporate tensed verbal heads.⁸

As Bender and Sag note, the two analyses are largely equivalent in terms of account for the data under discussion. The driving force behind this re-analysis is the fact that the incorporation of heads into dependents is ruled out by the ‘head-driven’ nature of HPSG, in which a large number of principles are formulated in terms of the notion of syntactic head (which is itself essentially based on a notion of constituent structure head). These principles include the Valence Principle and the Head Feature Principle.

The analysis is formalised by Bender and Sag by means of a lexical rule of Pronominal Incorporation which operates at the level of the *word*, taking two lexical entries as input (one with a SS|LOCAL value of type *pr-local*, appropriate for pronominals and the other with the HEAD features of a finite auxiliary) and outputting a third. In the output, the incorporated pronominal is constrained to have a SYNSEM value of type *affix* and the SUBJ feature is the empty list ([1] and [2] refer to the PHON values of the input, [3] is the LOCAL value of the pronominal and [4] the HEAD features of the input auxiliary verb).

$$\begin{array}{l}
 (24) \quad < \left[\begin{array}{l} \text{PHON} \quad \langle [1] \rangle \\ \text{SS | LOC} \quad [3] \text{pr-local} \end{array} \right]_{\text{word}}, \left[\begin{array}{l} \text{PHON} \quad \langle [2] \rangle \\ \text{HEAD} \quad [4] \\ \text{ARG-ST} \quad [5] \end{array} \right]_{\text{word}} \left[\begin{array}{l} \text{AUX} \quad + \\ \text{VFORM} \quad \text{fin} \end{array} \right]_{\text{verb}} > \\
 \Rightarrow \left[\begin{array}{l} \text{PHON} \quad \text{FP1}(\langle [1] [2] \rangle) \\ \text{SUBJ} \quad \langle \rangle \\ \text{HEAD} \quad [4] \\ \text{ARG-ST} \quad [5] \left\langle \begin{array}{l} \text{LOC} \quad [3], \dots \end{array} \right\rangle \end{array} \right]_{\text{affix}}
 \end{array}$$

The HPSG analysis, then, essentially assimilates the phenomenon to the well-known phenomenon of pronominal incorporation. Although technically workable, we believe there are several strong arguments against such an analysis.⁹ There are several reasons to doubt the identification of these data with the phenomenon of pro-drop. For a start, standard English does not elsewhere generally permit pronominal incorporation.¹⁰ If this is pro-drop, it is not clear why pronouns incorporate *only* into the reduced forms of the auxiliaries, and why only into auxiliary verbs (rather than, for example, all tensed verbs).

Furthermore, note that the analysis is less than natural from a morphological point of view. Firstly, the element which has reduced morphology, the auxiliary, is taken to be the head of the morphological construction, while the element which is unreduced, the pronominal, is taken to be an affix. In well established cases of pronominal incorporation, however, it is clearly the pronominal which has reduced morphology (as

⁸Bender and Sag (2000) are correct in observing that the tensed pronoun proposal of Sadler and Barron utilise the theory of blocking of Andrews (1990) to provide in addition an account of preemption. They suggest that this is a weakness, in the case where there is no blocking effect. But as they observe, the invocation of blocking is independent of the analysis of the phenomenon. If, contrary to fact, there were no blocking, the appeal to blocking would be dropped. Moreover, Bresnan (pc) points out that blocking might be substituted by an OT alternative to give the desired degree of sensitivity.

⁹We thank Joan Bresnan, Ida Toivonen and Andy Spencer for discussion of the points made in this section.

¹⁰This is not to deny, of course, that English does permit both subjects and tensed verbs to be dropped in certain discourse circumstances, but this is a different matter.

in Bantu, see (Givón 1976, Bresnan and Mchombo 1987)). The identification of the pronominal as being of type *affix* is crucial to the Argument Realization Principle which is used to ensure that the first argument on the ARG-ST list (which corresponds to the pronominal argument) is not on the COMPS list, and therefore not externalised in the syntax (since elements of type *affix* do not occur as independent elements in the syntax).

Secondly, the pronominal affix view amounts to claiming that English has pronominal *prefixes*, which is extremely questionable on morphological grounds. English makes very scant use of prefixation (as opposed to suffixation) at all, and subject prefixes can hardly be argued to be natural in the language.

Turning now to the phonological consequences of incorporation (be it head incorporation (as on the Sadler/Barron view) or dependent incorporation (as on the Bender and Sag view)), Bender and Sag specify a partial function over input forms, explicitly enumerating the output forms to account for the phonological processes associated with what is, on their view, prefixation of pronominal forms to a verbal stem. It is clear, however, that they view the process as involving a “rule of laxing of tensed vowels that applies only to the vowels of pronouns in combination with contracted auxiliaries” (p4). The appeal to class specific phonological rules is unfortunate, given that phonology has largely moved away from such devices. But more importantly, this formulation misses the crucial point that what is involved here is a case of the well-known phenomenon of affix-conditioned stem allomorphy (which does not, moreover, always involve laxing of tensed vowels): consider *we’ve* → /wIv/ */wəv/ versus *we’re* → /wə(J)/ */wI(J))¹¹.

In our view, an important consideration in the evaluation of these different analyses of a synchronic phenomenon is the degree of fit between the analysis and diachronic tendencies. On this ground, the head incorporation view is to be preferred. Alongside the non-syllabic reduced auxiliaries under discussion, English has a set of syllabic reduced auxiliaries which are *phonologically* enclitic. The diachronic drift to grammaticisation, by which a form reduces and phonologically cliticises and then is absorbed into the host as a bound element is well known; it is well established, for example, that incorporated pronominals have evolved diachronically from full pronominals which became phonologically weakened cliticised forms, and then bound forms. Under the head incorporation view, the affixal auxiliaries merely represent a further step on the path away from full wordhood. The pronominal incorporation view, on the other hand, which treats the reduced element as the head, runs counter to the evidence of this diachronic path.¹²

While the core phenomenon involves subject pronouns, there are several suggestions in the literature that at least some speakers accept non-syllabic (and hence incorporated) forms for certain lexical NPs (Barron cites the non-syllabic pronunciation of *The BBC’ve accepted the contract* as acceptable to some speakers, and Bender and Sag themselves cite *The sky over California’s always blue* from a Pullum and Zwicky 1997 LSA conference presentation). The issue is complicated by the fact that phonological processes can also (independent of this phenomenon) produce non-syllabic forms, which it is necessary to control for. Furthermore, much detailed work on speaker variation is required before definitive pronouncements can (if ever) be made on these matters.¹³ Note however that the extension to larger sets of incorporations is more natural on the head incorporation view: more permissive speakers are simply less selective about stem selection. On the other hand, the head driven account requires the incorporation of a lexical N (as affix) into

¹¹This point is made in the discussion in (Spencer 1991)

¹²Putting this another way, we might ask why it is that pronouns incorporate only into *reduced* forms of the auxiliaries. On the Bender and Sag view, this is essentially stipulated by enumeration in the phonological function, while on the view which we adopt, incorporation of the reduced auxiliary as an affix/bound form is a natural progression for a phonological clitic.

¹³Bender and Sag give examples suggesting that forms of *be* other than the tense auxiliary also involve incorporation. The LFG account can be extended straightforwardly to cover these data, as Bender and Sag acknowledge. However, many of these examples seem ungrammatical to at least one author of the current paper, underlining the point that much detailed informant work is required to establish the facts in these murky areas.

the auxiliary.¹⁴

Before leaving the discussion of Bender and Sag, we note that they suggest that there is some correlation between the head-incorporation in LFG and a morpheme-based view of morphology, on the one hand, and between pronominal incorporation and a non-morphemic (presumably, realizational) view of morphology. In fact, there is no such correlation. In the work on constructive case, Nordlinger (1998) assumes lexical entries for affixes, thus treating them as morphemes, as a notational convenience (p. 21). Nordlinger's principle of morphological composition, for example, can be reformulated in terms of morphological functions or constructions, rather than in terms of morphological trees. Sadler (1998) makes no commitment whatsoever to morphological analysis, simply presenting lexical entries for completely derived words and eschewing all discussion of how the morphology itself is modelled. There is no necessary connection at all between these two aspects.

To sum up, we think there are several grounds for questioning Bender and Sag's reanalysis of the English facts as a case of pronominal incorporation. We have shown in this paper that there is good cross-linguistic evidence for the existence of tense-inflecting pronominals. The fundamental difficulty that Sadler's (1998) analysis of the English data poses for HPSG is that it involves a constituent structure which lacks a head (a verbal projection without a verb). Bender and Sag's argumentation is built on the covert premise that such structures are not attested (and indeed, the centrality of the structural notion of head is a fundamental HPSG idea). Although much further work needs to be done, we suggest that English is not the only language exhibiting this radical form of head incorporation. In the rest of this section we sketch out some other possible cases. Even if Bender and Sag were correct about English, HPSG will have to take account of these cases.

The past tense is expressed in Polish by means of a *l* form participle and a perfect auxiliary (a form of the verb *be*). The auxiliary (which bears subject agreement features and may be the sole expression of the subject) may be combined with the participle or may appear attached to an element to the left of the verb. The phenomenon of so-called "floating inflection" is exemplified in (25) to (31) (Dziwirek 1998, Borsley and Rivero 1994).

- (25) Wieczorem czytali**śmy** książki
 evening read-1pl books-acc
- (26) Wieczorem**śmy** czytali książki
 evening-1pl read books-acc
- (27) Książki wieczorem**śmy** czytali
 books-acc evening-1pl read
- (28) Książki**śmy** wieczorem czytali
 books-1pl evening read
- (29) Wieczorem książki**śmy** czytali
 evening books-1pl read
- (30) My**śmy** wieczorem czytali książki.
 we-1pl evening read books-acc
 In the evening we read books.

¹⁴Bender and Sag criticise the use of long distance paths in LFG, stating that a theory which excludes long distance selection is to be preferred. The architecture of LFG is one which makes a clear separation between *c-structure* locality and *f-structure* locality precisely to allow for mismatches and apparent long distance feature flow: *c-structure* locality of selector and selection is only a theory-internal desideratum of HPSG and similar theories. Given that the phenomenon of tense-inflected nominals is one of many cases in which non-local selection is precisely what is at issue, this criticism simply begs the question.

- (31) Ewy-s ksi ażk e czytal
Ewa's-2S book read.SM
You read Ewa's book.

It is clear that these forms of the verb *be* are part of a periphrastically expressed tense/aspect form in combination with a participle (which inflects adjectivally). The auxiliary element was diachronically a phonological clitic. Analyses are split on whether to treat this element as a syntactic atom phonologically cliticised, or as a bound form precisely because of the difficulty in head driven syntactic frameworks of accommodating the resultant 'headless' construction: for example, Borsley and Rivero (1994) treat the participle-auxiliary combination as syntactically analysable syntactic incorporation of V into Aux and the "floating inflection" as PF (phonological) cliticization of I to the constituent to its left. Dziwirek (1998) treats the auxiliary morphologically. The morphophonological evidence for affixal status is extremely strong, (see (Spencer 1991) for a full discussion), and, as Spencer observes, the only evidence against this view is the lack of strong selection of the stem/host by the auxiliary (promiscuous attachment). Indeed, this mix of properties led Booij and Rubach (1987) to argue for a lexical treatment, but keeping the process of word-internal cliticisation separate from other word formation processes. The evidence therefore strongly suggests that the combination of host and auxiliary is not syntactically transparent. If this is correct, then these data constitute another case in which a head (here, the auxiliary (and subject agreement marker) in the past tense formations) is incorporated into a dependent. This can be captured by means of inside out equations in LFG, but, like the English data, appears problematic on a head driven view¹⁵.

- (32) *Wieczoremśmy*
(↑PRED) = 'evening'
((GF↑) SUBJ) = ↓
(↓PRED) = 'PRO'
(↓NUM) = PL
(↓PER) = 1
(GF↑) TNS) = PAST

- (33) *Książkiśmy*
(↑PRED) = 'book'
((GF↑) SUBJ) = ↓
(↓PRED) = 'PRO'
(↓NUM) = PL
(↓PER) = 1
(GF↑) TNS) = PAST

Borsley and Morris Jones (Welsh Syntax 2000 workshop presentations) discuss some cases in Welsh where verbless sentences with pronominal subjects are permissible. Copula-less patterns are found with 2S, 1PL and 2PL pronouns (in all these cases the final consonant of the "missing" copula form and the initial consonant of the pronoun are the same). The glosses in the following data (attributing verbal properties to the pronominal forms) are those provided by Morris Jones.

- (34) ti 'n licio sudd oren.
[be+pres]2S PROG like juice orange
You like orange juice.

¹⁵We do not give a full analysis here, which would require the addition of f-precedence constraints to capture the "left of V" constraint.

- (35) chi ddim yn licio sudd oren.
 [be+pres]2PL not PROG like juice orange
 You don't like orange juice.

Morris Jones establishes several crucial facts about these data, which distinguish them from a clipped or fast informal speech phenomenon and in particular from similar forms with full NPs. The diagnostics include control of responsiveness appropriate for questions with forms of *be*, form of tag questions, possibilities for fronting constituents, possibility of ellipsis and occurrence in noun clauses (the last is illustrated below):

- (36) Dw i'n meddwl ti 'n gwbod
 Be.PRES.1SG I-PROG think [be+pres].2SG PROG know
 I think you know
- (37) *Dw i'n meddwl dadi 'n gwbod
 Be.PRES.1SG I-PROG think Daddy PROG know
 I think Daddy knowing

Again, these data strongly suggest that these forms are pronouns carrying tense and aspect information, and are appearing in subject (NP) position. As Borsley (workshop presentation) points out, an analysis of these data in HPSG appears to require either some sort of empty copula, or a headless construction type (in constructional HPSG), or a re-analysis of the pronominal forms as pronominal incorporations into Aux.

6 Conclusion

In this paper we have shown that the phenomenon of TAM-inflected nominals is not typologically marginal but is, on the contrary, well established across a range of typologically diverse languages. We have argued that these data are not straightforwardly captured in a head-driven fashion, but are naturally accommodated by the use of inside out constraints, as in the constructive morphology approach of LFG.

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