

## CONSTRAINING XP-SEQUENCES\*

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### 1. Introduction

Current approaches to syntactic theory offer several proposals for the structure of the Inflectional Phrase (henceforth IP) (e.g. Chomsky 1989, Pollock 1989, Belletti 1990). At the heart of this controversy have been questions about how many functional projections are included in the IP, what the order of those projections is, and whether these characteristics are universal or language particular. These questions are part of the general problem of determining what the functional XP sequences are and how they cooccur and interact with the various lexical or thematic projections (e.g. VP, NP) (see Abney 1987, Fukui and Speas 1985) to form an 'extended projection' (Bittner and Hale 1993, Grimshaw 1991, 1993).

In this paper we find solutions to aspects of each of these problems in a strong claim about the form of the basic X' structure that feeds the syntactic system. Much of our discussion draws on evidence from morphologically rich Bantu languages, where 'compound tense' forms like those in (1) pose problems for traditional analyses of IP structure.

- (1) Ke-n-e ke-tla-reka dijo. (Sesotho/Setswana)<sup>1</sup>  
AGR-COP-PAST AGR-IRR-buy food  
'I would have bought food.'

Our analysis of these constructions provides strong evidence for two types of syntactic organization. First, the BASIC PROJECTION SEQUENCE (BPS) constitutes a basic unit which in the verbal domain is realized as AgrP-TP-VP. The BPS thus constrains the order and composition of functional and lexical projections, both within the IP and in the composition of extended projections generally (e.g. CP's, DP's). Second, our analysis of 'compound tense' forms shows that these are sequences of IP's, each a BPS unit. Thus, BPS units combine to form a LEXICAL PROJECTION SEQUENCE (LPS). The LPS constrains the order and composition of thematic and non-thematic projections among the iterating BPS structures. In general, syntactic structures built by repetition of these basic units make it possible to avoid postulating a large variety of functional projection types.<sup>2</sup>

While our discussion centers on Sesotho and Setswana, two closely related southern Bantu languages, our findings have direct implications for the structure of other languages. This is evidenced in the provision of a fruitful account of language variation involving Bantu, Italian, French and English. We argue that the structures we identify are more widely found than a cursory examination of surface structures might show.

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<sup>1</sup>Sesotho (or Southern Sotho) is spoken by approximately 4 million speakers residing in the countries of Lesotho and South Africa. Setswana is spoken by approximately 5 million speakers residing in the countries of Botswana and South Africa. The two languages are part of the Sotho group and are generally considered mutually intelligible. Our data is drawn from Doke and Mofokeng (1957) and Cole (1955). See Machobane (1985) for a semantic treatment of some of the issues discussed here.

Unless otherwise specified, the examples provided are equivalent for both Sesotho and Setswana, with a modified Sesotho orthography. Bantu languages are generally characterized by a noun class and 'concordial' agreement system composed of several singular/plural pairs (e.g. 9/10), identified by standardized numbering (see Welmers 1973: 165). Glosses are as follows: 1SG = 1st person singular, 1 = noun class #1, AGR<sub>O</sub> = object agreement formative, AGR<sub>S</sub> = subject agreement formative, AFOC = anti-focus, ASP = aspect, COP = copula, COND = conditional tense, CONT = continuous aspect, EXCL = exclusive, FPT = future participial, FUT = future, HAB = habitual, INF = infinitive, IRR = irrealis, MOD = Modal, NEG = negative formative, OCC = occasional, PAST = past, PERF = perfect, POSS = possessive, POT = potential, PRES = present, T = Tense, V = Verb. We do not address the possible modal status of the verb-final vowel -a, which alternates with -e in the negative imperfect present.

<sup>2</sup>We are concerned here with the phrasal projections AgrP and TP or DP immediately extending each lexical phrasal projection, VP or NP, respectively, making up a BPS, and not primarily with its further extension to CP or KP, considered in the work of Bittner and Hale (1993) and Grimshaw (1991, 1993). In our terms the latter would constitute the higher extension of an LPS. But see §4 for discussion of the role of CP.

Indeed, their fundamental motivation, on both empirical and conceptual grounds, suggests that they are universal.

Our analysis focuses on syntactic structure, and assumes recent work on head movement (Travis 1984, Chomsky 1989, Pollock 1989) and its implications for word formation (Li 1990, Poletto 1991). Furthermore, it treats functional items (grammatical morphemes) as syntactically independent abstract feature bundles, thereby allowing for the possibility of their null or coalesced morphological realization as a matter of language variation (Demuth 1994, Gruber 1976, Halle and Marantz 1993; see in contrast Anderson 1992, Lieber 1992). The analysis thus elucidates the relation among functional elements and items of lexical content as they occur in the BPS, as well as some of the mechanisms involved in determining their representation in phonetic form (PF). A unified explanation is thereby provided for several seemingly disparate morpho-syntactic problems such as *pro*-drop, auxiliary ordering, affix-hopping and *do*-support.

The paper proceeds as follows. In §1 we examine simple and complex Bantu IP structures, showing how both adhere to an AgrP-TP-VP structure. In §2 we present the BASIC PROJECTION SEQUENCE as the fundamental architectural unit which constrains the number and type of functional projections within the IP. In §3 we show how the LEXICAL PROJECTION SEQUENCE (LPS) incorporates the BPS in a principled fashion, providing constraints on the ordering among thematic and non-thematic IP's. In §4 we employ restrictions inherent in the LPS to explicate the syntactic distinctions between auxiliary, raising and non-raising thematic verbs, and to explore the mechanisms of Case assignment in constructions with multiple AgrP's. In §5 we discuss interactions at the morpho-syntactic interface, showing how the BPS provides a principled set of constraints on word formation. Finally, we conclude in §6 with a sketch of how the BPS might be generalized to DP structures.

### 1.1 IP structure in Bantu languages

Bantu languages are generally characterized as SVO *pro*-drop languages, where an obligatory subject marker prefixes to the verb, and the lexical subject can be freely reordered. The lexical object can also be freely reordered when an object marker is prefixed to the verb (Bresnan and Mchombo 1987, Demuth and Johnson 1989). In this paper we assume that subject markers and object markers are AGR<sub>S</sub> and AGR<sub>O</sub> functional heads respectively (see Demuth 1992, 1994). The underlying structure of Bantu IP's is then relatively transparent, generally consisting of an AGR<sub>S</sub>, a TENSE/MODAL/ASPECT formative (henceforth T(ense)), an optional AGR<sub>O</sub>, and the Verb to which the other formatives are prefixed, in that order. This is illustrated in the Sesotho/Setswana examples in (2).

- (2)a. Ke-tla-reka dikhomo. [AGR<sub>S</sub>-[T-V]] N  
 1SG-FUT-buy 10cattle  
 'I will buy cattle.'
- b. Ke-tla-di-reka. [AGR<sub>S</sub>-[T-[AGR<sub>O</sub>-V]]]  
 1SG-FUT-10them-buy  
 'I will buy them.'

This is the most salient and common order amongst IP formatives. Apparent 'exceptions' are of two types. The perfect-tense/aspect formative *-ile* suffixes to the verb in (3a), and the present tense formative *-a-* in (3b) is realized by a null morpheme when a lexical object follows the verb in (3c).<sup>3</sup>

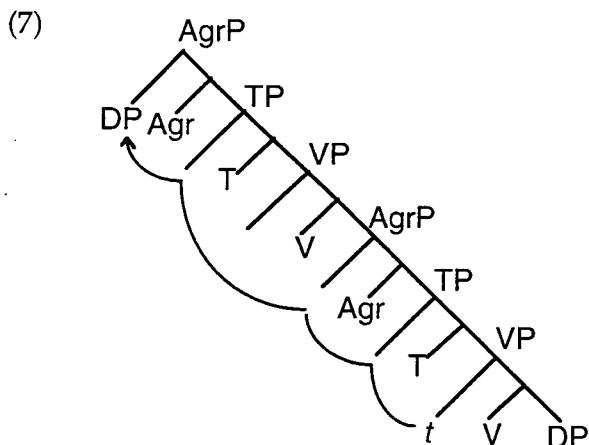
- (3)a. Ke-di-rek-ile. [AGR<sub>S</sub>-[[AGR<sub>O</sub>-V]-T]]  
 1SG-10them-buy-PAST  
 'I (have) bought them.'
- b. Ke-a-di-reka. [AGR<sub>S</sub>-[T-[AGR<sub>O</sub>-V]]]  
 1SG-PRES-10them-buy  
 'I am buying them.'

<sup>3</sup>We treat the perfect marker *-ile* as a simple suffix. It is sometimes analyzed as *-il-*, an allomorph of *ya* 'go' with final affix *-e*. All other T's are prefixes. The perfect form can have simple past significance. The temporal status of *a-* is debatable—it may rather be thought of as a prosodic place holder or 'Antifocus' marker. We do not address these issues here as they do not bear on our analysis.



order. We identify these constructions as iterative IP's, where each IP conforms to the basic underlying structure ascribed to the simple tense forms discussed above. That is, 'compound tense' constructions appear to be successively nested IP's, each IP composed of AgrP, TP and VP, in that order, with succeeding IP's serving as complements to VP. This is shown in (7), where the subject raises from the lowest (main) verb to the highest Spec AGR<sub>S</sub>.

We note here that the basic underlying IP pattern shown in (4) is given here twice, with a minor difference between the initial and final IP's in (5); the initial IP never takes a lexical object (or AGR<sub>O</sub>P), while the final IP will if the verb is transitive. In these constructions the 'thematic' verb, i.e. the main verb or the verb with predicative significance that determines argument structure, is the last in the sequence, while a non-thematic verb, or auxiliary verb (or copula), resides in the first IP. Generalizing to syntactic structure, the thematic verb is the lowest in a series of iterative IP's, while auxiliary verbs are higher.



Iterative IP structure is a robust phenomena found not only in Sesotho and Setswana, but in other Bantu languages as well. Consider the following examples from Kiswahili (our glosses) (Carstens and Kinyalolo 1989:3):

- (8)a. Juma a-ta-kuwa a-me-pika chakula.                    AGR<sub>S</sub>-T-V    AGR<sub>S</sub>-T-V  
       I-FUT-COP I-PERF-cook food  
       'Juma will have cooked food.'
- b. Juma a-li-kuwa a-ki-pika chakula.                    AGR<sub>S</sub>-T-V    AGR<sub>S</sub>-T-V  
       I-PAST-COP I-CONT-cook food  
       'Juma was cooking food.'

Note the similarity between the Sesotho/Setswana examples in (5) and the Kiswahili examples in (8), where the verb in the higher IP is once again a copula, and the verb in the lower IP is a thematic verb. In other words, the basic sequence AGR<sub>S</sub>-T-V is strictly followed in Kiswahili. It would therefore appear that IP structure in Bantu languages is strongly constrained. Specifically, every TP has a VP complement, and every VP must be headed by a T. Furthermore, every TP-VP sequence must have its own AGR<sub>S</sub>P, as shown by the presence of multiple AGR<sub>S</sub> formatives in Iterative IP structures.

We will argue below that this AgrP-TP-VP structure, which we call the Basic Projection Sequence (BPS), is universal, even when obscured by surface realization. For example, Tense formatives and auxiliary verbs may be realized as a single morpheme:

- (9)a. Ke-ne                    ke-Ø-di-reka.  
       ISG-COP+PAST ISG-CONT-1othem-buy  
       'I was buying them.'
- b. Ke-se                    ke-Ø-di-reka.  
       ISG-EXCL+PAST ISG-CONT-1othem-buy  
       'I am already buying them.'

In (9a) the formative *-ne* is derived from the copula *-na*, which has combined with the perfect formative *-e*, the phonological variant of *-ile* when preceded by a nasal ( $n + ile > ne$ ). Thus, *-ne* consists of T+V, and adheres to the sequence of formatives already seen in IP structures. Likewise, the auxiliary *-se* is the reduced perfect form of the verb *sala* ‘to remain’ ( $sal + ile > setse$ ;  $s + e > se$ ), and therefore also adheres to the basic sequence of IP formatives (Doke and Mofokeng 1957). In both cases, continuous aspect is encoded by a null morpheme on the main (thematic) verb. Thus, while the constructions in (8) do not appear to conform to the Basic Projection Sequence on the surface, we argue that they do at the structural level.<sup>6</sup>

Another possible ‘exception’ to the BPS might be the copula *-na*. Unlike the copula *-be/bo*, the copula *-na* is used in constructions meaning to ‘have’ or to ‘be (with)’. Forms such as those in (10) indicate that the copula *-na* cooccurs with a null present or continuous tense/aspect formative.

- (10)a. Ke-Ø-na        le buka.  
 1SG-PRES-COP with 9book  
 ‘I have (be with) a book.’
- b. \*Ke-tla-na        le buka.  
 1SG-FUT-COP with 9book  
 [‘I will have (be with) a book.’]
- c. Ke-tla-be/bo ke-Ø-na        le buka.  
 1SG-FUT-COP 1SG-CONT-COP with 9book  
 ‘I will have (be with) a book.’

Note that *-na* cannot occur with another Tense formative, hence the ungrammaticality of (10b). Furthermore, an Iterative IP construction employing the copula *-be/bo* must be used if the future tense is employed (10c).

We therefore argue that apparent exceptions to the BPS are only surface morphological variants, not structural exceptions. This implies that ‘exceptions’ in other languages may be analyzed in a similar fashion. Consider the following examples from Zulu (Doke 1927: 169, 204; our glosses):

- (11)a. Ngi-be            ngi-Ø-thanda.  
 1SG-COP+PAST 1SG-CONT-love  
 ‘I was loving.’
- b. Ngi-zo-ke        ngi-Ø-thande.  
 1SG-FUT-OCC 1SG-CONT-love  
 ‘I will love sometime soon.’

The examples in (11) are very similar to those seen for Sesotho and Setswana in (9) above. We propose that they also have the same syntactic structure – i.e. in every case a Tense formative is complemented by a Verb, and every Agr formative is complemented by a Tense formative. In other words, ‘compound tense’ constructions in other Bantu languages also conform to the BPS.

In sum, we have shown that ‘compound tense’ constructions in Bantu languages appear to be iterative IP structures where each IP is composed of an AgrP, a TP and a VP, in that order. Furthermore, we have seen that the heads of TP and VP in some IP’s may morpho-phonologically coalesce, obscuring their status as separate formatives. In the following section we will show that such forms are quite widely attested amongst the world’s languages. We turn now to a discussion of the BPS and the implications it holds for the structure of language.

## 2. The Basic Projection Sequence (BPS)

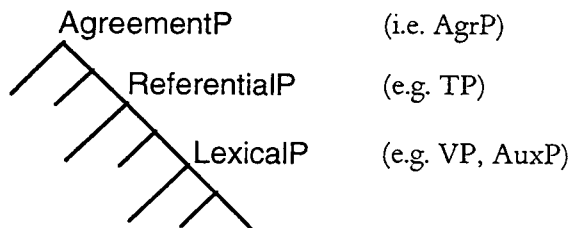
Drawing on the foregoing evidence from Bantu languages, we argue that each IP must contain the sequence of syntactic projections described above as a basic architectural requirement of language. Furthermore, we note that the sequence requirement cannot be one of ‘strict subcategorization’ or ‘selection’. While VP may be subcategorized by T, this is not sufficient to require every VP to co-occur with a TP, since such a condition should normally be in the direction of c-command. In addition,

<sup>6</sup>Note that, despite historical processes of categorical reanalysis (Heine 1991), the BPS is still met.

subcategorization or selection would not be sufficient to require, or make available, AgrP's in exactly the positions where they may or must occur.

Rather, the Basic Projection Sequence, or the BPS, is of conceptual significance to syntactic theory. In Grimshaw's (1993) terms, the well-formedness of an extended projection is a matter of principles of projection. Firstly, the structure reflects the functional necessity to associate every lexical or 'thematic' head (e.g. Verb) with an immediately c-commanding head providing reference-related properties (e.g. Tense, i.e. tense, modality or aspect). Thus, as observed in Di Sciullo and Williams (1987), lexical phrasal projections in syntax are associated with reference, either to objects (NP's), time (IP's), or truth values (CP's). The projection of each referential and thematic head is then associated with an Agreement Phrase, this also arising out of functional necessity, viz., the licensing of arguments and words, as discussed below. The resulting structure, as instantiated for an IP, is shown in (12).

(12) Basic Projection Sequence (BPS)



Thus the BPS constitutes an elemental linguistic unit consisting of three types of projection, nested in a particular sequence and distinguished by function, content and their mutually supportive roles.

The structure of the BPS given in (12) is similar to that proposed for IP's elsewhere. First, it incorporates the split-Inflection hypothesis of Pollock (1989), where the IP is analysed as an AgrP and a TP. Secondly, it incorporates the ordering insights of Chomsky (1989) and Belletti (1990), where the AgrP dominates the TP. Thirdly, it allows for the possibility of cyclic head-to-head movement, where V can move to T, and where both V+T can then raise to Agr, as is commonly assumed in the case of languages like Italian and French. Finally, wherever the structural presence of AgrP is obligatory, there is the necessity for a subject to move into it for the discharge of its  $\phi$ -features, suggestively encompassing thereby the Extended Projection Principle. Thus, the BPS captures many of the formal characteristics that have been posited as critical for the structure of language, while at the same time providing a principled explanation for their presence. We pursue these explanations below.

### 2.1 Restrictions on number and type of functional projections

The specific contribution made here to the structure of IP is to provide a principled basis for *constraining* the number, type and order of functional projections that human language allows. In general, this obviates the need for postulating a variety of types of functional projection and constructions in which they occur. Instead, the BPS constitutes an elemental linguistic unit from which more elaborate forms are constructed and various surface forms are derived. Accordingly, we expect the BPS to generalize across languages and constructions. For the moment we restrict our discussion to the BPS as it applies to the IP. The instantiation of the BPS in other domains (e.g. CP's and DP/NP's) will be considered in §4 and §6 respectively.

Consider the status of the ReferentialP (we will generally refer to this as TP within the verbal domain). Some of the controversy surrounding the number and type of functional projections permitted in human language has centered around the possibility of having both a Tense Phrase and an Aspect Phrase as functional projections within the same extended projection (e.g. Carstens and Kinyalolo 1989, Belletti 1990). From the perspective of the BPS, such constructions are disallowed. That is, the presence of both a functional Tense Phrase and a functional Aspect Phrase implies the extended projections of two distinct VP's, or two BPS's. But, perhaps more importantly, the BPS also provides a logical explanation for why such proposals have been made. We have already seen that the surface realization of tense/aspect formatives is subject to variation. We have also seen that such formatives frequently coalesce with semantically bleached auxiliary verbs. This has led to multiple interpretations regarding both the semantic content of TP's, as well as the number and type of functional categories permitted within a given IP.

The BPS is agnostic regarding the particular semantic content of a given TP, or ReferentialP. It allows for the possibility that this structural position is filled by a formative that specifies either temporal, modal, or aspectual content. For example, we saw in (3a) above that Sesotho/Setswana verbs can be marked for the perfect suffix *-ile*. Given that *-ile* has a possible aspectual semantic interpretation, and follows the verb, we might expect, given a slot-filler type of morphology, that another Tense formative could precede the verb. However, this results in the ungrammatical form in (13a). Rather, the Tense formative *-tla-* must occur within its own BPS, as shown in (13b).

- (13)a. \*Ke-tla-rek-ile buka. \*AGR<sub>S</sub>-T-V-ASP  
 1SG-FUT-buy-PERF 9book  
 ['I will have bought the book.']
- b. Ke-tla-be/bo ke-rek-ile buka. AGR<sub>S</sub>-T-V [AGR<sub>S</sub>-[V-ASP]]  
 1SG-FUT-COP 1SG-buy-PERF 9book  
 'I will have bought the book.'

Similarly, a tense and modal formative cannot occur within the same BPS. Thus, (14a) is grammatical with two BPS's, the first with a tense formative and the second with a modal formative. In contrast, (14b), with both a tense and a modal formative within one BPS is ungrammatical.

- (14)a. Ke-tla-be/bo n/ke-ka-di-reka. AGR<sub>S</sub>-T-V AGR<sub>S</sub>-MOD-AGR<sub>O</sub>-V  
 1SG-FUT-AUX 1SG-POT-10them-buy  
 'I will possibly buy them.'
- b. \*Ke-tla-ka-di-reka. \*AGR<sub>S</sub>-T-MOD-AGR<sub>O</sub>-V  
 1SG-FUT-POT-10them-buy  
 'I will possibly buy them.'

Examples such as (13) and (14) show that only one Tense formative, either temporal, modal, or aspectual, is permitted with a given BPS, each dominated by an AgrP, and each complemented by a VP. In other words, only one ReferentialP is permitted within the BPS. This means that tense, modality and aspect, each with its referential-like properties, have the same structural requirements, each occurring within their own BPS. The number and type of functional categories permitted across languages is thereby constrained.

Interestingly, these constraints also appear to apply to negation. While we leave open the possibility of distinct alternative base generated positions for negation formatives (e.g. Di Sciullo and Tremblay 1993, Zanuttini 1991), we suggest that the embedded type of negation can also occupy the head of the ReferentialP. Consider the Sesotho/Setswana examples in (15).

- (15)a. Ke-tla-be/bo ke-sa-di-reka. AGR<sub>S</sub>-T-V AGR<sub>S</sub>-NEG-AGR<sub>O</sub>-V  
 1SG-FUT-AUX 1SG-NEG-10them-buy  
 'I will not buy them.'
- b. Ke-tla-\*(be/bo) \*(ke)-sa-di-reka. AGR<sub>S</sub>-T-\*(V)\* (AGR<sub>S</sub>)-NEG-AGR<sub>O</sub>-V  
 1SG-FUT-AUX 1SG-NEG-10them-buy  
 'I will not buy them.'

Example (15) shows that negation must occur within its own BPS; it can not cooccur with a TP within the same IP. We therefore propose that TP, or more generally ReferentialP, is the structural projection under which tense, modality, aspect, or negation can be realized. We pursue these issues further in §3.

In sum, each TP must be complemented by a VP. The universality of this requirement is suggested by the use of 'dummy' auxiliaries to support Tense in languages generally. The requirement that each TP has a VP complement is demonstrated in Sesotho/Setswana by the fact that the dummy copula *-be/bo* is inserted to support TP where necessary (e.g. 14a). Dummy auxiliaries in other languages play the same supporting role. In English, the function of *have* and *be* as well as *do*-support may be viewed in this way. The tense formative must be supported by the dummy verb *do*, not because tense is an affix as in traditional analyses, but because each TP must be associated with a VP. The negative formative that apparently separates the TP from its VP complement can then be analyzed as being structurally within its own BPS, as indeed it is overtly in Sesotho/Setswana (15a). Thus in English as in Sesotho and Setswana, negation must appear

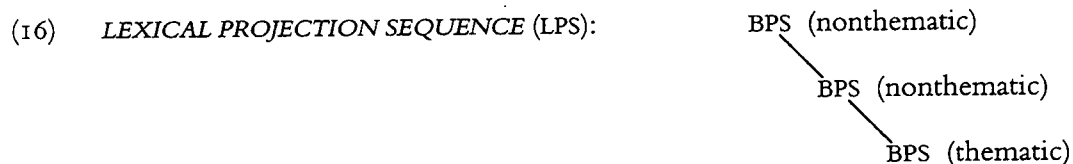




of syntactic organization as the Basic Projection Sequence—the BPS—and show that it provides a principled set of structural constraints on the number, type, and order of functional projections permitted within the IP. The BPS is also overtly instantiated in various dialects of Italian, and appears to generalize, though not as transparently, to other Romance languages, as well as to English. Some of these apparent surface ‘exceptions’ to the BPS will be discussed in the following section along with conditions imposed by the Lexical Projection Sequence; others will await a discussion of morpho-phonological realization in §5. We turn now to a discussion of the Lexical Projection Sequence.

### 3. The Lexical Projection Sequence (LPS)

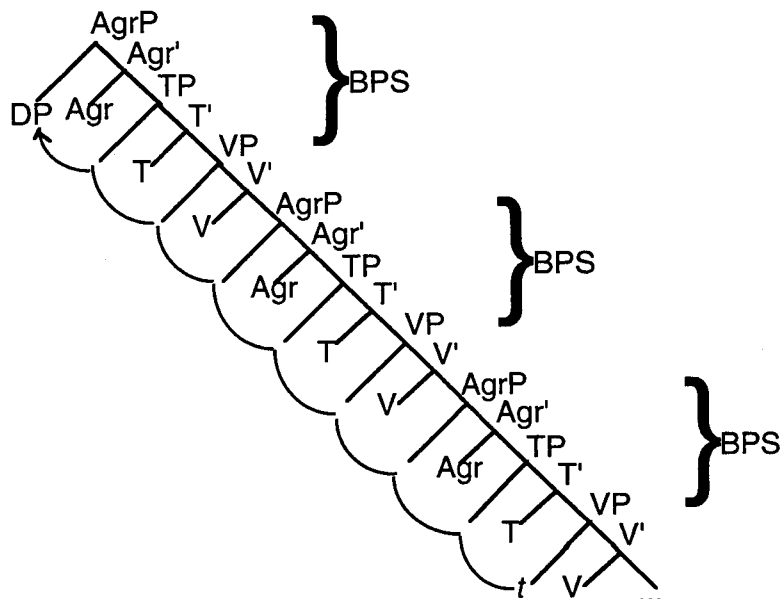
‘Compound tense’ constructions, or iterative IP’s, present a number of problems for traditional notions of syntactic structure. As outlined in §2, the BPS provides a principled basis for constraining the form of simple IP structures. In this section we show that the Lexical Projection Sequence, or LPS, constrains the form of iterative IP structures, or iterative BPS’s. The LPS, as realized for IP’s, is illustrated in (16), where each BPS has been annotated for the thematic (VP) or nonthematic (AuxP) nature of its Lexical Projection (LP). Note that the thematic LP is structurally the lowest within the LPS.



As previously described, each BPS consists of the functional and lexical phrases AgrP–TP–LP. Thus, a fully articulated phrase structure for a verbal LPS would be as in (17).

It appears that iterative IP constructions are much more common amongst the world’s languages than generally thought. Given the BPS, where the VP can be either thematic or nonthematic, auxiliary verbs are the lexical heads of IP’s. Given that auxiliaries are frequently inflected for either Tense or Agr across languages, such an identification is reasonable. In fact, given the BPS, along with the LPS, the analysis of various auxiliary constructions in languages like Italian and English is straight-forward. Thus, like Giorgi and Pianesi (1991), we analyze the Italian *ebbi mangiato* as an iterative IP construction subject to both the BPS and the LPS. We analyze the English equivalent *He has eaten* in a similar fashion, where *has* = COP + PRES + AGR, and *eaten* = eat + PASTPART + ØAGR. We expect that auxiliary constructions in other languages can be equally and elegantly described by such an analysis, thereby avoiding the problematic postulation of additional types of functional projections.

(17) Articulated Lexical Projection Sequence (LPS)



By appealing to the LPS as a higher level unit of syntactic organization, several apparent structural problems can be resolved. Firstly, the LPS provides constraints on possible orderings amongst Tense, Modality and Aspect, along with a principled explanation for the verb adjacent position of Aspect Phrases that has been observed in many languages (Emonds 1976, Schachter 1983, Tenny 1987). This is discussed in §3.1.

Secondly, a principled structural distinction can now be made between auxiliary (nonthematic) verbs, and main (thematic) verbs. Nonthematic verbs can only take IP complements, while thematic verbs *cannot* take IP complements. This provides a useful diagnostic for distinguishing truly iterating IP structures from others. In other words, IP's can iterate as long as the VP of a given IP is nonthematic. Once a thematic VP is reached, IP iteration stops. The syntactic distinction between auxiliary verbs and thematic verbs now becomes relevant. The higher IP's must contain auxiliary verbs, while the lowest IP must contain a thematic verb. This is due not to any restriction on surface order, but rather to the nature of complement choice. Thus, a set of iterative IP constructions will terminate once a thematic verb is chosen. We argue that this is a syntactic universal.<sup>8</sup> Further discussion of the syntactic distinction between verb types will be addressed in §4.

Thirdly, the LPS, in conjunction with the BPS, holds important implications for constraints on head movement and word formation. Following Li (1990) and Poletto (1991), we note that Agr 'saturates' a word. That is, successive head-to-head movement of the verb applies into each functional head within a given BPS. Once a verb has raised to adjoin to an Agr head, overt incorporation stops. While the morphological realization of Agr is subject to language variation, we argue that the structural presence of Agr in these constructions is obligatory. Thus, even in languages like English where the surface realization of multiple Agr heads is not found, the structural presence of Agr defines the extent of overt head incorporation within the word.<sup>9</sup> We pursue these issues in §5.

In sum, the LPS, in conjunction with the BPS, provides a structural framework for exploring constraints on the syntactic, semantic and morphological form of language. In §3.1 we discuss restrictions on the order of TP's within the LPS, and in §3.2 we show that English modal and auxiliary constructions, including 'affix-hopping' phenomena, conform to these constraints.

### 3.1 TP order within the LPS

It has long been observed that auxiliary verbs exhibit certain ordering restrictions in relationship to each other (Bickerton 1981, Carstens and Kinyalolo 1989, Emonds 1976, Tenny 1987). For example, English *John might have gone* is well formed, while *\*John has might go* is ungrammatical. We suggest that each auxiliary actually fills the T+V requirements of a BPS, and that the 'sentence' is an LPS composed of three BPS (or IP) units. The restriction on order, we argue, is one of composition of semantic content of T<sup>0</sup> heads within the LPS.

The general order observed amongst TP's within the LPS with respect to their semantics is Tense (TNS) > (Modality (MOD)) > (Aspect (ASP)). Furthermore, Tense is obligatory, while Modality and Aspect are optional. This order is exemplified in several of the Sesotho/Setswana examples given above and in the following:

- (18)a. Ke-n-e            n/ke-ka-be/bo ke-Ø-reka.            TNS > MOD > ASP  
 1SG-COP-PAST 1SG-POT-COP 1SG-CONT-buy  
 'I would have been (now) buying.'
- b. Ke-n-e            ke-tla-be/bo ke-Ø-reka.            TNS > MOD > ASP  
 1SG-COP-PAST 1SG-IRR-COP 1SG-CONT-buy  
 'I would have been (now) buying (when...)'

<sup>8</sup>This is true even in apparent counterexamples such as classical Latin, where word order is OV, and auxiliary verbs follow the thematic verb because it is a head final language (see Giorgi and Pianesi 1991: 16). Serial verbs, however, are an apparent exception, where thematic VP's seem to iterate. However serial verbal constructions may be analyzed as independent Lexical Projection Sequences connected by a form of asymmetric conjunction, where each sequence terminates in a thematic VP (Gruber 1994, Gruber and Collins 1995).

<sup>9</sup>Given the possibility of one or more AGR<sub>O</sub> heads in a word with AGR<sub>S</sub> in Bantu languages, the notion that Agr 'saturates' a word must be qualified to pertain only to AGR<sub>S</sub>. See §5.1.

- c. Ke-tla-be/bo ke-rek-ile dijo. TNS > ASP  
 1SG-FUT-COP 1SG-buy-PERF 8food  
 'I will have bought...'
- d. Ke-rek-ile dijo. TNS  
 1SG-buy-PAST 8food  
 'I (have) bought food'
- e. Ke-Ø-reka dijo. TNS  
 1SG-PRES-buy 8food  
 'I am buying food.'

Certain ReferentialP formatives may fulfill multiple semantic functions.<sup>10</sup> The formative (*il*)e has temporal features in (18a,b,d), but aspectual features in (18c) (cf §5.1 fn.). Similarly, *-tla -*, when it functions as a Tense formative, is Future (18c), but when it functions as a Modal formative it is Irrealis (IRR) (18b). *-Ø-* has the significance of a present Tense formative if initial (18e), but of continuous Aspect if final (18a,b). The apparently common correlation and conceptual similarity between these pairs of TNS and MOD or ASP—Past and Perfect, Future and Irrealis, and Present and Continuous—suggests that they may be categorially identical, differing only configurationally, i.e. by relative position. In 'simple tense' forms, since TNS is obligatory, the formative would always be interpreted as TNS. In 'compound tense' forms, if initial it would be TNS, otherwise MOD or ASP. All the examples in (18) are therefore consistent with the order TNS > (MOD) > (ASP).<sup>11</sup>

These ordering restrictions also prohibit multiple occurrences of TP's of the same semantic class within the same LPS. For example, although ASP > ASP, e.g. PERF > CONT (*has been*) is possible as an auxiliary sequence in just that order, MOD > MOD or TNS > TNS is ruled out. Consider English *must* and *ought-to*, which have similar but contrastive meaning, and *have to*, which has about the same meaning as *must*. *Must* and *ought-to* are MOD auxiliary formatives that take IP complements. They cannot cooccur with each other within the same LPS (19b). In contrast, *have to* is a raising main verb, taking a clausal complement, and can cooccur with a modal in the same LPS (19d).

- (19)a. John *must/ought-to* go. MOD > V  
 b. \*John *must ought-to* go. \*MOD > MOD > V  
 c. John *has to* go. V > [<sub>CP</sub> V  
 d. John *must have to* go. MOD > V > [<sub>CP</sub> V

Further evidence that this order is a robust phenomenon comes from the fact that it is universally found amongst pidgins and creoles. Its cognitive significance becomes quite plausible if we assume, as does Bickerton (1981), that creoles result from language acquisition by children, who organize language according to innate principles of universal grammar.

The proper ordering of TP's, or modal/auxiliary complexes (i.e. TP + AuxP units), within the LPS cannot be computed by reference to mere semantic coherence, since this could pertain equally to the complements of raising verbs. Nor can the proper order be determined by lexical selection or subcategorization, since it applies in either direction of c-command, and independently of whether a particular auxiliary is present or absent. Rather, the ordering reflects a semantic categorial hierarchy, such as that which constrains attributive adjective order (Dixon 1982). For example, the fixed order of adjectives in *a tall young male giraffe* may be said to follow the hierarchical (superordinate to subordinate) order of the semantic categories to which they each pertain, inherent in the noun they modify (viz., Physical Object > Living Thing > Animate Thing). Similarly, it is possible that the TNS > MOD > ASP constraint on ordering of TP formatives within the LPS is due to the hierarchical framing function of T's. By virtue of being part of

<sup>10</sup>Morris Halle (p.c.) points out multiple uses of auxiliary formatives in English: T = -EN for passive and perfect, and V = BE for progressive and passive.

<sup>11</sup>There is one formative in Sesotho and Setswana which co-occurs with the T of the BPS, this being the persistive *-sa-* in constructions like *ke-sa-tla-reka* 'I will still buy'. This fact, however, and the sense of the formative suggests that it reflects an adverbial modifier or quantifier within the Tense BPS.

a single LPS, Tense can frame either Modality or Aspect or both, and Modality can frame Aspect, but not vice versa. Thus, the order of TP's within a complete thematic functional complex, or verbal LPS, is constrained.

The semantic category hierarchy amongst auxiliaries could reflect conditions under which heads in an adjunction structure must be licensed or 'checked' at LF by being a subcategory of the head to which it adjoins (see Di Sciullo and Gruber 1993A,B for this proposal and its development). If the TP's in an LPS contained the categories TNS, MOD, ASP, the T's would have to create an adjunction structure at LF that reflects the hierarchical order TNS > MOD > ASP.<sup>12</sup> This will be possible only if the BPS's which house the TP's follow this order.

As suggested by the morphological evidence in §2.1 and in the account of 'affix hopping' in §3.2, auxiliary verbs are essentially semantically empty and primarily perform an architectural supportive function for the TP with which they are associated in the BPS. Alternatively, auxiliaries may appear empty as a reflection of their incorporation into their associated T's, with consequent representation of semantic content in the T and cooccurrence restrictions on the T's and V's within a BPS, as in Sesotho/Setswana. In this conception, distinctions of semantic content initially reside in the auxiliary verb, while T's perform a checking function for the relative event-framing properties inherent in this content through their relative adjoined positions at LF.

In this section we have shown that the LPS represents a higher level of syntactic organization which, in conjunction with the BPS, provides a description of language structure which is more pervasive than immediately apparent. The two provide a mechanism for constraining the number and type of functional projections found among languages, and offer a principled means for understanding some of the ordering restrictions that are characteristic of iterative IP structures. Finally, the morphological realization of lexical heads within the LPS provides a natural explanation for problems such as English 'affix-hopping'. We discuss this and related issues in §3.2.

### 3.2 Morphological realization of lexical heads within the LPS

English is said to exhibit 'affix-hopping' phenomena, where an inflectional affix shows temporal or aspectual properties inherent in the semantics of the preceding modal or auxiliary. English might therefore appear to violate sequencing constraints within the LPS, although the order amongst T's within the LPS seems to be followed. In this section we show that the apparent violation is due to a difference in the position in which the semantic content of lexical heads (in this case auxiliary verbs) is spelled out, thus relating 'affix-hopping' to 'light-verb' phenomena. When this is considered, English and Sesotho/Setswana look exactly alike (abstracting away from the difference in head-direction and the null realization of Agr (AGR<sub>S</sub>) in English). Compare the following:

- |        |   |   |                           |
|--------|---|---|---------------------------|
| (20)a. | (I) coul-d                                | have-∅                                    | bough-t                   |
| a'     | MOD-TNS                                   | ASP-MOD                                   | V-ASP                     |
| a''    | V <sub>MOD</sub> -TNS-[AGR <sub>S</sub> ] | V <sub>ASP</sub> -MOD-[AGR <sub>S</sub> ] | V-ASP-[AGR <sub>S</sub> ] |
|        | PAST                                      | POT                                       | PERF                      |
| b.     | ke-n-e                                    | ke-ka-be/bo                               | ke-rek-ile                |
|        | AGR <sub>S</sub> -V-TNS                   | AGR <sub>S</sub> -MOD-V                   | AGR <sub>S</sub> -V-ASP   |
|        | PAST                                      | POT                                       | PERF                      |

In (20a'), the first English auxiliary word, or BPS, contains semantic features for both modality (MOD) and tense (TNS). As such it might seem to violate the structure of the BPS, which allows only one T (=TNS, MOD, or ASP).<sup>13</sup> English auxiliaries, however, are said to show 'affix hopping', a strict correlation between formatives in neighboring but separate words. For example, both the second and third words contain formatives with features for Aspect, viz. *have* and *+t*, respectively, usually identified as the perfect auxiliary formatives HAVE+EN. Similarly, both the first and second words contain a sign of modality, viz. *coul-* in the first word and the cooccurring null affix *-∅* in the second.

<sup>12</sup>The hierarchy among event-frame categories implies a directional entailment: Aspect entails at least a default Modality (Realis?), and Modality entails at least a default Tense (Present/Generic?).

<sup>13</sup>Here T refers to the functional head while Tense (TNS) refers to one of its possible conceptual contents.

Suppose affix-hopping is implemented by LF movement and adjunction of the head of TP (TNS, MOD or ASP) to the head of the VP in the immediately higher BPS (cf. Chomsky 1993). The initial positions of the T<sup>0</sup>s would then be each in its unique BPS, as required. Presuming the conflation of BPS's within an LPS to be a universal condition at LF (see §3.1), an option may be for a V in its base form to contain features of the T in the next lower BPS, reflecting the later merger at LF. The form at SpellOut therefore reflects this content, without involving morphological movement. This form or the later LF movement is represented in (20a''), with adjunction of the relevant T or T-features indicated by subscripts. Each word may now be seen to represent one BPS with a unique base-generated T, and there is no violation of the proposed BPS structure. In fact, the English now appears structurally similar to the Sesotho/Setswana (20b).

As glossed in (19a<sub>ii</sub>), ASP would be base-generated in the T of the final BPS, represented by *-t*, MOD would be base-generated in the T of the second BPS, represented by  $-\emptyset$ , while the first BPS would contain TNS, generated in T and represented by *-d*. *Coul-* in the first BPS would then result from T-to-V incorporation from a position in the second word or BPS.

In other words, it is the affix, or T, in English that is significant with respect to semantic order within the LPS. Nevertheless the higher verb to which each T is adjoined reflects the semantic content of that T. For example,  $V_{MOD}$  is represented by the modal verb *can/coul-* and  $V_{ASP}$  by the perfect aspect auxiliary *have*. The semantic content of the T, then, appears most prominently in the auxiliary verb of the preceding BPS, to which it adjoins. We identify this effect as so-called 'affix-hopping'.

Sesotho and Setswana do not show affix-hopping; there is no strict cooccurrence relation between an auxiliary verb and the T in the following word, as in English. For example, if the pattern of verb and following T in (20b) is always adhered to in the way HAVE+EN is in English, we might expect the BPS that contains T=*ile* PERF to always be preceded by a BPS containing the auxiliary verb *-be/bo*. But this is not the case, as seen in (21b).

- (21)a. (I) ha-d                      bough-t  
            $V_{ASP-TNS-[AGR_S]}$   $V-ASP-[AGR_S]$   
           PAST                      PERF
- b. ke-n-e              ke-rek-ile  
        $1SG-V-TNS$   $1SG-buy-ASP$   
       PAST              PERF

Rather, the auxiliary verb and T within the same BPS form a semantic unit, as shown by contrasting (21b) with (22b).

- (22)a. (I) wa-s                      buy-ing  
            $V_{ASP-TNS-1SG}$   $V-ASP-[AGR_S]$
- b. ke-n-e              ke- $\emptyset$ -reka  
        $1SG-V-TNS$   $1SG-ASP-buy$   
       PAST              CONT

The English auxiliary  $V_{ASP}=wa-s$  reflects the continuous T of the following BPS in accordance with 'affix-hopping' (viz., the auxiliary BE+ING). In contrast, the choice of copula in Sesotho/Setswana is morphologically conditioned: *n-* supports *-(il)e*, while *-be/bo* supports other forms (such as *-tla-*), regardless of whether they carry Tense features or Mood features (see (18b) and (20b) respectively).<sup>14</sup>

We can describe this difference between English and Sesotho/Setswana in terms of 'heavy' vs. 'light' surface realizations of semantic content. That is, either a V or the T within the next lower BPS may be 'heavy' or 'light'. For example, the auxiliary verb *coul-* in the first BPS in (16a) is actually spelling out the

<sup>14</sup>A possible counter-example in Setswana, which may have a similar explanation, is given in Cole (1955):

- (i) Ke-ka-bo              ke-n-e              ke- $\emptyset$ -reka...                      M > T > A  
        $1SG-COND-COP$   $1SG-PAST-COP$   $1SG-cont-buy$   
       'I would have been buying (if)...

*Ka-* is described by Cole here as a conditional auxiliary (COND). It is perhaps then not of potential modality (POT), as in the usage in (4) and (18a), but has a clause-subordinating function and therefore a higher position among the auxiliaries in the LPS.

MOD feature of the next T (represented as a null morpheme + $\emptyset$  in the second BPS). Modality may then be said to have a heavy-light content pattern in English. Since  $V_{ASP}$  is specific to T in the following BPS (e.g. HAVE+EN), we may say that Aspect has a heavy-heavy pattern of morphological realization. On the other hand, since the form of the copula V in Sesotho/Setswana auxiliaries never reflects the semantic properties of the following T, Sesotho/Setswana consistently represents MOD and ASP in a light-heavy pattern. Aside from this spell-out variation, the languages are structurally similar.

'Affix-hopping' can therefore be treated as the morphological incorporation of T features into the higher V to which it has adjoined. Modals and auxiliaries in English are 'heavy', incorporating semantic features from T's of complement BPS's. In contrast, dummy (copula) verbs like those in Sesotho/Setswana are 'light', incorporating semantic content of complement T's at LF. A parallel can be drawn here with noun incorporation in cognate object constructions. In both cases the phenomenon is due to head movement of a complement (T or N), driven by LF interface conditions, and the possibility of its morphological realization at PF in either the head (V) to which it adjoins, or in its base position.<sup>15</sup>

In this section we have shown that the base order of T's within the LPS is constrained, with covert conflation at LF. 'Affix-hopping' effects are evidence of this conflation between BPS's (T-to-V movement). When such effects are considered, English exhibits this same order amongst distinct BPS's as that found in Sesotho and Setswana.

The LPS therefore represents a higher level of syntactic organization which potentially incorporates several BPS's. The two constrain the number and type of functional and lexical projections that can be associated with thematic projections in human language. Furthermore, they provide a principled means for understanding some of the ordering restrictions that are characteristic of iterative IP structures. In so doing, however, several potential problems arise. These include the syntactic distinctions between auxiliary verbs, main verbs and raising verbs, as well as the issue of multiple AgrP's, Case assignment and the Theta-criterion. We turn to a discussion of these points in §4.

#### 4. Auxiliaries and main verbs

In this section we employ restrictions inherent in the LPS to account for the syntactic and conceptual distinctions between complementation in auxiliary, raising and non-raising thematic verbs, and to explore the mechanisms of agreement and Case assignment in constructions with multiple AgrP's.

##### 4.1 Syntactic and conceptual aspects of complementation

Our discussion so far has focused on auxiliary (nonthematic) and main (thematic) verbs, where the latter constitute the lowest lexical head within an LPS. In this section we explore the grammatical distinctions between these and other verb classes, showing how the LPS gives a principled means of characterizing the categorial and syntactic differences between them.

First of all, our account provides an answer to the question of the categorial nature of auxiliary verbs. They are not raising verbs, but 'deficient' verbs, in that they take IP complements (Cole 1955, Doke and Mofokeng 1957, Chomsky 1986). In contrast, main verbs (including both raising and control verbs) take CP (or NP, AP, PP) complements. Because auxiliary verbs take IP complements, they can iterate, in accordance with constraints within the LPS, whereas main verbs terminate an LPS.

This distinction between main and auxiliary verbs is conceptually satisfying in that it provides a correspondence between syntactic structures and categories on the one hand, and semantic functions and ontological categories on the other. Main verbs are thematic in that they characterize events in terms of thematic roles. They must take a complement that can be an argument, one that can express the thematic role of an event. We surmise that this cannot be realized as an IP complement; only CP, DP (i.e. NP), PP, or AP complements can be arguments or bear theta-roles. Thematic verbs taking such complements therefore characterize and terminate an event or sub-event in a complete thematic-functional complex. In contrast, auxiliary verbs have a non-thematic event-framing function, which serves in the construction of functional complexes without terminating them. The complement of an auxiliary verb must express an

<sup>15</sup>The serial verb construction and its variation as a single or compound verb-is similarly evidence for V-to-V incorporation at LF. For example, so-called 'splitting verbs' (Awoboluyi 1978) have the serial form with overtly separate verbal heads, each of which cannot be interpreted alone. Rather, identification and interpretation as a lexical item must happen after movement and adjunction at LF.

event or sub-event frameable in this structure, not a theta-role bearing category; hence not CP, or DP, PP, or AP. Only IP's (i.e. VP's) serve to express framed sub-events within a thematic-functional complex, while each IP may itself contain framed sub-events and therefore iterate.

This conception of main and auxiliary verbs also forces a particular analysis for raising verbs, i.e. licensing the raising of the complement subject over the complement boundary. Essentially the same problem is involved in exceptional Case-marking, where the subject of the complement is raised to the Case-position of the object of the matrix verb. Some accounts obviate the CP obstacle by deleting the CP (Chomsky 1981), or by eliminating the independent 'governing' character of its head C by rendering it syntactically null (e.g. by deleting it, or by incorporating it into V, Baker 1988). An alternative account could postulate that CP is absent altogether as the base-generated complement of a raising verb, i.e. that the verb takes an IP complement rather than a CP complement. Since, given the LPS, IP complementation is excluded as a possibility for raising verbs, we are forced to accept an account in which raising verbs take base-generated CP complements whose head has lost its syntactic independence from the matrix V. There is, in fact, supporting evidence that a CP is present in a raising verb, as it is required to provide a landing site for A'-movement (Lasnik and Saito 1984).

In sum, auxiliary verbs take IP complements, while other verbs do not. In the following section we explore some of the other distinctions between verb classes.

#### 4.2 Theta-roles, $\phi$ -features and Case

Auxiliary verbs within the Sesotho and Setswana LPS always show agreement with the thematic verb in  $\phi$ -features (person, noun-class, number). In contrast, raising and control verbs always utilize the infinitival concord (*ho/go-*) (Doke and Mofokeng 1957, Cole 1955), in which the  $\phi$ -features of the subject appear to be neutralized. We will call this latter agreement non- $\phi$ -feature or 'null'-agreement. This is illustrated in the following Setswana examples, where the verb *batla* (want/be.about.to) can appear in three different types of constructions (23), but can only function as a control verb when the subject is animate (24).

(23)a.	ke-batla [ <sub>CP</sub> PRO go-tsamaya]	'I want to go.'	<i>control verb</i>
b.	ke-batla [ <sub>CP</sub> t go-tsamaya]	'I am about to go.'	<i>raising verb</i>
c.	ke-batla [ <sub>IP</sub> ke-tsamaya]	'I am about to go.'	<i>auxiliary verb</i>
(24)a.	*le-ntswa le-batla go-wa	['The stone wants to fall.']	<i>control verb</i>
b.	le-ntswa le-batla go-wa	'The stone is about to fall.'	<i>raising verb</i>
c.	le-ntswa le-batla le-wa	'The stone is about to fall.'	<i>auxiliary verb</i>

Control and raising verbs are similar in form in Setswana, but have a different meaning ((a) and (b) examples, respectively). In contrast, raising and auxiliary verbs have a similar meaning but involve a difference in morpho-syntactic form ((b) and (c) examples). The difference in meaning between control and raising verbs reflects the difference in the theta-role of the subject of the embedded clause. In control verbs the theta-role of the embedded clause subject is independent of the theta-role of the matrix clause subject, whereas in raising verbs it is not. Thus, the control verb entails a subject theta-role that requires an Animate noun, so that (23a) is acceptable, but (24a) is not. The raising verb however requires no such independent subject theta-role, so that either an Animate or Inanimate noun may appear in the surface subject position ((b) examples).

In both control and raising verbs the agreement element on the main verb is that of an infinitive *go-* (*ho-* in Sesotho), reflecting a lack of  $\phi$ -features, irrespective of the form of Agr on the preceding verb (e.g. *ke-* or *le-* in (23) and (24)). Despite the absence of overt features, this formative (a concord of Class 15) does indeed represent a kind of agreement which we will call 'null agreement'. For example, when an infinitive, as a verbal noun embedding a CP, serves as subject, the thematic verb of the IP shows agreement with this concordial element in the subject. This is illustrated in the Setswana example in (25).

(25)	[ <sub>DP</sub> [ <sub>CP</sub> go- $\emptyset$ <sup>I6</sup> -ruta] g-a-me]	[ <sub>IP</sub> go-n-e ]	[ <sub>IP</sub> go-tshwanets-e ]
	15-INF-teach 15-POSS-1SG	15-COP-PAST	15-be.necessary-PERF
	'My teaching was necessary.'		

<sup>16</sup>We assume, in accordance with the BPS, that a phonologically null T with nonfinite features is present in deverbal (gerundive) subjects.

The possessive *g-a-me* and the IP *go-n-e* show that *go-* is not restricted to non-finite or infinitival Tense (T=INF), but rather that it is a form of agreement (i.e. AGR).

In sum, the auxiliary constructions shown in the (c) examples in (23) and (24) are like raising verbs in that there is no subject theta-role independent of that of the complement verb. However, there is a difference in morphological and syntactic form. While the raising verb, like the control verb, requires an infinitival Agr on the complement verb (distinct from the Agr of the raising or control verb itself), the auxiliary verbs within the same LPS exhibit the same form of Agr as the main verb, i.e. both agree with the subject. We summarize these and other aforementioned characteristics of the different verb classes in Table 1.<sup>17</sup>

complement type:	verb type:		
	auxiliary V	raising main V	non-raising main V
	IP	infinitive CP (C = null/incorporated)	DP/NP, PP, AP, CP (CP = control V)
complement = thematic argument	no	yes	yes
constrained order amongst V's of type	yes	no	no
$\phi$ -features on AGR <sub>S</sub> of complement	yes	no	no
independent $\theta$ -role in AGR <sub>S</sub> P	no	no	yes

TABLE 1. VERB CLASS CHARACTERISTICS

Table 1 shows that auxiliary verbs differ from main verbs in several respects. Auxiliary verbs take IP complements which are non-thematic, where there is a constrained order amongst auxiliaries, and where there are  $\phi$ -features on AGR<sub>S</sub> of the complement, but no independent theta role. In this last respect only, auxiliaries are like raising verbs.

How, then, does Case assignment take place? As noted above, a phonologically overt form of agreement (Agr) occurs in each IP within the LPS. For example, in (23c) *ke-* appears with each BPS, while in (23a-b) null agreement *go-* appears on the lower BPS, and *ke-* appears on the higher one. Assuming that the subject originates in a VP internal position (Kuroda 1985, Koopman and Sportiche 1991), its movement into the highest AGR<sub>S</sub> in an LPS is motivated in order to obtain Case. The fact that agreement appears in intermediate positions means that the subject moves through intermediate Spec AgrP's active for the assignment of agreement but not for Case.<sup>18</sup> This means that agreement is significant independent of Case.<sup>19</sup> As noted above, we follow Poletto 1991 in observing that agreement serves a function in 'word-saturation'. While Case relates to the satisfaction of an LF interface condition on XP arguments, thereby driving XP-movement, agreement relates to the satisfaction of a PF interface condition on X<sup>0</sup> heads. The latter will drive X<sup>0</sup>-movement and conflation into a word at PF. We discuss this further in §5.

An XP subject must be driven to move into Spec AGR<sub>S</sub>P for independent reasons, however. Suppose Case-driven movement regards each Spec AGR<sub>S</sub>P that is active for agreement as a potential Case-position, i.e. an argument position, and therefore requires movement into it. Since Case is not in fact assigned however, the subject must move again. Such a conception of how movement is driven seems to be independently supported by raising and exceptional Case-marking constructions, in which intermediate landing without Case-assignment must occur.<sup>20</sup>

<sup>17</sup>The classification of verbs presented here is not exhaustive. A fuller treatment of verb classes would have to consider constructions like the following which look like Iterative IP structures, but which take subjunctive complements.

(i) Ke-ile                    k-a-di-reka.  
1SG-go+PERF 1SG-buy-1othem-buy  
'I bought them.'

<sup>18</sup>Chris Collins points out that floated quantifiers provide evidence for movement to intermediate landing sites in English (Sportiche 1988), viz., Spec AgrP's, e.g. *they will (all) have (all) been buying*.

<sup>19</sup>Cf. Chomsky (1993) for a relevant treatment of agreement without Case in adjectival Small Clauses.

<sup>20</sup>We are in accord here with the minimalist conception in Chomsky (1993) that an element can move only to fulfill requirements contingent on its own properties, i.e. operations demonstrate 'Greed'. We might name the quality described here, whereby the operation is driven into a relevant position 'seen' imperfectly at a distance as 'Myopia'. That is, Spec AGR<sub>S</sub>P's are in principle Case, or argument positions, so that A-movement is driven into such positions, even though, when in that position, Case-assignment or checking is not attained.



Subject arguments are linked in subordinate and matrix clauses either by control or movement, the subject moving in all cases cyclically from the lowest VP through all  $\text{AGR}_S\text{P}$ 's within the complement CP.<sup>21</sup> We might therefore expect  $\emptyset$ -feature agreement to appear on every  $\text{AGR}_S\text{P}$  in the sentence (in languages that realize Agr heads overtly).<sup>22</sup> It therefore becomes necessary to account for the phenomenon of null agreement in embedded CP complements. Compare the Kirundi control (26a) and raising (26b) constructions with the LPS in (26c). It appears that if the complement itself contains multiple BPS's, as in (26a-b), then null agreement will appear in the highest AgrP of the complement, while lower AgrP's will contain  $\emptyset$ -feature agreement.<sup>23</sup>

- (26)a. Tu- $\emptyset$ -shaka PRO ku- $\emptyset$ -ba tu-ra-kora.<sup>24</sup>  
 1PL-PRES-want 1 $\mathcal{S}$  INF-COP 1PL-AFOC-work  
 'We want to stay working (before...)'
- b. Ikiti ki- $\emptyset$ -gomba ku- $\emptyset$ -ba ki- $\emptyset$ -ri mu nzu.  
 7tree 7-PRES-bound.to 1 $\mathcal{S}$ -INF-COP 7-PRES-COP in  $\mathcal{S}$ house  
 'It is inevitable for the tree to be in the house.'
- c. Tu-zo-ba tu- $\emptyset$ -riko tu-ra-gura ibi-tabu.  
 1PL-FUT-COP 1PL-HAB-COP 1PL-AFOC-buy 9PL-books  
 'We will be habitually buying books.'

In (26a) the auxiliary verb *-ba* (copula) in the complement of the control verb *shaka* 'want' bears the infinitival Agr *ku-*, while the Agr on the main verb of the complement *kora* 'work' agrees with the subject of the complement PRO, linked by control with the matrix subject. Likewise, in (26b) the auxiliary verb *-ba* (copula) in the complement of the raising verb *gomba* 'be.bound.to' bears the infinitival Agr, while the concord on the main verb of the complement, the copula *-ri*, agrees with the trace of the raised subject of the complement linked by movement to the subject of the sentence as a whole. In (26c), however, the auxiliary verbs *-ba* (copula) and *-riko* (copula) do not bear an infinitival concord, but agree with the subject of the sentence as a whole, as does the main verb *gura* 'buy' of the single LPS.

In both control and raising verbs in Kirundi,  $\emptyset$ -feature agreement is with the subject of the sentence as a whole, despite the intervening null agreement formative in the head of the CP complement. This clearly shows that agreement formatives must result from movement of an internal subject into AgrP's, and that this is equally true with lexical NP subjects in the case of raising verbs, and PRO subjects in the case of control verbs. Multiple agreement cannot be merely a morphological phenomenon.<sup>25</sup> In both raising and control verbs, the NP must move from its VP internal position to receive Case. In other words, PRO also moves to receive Case, supporting the conception that it receives what has been called 'null' Case (Chomsky and Lasnik 1992) in the highest Spec AgrP.

What are null agreement and null Case, and how do we account for their distribution? It appears that they are structurally associated with the same AgrP. Up till now our discussion of the BPS has dealt with the IP domain, where VP's are the lexical heads of each BPS. Given that there is a BPS associated with every lexical projection, and that CP's are lexical, we also expect to find the sequence AgrP-TP-CP (or AgrP-DP-CP). It seems plausible therefore that null Case is assigned in Spec AgrP associated with CP, while null agreement appears in AgrP associated with CP. It is such null agreement associated with CP that is overtly manifested in the Class 1 $\mathcal{S}$  concord in Bantu languages.

<sup>21</sup>Note that multiple IP's in which all the specifiers are empty, or present irrelevant positions to A-movement, pose no 'barrier' to subject movement, which could, except for the conditions described here, be direct to the highest Spec  $\text{AGR}_S\text{P}$  in which Case is actually assigned, thereby by-passing all intermediate  $\text{AGR}_S\text{P}$ 's. Also, because movements are all local there is no problem for XP-movement before SpellOut even though head-conflation between BPS's is after SpellOut at LF.

<sup>22</sup>The situation cannot arise where the subject in the absence of an object moves into  $\text{AGR}_O\text{P}$  manifesting subject-agreement. If there is no object to be Case-marked  $\text{AGR}_O\text{P}$  will not be active for Case. Since  $\text{AGR}_O\text{P}$  is also not functional for word-determination (See Section 5),  $\text{AGR}_O\text{P}$  will in this circumstance be structurally inert, or absent.

<sup>23</sup>We thank Juvénal Ndayiragije of the Modularity Project for supplying these data and for insightful comments.

<sup>24</sup>Similar constructions exist in Sesotho ('Malillo Machobane, p.c.), viz:

- i. re- $\emptyset$ -rata PRO ho- $\emptyset$ -sala re- $\emptyset$ -sebetsa  
 'we want to remain working'

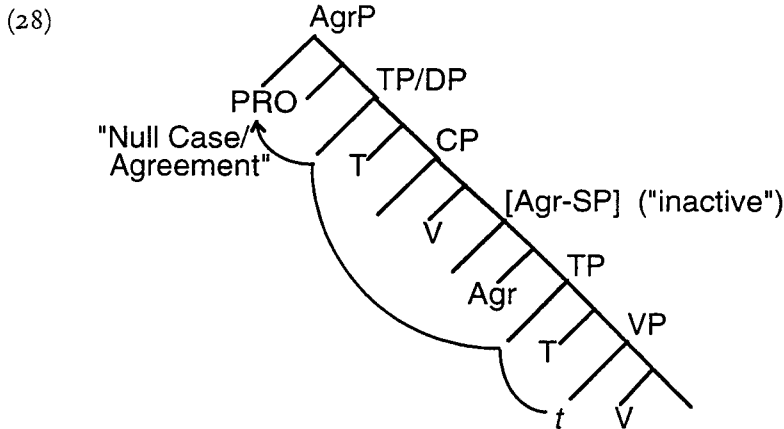
<sup>25</sup>E.g., a kind of morphological spreading of some formative to each verbal head.

Emonds (1985) gives evidence that C is categorially similar to P. The *for/to* complementizer construction exhibits Case-marking by the 'prepositional' complementizer *for*. Given the BPS, with an AgrP associated with CP, Case-marking then occurs when the lexical subject moves to Spec AgrP of CP. That is, the *for/to* complementizer construction is like a raising construction, although assigning a kind of prepositional Case. Concomitantly, null agreement appears in the infinitival form, overtly in Bantu. Prepositional Case generally does not cooccur with  $\emptyset$ -feature agreement<sup>26</sup>, and has this property even if, as we propose, it is assigned like structural Case by movement into an agreement phrase. Thus, null agreement is a manifestation of a type of prepositional Case assignment in Spec AgrP of a CP, as in (27a).<sup>27</sup>

(27)a. [AgrP for John [Agr' [Agr<C<V to-go ] ] [CP ...

b. [AgrP PRO [Agr' [Agr<C<V to-go ] ] [CP ...

We argue, then, that an infinitival clause with null subject (27b) is structurally parallel to a *for*-phrase subject (27a), the difference being that null Case, rather than prepositional Case, is assigned. In the case of a control verb, then, PRO raises to Spec AgrP-CP as an ordinary subject. Null Case is then assigned to PRO in Spec AgrP. Null agreement, overt in Bantu, then appears in its associated Agr<sup>o</sup>. Nominative Case is only assigned in an AGR<sub>S</sub>P associated with an IP. The relevant structure is given in (28).



AGR<sub>S</sub>P is inactive both for Case and agreement and is effectively absent (see §5.1). The raising of PRO to get Null Case, with concomitant null-agreement in the AgrP associated with CP, is accomplished by V-to-C incorporation, i.e. V-to-T (or D)-to-C. Only one word is formed despite two BPS's, since the intermediate AGR<sub>S</sub>P is inactive for agreement or word-formation.<sup>28</sup>

Suppose subject-to-subject raising is accomplished by further C-to-V incorporation, i.e. C-to-T (or D) to the matrix verb. Incorporation, or head-movement, is generally associated with a non-finite TP (or non-specific DP or CP). T incorporation would then take place except when T is finite in an overt CP (where the subject receives Case in the Spec AgrP associated with the highest IP). In the lower IP's of an LPS, which are presumably non-finite, there is T-to-T (i.e. I-to-I) incorporation. In a raising construction, where both C and I would be non-specific, C-to-V incorporation would be licensed, with the incorporation, as well, of I-to-C within the lower, non-finite clause; this permits raising of the subject through CP to the

<sup>26</sup>But see Kayne (1993) and Watanabe (1993) for considerations that agreement can be associated with prepositional Case.

<sup>27</sup>The BPS predicts interaction between Case marking in the Spec AgrP of a BPS associated with a CP, and operator licensing, presumably in Spec TP/DP of CP. According to the BPS, the Case-marked subject (in Spec AgrP) must precede the operator (in Spec DP). Therefore, it correctly predicts that (i) below is ungrammatical, while a PRO subject would be acceptable if it had the form (ii), but a lexical subject would be ungrammatical, as in (iii); (iv) is acceptable because the operator has raised within the additional BPS provided by the DP subject:

- i. \*I wonder who for John to see
- ii. I wonder [AgrP PRO [DP who to see]]
- iii. (\*)I wonder [AgrP for John [DP who to see]]
- iv. [DP who [AgrP for John [DP t to see]]] is a problem

<sup>28</sup>Note that the English infinitive form (e.g. *to go*) is suggestive of two BPS's, where *to* is a fused form for Agr-T/D-C.

Case-position of the subject of the matrix clause.

In a control or *for/to* complementizer construction, I but not C is nonspecific/nonfinite, so that there is I-to-C incorporation, but no C-to-V incorporation; this permits raising of the subject just to Spec AgrP-CP, where Case (null or prepositional) is assigned and movement terminates.

The position in which subject Case assignment takes place is therefore the highest AgrP available. There are three possibilities for Case assignment to a lexical subject. Either (i) a finite T assigns nominative Case in the AgrP of that IP (since T, being finite, cannot incorporate further); or (ii) a non-finite T permits and requires incorporation and further movement to Spec AgrP-CP, assigning prepositional Case (*for*); or c), if the CP is non-specific, C will incorporate into V permitting and requiring raising of the subject to the highest AGR<sub>S</sub>P of the matrix clause, where Case is assigned by the finite T (or to the object Case-position in exceptional Case-marking).

The following table summarizes the characteristics of these different constructions:

construction type	form of subject in Spec AgrP	in BPS of	definiteness of CP	definiteness of IP	agreement type	Case (type)
auxiliary	<i>t</i>	IP	n.a.	non-finite	$\phi$ -feature	no
raising	<i>t</i>	CP	non-specific	non-finite	null	no
control	PRO	CP	specific	non-finite	null	yes (null)
[ <sub>CP</sub> <i>for/to</i> ...]	lexical NP	CP	specific	non-finite	null	yes (Prep)
[ <sub>CP</sub> <i>that</i> ...]	lexical NP	IP	specific	finite	$\phi$ -feature	yes (Nom)

TABLE 2. DISTRIBUTION OF SUBJECT AGREEMENT AND CASE

As seen in Table 2,  $\phi$ -feature agreement occurs only in AgrP's associated with IP's, while null agreement occurs in AgrP's associated with CP's. We would suppose that in a raising construction, the subject must land at Spec AgrP of CP, active for null agreement but not for Case, so that the subject raises further to receive Case.

Furthermore, as already shown, only the highest BPS within an LPS contains a finite, Case-assigning TP. Case assignment then takes place in accord with economy of derivation, where movement to the highest TP is driven by the need to receive Case. Only a specific CP or a finite IP will block movement to a higher BPS, permitting and requiring Case to be assigned at that point. In the case of a raising verb, for example, with a non-specific CP and a non-finite IP in the lower clause, Case is not assigned until the lexical NP stops raising, i.e. has raised to the AgrP of the highest (finite) BPS of the matrix clause.

In this section we have shown that one of the principal syntactic differences between auxiliary verbs and other verbs is the nature of their complement. Auxiliary verbs always take IP complements, while main verbs do not. Thus, while auxiliary verbs function as lexical heads, lying structurally in the VP of a BPS, they are also 'deficient' in terms of the type of complements they take. The BPS, together with the LPS, therefore sheds some light on the ambiguously lexical and functional nature of auxiliaries.

Given the possibility of multiple auxiliaries within the LPS, issues of agreement and Case assignment also arise. We have given supporting evidence that Case assignment and agreement are distinct, though structurally related, linguistic phenomena, the former required for legitimacy at LF, the latter, as will become clear in §5, required for legitimacy at PF. Their distinctness is demonstrated by the fact that Case is assigned either by finite TP's, which must be the highest within an LPS, or by specific CP's. In contrast,  $\phi$ -feature agreement occurs only on AgrP's associated with IP's, while null agreement occurs on AgrP's associated with CP's. We suggest that these conditions are universal, despite the fact that only some languages employ overt agreement formatives within each BPS. We turn now to a discussion of morpho-syntactic interactions at PF and language variation.

### 5. Morpho-syntactic interactions and language variation

In this section we discuss morpho-syntactic interactions involving both LF and PF interface conditions, showing how the BPS provides a principled set of constraints on word formation. In so doing, we also

explore language variation in the morphological realization of functional heads within the BPS, and the possibility of incorporation across BPS's. In particular, we focus on the fact that Bantu languages typically manifest an obligatory agreement formative with every overt BPS, proposing a theoretical explanation of language variation that goes beyond mere lexical generalization. We begin with a discussion of the possibility of incorporation amongst BPS's in §5.1, turning to PF/LF interactions on word formation in §5.2.

### 5.1 Incorporation amongst BPS's

While the claim is that an AgrP occurs only as the highest projection in a BPS, there are instances where AgrP's are entirely inactive or effectively absent, i.e. inactive for both Case and agreement. This happens, for example, with respect to AGR<sub>S</sub>P in control and raising constructions (see §4.2). While the distribution of AgrP's active for Case appears to depend on optimizing the movement of DP's to receive Case, the distribution of Agr's active for agreement or word-saturation alone appears to be a matter of language variation. Appropriately, this yields similarity across languages at the LF interface, while allowing for language variation at the PF interface.

Given that the function of agreement, whether morphologically overt or not, is word-formation or saturation (Giorgi and Pianesi 1991, Li 1990, Poletto 1991), and that this is effected by successive head-movement until an Agr is reached, the effective absence of an Agr means conflation of BPS's into a single word. This provides an account for the possibility of agglutinative or polysynthetic structures. Consider the following paradigm of Latin, where T and Agr (AGR<sub>S</sub>) formatives are suffixes (our glosses).<sup>29</sup>

(29)a.	lauda-ba-m praise-PAST-ISG 'I praised'	[[[V-T]-AGR <sub>S</sub> ]	
b.	lauda-b-o praise-FUT-ISG 'I will praise'	[[[V-T]-AGR <sub>S</sub> ]	
c.	lauda-v-er-a-m praise-PERF-COP-PAST-ISG 'I had praised'	[[[[[V-T]-V]-T]-AGR <sub>S</sub> ]	
d.	lauda-v-er-Ø-o praise-PERF-COP-FUT-ISG 'I will have praised'	[[[[[V-T]-V]-T]-AGR <sub>S</sub> ]	
e.	lauda-tur-us er-a-m praise-FPT-MSG COP-PAST-ISG 'I was going to praise'	[[[V-T]-AGR <sub>S</sub> ]	[[[V-T]-AGR <sub>S</sub> ]
f.	lauda-tur-us er-Ø-o praise-FPT-MSG COP-FUT-ISG 'I will be going to praise'	[[[V-T]-AGR <sub>S</sub> ]	[[[V-T]-AGR <sub>S</sub> ]

Past and future Tense forms are shown for simple (29a-b), perfect (29c-d), and future participial (29e-f) constructions. In each case, the formative for either PAST *-(b)a-* or FUT *-b/Ø-* appears.

Note, however, the variation in word formation between the perfect and future participial forms. The future participial forms in (29e-f) consist of two BPS's, each showing the expected formatives Agr, T and V.

<sup>29</sup>The data are from Giorgi and Pianesi (1991), q. v. for discussion. Since not illustrative of our point, present (*laud-f-o* 'I praise') and present perfect (*lauda-vi-t* 'he has praised') are not included. The general use across languages of PERF formatives, such as Sesotho/Setswana *-ile* (see §3.1), as a kind of simple past suggests that it is a default or lexically underspecified category. Latin *-ba-* PAST and *-v(i)-* PERF could be distinguished as tense formatives in the first BPS in this way. While *-ba-* is specified as simple past, *-v(i)-* is specified only by what is common between them. The Latin *-ba-* would then block the simple past, while *-v(i)-* will express either present perfect or a default situation. In terms of Reichenbach (1947) and Hornstein (1990), past simple, i.e. PAST, may be represented as E,R,S, while present perfect as E,R,S (E,R,S = event, reference and speech time, respectively). The lexical underspecification of PERF would then be just E,S. If tenses are relations between (undifferentiated) E/R and S, while aspects are relations between E and R, both PAST and PERF can represent kinds of tense according to their lexical specifications.

Note especially the presence of multiple Agr<sup>o</sup> formatives, remarkably similar to that of Bantu languages. In these examples Agr appears to be not only present, but active for agreement as well. The future participial contrasts, however, with the perfect constructions in (29c-d), where the copula *-er-* provides evidence for two BPS's, but where Agr on the lower BPS is apparently absent, thereby allowing for BPS incorporation (i.e. BPS > BPS). In other words, the lower BPS does not form its own word because Agr, needed for word saturation, is not present.<sup>30</sup>

It is theoretically significant that a 'dummy' copula appears within a word containing another verbal head in (29c-d). This cannot be explained by the need to support wordhood, as is often proposed for auxiliaries (e.g. *do-Support*). This is because wordhood is already satisfied by the presence of the thematic verb. Rather, the reason for the presence of the copula is the architectural/functional requirement for BPS wellformedness: a TP cannot occur without a VP, and a VP cannot occur without a TP.

Certain related issues concerning incorporation across BPS's deserve mention here. Firstly, an overt AGR<sub>O</sub> can appear in Sesotho/Setswana within the same word as an AGR<sub>S</sub> (see (2b)). In other words, AGR<sub>O</sub> does not appear to saturate a word. It must be the case therefore that only AGR<sub>S</sub> is involved in determining a word.<sup>31</sup>

Secondly, BPS incorporation may occur in some cases even where the Agr is AGR<sub>S</sub>, namely in the case of I-to-C movement in verb second phenomena. In this instance, the highest BPS is incorporated into the CP—which is also a BPS (see §4.2). We can account for this latter behavior in terms of Case assignment. Agr's which discharge Case functions before SpellOut, as does the highest AGR<sub>S</sub>, do not block incorporation across BPS's. That is, the discharge of its Case-assigning/checking function removes the word-determining function of Agr. This is in accord with the theoretic conception that Agr disappears after it performs its function. Consequently the highest AGR<sub>S</sub> among IP's in a verbal LPS will not block I-to-C raising in verb-second phenomena. On the other hand, intermediate AGR<sub>S</sub>'s, which do not assign Case, can never lose their word-determining function, and so permit no PF incorporation across them. This then makes the general claim that multiple intermediate AGR<sub>S</sub>'s can never appear within the same word.<sup>32</sup>

The condition of word-determination within the BPS by movement into Agr<sup>o</sup> seems to be a requirement of interpretation at the PF interface, although its function appears to be related to the discharge of Case, a condition on XP's at LF. We turn now to further exploration of the word-determining function of X<sup>o</sup>-movement into Agr and its interaction with LF interface conditions on X<sup>o</sup> movement.

## 5.2 Interface conditions on X<sup>o</sup>-movement and surface realization

The appearance of AgrP's is pervasive in Bantu. Every overt BPS, or word, has overt agreement, including CP's (see §4.2) and DP's (see §6). The phonological realization of null agreement on CP's in Bantu languages (e.g. Sesotho *ho-*, Setswana *go-*, Kirundi *ku-*) underlines the systematic necessity these languages exhibit for the overt appearance of agreement on lexical heads—it must appear even when  $\emptyset$ -features are absent.

Why is agreement necessary in word-formation? We have supposed that, while Case is needed to license XP arguments at LF, agreement is needed to license words, or 'lexical heads', at PF. That is, incorporation of a lexical head into Agr is necessary for defining a word. It functions to 'saturate a word' (Poletto 1991).

<sup>30</sup>According to Giorgi and Pianesi (1991) the Agr on the future participle is adjectival and therefore carries features of gender and not person. Giorgi and Pianesi require a VP with every TP by supposing that TP is lexical and thematic and must assign a 'T-role' to a VP; they do not require a TP with every VP however, accounting for the absence of an overt Tense formative in present tenses (e.g. present perfect) by the assumption that present tense is the absence of semantic content, i.e. the absence of a T, and that there is a biunique relationship between an underlying T and its overt representation. The BPS, however, requires that present tense in such cases is a null formative with minimal, but existent, semantic content, its disposition to being null in virtue of its semantic specification being minimal.

<sup>31</sup>It might be, however, that AGR<sub>O</sub> must occur within its own BPS, where it then incorporates into the head of an AGR<sub>S</sub> to form a word. Examples such as the perfect of a French transitive verb with overt AGR<sub>O</sub> (pointed out to us by Morris Halle), would then have to be analyzed as having an implicit AGR<sub>S</sub>.

(i) l-a lettre que Jean a- $\emptyset$  t ecri-t-e  
 the-FEM letter which have-PRES-III write-PERF-FEM- $\emptyset$ - $\emptyset$ - $\emptyset$   
 [[V-T]-AGR<sub>S</sub>] [[[[[V-T]-AGR<sub>O</sub>]-V]-T]-AGR<sub>S</sub>]  
 'the letter which Jean has written'

<sup>32</sup>Winnebago, pointed out to us by Kenneth Hale, provides possible or apparent counter-examples (see White Eagle 1988).

If we apply the strong/weak dichotomy sometimes made for morphological features (Pollock 1989, Chomsky 1993) to agreement, agreement or word-saturation features could be strong, discharging their function before SpellOut, or weak, discharging their function after SpellOut. The satisfaction of agreement, or word-saturation, would then be a PF interface condition. The discharge of agreement can therefore not take place after SpellOut during the SpellOut-LF computation, as it will not be motivated. If the agreement feature is strong, it must discharge its function before SpellOut, otherwise an uninterpretable strong feature will be present at LF. A weak agreement feature, however, will be discountable at LF, and can discharge its function after SpellOut during the SpellOut-PF computation. If the economy principle of Procrastinate (Chomsky 1993) applies with respect to PF as well as LF, then a weak feature whose properties must be discharged to satisfy PF interface conditions will take place in the SpellOut-PF computation.

The variation Pollock (1989) observed between English and French, where the former has raising of V-to-T covertly in SpellOut-LF, while the latter has V-to-T overtly before SpellOut, does not involve agreement features or word saturation as such. Rather, V-to-T raising is driven by the need for event-binding (Pollock 1989) or for V to have a T feature checked or discharged in V (Chomsky 1993). In §3.1 we have described an event-framing property of T. Let us then refer to an event-feature of V to be discharged in T. Thus, French has a strong event-feature, which needs to be discharged before SpellOut, while English has a weak event-feature. While agreement, or word-saturation, is a requirement of PF interface conditions, the discharge of event-features is a requirement of LF interface conditions. Strong event-features must be discharged before SpellOut. They must be deletable at PF where they are irrelevant; otherwise a strong event-feature will appear and be uninterpretable at PF. A weak event-feature, however, can be disregarded at PF and may, and therefore must, discharge its function after SpellOut, in the SpellOut-LF computation.

We argue that Bantu languages, in contrast to English and French, have strong agreement features, where head-movement, or incorporation of T-to-Agr, must occur before SpellOut. In French and English, with weak agreement, T-to-Agr incorporation occurs after SpellOut in the PF component. Furthermore, in Bantu languages event-features must also be strong, so that V-to-T incorporation occurs before SpellOut. The difference between French and English is that event-features in French are strong, while in English they are weak (Pollock 1989, Chomsky 1993). We summarize this typology as follows:

	Bantu	French	English
Agr < T	STRONG	WEAK	WEAK
T < V	STRONG	STRONG	WEAK

TABLE 3. HEAD INCORPORATION WITHIN THE BPS

Strong agreement, or word-saturation, correlates with *pro*-drop, which is also probably a PF interface phenomenon.<sup>33</sup> *Pro*-drop does not occur in English or French, but does occur in Bantu languages, as well as many Romance and other Indo-European languages such as Italian and Russian, both of which have overt agreement morphology.

Consider now how the strong/weak distinctions for both agreement and event-features determine the surface morphological differences between Bantu, French and English. In the framework of Distributed Morphology of Halle and Marantz (1993), the process of SpellOut may include 'readjustment' of feature-morpheme mappings. Readjustment may involve either 'merger' or 'fusion', both occurring under conditions of morpheme adjacency and executed after SpellOut. We take merger to be a process of head-adjunction in the PF computation, resulting in heads occupying distinct terminal nodes, maintaining their morphological identity. The head-incorporation that takes place before SpellOut is similar, except that it requires c-command, not adjacency, and leaves a trace, while merger requires adjacency and leaves no trace. Fusion, on the other hand, is also a process in the PF computation requiring adjacency, but it reduces heads to a single terminal node representing a complex of features.

<sup>33</sup>A possible explanation for the correlation of *pro*-drop with strong agreement supports the conception that strong agreement means T > Agr before SpellOut. Suppose weak subject pronouns are characterized by a weak or absent topicality feature. They therefore cannot serve as a topic in the highest Spec TP and so must move directly to the highest Spec AGR<sub>S</sub>, crossing Spec TP. Spec TP however will be a minimality barrier for movement to Spec AgrP unless T incorporates into Agr. Suppose a phonologically null pronoun cannot move after SpellOut. *Pro*, as a null weak pronoun, must then move before SpellOut. It is therefore necessary that T > Agr occur before SpellOut as well. That is, Agr must be strong.

Satisfaction of the PF interface condition on agreement (i.e. that a word contain an Agr head), is noncommittal regarding the computational means by which this is achieved. It can either be satisfied after SpellOut, by the readjustment processes of fusion or merger, or before SpellOut by head-incorporation. Fusion would amalgamate features of Tense and Agreement into a single formative under one head. Head-incorporation or merger, however, would result in separate but adjoined heads.

Note that head-movement can occur either before SpellOut (incorporation) or after SpellOut in the PF computation (merger). It seems reasonable to suppose that fusion is only possible in the PF computation, after SpellOut; otherwise LF will be affected and become uninterpretable. Either process, head-movement (incorporation or merger) or fusion, results in a single dominant head with an Agr feature that can satisfy word saturation conditions. However, each process is only driven by the need to satisfy these conditions. If word saturation is satisfied in one way, the other will not occur—in accord with the spirit of the Minimalist program (Chomsky 1993).

Thus, in Bantu languages, the strong agreement or word-saturation features, as well as the strong event-features, must be discharged before SpellOut. This must be by means of head-movement or incorporation, resulting in a sequence of adjoined heads. Since word-saturation is now satisfied, further computation in the SpellOut-PF component is not possible. Therefore fusion, which can only be a part of the SpellOut-PF computation, is impossible, and the components of Agr-T-V must all appear as separate formatives.

On the other hand, in French and English the agreement or word-saturation feature is weak. T will not move to Agr in French before SpellOut, although, because of strong event-features, V will move to T. In English, however, because of weak event-features, both V-to-T and T-to-Agr will not occur before SpellOut. Thus, in English, Agr, T and V may be fused into a single formative, since fusion can be the means of producing a single head in the PF computation in English. In French, however, V will always be separate from T, although T and Agr may be fused. Thus, French shows an overt T-Agr, or T followed by Agr morphology, while English does not. The consequences of the ordering relationship between head-movement and SpellOut are summarized below (where < = 'incorporation before SpellOut'; = = 'merger'; and / = 'fusion after SpellOut').

	process	language
PF realization: Agr-/T-/V-	merger or fusion	(English)
Agr-/T<V	merger or fusion + incorporation	(French)
Agr<T<V	incorporation	(Bantu)

TABLE 4. MORPHOLOGICAL REALIZATION OF AGREEMENT AND TENSE WITHIN THE BPS

In Bantu languages the T formative will always be distinct from the lexical head (e.g. V), and the Agr formative will always be distinct from the T formative, since only syntactic incorporation has taken place. There will therefore in principle always be three morphemes per word in Bantu, although some morphemes may be phonologically null or have phonologically altered forms. In French the T formative will always be distinct from V due to syntactic incorporation, but the Agr formative may be indistinct from the T formative if the two have fused. Alternatively Agr and T may remain distinct through merger. There may therefore be either two or three morphemes per verbal word in French. In English, T and Agr may have fused, or V, T and Agr may all have fused. That is, there may be just one morpheme per word in English. The following examples illustrate these contrasts:<sup>34</sup>

(30)a.	You must go.	V/T/Agr	V/T/Agr
	2PL.PN must/PRES/∅ go/INF/∅	(English)	
b.	Vous dev-ez all-er.	V>T/Agr	V>T/Agr
	2PL must>PRES/2PL go>INF/∅	(French)	
c.	Lo-tshwanets-e go-∅-tsamaya.	Agr<T<V	Agr<T<V
	2PL<must<PERF 15<INF<go	(Setswana)	

<sup>34</sup>It is not clear whether Strong T-to-Agr can occur with Weak V-to T. This would mean T incorporating into Agr before V into T, possibly violating cyclicity. The morphological effect would be that V and T could be fused, but not T and Agr, i.e. there could be V/T > Agr forms, for example, verb forms suppletive with respect to tense with distinctly identifiable agreement formatives.

Note that in English,  $\text{Agr}^{\circ}$  has no distinct morphological representation in all but the highest BPS, and then only in the present tense.  $\text{Agr}^{\circ}$  is always structurally present, however, serving to determine words between BPS's. There is thus a general morphological obscuring of agreement features by those of Tense in English. This seems to be the effect of fusion between  $\text{Agr}^{\circ}$  and  $\text{T}^{\circ}$ , together with that of lexical blocking. In the process of inserting items during morphological SpellOut, formatives compete with, or disjunctively delimit, others in a lexical field (Gruber 1976, Halle and Marantz 1993). In general, the more highly lexically specified items win over the less specified. It seems plausible that, for features fused under a single node,  $\text{T}^{\circ}$  features count as more highly valued in lexical specification than  $\text{Agr}^{\circ}$  features.<sup>35</sup> The present tense, however, would be characterized by the absence of  $\text{T}^{\circ}$  features. Consequently, a formative with a lexical specification consisting of just a  $\text{T}^{\circ}$  feature (English *-ed*, *-en*, *-ing*) will always block or delimit the use of one with just  $\text{Agr}^{\circ}$  features. In the present tense, however, the formative specified for 3SG (*-s*) delimits the unspecified formative (*-∅*).<sup>36</sup>

In this section we have shown that the BPS provides a principled set of constraints on word formation, where the structural presence of an  $\text{AgrP}$  'saturates' a word, and the structural presence of a TP is required for 'event-framing', i.e. the discharge of event-features. Furthermore, we have argued that the surface realization of  $\text{Agr}$  and  $\text{T}$  formatives is determined by language particular strategies for satisfying PF conditions. Head movement, or incorporation, occurs early (i.e. before SpellOut) in Bantu languages, and later (i.e. after SpellOut—as either merger or fusion) in English, with French exhibiting aspects of both. LF and PF interface conditions therefore constrain  $\text{X}^{\circ}$ -movement and surface realization within the BPS.

Our discussion so far has focused on the BPS and the LPS in the verbal, and to some extent the CP domain. The claim is that these organizational units will be found in other lexical domains as well. We conclude in the §6 with a sketch of how the BPS and LPS may generalize to the nominal domain.

## 6. Discussion: extension to NP's

We have argued that the Basic Projection Sequence, or BPS, is an elemental conceptual unit that underlies the structure of language. This unit must have a LexicalP (e.g. a VP), a ReferentialP (e.g. a TP to ensure event-framing, or checking of event-features), and an  $\text{AgrP}$  (to check Case and  $\phi$ -features). We have also argued that this three-headed complex is required for the licitness of word formation, where the head of ReferentialP is necessary for interpretation at LF, and the head of  $\text{AgrP}$  is necessary for interpretation at PF. We have then demonstrated that the BPS exists not only in Bantu languages, where there is overt morphological evidence of such structure, but also in languages like English and French, where morphological processes such as fusion frequently provide only covert evidence. We therefore postulate the BPS as a universal underlying structure of human language, constituting a principled set of constraints on possible syntactic forms. The BPS, along with the Lexical Projection Sequence (LPS), thereby establishes a syntactically and semantically motivated distinction between auxiliary and main verbs, as well as a principled set of constraints on the number, type, and order of functional and lexical projections amongst auxiliaries.

Our present discussion has focused on the verbal domain, or IP structures, where the lexical, or thematic head is a VP. However, if postulating the BPS as a pervasive basic structure is correct, we would expect it to generalize to all lexical domains. We have already shown that the BPS generalizes to CP's, where  $\text{C}^{\circ}$  is the lexical head, the ReferentialP (TP, or DP?) is either specific (assigning Case as in control and

<sup>35</sup>In Gruber (1976) the general condition is put forth that features of a category  $\alpha$  count as more highly specified than those of a category  $\beta$  if  $\alpha$  c-commands  $\beta$ . Given that  $\text{Agr}^{\circ}$  c-commands  $\text{T}^{\circ}$ , this condition seems contradicted here. Although the c-command relation would be eliminated in the fusion process, the condition correctly applies in most cases, e.g. *they* specified in just Number blocks *he*, *she*, *it* specified in just Gender. Interestingly, Case, though c-commanding like agreement, appears to count as less specified than Person. *You*, specified in Person but not Case, blocks *them*, *him*, *her*, specified in Case but not Person.

<sup>36</sup>An explanation for the obscured agreement in English might also lie in the strong/weak typology, and the fact that agreement is a PF licensing condition. The latter implies that the representation of agreement features depends on their having been checked or licensed in  $\text{Agr}^{\circ}$  at PF. In both Bantu and English the subject moves for Case before SpellOut into the highest  $\text{AGR}_{\text{SP}}$ . If agreement is strong, as in Bantu, then  $\text{T} > \text{Agr}$  occurs before SpellOut as well. This permits the  $\phi$ -features to enter the PF component checked in each  $\text{Agr}^{\circ}$ . On the other hand, if agreement is weak, as in English,  $\text{T} > \text{Agr}$  occurs after SpellOut, and therefore it may be that the  $\phi$ -features cannot be checked in each  $\text{Agr}^{\circ}$  before SpellOut. They therefore enter the PF component unchecked, and can only be checked where the subject then is, i.e. in the highest  $\text{AGR}_{\text{SP}}$ . Similar phenomena occur with respect to object shift, where object agreement occurs only when the object moves for Case before SpellOut. However, French, also with weak  $\text{T} > \text{Agr}$ , seems to manifest subject agreement formatives in non-initial BPS's, e.g. intransitive perfect or passive participles.

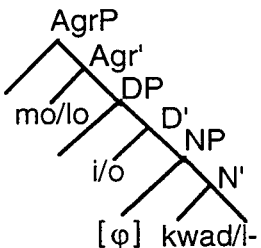
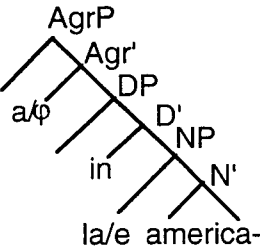


for/to constructions), or nonspecific (not incorporating and not assigning Case in raising constructions), and the AgrP exhibits null  $\varnothing$ -features (see §4.2). The implication is that the BPS also generalizes to the nominal domain, where an NP is the lexical, or thematic projection.

Given the overt realization of Agr heads in Bantu BPS's in the complementizer and verbal domains, we might expect overt realization of Agr heads in the nominal domain as well, and this is the case. Bantu nominals occur with a noun class prefix (e.g. Sesotho/Setswana *mo-tho* 'person', *ba-tho* 'people'). Suppose Bantu noun class prefixes are actually Agr heads, again carrying the  $\varnothing$ -features associated with the lexical head of the BPS, and that nominal inflections of declension class, gender and number in other languages should also be considered Agr heads. Carstens (1991) proposes that the feature carried by Bantu noun class prefixes is Number, and NumberP's have been proposed for other languages as well (e.g. Ritter 1990). As in the case of IP's, however, number features are a property of AgrP's, and NumberP's posited for other languages can be reanalyzed as such. Alternatively, a lexical NumberP which appears as a separate word with its own agreement formative, signals another BPS; the NumberP and NP sequence forming an LPS.

Furthermore, like CP's and VP's, NP's have an associated ReferentialP—in this case DP. The infinitival form of verbs in Bantu languages generally terminate in a final vowel *-a*. When deverbal nouns are formed, this final vowel changes to an agentive *-i*, or a nominal *-o*. Noun-final vowels in Bantu languages are therefore often identifiable as Ds signaling internal reference (lambda-extraction) with respect to an internal argument position. It could be that the corresponding Spec DP contains a *wh*-like operator linked to the internal argument position.<sup>37</sup>

For example, consider Setswana *lo-kwal-o* 'letter' and *mo-kwad-i* 'writer' both derived from *go-kwal-a* 'to write'. These could be analyzed as Agr-N-D with D= *-o* signaling reference to the object and D= *-i* signaling reference to the subject: 'a thing (one) writes/written', 'one who writes'. We might then derive simple nominals in Setswana and French from the following base-generated forms:

- (31) a.  b. 
- mo-kwad-i* 'a/the writer'                      *l-Ø-a america-in-e* 'the american'(F)  
*lo-kwal-o* 'a/the letter'                      *l-Ø-e america-in-Ø* 'the american'(M)

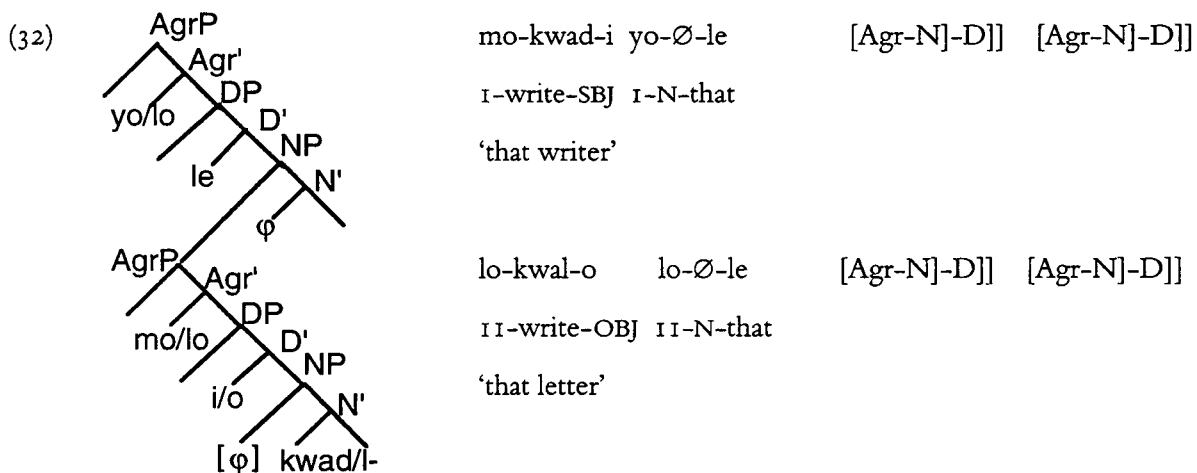
In Setswana (31a), head movement of N to D, to Agr creates the noun, while the null article bearing lexically specified  $\varnothing$ -features [ $\varnothing$ ], moves from Spec NP to Spec AgrP, determining Agr with identical features. In the French forms (31b), we propose that the affix *-in-* represents D, signaling reference to an internal thematic position of the head noun (e.g. 'one who lives in America'). In French, however, an overt article (which itself constitutes a BPS) moves from Spec NP to Spec AgrP, also triggering agreement. The cooccurrence of a null article in Bantu and other languages with well articulated nominal concords suggests that null articles are licensed in the same way as *pro*-drop. This supports the conception that nominal concords are Agr's while articles are DP-internal 'subjects'.

Ds in lexical determiners signal external reference. Lexical determiners themselves must represent a BPS. In the case of articles (as in English, French, etc.), as well as in demonstratives, definiteness (or lack thereof) and deixis would be encoded in the head of the DP. Lexical determiners often also contain an overt Agr<sup>0</sup>, indicating another BPS. For example the French articles *le/la* could be analyzed as D-N-Agr (*l-Ø-e/a*), with N a null deficient lexical head. In Bantu languages such as Zulu or Kirundi, a pre-prefix on nominals has a definitizing function. Many Bantu languages, however, including Sesotho and Setswana, do not mark definiteness in overt articles. In these languages we presume that the article and its associated D is phonologically null.

<sup>37</sup>The inclusion of operator heads in derivational morphology arose in part in discussions with A.-M. Di Sciullo and is developed in Di Sciullo (1994).

Agreement within a nominal expression would be produced in the usual way. A  $\phi$ -feature bearing element moves into an associated Spec AgrP to satisfy expression-internal Case requirements. Concomitantly, agreement is manifested on the Agr<sup>o</sup> to which are adjoined a noun or lexical head and some referential or deictic head. We might implement this idea by supposing that the  $\phi$ -feature bearing element that moves to receive Case in a simple nominal is the article, realized covertly (Sesotho/Setswana) or overtly (e.g. English, French). The article would be a deficient nominal expression base-generated in a thematic position of the NP corresponding to that of the internal 'subject' of a VP. It is primitive in the sense that its Agr bears base-generated  $\phi$ -features that are licensed lexically in relation to the head noun, rather than by movement, in accord with traditional conceptions. In fact it is impossible to license  $\phi$ -features lexically in an Agr position, remote from the head noun of the BPS. Therefore the BPS correctly predicts that articles are obligatory. Like a subject, the article then moves to a nominal-internal Spec AgrP in order to receive Case.

The Setswana demonstratives in *mo-kwad-i yo-le* 'that writer' or *lo-kwal-o lo-le* 'that letter' would be similarly analyzed as a BPS, with the expected structural positions Agr-N-D (*yo/lo-Ø-le*). Demonstratives in a complex nominal expression would correspond, in a sense, to auxiliaries in the verbal realm, constituting a nominal LPS. Because each BPS is an extended NP, however, it is an argument and would itself move as a whole for Case. This derives successive agreement among BPS's in Sesotho and Setswana, with the resultant surface order of BPS's within the LPS being opposite to that of the verbal LPS (i.e. the thematic BPS occurs first):



*Mo-kwad-i* and *lo-kwal-o* each constitute BPS's which conflate into a word in the same way as in (31). The BPS-word unit then moves as a whole to the higher Spec AgrP in order to receive Case, with concomitant head movement of the upper N to D to Agr, forming the demonstrative. Forms with different orders e.g. English *that letter*, would result from alternative processes of Case discharge in a similar nominal LPS structure. Thus, the BPS and the LPS seem to correctly characterize and constrain the forms of nominal as well as verbal structures.

To conclude, we have shown that the Basic Projection Sequence (BPS) represents an elemental, conceptual, organizational unit of language constraining the cooccurrence of functional and lexical categories. We have also demonstrated how the Lexical Projection Sequence (LPS) constitutes a higher level unit which constrains sequences of BPS's. These units constitute universal constructive principles, found in all languages, and in all lexical domains. Language therefore shares a mode of simplicity and organization with the physical world, where the structure of matter consists of a few distinct particle types combining to form atomic units, which in turn combine to form molecules. Simplicity in linguistic structure thus lies in a similar repetition of a small number of category and unit types, organizable into larger structures.

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