

Jan Anward

A dynamic model of part-of-speech differentiationⁱ

Most, if not all, natural languages organize their lexical items into a system of broad lexical classes, whose members share unique clusters of semantic, syntactic, and morphological properties.

Such part-of-speech systems are not of one kind, but vary from language to language, along a number of parameters.

Curiously, however, one common feature of naturally occurring part-of-speech systems seems to be that they are not 'well-designed', at least not qua part-of-speech systems. It is characteristic for part-of-speech systems to be complex and opaque. Whatever identifying criteria we use for parts of speech - meaning, syntactic function, or inflection, the relationship between particular criteria and particular parts of speech is typically many-to-many.ⁱⁱ

The medieval *modistae* (Robins 1990: ch 4, Covington 1979, 1984, Itkonen 1991: 219-252) demonstrated that part-of-speech membership cannot be predicted from lexical meaning. A telling quadruple was devised by Boëthius Dacus to show the nature of the problem: *dolor* (pain), *doleo* (I feel pain), *dolenter* (painfully), and *heu* (ouch) have very similar meanings, but belong to four different parts of speech: noun, verb, adverb, and interjection, respectively (Covington 1984:26).ⁱⁱⁱ

Conversely, most parts of speech accommodate several semantic categories. For example, nouns are not only person or thing expressions, they also express event notions, such as *scandal* and *war*, place notions, such as *rear*, *way*, *left*, and *north*, temporal notions, such as *day*, *week*, and *winter*, and in fact most other kinds of notions. Likewise, verbs are not only event expressions, but also express, for example, place (*inhabit*), time (*elapse*), relation (*resemble*), and quantity (*multiply*).

A similar story can be told of syntactic functions and parts of speech. Nouns, verbs, and adjectives can all be used as arguments, predicates, and modifiers.

Not even inflection, the last resort for the weak-hearted, escapes the many-to-many pattern. In Swedish, for example, not only nouns, but also adjectives, some quantifiers, and past participles take nominal inflection. Conversely, in all these parts of speech, there are members that, for various reasons, do not inflect at all.

Thus, part-of-speech systems present us with three theoretical problems:

1° Why do most, if not all, languages have a part-of-speech system, rather than just a homogeneous set of lexical items?

2° Why do part-of-speech systems vary from language to language, rather than being of one kind for all languages?

3° Why are part-of-speech systems not ‘well-designed’ one-to-one mappings of semantic categories onto functional and formal categories (one meaning - one function - one form)?

In this paper, I will present a model of language structure in which these problems can begin to be resolved. The model has two basic premises.

The first premise is that a natural language is not learnt in one fell swoop, but is the result of a series of successive expansions of an originally very simple system. Language acquisition is a prime example of a learning process that, in Elman’s terms (Elman 1993), ‘starts small’, in order to organize the data on which ‘structural couplings’ (Varela, Thompson & Rosch 1991) between behavior and environment are based in a manageable way. Otherwise, the learner is overwhelmed by evidence and does not learn effectively. Elman, as well as Plunkett & Marchman (1993), make the further point that starting small may be better implemented on the capacity side than on the evidence side. An organism with a limited initial capacity must start small, irrespective of how its environment is organized.

The second premise is that the process of expansion can be modelled as a process of successive syntagmatic and paradigmatic expansion, driven by a need for increased expressive capacity, and constrained by considerations of economy and contrast. A particularly important economic principle is the ‘green’ principle that recycling of already available resources is to be preferred to introduction of new resources (Anward & Lindblom *fc.*).

In this kind of model, the ‘deep’ organizing factors of part-of-speech systems are not motivated by properties of such systems. They are instantiations of factors which drive language development in general: maximization of meaning, minimization of effort. Speakers do not set out to acquire part-of-speech systems, well-designed or not. Part-of-speech systems are what ‘happen’, as language users engage in processes of successive syntagmatic and paradigmatic expansion.

I will start with a much simpler, but quite successful, model of part-of-speech differentiation, which has the double attraction of being the basis of a typology and easily interpretable in terms of syntagmatic and paradigmatic expansion: the Amsterdam model of part-of-speech systems, proposed by Hengeveld (1992: 47-72) and since elaborated by de Groot (1997) and Hengeveld, Rijkhoff & Siewierska (1997).

After having presented the Amsterdam model and a dynamic reinterpretation of it, I invoke the forefathers of our craft, the classical Greek and Latin grammarians, to broaden the perspective.

After that, I develop a more complete model, using empirical evidence mainly from Swedish, but also from a small pilot sample of nine additional languages.^{iv}

<i>Africa:</i>	Khoisan:	<i>Nama</i>
	Niger-Congo:	<i>Yoruba</i>
<i>Eurasia:</i>	Indo-European:	<i>Swedish</i>
	Uralic:	<i>Finnish</i>
	NE Caucasian:	<i>Archi</i>
	Chukchi-Kamchatkan:	<i>Chukchi</i>
	Isolate:	<i>Ainu</i>

<i>Oceania:</i>	Austronesian:	<i>Maori</i>
	Papuan:	<i>Kobon</i>
<i>America:</i>	Macro-Ge:	<i>Bororo</i>

1. The Amsterdam typology

1.1. In the Amsterdam model of part-of-speech systems, classes of lexical items are differentiated by the syntactic functions they can serve. Functions recognized by the model are predicate, term (subject or object), term modifier (attribute) and predicate or modifier modifier (adverbial), and lexical items are thus categorized by means of the following functional properties (based on the part-of-speech definitions in Hengeveld 1992: 58):

- (1)
- (i) *predicate use*: can, without special marking, be used as a predicate
 - (ii) *term use*: can, without special marking, be used as the head of a term
 - (iii) *term modifier use*: can, without special marking, be used as a modifier of the head of a term
 - (iv) *predicate modifier use*: can, without special marking, be used as a modifier of a predicate or of another modifier

If each non-null combination of functions defines a possible part of speech, there is a total of 15 possible parts of speech. But Hengeveld argues that only six of these are actually attested in his empirical database, a principled sample of 40 languages. First, all major lexical items have a predicate use. Thus, property (i) is not discriminating. Secondly, Hengeveld does not find items that have a term use and a predicate modifier use, but not a term modifier use, or items that have a term use and a term modifier use, but not a predicate modifier use. In other words, an item with a term use has either both modifier uses or no modifier use.

When it comes to naming the six remaining parts of speech, Hengeveld proposes the following: an item that has a predicate use only is a verb (V); an item that has a term use is a noun (N); an item that has a term modifier use is an adjective (A); and an item that has a predicate modifier use is an adverb (D). Like Whorf (1945), Hengeveld allows items to have compound names. An item that has both modifier uses is consequently both an adjective and an adverb (A/D).

The six parts of speech that this model makes available to natural languages are then the following ones:

part of speech	predicate use (p)	term use (t)	term modifier use (tm)	predicate modifier use (pm)
V	+			
N	+	+		
A	+		+	
D	+			+
A/D	+		+	+
N/A/D	+	+	+	+

Table 1. The six parts of speech of Hengeveld (1992)

The six parts of speech of table 1 can be exemplified by means of the skeletal sentences of (2). A V is an item with the distribution of *run* in (2), an N is an item with the distribution of *horse* in (2), a D is an item with the distribution of *around* in (2), an A is an item with the distribution of *strong* in (2c,f), an A/D is an item with the distribution of *strong* in (2c,f,g), and an N/A/D is an item with the distribution of *strong* in (2c,f,g,h).

- (2)
- a. horse run ('a horse runs')
 - b. horse around ('a horse is around')
 - c. horse strong ('a horse is strong')
 - d. horse horse ('a horse is a horse')
 - e. horse run around ('a horse runs around')
 - f. strong horse run ('a strong horse runs')
 - g. horse run strong ('a horse runs strongly')
 - h. strong run ('a strong one runs')

In addition to the parts of speech in table 1, Hengeveld (1992: 68-69) also recognizes a part of speech V/N/A/D. However, apparently he fails to notice that such a part of speech is incoherent, according to his own definitions. A V can not have any other use beside predicate use. A four-use-item should be an N/A/D and nothing else. Nevertheless, in what follows, I will conform to Hengeveld's usage, rather than to his definitions, and use V/N/A/D for an N/A/D which does not contrast with a V.

1.2. There are 63 ($2^6 - 1$) possible non-null combinations of the parts of speech in table 1. Of these, only seven are actually attested, according to Hengeveld (1992: 69-71):

(3)

	p	t	tm	pm
1	V/N/A/D			
2	V	N/A/D		
3	V	N	A/D	
4	V	N	A	D
5	V	N	A	
6	V	N		
7	V			

System 4 is maximally differentiated, with separate classes of items serving the functions of term, term modifier, and predicate modifier. Hengeveld's example of a language with such a system is English. This kind of system contrasts with less differentiated systems, in two ways. In one direction (5 - 7), items retain their specialized functions, but the number of functions is reduced. In the other direction (3 - 1), the number of functions is retained, but items become more polyfunctional, or flexible.

In languages of type 5, there are no predicate modifiers. Instead, dependent predications, such as serial verbs, are used. In languages of types 6 and 7, first term modifiers and then also terms are absent, again with dependent predications taking over their rôles. Examples of languages of type 5, 6, and 7 are Wambon, Hausa, and Tuscarora, respectively.

In languages of type 3, there is a class of flexible items serving both modifier functions. In languages of type 2, the class of flexible items also serve the function of term. In addition, there is a class of verbs, reserved for predicate use only. In languages of type 1, even such a class of verbs is absent, and all words can be used in all functions. Examples of languages of type 3, 2, and 1 are Dutch, Quechua, and Tongan, respectively.

2. A dynamic interpretation of the Amsterdam typology

The Amsterdam typology of part-of-speech systems has a straightforward interpretation as the outcome of a process of successive syntagmatic and paradigmatic expansion.

The process is simple enough, a successive iteration of the following moves:

- (5)
- D1. Introduce a new function, F, and
 - D2. Introduce a new class of items in F, or
 - D3. Use an old class of items in F

We start by introducing the function of predicate, or head of an independent S, and a class of items to serve that function. Since items in that class have a predicate use only, they are naturally called verbs. This step is common to all the seven types of systems recognized in the typology, and has the following outcome:

(6) *Step 1:*

	p
1-7	V

In the second step, the function of term is introduced. Here, there are three possible outcomes. A language may abstain from this step, and stick with (6), which results in a system of type 7. If a language takes the step, a new class of items, nouns, may be introduced to serve the function of term, or the old class of verbs may be used in that function as well. In the first case, we get systems of types 2 to 6, systems with a verb - noun split. In the second case, the old V class gets both a predicate use and a term use, which transforms it into an V/N class. This outcome is bound for a system of type 1.

(7) *Step 2:*

	p	t
1	V/N	V/N
2-6	V	N
7	V	

In the third step, the function of term modifier is introduced, and the simple function of term is reanalyzed as head of term. This step can only be taken by a language that has taken the second step. Thus, a system of type 7 is unaffected by the third step. A language may abstain from the third step, which gives us a system of type 6. If the step is taken, there are three possible outcomes. Either a new class, adjectives, is introduced, resulting in systems of types 3 to 5, or the old term class is used in term modifier function as well, resulting in the new classes of V/N/A and N/A, and systems of types 1 and 2.

(8) *Step 3:*

	p	t	tm
1	V/N/A	V/N/A	V/N/A
2	V	N/A	N/A
3-5	V	N	A
6	V	N	
7	V		

The Part-of-Speech Hierarchy in (9) constrains the process in such a way that only the option of using the old class of nouns is available, if there is no previous verb - noun differentiation.

(9) Verb > Noun > Adjective > Adverb

This hierarchy sums up a series of implicational statements, where the existence of a part of speech in a language entails the existence in the same language of all parts of speech to the left of it on the hierarchy. The hierarchy can also be restated as a constraint on successive

differentiations, allowing adjectives, only if nouns have been differentiated from verbs, and adverbs, only if adjectives have been differentiated from nouns.

In the fourth and final step, the function of predicate modifier is introduced. This step can only be taken by a language that has taken the third step. Systems of types 6 and 7 are unaffected by the fourth step. A language may abstain from the fourth step, which gives us a system of type 5. If the step is taken, there are three possible outcomes. Either a new class, adverbs, is introduced, resulting in systems of type 4, or the old classes of A, N/A or V/N/A are used in predicate modifier function as well, resulting in the new classes of A/Adv, N/A/Adv, and V/N/A/Adv, and systems of types 3, 2, and 1. The Part-of-Speech Hierarchy constrains the process in such a way that only the option of using an old class is available, if there is no previous noun - adjective differentiation.

(10) *Step 4:*

	p	t	tm	pm
1	V/N/A/D	V/N/A/D	V/N/A/D	V/N/A/D
2	V	N/A/D	N/A/D	N/A/D
3	V	N	A/D	A/D
4	V	N	A	D
5	V	N	A	
6	V	N		
7	V			

A priori, there is no reason why a budding system of type 1 might not abstain from the third step or the fourth step, but apparently Hengeveld found no such systems.

3. Broadening the perspective

The Amsterdam typology constrains linguistic diversity in a powerful way. However, it is based on a very impoverished model of part-of-speech systems. Compared to most other models of part-of-speech systems, the Amsterdam model recognizes very few parts of speech.^v Pronoun, article, preposition, conjunction, quantifier, numeral, and interjection have no place in the typology. Moreover, the model does not take into account formal differentiation of parts of speech by means of inflectional, function-indicating, and derivational morphology. Nor does it take into account the interaction of functional and formal differentiation with semantic differentiation.

It is useful to compare the Amsterdam model to the list of *mevroi lovgou* (*méroi lógou*, parts of speech) posited for Classical Greek by Dionysius Thrax (Robins 1990: 39):

ónoma (noun): a part of speech inflected for case, signifying a concrete or abstract entity.

rhema (verb): a part of speech without case inflection, but inflected for tense,

person, and number, signifying an activity or process performed or undergone.

metoche (participle): a part of speech sharing the features of the verb and the noun.

áarthron (article): a part of speech inflected for case, preposed or postposed to nouns.

antonymía (pronoun): a part of speech substitutable for a noun and marked for person.

próthesis (preposition): a part of speech placed before other words in composition and in syntax.

epírrhema (adverb): a part of speech without inflection, in modification or in addition to a verb.

syndesmos (conjunction): a part of speech binding together the discourse and filling gaps in its interpretation.

and the list of Latin *partes orationes*, derived from the Greek list by Apollonius Dyscolus (Itkonen 1991: 201-216) and Priscian by omitting article, which Latin lacks, and adding interjection (Robins 1990: 66):

nomen (noun): the property of the noun is to indicate a substance and a quality, and it assigns a common or a particular quality to every body or thing.

verbum (verb): the property of a verb is to indicate an action or a being acted on; it has tense and mood forms, but is not case inflected.

participium (participle): a class of words always derivationally referable to verbs, sharing the categories of verbs and nouns (tenses and cases), and therefore distinct from both.

pronomen (pronoun): the property of the pronoun is its substitutability for proper nouns and its specifiability as to person (first, second, or third).

adverbium (adverb): the property of the adverb is to be used in construction with a verb, to which it is syntactically and semantically subordinate.

praepositio (preposition): the property of the preposition is to be used as a separate word before case-inflected words, and in composition before both case-inflected and non-case-inflected words.

interiectio (interjection): a class of words syntactically independent of verbs, and indicating a feeling or a state of mind.

coniunctio (conjunction): the property of conjunctions is to join syntactically two or more members of any other word class, indicating a relationship between them.

Priscian insists that his list of *partes orationes* presents them in their 'natural order' (Covington 1984: 5-6), and the order in which Dionysius' and Priscian's systems of parts-of-speech are presented is in fact quite systematic.

Robins (1990: 39) suggests that Dionysius' and Priscian's systems of parts-of-speech are primarily based on a morphological classification of words, which is most clearly described by Varro (Robins 1990: 58-59), who distinguishes words inflected for case, but not for tense, words

inflected for tense, but not for case, words inflected for both case and tense, and uninflected words. In feature notation:

[+case; - tense]
 [- case; +tense]
 [+case; +tense]
 [- case; - tense]

However, if we spell out these features for the parts of speech recognized by Dionysius, we see that Varro's morphological classification do not constitute the only organizing principle of the system. If it did, article and pronoun should immediately follow noun in Dionysius' list.

[+case; - tense]	noun
[- case; +tense]	verb
[+case; +tense]	participle
[+case; - tense]	article
[+case; - tense]	pronoun
[- case; - tense]	preposition
[- case; - tense]	adverb
[- case; - tense]	conjunction

Rather, the morphological classification is combined with and partially overridden by a syntactic classification. The syntactic functions of nouns as subjects and verbs (and participles) as predicates are only presupposed (for this point, see e.g. Itkonen 1991: 177-178, 186-187), but the other parts of speech are explicitly characterized as to syntactic function. Thus, there is a progression of the following kind in Dionysius' list: nouns, verbs and participles, words which modify nouns or substitute for nouns (article, pronoun), words which modify both nouns and verbs (preposition), words which modify verbs (adverb), and words which join other words together (conjunction).

Priscian's system is a slight variation on this system, with article missing, words which modify both nouns and verbs after words which modify only verbs, and another non-modifier part of speech, interjection, added before conjunction.

Finally, the systems are grounded in a semantic interpretation of nouns and verbs as words which denote substance and action, respectively. This grounding justifies the ordering of nouns, which denote a semantically and ontologically primary category, before verbs, which denote a semantically and ontologically secondary category - and of adnominals before adverbals. Possibly, the syntactic functions of noun and verb are held to follow from the semantic interpretations of these parts of speech and need not be explicitly mentioned. The complete Dionysian system is thus as follows:

substance	[+case; - tense]	noun
action	[- case; +tense]	verb
	[+case; +tense]	participle
N modifier	[+case; - tense]	article
N substitute	[+case; - tense]	pronoun
X modifier	[- case; - tense]	preposition
V modifier	[- case; - tense]	adverb
conjoiner	[- case; - tense]	conjunction

In other words, in Dionysius' and Priscian's systems, a part of speech is individuated by a characteristic combination of a *syntactic function*, an *inflectional pattern*, and a *semantic category*. For example, a full characterization of the class of nouns, including the presupposed notion of subject, is given by the combination

Subject,
inflected for case, not for tense,
signifying person or thing.

Thus, instead of the Amsterdam model's single dimension of differentiation - syntactic function - the classical models recognize three dimensions of differentiation: semantic category, syntactic function, and inflection. In what follows, I will show that the higher resolution permitted by the classical models is descriptively desirable (see also Anward, Moravcsik & Stassen 1997).

4. An elaborated model

The dynamic model presented in section 2 is basically a stylized model of language acquisition. However, as such, it is not entirely realistic. Syntactic functions do not seem to be introduced one by one in the manner suggested by steps one through four.

Rather, the development of syntactic complexity passes through three stages of a quite different kind. In the first stage, the one-word stage, utterances are co-extensive with single words. In this stage, the utterances in (11a) are possible utterances, but not the utterances in (11b) or (11c). In the second stage, the two-word stage, a word can be construed with exactly one more word. Thus, (11a) and (11b) are possible utterances in this stage, but not (11c). Finally, in the third stage, constructions can be embedded within other constructions, allowing for all of (11a), (11b), and (11c).

- (11) a. Banana; Yellow; Good
 b. Yellow banana; Banana good; Very good
 c. The yellow banana is very good

These stages can be roughly characterized in the following way. In the first stage, words are used as complete utterances. In the second stage, a word may also be construed with a modifier or

a term. In the third stage, terms and modifiers may themselves be construed with their own terms and/or modifiers. In what follows, I will outline a dynamic model of this kind.

5. Step one revisited

5.1. Let us retrace step 1. To begin with, I make the fairly uncontroversial assumption that words are semantically differentiated, even when used as one-word utterances (see e.g. Schlesinger 1982). I will furthermore use the semantic landscape in (12) (Stassen 1997, ch. 14) to structure this semantic differentiation.

- (12) event
 place
 time
 property
 quantity
 person/thing

The landscape in (12) is based on a one-dimensional projection of the semantic landscape used by Stassen (1997, ch. 14) to model the varieties of intransitive predication in the languages of the world:

- (13) event
 place
 property
 class
 entity

Stassen argues that (13) forms "a universally valid semantic or cognitive space. It is a point of departure shared by all natural languages in the encoding of intransitive predication." (Stassen 1997: 581).

In order to ensure a better coverage of lexical diversity, I have added the additional categories of time and quantity (cf. Anward *fc.*). I also depart from Stassen in collapsing his two categories of class and entity into the single category of person / thing. The distinction is important to Stassen's investigation (and to a more detailed model), but need not be observed in the present context.

The semantic categories in (12) - and (13) - are ordered along a rough scale of time-stability (Givón 1984: 51-52; see also Stassen 1997: 15-16, 578-581 for a recent assessment), from the least stable entities (event) to the most stable entities (person and thing). In Stassen's model, there is also an additional scale of spatiotemporal specification involved, which, however, I will disregard here.

This means that the first step can be more precisely reformulated, as in (14).

- (14) Introduce an expression for category K in root function,
 where K is event, place, time, property, quantity, person, or thing.

An expression which by itself constitutes an independent utterance (or root sentence, in the sense of Emonds 1976) is (not yet) a predicate, since it is not construed with a dependent. That is why I have used root rather than predicate to designate the syntactic function of holophrastic words.

Using a few examples from the one-word utterances of the Swedish girl Embla (Lange & Larsson 1973): *oj* (oh), *hjälpa* (help), *ramla* (fall), *där* (there), *nu* (now), *stor* (big), *mera* (more), *mamma* (mummy), and *bil* (car), we can construct a small concrete case of step 1 for Swedish:

semantic category	root function (r)
event	<i>oj</i> <i>hjälpa</i> <i>ramla</i>
time	<i>nu</i>
place	<i>där</i>
property	<i>stor</i>
quantity	<i>mera</i>
person /thing	<i>mamma</i> <i>bil</i>

5.2. An interesting question is whether lexical items are ever introduced more than once at this stage, if they ever lexicalize more than one of the categories in (12). Available evidence on early stages of language acquisition indicates that multiple lexicalization of this kind is uncommon. There are reported cases where early items lexicalize more than one category (reported as mistakes in part-of-speech assignment in Schlesinger 1982: 222-223), but these are neither frequent nor systematic. Even the oft-discussed cases of over-extension in the one-word stage typically respect semantic category (see e.g. de Villiers & de Villiers 1979: 35-42).

We can make sense of this by means of the following - almost banal - condition on the use of linguistic expressions:

(15) ***Identification***

An expression must be identifiable as to semantic category and syntactic function

Syntactic function of expressions used in one-word utterances is of course no problem. Semantic category of such expressions may be determined either by contextual priming or by previous use. Since previous use tends to block new contextual priming (Bichsel 1969), it follows that expressions used in one-word utterances tend to get 'stuck' in the semantic category they are originally placed in.

6. Syntagmatic expansion

6.1. Further functions are introduced through a process of syntagmatic expansion. Basically, this process involves the following two moves:

(16) *Syntagmatic expansion*

- a. Construe an expression for category K in function F with a term expression.
- b. Construe an expression for category K in function F with a modifier expression

The distinction between term and modifier is essentially that established already by the modistae (Covington 1979). In modern terms, the contrast amounts to the following: in a head - term construction, such as verb - object, the head is predicated of the term; in a head - modifier expression, such as noun - adjective, the modifier is predicated of the head. Thus, a head requires terms to be saturated, and can only be construed with as many terms as can saturate it. Modifiers, on the other hand, are not required by a head, and there can be an indefinite number of modifiers of a single head.

When a root expression is construed with a term expression, we get a subject - predicate construction. A predicate expression can then in turn be construed with a term expression, with a transitive predicate - object construction as result. Finally, a term expression can itself be construed with a term expression, giving rise to possessor - head constructions.

Predicate and term expressions can then be construed with modifiers, giving rise to predicate modifiers (adverbials) and term modifiers (attributes), and such modifiers can themselves in turn be construed with terms and modifiers.

6.2. In Swedish, as in English, words such as *nu*, *där*, *stor*, *mera*, *mamma*, and *bil*, i.e. adverbs, adjectives, quantifiers, and nouns, cannot be directly construed as predicates:

- (17)
- a. *Det nu (It now)
 - b. *Hon där (She there)
 - c. *Han stor (He big)
 - d. *Det mera (That more)
 - e. *Det bil (That car)

Instead, adverbs, adjectives, quantifiers, and nouns are construed as dependent predicates, or predicatives, of another predicate, with which they 'share' a term.

- (18)
- a. Det är nu (It is now)
 - b. Hon är där (She is there)
 - c. Han är stor (He is big)
 - d. Det är mera (That is more)
 - e. Det är en bil (That is a car)

A dependent predicate, such as *hungry* in *John was hungry* and *Joan kept John hungry*, is predicated of a term of its head. The semantic operation involved is functional composition (Steedman 1985: 530-533), whereby the predicates expressed by head and dependent form a composite predicate. ‘Is(x)’ and ‘hungry(y)’ become ‘is(hungry(y))’, ‘keep(x, y)’ and ‘hungry(z)’ become ‘keep(x, hungry(z))’.

There are also cases such as *Joan wrote the book hungry*, where a dependent expresses an additional predication about the subject or object of its head. In this case, functional composition results in a conjoined predicate: ‘wrote(x, the-book) & hungry(x)’.

Obviously, then, we need a third move of syntagmatic expansion:

(19) ***Syntagmatic expansion***

Construe an expression in predicate function with a dependent predicate expression.

6.3. As pointed out by Jespersen (1924), part-of-speech distinctions are licensed only by ‘shallow’ positions in a sentence: predicate, subject/object, adverbial, attribute in main clauses. Thus, we would be surprised if a language would use a particular class of lexical items which, like the nonce-word *meddy* in (20b), can only be used as modifiers of attributes in subordinate clauses.

- (20) a. She made a very good suggestion
b. It is evident that she made a meddy good suggestion

This restriction is of course already incorporated in the Amsterdam model, where only term, term modifier, and predicate modifier functions may trigger part-of-speech distinctions.

There is reason though to relax the restriction slightly. It is true that different types of terms do not seem to license distinct lexical classes. There is no known language where one class of words is used for subjects, one class of words is used for objects, and one class of words is used for possessors. However, in the case of pronouns, there might be small tendencies in this direction. Thus, personal pronouns may have suppletive forms in different term functions (e.g. *I - me*), reflexive pronouns cannot be used as subjects, and logophoric pronouns are restricted to subordinate clauses.

When it comes to modifiers, it is fairly usual for predicate modifiers and term modifiers to license distinct classes of lexical items. However, there are also items which are licensed by other modifier functions. For example, the word *ganska* (rather) in Swedish can be used neither as term modifier nor as predicate modifier, but only as modifier of another modifier:

- (21) a. *Han sprang ganska
(He ran rather)
b. *Han är en ganska löpare
(He is a rather runner)
c. Han sprang ganska snabbt
(He ran rather fast)

- d. Han är en ganska snabb löpare
(A rather fast runner)

As a preliminary generalization, we can use (22).

- (22) A lexical item can be licensed only by its immediate syntactic function, that function being specified as either ‘ ϕ ’ (root, predicate, term, or modifier) or ‘modifier of ϕ ’.

6.4. A further ingredient of the Amsterdam model is the notion that a language need not use all of the syntactic functions made possible by (16). Indeed, there seem to be languages which lack predicate modifiers, using serial or medial verbs - i.e. verbs in dependent predicate function - instead, as predicted by the Amsterdam model. Contrary to the predictions of the model, there also seem to be languages which lack term modifiers, using predicate modifiers (or something equivalent) to express term modification. Hixkaryana and other Carib languages are examples of languages that approximate this type (Derbyshire 1979). Following Whorf (1945) and Sasse (1988), Hengeveld (1992: 67) also proposes that there are languages which lack terms altogether and express everything through series of predicates. However, proposed examples of such languages, Wakashan and Iroquoian languages, do not actually seem to fit the type (Jacobsen 1979, Mithun 1997). A possible conclusion is that the term part of (16) is the only obligatory component of syntagmatic expansion.

7. Paradigmatic expansion

7.1. Fillers for a new functional slot made available by (16) are recruited by two methods, corresponding to D2 and D3 in (5): a new item can be introduced as an expression for a certain category in the new function, or an expression for a certain category in an old function can be recycled as an expression for that category in the new function. However, it is not really motivated to treat these methods as mutually exclusive alternatives, as they are in (5). To take a simple example, consider again the case of *ganska* (rather) in Swedish. This is certainly an item that is introduced as an expression for quantity in modifier of modifier function in Swedish. However, it co-exists happily with other expressions of quantity in that function, for example *hemskt* (terribly), which are best seen as recycled expressions for property in predicate modifier and/or term modifier function. Witness the the sentences in (23), for example.

- (23) a. Han sprang hemskt
(He ran in a terrible manner)
b. Han är en hemskt löpare
(He is a terrible runner)
c. Han sprang hemskt fort
(He ran terribly fast)
d. Han är en hemskt snabb löpare
(He is a terribly fast runner)

In the normal case, rather, lexical resources for a function are recruited by both methods. This is made explicit in (24).

(24) *Paradigmatic expansion*

- a. Introduce an expression for category K in function F.
- b. Use an expression for category K in function F as an expression for category K' in function F'.

7.2. Following Hopper & Thompson (1984) and Croft (1990), we recognize certain 'unproblematic' combinations of semantic category and syntactic function:

(25)

semantic category	syntactic function
event	predicate
time	modifier
place	modifier
property	modifier
quantity	modifier
person/thing	term

In this context, I will simply accept the arguments by Hopper & Thompson and Croft that the unproblematic nature of the combinations in (25) is grounded in human experience and practice. For some further discussion, see Lyons (1977, ch. 11.3) and Anward & Lindblom (fc, section 9).

A consequence of (25) is that expressions in non-root function can get their syntactic functions determined by their semantic categories. An expression for event in root function which is recycled in non-root function can be identified as an expression for event in predicate function. An expression for person/thing in root function which is recycled in non-root, non-predicate function can be identified as an expression for person/thing in term function, and so on.

Thus, simple recycling of root expressions will be streamlined by the principle of identification in (15) into the combinations of (25). Once a slot for a new function has been established in this way, new expressions can be introduced into that function. For example, if *diagonalize this matrix* is heard as an answer to the question *What should I do next?*, and it is clear from the context that *this matrix* signifies a thing, then the semantic category of *diagonalize* - event - follows from its occurrence in predicate function in an utterance which as a whole signifies an event.

8. Inflectional elaboration and take over

8.1. As Hopper & Thompson (1984) show, expressions for event in predicate function and expressions for person/thing in term function are loci for inflectional elaboration. Nominal morphology - inflection for definiteness, number, gender, case, and possessor agreement - is maximally elaborated on expressions for person/thing in term function, and verbal morphology - inflection for finiteness, tense, mood, aspect, subject agreement, and object agreement - is maximally elaborated on expressions for event in predicate function.

This is made explicit in (26).

(26) ***Inflectional elaboration***

- a. Add verbal inflection to an expression for event in predicate function.
- b. Add nominal inflection to an expression for person/thing in term function.

Inflectional elaboration is subject to considerable variation in the world's languages.

Verb		Noun			Language
f	so	k	(d)		Chukchi
f	so			p	Ainu
f	s	k	d	p	Finnish
f	s	k	d		Nama
f	s	k	d		Archi
f	s	k		p	Bororo
f	s				Kobon
f		k	d		Maori
f			d		Swedish
					Yoruba

Table 3. Inflectional elaboration in the pilot sample

In the languages of the pilot sample - as shown in table 3 above - nouns in argument function are maximally inflected for case (k), determiner categories (d), such as number and definiteness, and possessor agreement (p), while verbs in predicate function are maximally inflected for finiteness (f), subject agreement (s), and object agreement (o).

However, none of these inflections is obligatory. Judging just from the data in table 3 - which of course are very limited - we can see some further tendencies at work. To begin with, nominal inflection implies verbal inflection. There are languages, such as Yoruba, which completely lack inflections, there are languages, such as Kobon, which have only verbal inflection, and there are languages that have both nominal and verbal inflection. Secondly, on verbs, object agreement implies subject agreement, and subject agreement implies finiteness inflection. Finally, as demonstrated by Allen (1964) and Seiler (1983), possessor agreement may be identical to either subject agreement or object agreement. In the pilot sample, possessor

agreement is identical to subject agreement in Ainu and Bororo, and subject agreement in Nama is identical to determiner inflection.

8.2. Through a process of take over (Stassen 1997), inflections are recycled in contexts which are not subject to inflectional elaboration. The simplest cases of take over are ‘vertical’ and ‘horizontal’ take over. Vertical take over, which is described in great cross-linguistic detail by Stassen (1997) for intransitive predication, is a process whereby the inflection on expressions for K in function F is recycled on expressions for K’ in function F. In Bororo, for example, verbal inflection is recycled on nouns in predicate function; in Swedish, nominal inflection on nouns in dependent predicate function is recycled on adjectives in dependent predicate function. Horizontal take over is a process whereby the inflection on expressions for category K in function F is recycled on expressions for category K in function F’. For example, all of the languages in the pilot sample have the same inflection on nouns in term function and nouns in dependent predicate function.

(27) ***Inflectional take over***

Use the inflection on expressions for category K in function F
on expressions for category K’ in function F
and/or expressions for category K in function F’.

9. Swedish, for example

Syntagmatic expansion - (16) and (19) - introduces predicates, terms, modifiers, and dependent predicates, and construes them with terms and modifiers. Paradigmatic expansion – (14) and (24) – introduces root and predicate expressions and recycles them as term expressions and modifier expressions. Inflectional elaboration and take over – (26) and (27) – introduce and recycle inflections.

(28)

items		functions					
		p	dp	t	pm	tm	mm
event	<i>oj</i>						
	<i>hjälp</i>	f	f				
	<i>ramla</i>	f	f				
time	<i>nu</i>		-		-	-	
	<i>ofta</i>		-		-	-	-
place	<i>där</i>		-		-	-	
property	<i>stor</i>		d		d	d	
quantity	<i>mera</i>		d	d	d	d	d
	<i>sju</i>		-	-		-	
person	<i>mamma</i>		d	d			
/thing	<i>bil</i>		d	d			

Together, these processes split the Swedish words discussed earlier, *oj* (oh), *hjälpa* (help), *ramla* (fall), *nu* (now), *där* (there), *stor* (big), *mera* (more), *mamma* (mummy), and *bil* (car) into several groups. This is shown in (28), where I have also included the words *ofta* (often) and *seven* (sju), to better approximate the true diversity of Swedish words.

First, interjections, such as *oj*, are differentiated from all other kinds of expressions. Interjections are expressions that only have a root function (r). They are not construed with subjects, and cannot be used as terms.

There are normally at least four subclasses of interjections (Ameka 1992): expressive interjections ('ouch', 'oh', 'wow', 'aha'), directive interjections ('hush', 'psst', 'hey'), phatic interjections ('mhm', 'yes', 'no', 'huh'), and descriptive interjections ('wham', 'thud', 'bang'), also called ideophones or expressives. Expressive, directive, and phatic interjections index aspects of the speech event, while ideophones signify topical events in an essentially iconic way.

In Anward (1986), I propose that expressive, directive, and phatic interjections are pragmatically saturated, i.e. predicated of speaker and/or hearer, and that this is what keeps them from being construed with terms or recycled as dependent expressions. Ideophones, on the other hand, can be recycled as dependent expressions in some languages.

Secondly, predicate use (p) differentiates verbs from other non-interjections. Only the verbal kind of event expressions, such as *hjälpa* and *ramla*, can, without formal modification, be used as predicate expressions. As shown in (17) and (18), other expressions can only be used in dependent predicate function (dp).

Note that verbs too can appear in dependent predicative function. Some languages such as Kobon and Yoruba, and to some extent Nama, in the pilot sample, have regular serial verb constructions, as in (29), from Baker (1989: 516).

(29) *Yoruba*

Ajé gbé as5o5 wò5
Aje took dress wear
'Aje put on a dress'

In a serial verb construction, either all verbs have the same inflection, or only one verb has inflection, while the other verbs are uninflected (Foley & Olson 1985).

In Swedish, there is a much more restricted construction, with pseudo-coordinated complements of verbs of location and motion, which shares the constraint that all verbs must have the same inflection (Anward 1988):

(30) *Swedish*

- a. Han är och hjälper henne
he is and helps her
'He is away to help her'
- b. Han gick och ramlade
he went and fell

'He accidentally fell down'

In English, there is a peculiar version of this construction, subject to the constraint that all verbs in it must be uninflected (Perlmutter 1971). Thus, (31a) is grammatical, but not (31b).

- (31) a. Go kiss a duck!
b. *He went kissed a duck

Verbs are also differentiated from all other words by finiteness inflection in predicate function, which also spreads horizontally to verbs in dependent predicate function.

Thirdly, term use (t) differentiates nouns, quantifiers, and numerals from other non-interjections. Only quantity expressions, such as *mera* and *sju*, and person/thing expressions, such as *mamma* and *bil*, can, without formal modification, be used as term expressions. Contrast, for example, the term use of *mera* and *317* in (32a) and (32b) with the impossibility of using an adjective as *stark* (strong) in the same way, as shown by (32c).

- (32) a. Enligt Bataille är mera inte nog
(According to Bataille, more is not enough)
b. Enligt Chlebnikov är 317 nyckeln till världshistorien
(According to Chlebnikov, 317 is the key of world history)
c. *Enligt Nietzsche är stark nödvändigt
(According to Nietzsche, strong is necessary)

Nouns and some quantifiers are also differentiated by nominal determiner inflection in term function, which also spreads, first horizontally to nouns and quantifiers in dependent predicate function, then vertically to adjectives in dependent predicate function, and then horizontally again to adjectives and (some) quantifiers in modifier functions.

Finally, the class of non-interjections, non-verbs, and non-nouns can, without formal modification, be used as modifier expressions. In (28), we see four patterns of use in modifier functions. Words such as *mera* can be used as predicate modifier (pm), term modifier (tm), and modifier of another modifier (mm); words such as *nu*, *där*, and *stor* can be used as predicate modifier and term modifier; words such as *ofta* can be used as predicate modifier and modifier of another modifier; and words such as *sju* can be used as term modifier only. This is exemplified in (33)

- (33) a. Vi kommer nu
(We are coming now)
b. Vi dricker ofta kaffe
(We often have coffee)
c. Vi sjöng där
(We were singing there)
d. Vi förlorade stort
(We lost big = We lost in a big way)

- e. Vi arbetar mera
(We work more)
- f. *Vi har varit i Rom sju
(We have been to Rome seven)
- a'. Modet nu är ganska konstigt
(The fashion now is fairly strange)
- b'. *De ofta kaffepauserna är trevliga
(The often coffee breaks are nice)
*Kaffepauserna ofta är trevliga
(The coffee breaks often are nice)
- c'. Sederna där är behagliga
(The customs there are nice)
- d'. De stora frågorna diskuterades
(The big questions were discussed)
- e'. Sedan behövde vi mera öl
(Then we needed more beer)
- f'. Vi köpte sju flaskor
(We bought seven bottles)
- a''. *En nu viktig fråga
(A now important question)
- b''. Den ofta viktiga frågan
(The often important question)
- c''. *En där viktig fråga
(A there important question)
- d''. *En stort viktig fråga
(A bigly important question)
- e''. En mera viktig fråga
(A more important question)
- f''. *En sju viktig fråga
(A seven important question)

10. Spread patterns and further introduction

After syntagmatic expansion, paradigmatic expansion, inflectional elaboration, and inflectional take-over, lexical items thus become associated with characteristic spread patterns: sets of Dionysian contexts, each context specifying a semantic category, a syntactic function, and a pattern of inflection.

Spread patterns, such as those in (28), serve as attractors for further paradigmatic expansion. For example, when expressions for other categories than event are introduced in predicate function and expressions for other categories than person or thing are introduced in term function, these assimilate to the pattern for verbs and nouns, respectively.

(34)

items		functions					
		p	dp	t	pm	tm	mm
event	<i>oj</i> <i>hjälpa</i> <i>ramla</i> <i>olycka</i>	f f	f f d				
time	<i>nu</i> <i>ofta</i> <i>förflyta</i> <i>vecka</i>		- - f d		- - d	- -	-
place	<i>där</i> <i>bebo</i> <i>botten</i>	f	- f d		-	-	
property	<i>stor</i> <i>leva</i> <i>mod</i>	f	d f d	d d	d		
quantity	<i>mera</i> <i>sju</i> <i>förökas</i> <i>dussin</i>		d - f d	d - d	d	d - d	d
person /thing	<i>mamma</i> <i>bil</i>		d d	d d			

In this way, in Swedish, (28) is expanded to (34). We thus get verbs which express time, place, property, and quantity, such as *förflyta* (elapse), *bebo* (inhabit), *leva* (live), and *förökas* (grow in number), respectively, and nouns which express event, time, place, property, and quantity, such as *olycka* (accident), *vecka* (week), *botten* (bottom), *mod* (courage), and *dussin* (dozen), respectively.

The assimilation of 'problematic' combinations of category and function to existing spread patterns makes sense in the light of the principle of identification, (15). Given that the term function of, say, *olycka*, cannot be predicted from its semantic category, identification of its term function is only possible if *olycka* is taken over by the nominal inflection and position of concrete nouns.

Assimilation of expressions to established spread patterns concerns not only form and range of functions, but also semantic category, in a subtle way. Following basically the medieval modistic theory of parts of speech, where each lexical item combines a lexical content, its individual meaning, with a mode of signification, a meaning ascribed to it through a particular part-of-speech membership, we can say that *förflyta* (elapse) signifies an interval viewed as an event or process, while *vecka* (week) signifies an interval viewed as a thing or entity (for a similar analysis, see Langacker 1987).

11. Steps two to four, take two

Let us now return to what would correspond to steps two, three, and four in the present model. As we have seen, in the case of Swedish, there are two means of lexical differentiation involved, inflectional elaboration and recycling, and spread over a range of functions.

11.1. In the pilot sample, distribution over the functions of predicate and dependent predicate and inflectional elaboration of predicates and dependent predicates will distinguish at most three parts of speech.

As shown in extensive detail by Stassen (1997), inflection in predicate function can be described as an alignment of the three options of verbal inflection (v), no inflection (-), and nominal inflection (n) with the semantic landscape in (13), in such a way that "v", "-", and "n" form a sequence <v; -; n>, each inflection covers a continuous stretch of the landscape, and the leftmost inflection in the sequence is always linked to event.

The names of differentiated parts of speech in predicate function are best based on semantic category, as in (35).

(35)

semantic category	part of speech
event	verb
time	adverb, adposition
place	adverb, adposition
property	adjective
quantity	quantifier, numeral
person/thing	noun

The principle of naming is that a class of items that includes expressions for category K in predicate function gets the name associated with K. In addition, we need something very similar to Hengeveld's Part-of-Speech Hierarchy (repeated below)

(9) Verb > Noun > Adjective > Adverb

as a preference ordering for naming. Thus, a class which includes expressions for both event and person/thing in predicate function would be called verb.

In the pilot sample, there are four attested combinations of verbal inflection (v), no inflection (-), and nominal inflection (n) in predicate position:

v in p:	Bororo, Swedish, Finnish, Ainu
v and - in p:	Archi, Chukchi, Nama, Kobon
- in p:	Yoruba
v and n in p:	Maori

In dependent predicate function, the same inflections are available. However, only no inflection and nominal inflection are distinctive. They may either be used to introduce items in dependent predicate function, which cannot be used in predicate function, or to differentiate items which can be used in predicate function. In Swedish, no inflection and nominal inflection differentiate prepositions and nouns, none of which can be used as predicates. In Nama, nominal inflection in dependent predicate function differentiates nouns and adjectives. Nouns occur with no inflection in predicate function and with nominal inflection in dependent predicate function. Adjectives occur with no inflection in predicate function, and do not appear in dependent predicate function. The differentiations appearing in the sample are shown below in (36)^{vi}.

(36)

language	predicate		dependent predicate	
Bororo	Verb	v		
Archi	Verb	v		
	Noun	-		
Chukchi	Verb	v		
	Num	-		
	Noun	v	Noun	n
Finnish	Verb	v	Adposition	-
			Noun	n
Swedish	Verb	v	Verb	v
			Adposition	-
			Noun	n
Nama	Verb	v	Verb	-
	Adjective	-		
	Noun	-	Noun	n
Kobon	Verb	v	Verb	
	Adjective	- μ		-
	Noun	- μ	Noun	n
Yoruba	Verb	-	Verb	-
	Adjective	-	Noun	-
Ainu	Verb	v	Noun	-
Maori	Verb	v		
	Noun	n		

11.2. Turning now to recycling of lexical items, we learn from the Amsterdam model that there is a sharp contrast between languages with and languages without a verb-noun distinction. However, when facts are reconsidered with the higher resolution provided by full Dionysian contexts, this picture is changed in an interesting way.

A first point is that what appears to be cases of verb - noun neutralization in the low resolution description of the Amsterdam model might turn out to be not quite that when looked at with the higher resolution provided by full Dionysian contexts.^{vii}

In Maori, for example, which in a low-resolution description looks like a language where both nouns and verbs can be used as both terms and predicates, apparently nouns cannot be used as expressions for event. There seem to be no basic nouns which refer to events, and a basic noun which refers to person or thing cannot be recycled as an expression for event in predicate function, but must preserve its semantic category in predicate function. Moreover, there is a fairly sharp distinction between verbal and nominal sentences in Maori, and although verbs can appear in both nominal and verbal sentences, nouns cannot appear in verbal sentences. Thus, the verb -

noun contrast in predicate and term functions in Maori takes the following form (v and n stand for verbal and nominal inflection, respectively):

(37)

<i>Maori</i>	infl	predicate	term
event	v	Verb	
	n		Verb
person /thing	v		
	n	Verb Noun	Verb Noun

A second point is that apparently rigid languages may be more flexible than the Amsterdam model would lead us to believe. Consider the situation in Swedish, which has a traditional verb - noun contrast. As we have seen, there is a class of basic abstract nouns in Swedish, but they are clearly too few to secure even a modest expressivity for the combination of event and term. Rather, what is being used in Swedish to secure such expressivity is what we might call marked recycling:^{viii} deverbal action nouns, derived by means of the suffix *-ande*. Likewise, the counterparts in Swedish to recycled verbs with nominal inflection as expressions for person/thing are deverbal agentive nouns, derived by means of the suffix *-are*. The Swedish system is summarized in (38) (noun(ii) indicates basic abstract nouns, and the distinction between true predicate and dependent predicate is ignored).

(38)

<i>Swedish</i>	infl	predicate	term
event	v	Verb	
	n		Verb- <i>ande</i> Noun(ii)
	-		
person /thing	v		
	n	Verb- <i>are</i> Noun	Verb- <i>are</i> Noun
	-		

What is significant about (37) and (38) is that Maori, a flexible language in the narrow sense, and Swedish, a language with a more traditional verb - noun distinction, both manage to provide expressions for all four possible combinations of semantic category and syntactic function. Both languages, one by simple recycling, the other by marked recycling, thus manage to achieve full expressibility for the combinations of event, person/thing, predicate, and term.

In fact, as de Groot (1997) has shown, this kind of balance of simple and marked recycling is common. When simple recycling cannot land an expression in a new function, often marked recycling will do the trick.^{ix} And this means that part-of-speech flexibility, in a looser sense than

Hengeveld's, might be a much more common situation than the Amsterdam typology would lead us to think.

11.3. The information available in full Dionysian contexts also allow for a sharper description of what actually happens in lexical recycling. Suppose we start with the following contexts:

- (39) a. *Verb*
 Expression for event in predicate function
 Construed with subject in predicate function
 Verbal inflection in predicate function
- b. *Noun*
 Expression for person/thing in term function
 Construed with possessor in term function
 Nominal inflection in term function

and look at what happens when verbs are recycled as term expressions. The simple generalization, due to Koptjevskaja-Tamm (1993), is that the verb acquires a new context, which is a combination of the contexts in (39a) and (39b). This new context ranges from a completely verbal context, a balancing subordinate clause, where the verb is construed with a subject and takes main clause verbal inflection in term function, to a completely nominal context, a complete nominalization, where the verb is construed with a possessor and takes nominal inflection in term function. An interesting intermediate case is where a subordinate clause takes nominal inflection as an external inflection, but keeps verbal inflection and government in its internal structure. For example, in the Salish language Lushotseed (van Eijk & Hess 1986: 324), a main clause, such as (40a), can also, construed with an article, be used as term expression, as in (40b).

- (40) a. k^wàx^wa-c
 help.3SG-TRANS.1SG
 '(s)he helps me'
- b. ti k^wàx^wa-c
 ART help.3SG-TRANS.1SG
 'the one who helps me'

Example (40b) also illustrates the general point that a verb in term function, even though fairly verbal in its trimmings, may also assimilate to the dominant semantic category of the part-of-speech typically associated with that function. category of nouns. Compare also the two meanings, activity and resulting thing, of the English deverbal nouns *painting* and *invention*.

In general, an expression for semantic category K, which is recycled in function F, will either retain its category or be taken over by the category that is typical of expressions in F. Given the requirement on identification of semantic category, these are in fact the only possible outcomes of recycling, unless the recycled expression is explicitly marked.

The fate of an expression in a new function can then be described as any combination of the following submoves:

- (41)
- the recycled expression loses its original inflection
 - the recycled expression is taken over by the dominant inflection of the new function
 - the recycled expression is taken over by the dominant semantic category of the new function
 - the new function and/or category is marked on the recycled expression

11.4. If we now add term function to (36), we get:^x

(42)

language	predicate		dependent predicate		term	
Bororo	Verb	v			Verb	(n) S
	Noun	v			Noun	n
Archi	Verb	v			Verb	n μ S
	Noun	-			Noun	n
Chukchi	Verb	v			Verb	n μ
	Num	-				
	Noun	v	Noun	n	Noun	n
Finnish	Verb	v	Adposition	(n)	Verb	(n) μ (S)
			Noun	n	Noun	n
Swedish	Verb	v	Verb	v	Verb	(n) μ (S)
			Adposition	-		
			Num	-	Num	-
			Noun	n	Noun	n
Nama	Verb	v	Verb	-	Verb	(n) μ (S)
	Adjective	-				
	Noun	-	Noun	n	Noun	n
Kobon	Verb	v	Verb	-	Verb	(μ) S
	Adjective	- μ				
	Noun	- μ	Noun	- μ	Noun	-
Yoruba	Verb	-	Verb	-	Verb	μ (S)
	Adjective	-	Noun	-	Noun	-
Ainu	Verb	v			Verb	μ (S)
			Noun	-	Noun	-
Maori	Verb	v			Verb	n (S)
	Noun	n			Noun	n

In all 10 languages of the pilot sample, both verb and noun occur in both (dependent) predicate function and term function. The generalization proposed in section 11.2 – that part-of-speech flexibility, in a less narrow sense than Hengeveld’s, might be the normal situation – is thus heavily supported for nouns and verbs in predicate and term functions. Thus, term function is in fact not very differentiating. There is only a small increase of part-of-speech distinctions from (36), with 15 distinctions, to (42), with 18 distinctions.

There is a further interesting generalization in (42). If we compare the markings (inflection and function-indicating marking (μ)) of verbs in predicate function and verbs in term function, we note that they are different in 8 out of 10 cases. The markings of nouns in predicate function and term function are different in 7 out of 8 cases.

Moreover, we note that in Maori, where nouns are not differentiated in predicate and term functions, there is an invariant predicate position which serves to differentiate nouns in predicate function and nouns in term function. Indeed, Hengeveld et al. (1997) have argued that flexibility in the narrow sense is strongly correlated with easily identifiable predicate positions.

In other words, judging from the pilot sample, we come very close to the conclusion that noun - verb flexibility in predicate and term functions is all-pervasive, although its form is constrained by the principle of identification, (15). If simple recycling is sufficient for identification of non-typical functions of nouns and verbs, simple recycling is used. If not, marked recycling is used.

11.5. Finally, if we add predicate modifier function and term modifier function to (42), as in (43)^{xi}, we see that differentiation is much increased.

(43)

language	p		dp		t		pm		tm	
Bororo	V	v			V	(n) S	V	n		
	A	v					Adv	-	A	-
	N	v			N	n	N	n		
Archi	V	v			V	n μ S	V	μ	V	n μ
							P	(n)	P	n μ
					Num	-	Num	- μ	[A]	-
Chukchi					N	n	N	n	Num	-
	V	v			V	n μ	V	n	V	n μ
	A	v					Adv	-		
						[P]	n	A	n μ	
	Num	-			N	n	N	n	N	n μ
	N	v	N	n	N	n	N	n	N	n μ

lg	p		dp		t		pm		tm	
Finnish	V	v			V	(n) μ (S)	V	(n) μ (S)	V	(n) μ (S)
			P	(n)			Adv	-		
			A	n			P	(n)		
			Num	n	Num	n	A	- μ	A	n
			N	n	N	n	N	n	Num	n
									N	n μ
Swedish	V	v	V	v	V	(n) μ (S)	V	(n) μ (S)	V	(n) μ (S)
			P	-			Adv	-		
			A	n			P	-	P	-
			Num	-	Num	-	A	-	A	n
			N	n	N	n	N	n		
							time			
Nama	V	v	V	-	V	(n) μ (S)			V	n μ S
	A	-					P	-	A	(n)
	N	-	N	n	N	n	N	n	Num	-

lg	p		dp		t		pm		tm	
Kobon	V	v	V		V	(μ) S			V	- μ
	Adv	- μ					Adv	-	Adv	- μ
							P	-		
	A	- μ		-					A	-
									Num	-
	N	- μ	N	- μ	N	-	N	-	N	- μ
							place			
Yoruba	V	-	V	-	V	μ (S)			V	(μ) (S)
	A	-					[P]	-		
			N	-	N	-	A	-	A	-
							N	- μ	N	- μ
Ainu	V	v			V	μ (S)	V	-	V	-
							state	-		
			N	-	N	-	P	-		
									N	-
									quant	
Maori	V	v			V	n (S)	V	- S	V	- S
	N	n			N	n	N	n	N	-
							place			

As we can see, the picture that emerges from (43) is fairly different from that of the Amsterdam model.

First, as we have already seen, a distinct class of nouns do not exclude verbs from term function. All languages in the sample use verbs in term function.

Secondly, there is no general tendency for languages which use specialized classes of lexical items in modifier functions to exclude nouns and verbs in modifier functions. Rather, there seems to be a tendency to use nouns and verbs as flexibly as possible. Of the 10 languages in the sample, 8 can use both nouns and verbs as modifiers. Verbs seem to be easier than nouns to recycle, though. In all 10 languages, verbs can be used as modifiers, but there are 2 languages where nouns can not be so used.

This is all the more impressive when we take into account the fact that typical nouns and verbs need to change category, from event or person/thing to place, time, property or quantity, in order to serve as modifiers. That this might be something that actually tends to block recycling is shown by cases where only atypical nouns and verbs, such that do not need to change category, can be recycled. Such cases in the sample are place nouns in Kobon and Maori, and temporal nouns in Swedish, which unlike other nouns can recycled in predicate modifier function, quantitative nouns in Ainu, which unlike other nouns can recycled in term modifier function, and stative verbs in Ainu, which unlike other verbss can recycled in predicate modifier function.

In predicate modifier function, it appears, though, that recycling requires a fairly transparent functional identification, which also identifies the new semantic category of the recycled items. Typically, this is done by means of case on nouns, and sometimes on verbs. If case-marking is not available in predicate modifier function, recycling is more limited, and there tends to be a more extensive use of adpositions and/or verbs in dependent predicate function (serial verbs). Term modifier function, on the other hand, does not seem to require any distinctive kind of functional identification, even though there are languages in the sample, such as Archi and Chukchi, which have a general way of indicating term modifier function. Thus, it might be case that it is in some way easier to recycle items in term modifier function than in predicate modifier function.

Finally, we can note that the languages in the sample which use adjectives in predicate modifier function also have adverbs and/or adpositions. Thus, we do not see, contrary to the predictions of the Amsterdam model, any complementarity between recycled adjectives and adverbs in predicate modifier function.

There is one fairly robust limitation on modifier categories (adverb, adposition, adjective, numeral) in the sample, though. Except for numerals (and certain classes of adjectives, such as color adjectives), modifier categories are not used in term function. Partly, this result may be an effect of my naming strategy. Thus, stative verbs in Ainu might just as well have been called adjectives, and quantitative nouns in the same language might have been called quantifiers (or numerals). However, there is a fair number of well-discriminated modifier categories in the sample and they typically do not appear in term function.

12. Conclusion

Returning to the three questions I posed in the introduction, I would like to propose answers along the following lines. As we have seen, languages tend to make optimal use of their lexical resources. Instead of coining distinct items for every combination of concept and function, languages tend to recycle items in several functions. But new functions of old items must be identifiable. This means that each language must strike a balance between flexibility (recycling) and contrast (identification), and such balances tend to block complete recycling of all items. Hence, languages tend to have part-of-speech systems. Since there are several ways in which languages can strike a balance between flexibility and contrast, languages furthermore tend to have different part-of-speech systems. And, finally, since part-of-speech systems are the outcome of a particular balance of flexibility and contrast, and not of any particular process of part-of-speech learning, questions of design are beside the point. As I said in the introduction: speakers do not set out to acquire part-of-speech systems; part-of-speech systems are what 'happen', as language users strive to maximize meaning and minimize effort.

References

- Allen, W. Sidney. 1964. "Transitivity and possession". *Language* 40. 337-343
- Ameka, Felix. 1992. "Interjections: The universal yet neglected part of speech". *Journal of Pragmatics* 18. 101-118
- Anward, Jan. 1986. "Emotive expressions". In Östen Dahl (ed): *Papers from the Ninth Scandinavian Conference of Linguistics*, Stockholm 1986. 39-52
- Anward, Jan. 1988. "Verb-Verb Agreement in Swedish, in *McGill Working Papers in Linguistics: Special Issue on Comparative Germanic Syntax*, May 1988. 1-33
- Anward, Jan. fc. "Parts of Speech (Wortklassen)". to appear in Ekkehard König & Martin Haspelmath (eds): *Language Typology and Language Universals. An International Handbook*, Berlin: De Gruyter
- Anward, Jan & Lindblom, Björn. fc. "On the rapid perceptual processing of speech: From signal information to phonetic and grammatical knowledge". To appear in Birgitta Englund Dimitrova & Kenneth Hyltenstam (eds): *Language Processing and Interpretation*. Amsterdam: John Benjamins.
- Anward, Jan, Edith Moravcsik & Leon Stassen. 1997. "Parts of Speech: A Challenge for Typology". *Linguistic Typology* 1. 167-183
- Baker, Mark C. 1989. "Object Sharing and Projection in Serial Verb Constructions". *Linguistic Inquiry* 20. 513-554
- Bamgbose, A. 1966. *A Grammar of Yoruba*. Cambridge: Cambridge University Press
- Bauer, Winifred. 1992. *Maori*. New York and London: Routledge
- Bichsel, Peter 1969: "Ein Tisch ist ein Tisch". In *ibid: Kindergeschichten*. Neuwied und Berlin: Luchterhand. 21-32
- Biggs, Bruce. 1969. *Let's learn Maori*. Wellington: Reed
- Bogoras, W. 1922. "Chukchee". In Franz Boas (ed): *Handbook of American Indian Languages. Part 2*. Washington: Government Print Office. ii. 631 - 903
- Brøndal, Viggo. 1928. *Ordklasserne*. Copenhagen: G. E. C. Gad
- Brøndal, Viggo. 1948. *Les Parties du Discours*. Copenhagen: Munksgaard

- Broschart, Jürgen. 1997. "Why Tongan does it differently: Categorial distinctions in a language without nouns and verbs". *Linguistic Typology* 1. 123-166
- Chomsky, Noam A. 1970. "Remarks on Nominalization". In R. A. Jacobs & P. S. Rosenbaum (eds): *Readings in English Transformational Grammar*. Waltham: Ginn and company. 184-221
- Comrie, Bernard. 1981. *The Languages of the Soviet Union*. Cambridge: Cambridge University Press
- Covington, Michael. 1979. The syntactic theory of Thomas of Erfurt, *Linguistics* 17. 465-496
- Covington, Michael. 1984. *Syntactic Theory in the High Middle Ages*, Cambridge: Cambridge University Press
- Croft, William. 1990. A Conceptual Framework for Grammatical Categories. *Journal of Semantics* 7. 245-280
- Davies, John. 1981. *Kobon*. Amsterdam: North-Holland
- de Groot, Casper. 1997. "Parts of speech and derivation". Presented at *ALT II*, Eugene, Oregon, September 1997.
- Derbyshire, Desmond C. 1979. *Hixkaryana*. Amsterdam: North-Holland.
- de Villiers, Peter A. & Jill G. de Villiers. 1979. *Early Language*. London: Fontana
- Eco, Umberto. 1995. *The Search for the Perfect Language*. Oxford: Blackwell
- Elman, Jeffrey L. 1993. "Learning and development in neural networks: the importance of starting small". *Cognition* 48. 71 - 99
- Emonds, Joseph. 1976. *A Transformational Approach to English Syntax*, New York: Academic Press
- Foley, William & M. Olson. 1985. "Clausehood and Verb Serialization". In J. Nichols and A. C. Woodbury (eds): *Grammar inside and outside the clause*. Cambridge: Cambridge University Press
- Gil, David. 1994. "The Structure of Riau Indonesian". *Nordic Journal of Linguistics* 17. 179-200
- Givón, Talmy. 1984. *Syntax. A Functional-Typological Introduction*. Amsterdam: John Benjamins
- Gleason, H. A., Jr. 1961. *An Introduction to Descriptive Linguistics*. New York: Holt, Rinehart & Winston
- Hakulinen, Auli & Fred Karlsson. 1979. *Nykysuomen lauseoppia*. Jyväskylä: SKS
- Hengevald, Kees. 1992. *Non-verbal predication*. Berlin / New York: Mouton De Gruyter
- Hengeveld, Kees, Jan Rijkhoff & Anna Siewierska. 1997. "Part-of-speech system as a basic typological parameter". Presented at *ALT II*, Eugene, Oregon, September 1997.
- Hopper, Paul & Sandra A. Thompson. 1984. "The discourse basis for lexical categories in universal grammar". *Language* 60. 703-752
- Huestis, George, 1963: "Bororo clause structure". *IJAL* 29. 230-238
- Itkonen, Esa. 1991. *Universal history of linguistics*. Amsterdam: John Benjamins
- Jacobsen, William H. 1979. "Noun and verb in Nootkan". In B. S. Efrat (ed). *The Victoria Conference on Northwestern Languages*. Heritage Record No 4, British Columbia Provincial Museum. 83-155
- Jelinek, Eloise & Richard A. Demers. 1994. "Predicates and pronominal arguments in Straits Salish". *Language* 70. 697-736
- Jespersen, Otto. 1924. *The Philosophy of Grammar*. London: Allen & Unwin
- Karlsson, Fred. 1978: *Finsk grammatik*. Helsinki: SKS
- Kibrik, Alexander E. 1977. *Opyt strukturnogo opisanija archinskogo jazyka*. Moscow: Moscow University Press
- Koptjevskaja-Tamm, Maria. 1993. *Nominalizations*. London: Routledge

- Kuryłowicz, Jerzy. 1936. "Dérivation lexicale et dérivation syntaxique; contribution à la théorie des parties du discours". *Bulletin de la Société de Linguistique de Paris* 37. 79-92
- Langacker, Ronald W. 1987. "Nouns and Verbs". *Language* 63. 53-94
- Lange, Sven & Kenneth Larsson. 1973: *Syntactical development of a Swedish girl Embla between 20 and 42 months of age. Part I, age 20 -25 months*. Stockholm: Project Child Language Syntax, Report No 1
- Lyons, John. 1977. *Semantics*. Cambridge: Cambridge University Press
- Mithun, Marianne. 1997. "Noun and verb in Iroquoian". Presented at *ALT II*, Eugene, Oregon, September 1997.
- Perlmutter, David 1971. *Deep and Surface Structure Constraints in Syntax*. New York: Holt, Rinehart & Winston
- Plunkett, Kim & Virginia Marchman 1993: "From rote learning to system building: acquiring verb morphology in children and connectionist nets". *Cognition* 48. 21 - 69
- Robins, R. H. 1990. *A Short History of Linguistics*. Third edition, London and New York: Longman
- Rowlands, E. C. 1969. *Teach Yourself Yoruba*. London: Teach Yourself Books
- Sasse, Hans-Jürgen. 1988. "Der irokesische Sprachtyp". *Arbeitspapier (Neue Folge)* 9. Institut für Sprachwissenschaft, Universität zu Köln.
- Schlesinger, I. M. 1982: *Steps to Language*, Hillsdale, NJ: Lawrence Erlbaum
- Seiler, Hansjakob. 1983. "Possessivity, Subject and Object". *Studies in Language* 7. 90-116
- Shibatani, Masayoshi. 1990. *The languages of Japan*. Cambridge: Cambridge University Press
- Skorik, P. 1961. *Grammatika chukotskogo jazyka, vol. 1*. Moscow: Izdatel'stvo AN SSSR
- Skorik, P. 1977. *Grammatika chukotskogo jazyka, vol. 2*. Leningrad: Nauka
- Stassen, Leon. 1997. *Intransitive Predication*. Oxford: Oxford University Press
- Steedman, M. 1985: Dependency and coordination in the grammar of Dutch and English, *Language* 61: 523-568
- Tesnière, Lucien. 1959. *Éléments de syntaxe structurale*. Paris: Klincksieck
- van Bulck, G. 1952: "Les langues khoïns". In A. Meillet & M. Cohen (eds): *Les langues du monde*. Paris: CNRS. 905-940
- van Eijk, Jan P. & Hess, Thomas. 1986. "Noun and Verb in Salish". *Lingua* 69. 319-331
- Varela, Francisco J., Evan Thompson & Eleanor Rosch. 1991. *The Embodied Mind*. Cambridge, Mass: MIT Press
- Vogel, Petra Maria. 1996. *Wortarten und Wortartenwechsel*. New York & Berlin: de Gruyter
- Westphal, E. O. J. 1971: "The click languages of Southern and Eastern Africa". In *Current Trends in Linguistics. Volume 7: Linguistics in Sub-Saharan Africa*. The Hague: Mouton. 367-420
- Whorf, Benjamin Lee. 1945. "Grammatical categories". *Language* 21. 1-11

ⁱ This is a substantially revised and condensed version of a paper that was originally presented at a conference on 'Functional Approaches to Grammar', in Albuquerque, New Mexico, July 1995, and then expanded into a longish manuscript entitled 'The Dao of Lexical Categories'. The research reported herein was partially supported by a grant from The Swedish Research Council for the Humanities and Social Sciences ('Part-of-Speech Systems', 1988-1992). I am grateful to Masja Koptjevskaja-Tamm, Edith Moravcsik, and Leon Stassen for their stimulating co-construction of much of the contents of this paper. Listening to several heterodox talks by David Gil over the years has been an invaluable source of inspiration. I also wish to thank Petra Vogel for much-needed encouragement and outstanding patience. Remaining inadequacies and errors are of course solely my responsibility.

ⁱⁱ It would be instructive to review ideas of what a well-designed part-of-speech system would be like, as they have appeared in critiques of natural languages, from Ockham to Reichenbach (see, for example, Eco 1995). I suspect that most of them include the notion that the principle of one form - one meaning is basic to any well-designed part-of-speech system.

ⁱⁱⁱ More or less the same kind of examples that the modistae used were used by American structuralists some six hundred years later, to make the same point; see e.g. Gleason (1961).

^{iv} The sources for information on these languages are: Nama: van Bulck (1952), Westphal (1971); Yoruba: Bamgbose (1966), Rowlands (1969); Finnish: Hakulinen & Karlsson (1979), Karlsson (1978); Archi: Kibrik (1977); Chukchi: Bogoras (1922), Skorik (1961, 1977), Comrie (1981, 240-251); Ainu: Shibatani (1990, 1-86), Maori: Biggs (1969), Bauer (1993); Kobon: Davies (1981); Bororo: Huestis (1963). For Yoruba, Archi, Chukchi, and Maori, I also draw heavily on unpublished sketches by Masja Koptjevskaja-Tamm.

^v I should point out, though, that there is a long tradition of recognizing only four basic parts of speech, starting with Varro (Robins 1990: 58-59). In the 20th century, representatives of this tradition are Brøndal (1928, 1948), Tesnière (1959), and Chomsky (1970).

Brøndal argues forcefully that parts of speech cannot be grounded in morphological or syntactic properties, since such properties are accidental and can change. Instead, he advocates a return to the foundations of the Greek grammatical tradition, the Aristotelian categories. However, Brøndal argues that only four of the categories are really needed, that the other categories can be defined in terms of these four, which are substance (R), relation (r), quantity (D), and quality (d), or, in modern terms, thing, relation, quantity, and property.

Tesnière (1959) regards only verb, noun, adjective, and adverb as 'full words' (*mots pleins*), relegating all other words to derivational markers, or 'empty words' (*mots vides*).

Chomsky's (1970) revival of Varro's [\pm case; \pm tense] model, with N substituted for case, and V substituted for tense, so that we get noun: [+N; -V], verb: [-N; +V], adjective: [+N; +V], and adposition: [-N; -V], is easily the most influential of these four-category models.

^{vi} 'μ' indicates marked recycling (see section 11.2). 'n' and 'v' indicate nominal and verbal inflection, respectively. '-' means uninflected. An empty cell indicates that a class of words is not used in the function in question.

^{vii} This is not to say that there are no genuine cases of verb - noun neutralizations. See Jelinek & Demers (1994), Gil (1994), and Broschart (1997) for some well-documented cases.

^{viii} This is what Kuryłowicz (1936) calls syntactic derivation and what Croft (1990) calls function-indicating morphology. For some further discussion, as well as a more detailed typology of recyclings, see Anward (fc., section 4.3.).

^{ix} I am ignoring here the argument by Vogel (1996) that flexibility and derivation (including conversion) are not the same thing. I hope to return to this issue in another context.

^x S indicates verbs which are recycled with full verbal government, being construed with subjects and objects as in finite main. The case where a subordinate clause takes nominal inflection as an external inflection, but keeps verbal inflection and government in its internal structure, is represented as S with nominal inflection.

^{xi} [X] means that X is a closed class.