(7.2) from Handbook of Syntax, Vol. 2 (de Gruyter). In press. Matthew Dryer J. Jacobs, ed.

XVII. Syntaktische Typologie II: Ansätze und Übersichtsdarstellungen
Syntactic Typology II: Approaches and Surveys

55. Word Order Typology

1. History

Although an awareness of a relationship between the order of verb and object and other word order characteristics dates back to at least the nineteenth century, it is the work of Greenberg (1963) – sometimes cited as Greenberg (1966), the apparently unrevised second edition – that is generally viewed as marking the beginning of an interest in word order typology. The basic idea of word order typology is that there is an association or correlation between a number of word order characteristics, so that given a single word order characteristic of a language, like the order of verb and object, one can predict, at least in a statistical sense, a variety of other characteristics of the language.

Greenberg proposed 45 linguistic universals, based primarily on a sample of 30 languages, though clearly formulated with an awareness of the properties of other languages as well. 28 of these universals refer to the order or position of grammatical elements, the others dealing exclusively with morphological characteristics. The majority of Greenberg's universals are *implicational*, taking the basic form "If P then Q". Another important feature of many of his universals is that they are *statistical*, being stated to hold "with overwhelmingly greater than chance frequency". The majority of them are not formulated in statistical terms, but many of these do in fact have exceptions outside his 30-language sample.

Many of Greenberg's universals refer to the basic order of subject, object, and verb. His typology assumes that languages belong to one of three types, SVO (e. g. English), SOV (e. g. Japanese) and VSO (e. g. Welsh). He described the other three possibilities (VOS, OVS, OSV) as not occurring at all or being excessively rare, but all three of these are now claimed to exist. Though not common, VOS languages are found in various parts of the world (cf. Keenan 1978; Tomlin 1986). The two types of object-initial languages, OVS and OSV, are so far primarily attested in South America (cf. Derbyshire/Pullum 1981; 1986), though a convincing case for an OSV language has yet to be presented in detail. Because VOS languages pattern like VSO languages in their characteristics, it is common to refer to these together as verb-initial languages. This term is potentially misleading since certain elements like negative words or question particles often precede the verb in such languages; the term should be understood in the sense that among the set of elements consisting of the verb, subject, and object, the verb occurs first. Though OVS and OSV languages seem to pattern like SOV languages, evidence is so far too meagre to draw firm conclusions. Because of the rarity of OSV languages, it is common to refer to SOV languages as verb-final. The notion of verb-medial language, however, does not seem useful, since SVO and OVS languages do not seem to form a natural class. The terms *predicate-initial* and *predicate-final* would be more appropriate than *verb-initial* and *verb-final*, since nonverbal predicates (e. g. nouns, locatives) normally occur initially in verb-initial languages and finally in verb-final languages, but the latter terms are well-established.

Implicit in many of Greenberg's universals and in some of his discussion is the idea that

many of his universals reflect a more fundamental typology of two "ideal" language types, OV and VO. This idea is made explicit in the later work of Lehmann (1973; 1978) and Vennemann (1973; 1974a; 1974b; 1976). The basic idea is that, at least in the ideal case, VO languages are the mirror image of OV languages, all word order characteristics being reversed. This basic pattern is discussed in 2. The work of Lehmann and Vennemann (as well as various others during the 1970's) was also characterized by attempts to explain this fundamental pattern, to find a single principle which would account for the full range of pairs of elements whose order correlates with that of the object and verb. Some of these possible explanations are discussed in 3. The work of Lehmann and Vennemann differed from that of Greenberg in two other important respects. First, although Greenberg's study was really only a pilot study (being based primarily on a 30-language sample), little attempt was made during the 1970's to expand the empirical basis for the universals or the basic pattern. A number of correlations or patterns not proposed by Greenberg were claimed to be true and have since become widely assumed by linguists. Yet little systematic evidence was presented in support of these claims. Unfortunately, many of these assumptions are not supported by the available empirical evidence. Among these is the idea that OV languages tend to place the adjective before the noun. In fact, as illustrated by Greenberg's 30-language sample, and as is more fully discussed in Dryer (1988b), both orders of adjective and noun are common among OV languages.

A second difference between the work of Greenberg and that of Lehmann and Vennemann is that the basic pattern of the two ideal types assumed by the latter two linguists, consistent OV and consistent VO, represents a statistical generalization of a far weaker sort than Greenberg's statistical implicational universals. While Greenberg's universals admitted at most a few exceptions in his sample, it is clear even from his sample that there are far more exceptions to the basic pattern, that there are many languages that are not one of the two ideal types. This can be viewed, however, as an inevitable consequence of isolating a more fundamental principle. If the array of existing types reflects the interaction of such a principle with a number of competing principles, one would expect many exceptions to the fundamental principle. An important aspect of the work of Lehmann and Vennemann was to bring out its diachronic implications. These are discussed elsewhere in this handbook in the article on word order change.

The more recent work by Hawkins (1979; 1980; 1983) contrasts with that of Lehmann and Vennemann in a number of ways. First, he argues for the use of absolute (nonstatistical) implicational universals, achieving this in general by formulating more complex multiterm implicational universals of the form "If P then if Q then R". He also argues for distinguishing these nonstatistical implicational universals from what he calls distributional principles, which predict the relative frequency of different language types. An example of the latter is his principle of Cross-Category Harmony, discussed in 2. He also argues against Greenberg's three-way SOV/SVO/VSO typology because SVO languages are supposedly varied in their properties (though cf. Dryer 1991) and because adposition type – whether a language uses prepositions or postpositions – seems to be a better predictor of other word order characteristics. Hawkins' work is the first since Greenberg's article to examine the relevant empirical evidence, based on an expansion of the data in Greenberg's appendix.

2. The Basic Pattern

The work of Lehmann and Vennemann focuses on the fact that many of Greenberg's universals seem to reflect a single fundamental underlying principle whereby a large number of pairs of grammatical elements tend to be ordered in a way that is predictable from the order of the object and verb. For example, genitives tend to precede the noun in OV languages, and follow in VO languages. Similarly, OV languages tend to employ postpositions, while VO languages tend to employ prepositions. In other words, objects of adpositions tend to precede the adposition in OV languages, but to follow in VO languages. Hawkins (1983) follows Vennemann (1974a; 1974b) in referring to the elements whose order correlates with that of the object and verb as *operators* and *operands* respectively, but since this terminology reflects Vennemann's earlier explanation for the correlations, and since the application of this terminology is sometimes found confusing (often being the opposite of what many

semantic theories claim), the terms *object patterner* and *verb patterner* will be used here for those elements whose order tends to correlate with that of the object and verb respectively. Thus genitives are object patterners, while the nouns they modify are verb patterners, and adpositions are verb patterners while the objects of adpositions are object patterners. The central question of this section is therefore: What is the set of pairs of object patterners and verb patterners? The answers given here are the results of a project by the author of this article that has involved the collection of word order data from over 600 languages. For reasons of space, the evidence supporting the conclusions stated is not given here. For details, see Dryer (1992).

Before we can ask what pairs of elements are object patterners and verb patterners, we must first address the question of what it means to say that pairs of elements tend to occur in the same order as the object and verb. In his discussion of Vennemann's work, Hawkins (1980) interprets Vennemann as claiming that the majority of languages of the world fall into one of his two ideal types, either consistently ordering object patterners before verb patterners, or consistently ordering verb patterners before object patterners. It is easy to show, at least for the set of pairs of elements Vennemann claims to be operators (object patterners) and operands (verb patterners), that such a claim would be false: a clear majority of the languages of the world are inconsistent in at least one respect. However, this seems to be a rather ungenerous interpretation of what Vennemann is claiming, although it does point to the fact that Vennemann (like others) is not clear as to exactly what he *is* claiming. An alternative interpretation of Vennemann suggested by Hawkins (1983) is that consistent languages are more common than languages with (exactly) one inconsistency, and that languages with one inconsistency are more common than languages with two inconsistencies, and so on. A rather different kind of interpretation is that for each pair of elements, object patterners more often precede verb patterners in OV languages, while they more often follow in VO languages. The following pairs of elements can be shown to be object patterners and verb patterners by this criterion:

object patterner	*verb patterner*
genitive	noun
noun phrase	adposition
adverb	verb
adpositional phrase	verb
main verb	auxiliary verb
main verb	modal verb
main verb	negative auxiliary
verb	verb *want*
verb	verb *cause*
standard of comparison	adjective
standard of comparison	marker
sentence	question particle
clause	adverbial subordinator
noun	plural word

By plural word is intended a word that serves the same function as plural affixes in other languages, but which is a separate word modifying the noun. By auxiliary verb is intended one indicating tense or aspect. Negative auxiliaries are negative words distinct from the main verb that exhibit verbal characteristics (cf. Dahl 1979).

The above list involves pairs of elements that exhibit *bilateral correlations* with the order of object and verb, where two pairs of elements X_1 Y_1 and X_2 Y_2 are said to exhibit a bilateral correlation if languages which are X_1 Y_1 tend to be X_2 Y_2 and languages which are X_2 Y_2 tend to X_1 Y_1. A number of other pairs of elements exhibit *unilateral correlations* with the order of object and verb, where two pairs of elements X_1 Y_1 and X_2 Y_2 are said to exhibit a unilateral correlation if languages which are X_1 Y_1 tend to be X_2 Y_2 *or* languages which are X_2 Y_2 tend to be X_1 Y_1, but not both. An example of a pair of elements that exhibits a unilateral correlation is the order of relative clause and noun. Although VO languages almost never place relative clauses before the noun, both orders of relative clause and noun are common among OV languages (cf. Dryer 1992). Such unilateral correlations, or asymmetries as Hawkins (1985) calls them, are naturally described by unilateral implicational universals, e. g. "If the language is VO, then the relative clause follows the noun." Given the unilateral nature of the correlation, one might even question whether it is appropriate to describe the situation as a correlation at all. However, the term is appropriate because a plausible interpretation of the facts is that there is a principle by which prenominal relative clauses are preferred in OV languages, but which is in conflict with a principle whereby postnominal relative clauses are universally preferred (cf. Hawkins 1988, 1990).

Furthermore, it remains the case that prenominal relative clauses occur significantly more often in OV languages than they do in VO languages. It will be assumed here that two elements X and Y are object patterner and verb patterner if X precedes Y more often in OV languages than in VO languages, i. e. if the proportion of languages in which X precedes Y is greater among OV languages than it is among VO languages. By this criterion, relative clauses are object patterners and the nouns they modify are verb patterners, despite the fact that OV languages with postnominal relative clauses are as common as OV languages with prenominal relative clauses. The following is a list of pairs of elements which can be shown to be object patterners and verb patterners in this weaker, unilateral, sense (though not in the bilateral sense):

object patterner	*verb patterner*
relative clause	noun
noun	article
noun	numeral
clause	complementizer
stem	affix
subject	verb

VO languages tend to have prenominal articles and numerals, and clause-initial complementizers, while OV languages tend to employ suffixes and to be SV rather than VS (i. e. OVS is rare). But the reverse tendencies do not hold: both orders of article and noun and of numeral and noun and both positions of complementizers are common among OV languages (though complementizers are not common in OV languages); both prefixes and suffixes are common among VO languages; and both orders of subject and verb are common among VO languages. The tendency for numerals modifying nouns to precede the noun in VO languages is not a strong one, and exhibits a strong areal split: VO languages in Africa generally place the numeral after the noun, while VO languages elsewhere in the world generally place it before the noun (cf. Dryer 1989). Affixes in general behave as verb patterners (i. e. suffixing is more common in OV languages than it is in VO languages), although different classes of affixes behave differently. In particular, pronominal object affixes on verbs exhibit the opposite correlation (they are prefixes more often in OV languages than they are in VO languages), and pronominal possessive affixes on nouns exhibit a similar though weaker trend (they are also prefixes more often in OV languages than they are in VO languages).

It turns out that even with this rather weak interpretation of what it means for a pair of elements to correlate in order with the object and verb, a number of pairs of elements that are often assumed to be object patterners and verb patterners are not in fact such. An important example of such is adjective and noun. Vennemann and Lehmann both assume that adjectives precede the noun more often in OV languages than they do in VO languages, but, as discussed by Dryer (1988, 1992), this is not so. Two facts apparently led people to this mistaken belief. First, there is a strong tendency in a large area of Asia, stretching from Turkey to Japan, and from southern India to Siberia, for OV languages to place the adjective before the noun (cf. Masica 1976). But this is apparently due to remote areal or genetic factors: outside this area, it is considerably more common for the adjective to follow the noun in OV languages. Second, one might be led to conclude that the order of adjective and noun correlates with the order of object and verb if one extrapolates from Greenberg's Universal 17: "With overwhelmingly more than chance frequency, languages with dominant order VSO have the adjective after the noun." But in fact it turns out that this universal is incorrect, and simply an accidental property of Greenberg's sample, in which all six VSO languages happened to place the adjective after the noun. It is somewhat more common for VSO languages to place the adjective after the noun, but the same is true for SOV languages as well. In short, adjectives are not object patterners and the nouns they modify are not verb patterners.

Similar comments apply to a number of other pairs of elements that are widely assumed to correlate in order with the order of object and verb. It is widely believed that modifiers in general tend to precede the noun in OV languages, follow in VO languages. But numerals, articles, and plural words exhibit a trend in the opposite direction, preceding the noun more often in VO languages than they do in OV languages. (Cf. Dryer (1992) for details.) Demonstratives, like adjectives, do not exhibit any significant correlation at all. In short, the only modifiers of nouns that are object patterners are genitives and relative clauses. Auxiliaries are verb pat-

terners and their accompanying main verbs are object patterners if one restricts attention to clearly verbal auxiliaries, ones like auxiliaries in English and German which exhibit verbal characteristics and are presumably best treated as a subclass of verbs. But if one examines nonverbal auxiliaries, i. e. particles or clitics indicating tense/aspect, one finds no correlation. Similar comments apply to negative words. If they are verbal, they tend to be verb patterners, but if not, there is no correlation; they tend to precede the verb in both OV and VO languages. Finally, the order of qualifier (adverbial modifiers of adjectives) and adjective exhibits no correlation either.

Hawkins (1980; 1983) approaches the basic pattern in a rather different way. His principle of Cross-Category Harmony claims (loosely speaking) that the most frequent language types are those in which the proportion of dependents preceding one category of head will be the same as the proportion of dependents preceding other categories of heads. In some ways, this makes similar claims to those of Vennemann, predicting that among languages in which all dependents precede the verb, the most common type will be that in which all dependents precede the noun. The results reported above might lead one to expect this prediction to be false for my data, since articles, numerals, and plural words precede the noun less often in OV languages than they do in VO languages, and since adjectives and demonstratives exhibit no correlation. In fact, however, this language type, in which all modifiers precede the noun, is one of the most common types of SOV languages, outnumbering most (and perhaps all) individual "inconsistent" language types. In other words, it represents a minority of SOV languages, but outnumbers most other possible types. However, most of these SOV languages in which all modifiers precede the noun are spoken in Europe and Asia; relatively few SOV languages outside this area are of this type. Hawkins' principle also predicts that the most common type among verb-initial languages will be that in which all modifiers follow the noun. This prediction is definitely not borne out: among verb-initial languages, the types with articles and/or numerals preceding the noun are definitely more common (cf. Dryer 1991).

Hawkins' principle differs from previous work in predicting that in languages in which the verb comes in the middle of the clause, the most common type should be that in which the noun comes in the middle on the noun phrase, that it should be less common for SVO languages to place all modifiers before the noun or all of them after. It thus places SVO languages between verb-final and verb-initial languages, in contrast to Lehmann and Vennemann, who treated SVO languages like verb-initial languages as belonging to the general category of VO languages. Although the evidence seems to bear this out to a certain extent, this may be largely due to the order of noun and genitive: while the genitive normally precedes the noun in verb-final languages and follows in verb-initial languages, both orders of noun and genitive are common among SVO languages. For other characteristics, however, SVO languages clearly pattern more like verb-initial languages (cf. Dryer 1991). For example, SVO languages are overwhelmingly prepositional rather than postpositional. In so far as SVO languages are less consistent than verb-initial languages, this may simply be due to the number of SVO languages which were recently verb-final languages (cf. Finnish). Questions also arise regarding the representativeness of Hawkins' sample. Despite being larger than Greenberg's 30-language sample, it suffers from genetic and areal biases (cf. Dryer 1989). In a number of cases it is not clear whether the greater frequency in his sample of one language type relative to another is not simply due to certain genetic groups being well-represented in his sample.

A further issue largely ignored in the literature is whether the various pairs of object patterners and verb patterners all correlate with each other. The early literature assumes a special status for the order of object and verb, and the definitions of object patterner and verb patterner employed here follow that tradition. But no evidence for such a special status has ever been provided, and Hawkins (1983) argues that adposition type is in fact a better predictor, at least for implicational universals. It is quite possible, of course, that no pair of elements has a privileged status. It is also important to distinguish privileged status as a predictor of word order properties from a common trigger of word order change. Adposition type might be a good predictor of word order properties, because it seems to be more stable than the order of object and verb, but an infrequent trigger of word order changes, for precisely the same reason. It has even been suggested (cf. Anti-

nucci/Duranti/Gebert 1979) that the order of relative clause and noun is a major trigger for word order change; but though prenominal relative clauses are a good predictor of OV order, postnominal relative clauses do not predict anything. Even if some special status should be assigned to one pair of elements, like the object and verb, the question arises as to whether the various pairs of object patterners and verb patterners correlate not only with the order of object and verb but also with each other. The various attempts to isolate a single underlying principle assume that they do. For example, if various pairs of elements correlate in order with the order of object and verb because they all involve pairs of dependents and heads (cf. 3.1.), then we would expect each pair to correlate with each other for the same reason. On the other hand, Justeson/Stephens (1987) argue that this is not the case, that the basic pattern actually consists of chains of correlations, where A correlates with B, and B with C, but where there is no direct correlation between A and C, where the apparent correlation between A and C is due entirely to the correlations between A and B and between B and C. This has important implications for explaining the basic pattern. Justeson and Stephens' conclusions are based on a sample of questionable quality, however, and it remains to be investigated what results a more careful sample would provide.

3. Explanations for the Basic Pattern

3.1. Syntactic Explanations

Considerably more attention has been given in the literature to attempts to explain the basic pattern than to determining which pairs of elements are in fact object patterners and verb patterners. Unfortunately, many of the proposals for explaining the basic pattern suffer from incorrect assumptions as to which pairs of elements do pattern with the object and verb, as discussed in 2. Perhaps the most popular explanation is that the basic pattern reflects a tendency to consistently order grammatical heads with respect to their dependents (or modifiers). Greenberg himself suggested that some such principle underlies the basic pattern, and the idea is widely assumed in the literature. Hawkins' principle of Cross-Category Harmony is formulated in terms of such notions. As noted in 2., however, there are many categories of dependent whose order with respect to their head does not correlate with the order of object and verb, at least under the most common assumptions as to what elements are heads and what are dependents. Among modifiers of nouns, only genitives and relative clauses are object patterners. Adjectives, demonstratives, articles, plural words and numerals do not precede nouns more often in OV languages than they do in VO languages, and in fact the last three of these categories exhibit precisely the opposite tendency. The order of negative particles and tense-aspect particles with respect to verbs does not correlate with the order of object and verb. Nor does the order of qualifier (adverb modifying adjective) and adjective. Conversely, a number of verb patterners are not heads, at least under the most common assumptions, such as articles, complementizers, question particles, numerals, plural words, and affixes. There are, however, theories in which these are heads; Vennemann (1976) and Vennemann/Harlow (1977) offer an account of the basic pattern in terms of a categorial grammar in which the first three of these are heads. There are other verb patterners whose status as heads is at least controversial; this includes adpositions and auxiliary verbs. Again, only theories which analyse these as heads could account for the basic pattern in terms of consistent ordering of heads and dependents. But the number of categories of dependents which fail to be object patterners presents a problem for any claim that there is a general tendency for dependents to precede heads in OV languages, and to follow in VO languages. There are a number of ways in which one might distinguish those dependents which are object patterners from those which are not. One possibility is the distinction between complements and noncomplements, though this distinction is heavily theory-dependent (cf. 3.2.). Another possibility (cf. Dryer 1992) is the distinction between phrasal dependents and nonphrasal dependents. It is also possible that certain categories, like numerals, are heads in some languages, dependents in others. (Babby (1987) argues that numerals in Russian have changed from being heads to being dependents. This suggests that the correlations with the order of numeral and noun can only be understood if we have evidence as to whether numerals are heads or dependents in a given language.

Lehmann (1973) offers a rather different kind of syntactic explanation for the basic

pattern. According to his principle, "modifiers are placed on the opposite side of a basic syntactic element from its primary concomitant" (Lehmann 1973, 48). One of the putative correlations that this is intended to account for is the presumed correlation between the order of adjective and noun and the order of object and verb. The idea is that the primary concomitant of an object is the verb, so an adjective modifying the object noun is on the opposite side of the noun from the verb if it precedes the noun in an OV language. However, as noted in 2., there is in fact no correlation between the order of adjective and noun and the order of object and verb. Similarly, Lehmann's principle is intended to account for the presumed fact that negatives follow the verb in OV languages. However, although such a tendency exists for negative affixes and negative auxiliaries, it is not true for negative particles. Even with some pairs of elements whose correlation in order with that of object and verb has long been widely-assumed, such as adverbials (cf. Vennemann 1974a; 1974b), Lehmann's principle seems to make the wrong prediction. Since objects are the primary concomitant of verbs (on his own assumptions), his principle would seem to predict that adverbials should tend to occur on the opposite side of the verb from the object. But exactly the opposite is the case.

The discussion here assumes that the notions *consistent OV language* and *consistent VO language* are tied to a pattern that is observable among the languages of the world, to a language type for which there is some sort of linguistic preference. An alternative view (cf. Vennemann 1981) is that the notions are simply a convenient way to characterize certain languages, quite apart from what word order patterns are common among the languages of the world. There is no doubt that certain languages can be characterized as consistently ordering heads before dependents or vice versa. And it is quite plausible that the grammars of these languages involve a single rule governing word order. This has not, however, been the standard view in word order typology. Rather, the standard view is that certain word order characteristics are expected or predictable (in a statistical sense) given other word order characteristics of the language.

3.2. Semantic Explanations

An alternative approach to explaining the basic pattern has been in terms of semantic notions. In his earlier work, Vennemann (1973; 1974a) proposes an explanation in terms of consistent ordering of functor and argument, or in his terminology, operator and operand. His account assumes a semantic system in which the assignment of functor and argument is different from that in many other semantic theories. For example, he assumes in the combination of object and verb that the object is the functor, the verb the argument. In later work, Vennemann (1976) and Vennemann/Harlow (1977) offer a revised account of the basic pattern that involves more conventional assumptions as to what is functor and argument, but the new theory, though formulated in terms of categorial grammar and thus tied to semantic notions, is essentially a theory of consistent ordering of head and dependent of the sort discussed in 3.1. Keenan (1979) offers an alternative semantic account in which the object is argument, the verb functor. Keenan's account requires a dissimilation principle, whereby the position of functors combining with "determined noun phrases", like *the tall man*, is the opposite of that of functors taking "common noun phrases", like *tall man*. For example, a VO language on his theory is one in which functors combining with determined noun phrases precede their arguments (e. g. verb preceding object), while functors combining with common noun phrases follow them (e. g. adjective following noun). As Hawkins (1983) points out, a dissimilation principle like this is less elegant than a single principle, like consistent ordering of head and dependent, or of functor and argument. A further weakness with Keenan's account is that it makes no prediction as to what should happen with functors that combine with arguments that are neither determined noun phrases nor common noun phrases, such as negatives, auxiliaries, or adverbs combining with verbs (or verb phrases), or qualifiers combining with adjectives.

Hawkins (1983; 1984) argues for an account in terms of head and dependent rather than one in terms of functor and argument, arguing against the approaches of both Vennemann and Keenan, but all three linguists assume essentially the same set of object patterners and verb patterners. However, these semantic approaches need to be re-evaluated in light of the new evidence. Keenan's dissimilation principle was motivated by the assumption that noun modifiers like adjectives, numerals, and articles are object patterners. But since they are not, the possibility exists

of a semantic account of the basic pattern within a theory that treats the verb as functor, but without any need for a dissimilation principle. The fact that articles (and to a lesser extent numerals) tend to precede the noun in VO languages is precisely what a theory claiming that functors tend to precede arguments in VO languages would predict. Nevertheless a number of problems still exist for an approach which claims that OV languages consistently place arguments before functors. First, adverbs and many adpositional phrases modifying verbs are most naturally treated as functors on the verb (or verb phrase), but they tend to precede the verb in OV languages. Second, prenominal relative clauses occur with very few exceptions only in OV languages. But relative clauses are most naturally treated as functors on the head noun. Finally, there are a number of pairs of elements whose order does not correlate with the order of object and verb, but which seem to involve a relationship of functor and argument. Among these are the adjective and noun, demonstrative and noun, qualifier and adjective, negative particle and verb (or verb phrase), and tense-aspect particle and verb (or verb phrase). It may be significant, however, that four of the functors in these five pairs of elements – all but demonstratives – are attributes, in the sense of Vennemann (1976): they are dependents which combine with their heads to form constituents of the same syntactic and semantic type as the head. Conversely, many of the object patterners are complements in Vennemann's sense: they are dependents that serve as arguments rather than functors. It is possible that both syntactic and semantic notions are relevant to accounting for the basic pattern.

3.3. Processing Explanations

The underlying assumption of the approaches to explaining the basic pattern that appeal to syntactic notions or semantic notions is that consistent languages involve simpler grammars while inconsistent languages involve more complex grammars. Other approaches assume that the higher frequency of consistent languages is to be explained instead in terms of extragrammatical notions. Kuno (1974) was the first to suggest that at least some of the correlations with the order of object and verb might be due to the nature of sentence processing. He argued that certain combinations of inconsistent types would lead to structures that are more difficult to process. He argues, for example, that prenominal relative clauses in VO languages and postnominal relative clauses in OV languages lead more often to centre-embedded structures than the reverse situations. Dryer (1992) argues that the consistent language types involve consistent left-branching or consistent right-branching, while inconsistent word order types, at least in certain cases, also leads to centre-embedding. Frazier (1979) argues that some of the correlations reflect a tendency for heads to be adjacent to heads of complements, a tendency for which she offers a further explanation in terms of processing. Hawkins (1990) offers further explanations in terms of processing.

3.4. Diachronic Explanations

All of the explanations discussed so far are synchronic in the sense that they assume that inconsistent languages present some small burden on speakers of the language, either in terms of greater complexity in the grammar, or in terms of more difficult sentence processing, and that such languages will be under some internal pressure to become consistent. An alternative line of explanation, suggested for some of the correlations, both by Greenberg (1963) and by Vennemann (1973; 1974b), but pursued at greater length by Givón (1971; 1975; 1984), is an entirely diachronic one. According to this approach, inconsistent language types present no burden on speakers, but rather are less common simply because the conditions under which they arise occur less often than the conditions under which consistent languages occur. Consider for example the fact that case suffixes correlate with postpositions, while case prefixes (though not common) correlate with prepositions. The most plausible diachronic source for case affixes is adpositional words that become attached to nouns. On the approach of Givón (1971), the position of affixes relative to stems reflects the position of the words from which they arise. Hence the normal diachronic source for case suffixes will be postpositions rather than prepositions. Prepositions that become attached to nouns will become case prefixes rather than suffixes. There is no natural way in which a preposition could become a suffix, unless it passed through an intermediate stage as a postposition. Consider the inconsistent language type with prepositions but case suffixes. On the diachronic approach, such a type would arise only if a language had

changed its adposition type from postposition to preposition, since the case suffixes would have arisen, by assumption, from postpositions. The greater frequency of consistent languages with postpositions and case suffixes is thus simply due, on this account, to the fact that languages do not often change their adposition type. If languages with postpositions tend to remain postpositional, then the account predicts that languages with case suffixes will more often be postpositional. Under this approach, the inconsistent type with prepositions and case suffixes is not dispreferred synchronically, nor will it be under any internal pressure to change, except in the sense that if the case suffixes are eventually lost by erosion, and new case affixes arise, the new affixes will be prefixes (since the language is prepositional).

Givón offers this type of explanation for the correlation between adposition type and the order of object and verb. One of the diachronic sources for adpositions is verbs; in an OV language, the verb will become a postposition, while in a VO language the verb will become a preposition. The English preposition *including* is an apparent example of this process. Since the verb *include* preceded its object, when *including* became reanalysed as an adposition, its order with respect to its object remained the same as when it was a verb, and so it became a preposition. Another source for adpositions is head nouns in genitive constructions. English *because of* is an apparent example of this. It became a preposition because it arose from the head noun *cause* that preceded a genitve (*by cause of X*). This predicts the correlation of adposition type with the order of noun and genitive. A further example of this line of explanation is the explanation for auxiliary verbs being verb patterners: they arise from main verbs, while the new main verb arises from a complement. The English verbals *be going to*, *used to* and *supposed to* all appear to be in the midst of such a transition. The tendency for the numeral to precede the noun in VO languages may reflect its original status as head in a noun-genitive construction, even in languages in which it is now a dependent. Finally, on such an approach the correlation between affix type and stem can be viewed as a reflection of the fact that the kinds of words which serve as the source of affixes tend to be ones which follow the word they go with in OV languages, but precede in VO languages, such as adpositions becoming case affixes and auxiliaries becoming tense-aspect affixes. It is significant that the two classes of affixes which are more often prefixes in OV languages than they are in VO languages are pronominal object prefixes on verbs and possessive prefixes on nouns. Both presumably arise from separate pronoun words (cf. Givón 1976) that more often precede their heads in OV languages.

Some of the correlations in the basic pattern seem less susceptible to this line of explanation. For example, there is no obvious diachronic account for the fact that adverbials tend to occur on the same side of the verb as the object. Rather this correlation seems to be due to the (synchronic) grammatical parallelism between the relation of objects to verbs and the relation of adverbials to verbs. Significantly, however, this correlation is an intra-categorial correlation, since it involves the order of two elements with respect to the same head, the verb. Whether there are cross-categorial correlations that are not susceptible to this kind of diachronic explanation is less clear. While it is clear that the cross-categorial correlations are due in part to diachronic factors of the sort discussed, there is very little evidence in the literature bearing on the question of whether the correlations are due entirely or largely to such diachronic factors, or whether synchronic factors of the sort assumed in 3.1. to 3.3. also play a significant role as well. Nor is there any reason to believe that the basic pattern reflects a single principle. Rather, the correlations may be due to a combination of factors (both synchronic and diachronic), and the individual correlations may be due to different factors: some may be largely due to diachronic factors, while others may be due more to synchronic grammatical parallels.

It was noted at the end of 2. that an unanswered question is whether the basic pattern involves a set of pairs of elements all of which correlate in order with each other, or whether there instead exist chains of correlations. The explanations which appeal to a single underlying principle, such as consistent ordering of heads and dependents, predict the former. The kind of explanation proposed by Givón is consistent with the latter since it involves specific explanations for each pairwise correlation. Justeson/Stephens (1987), as noted in 2., argue that there do indeed exist such chains of correlations, and that not all the pairs of elements correlate in order with each other. One of the chains they argue for

is one by which the order of genitive and noun correlates with adposition type and adposition type correlates with the order of object and verb; but they argue that there is no direct correlation between the order of genitive and noun and the order of object and verb, and that the apparent correlation is simply due to the fact that each of these correlates with adposition type. Significantly this is precisely what Givon's account of adposition type would lead us to expect. His argument that adpositions arise either from verbs or from head nouns in noun-genitive constructions predicts the two correlations with adposition type, but does not predict any correlation between the order of object and verb and the order of genitive and noun.

4. Other Patterns

4.1. Deviations in the Basic Pattern

Although the basic pattern may characterize consistent languages, it represents at best a tendency, a statistical generalization about an ideal around which languages cluster. As Hawkins (1983) notes, simply characterizing this ideal fails to do justice to the large number of languages which do not conform to it. And not only are there many languages which do not conform; there are many additional generalizations to be made about those which do not. Hawkins' distinction between implicational and distributional universals is an attempt to address this problem. On the one hand, his principle of Cross-Category Harmony makes predictions about the relative frequency of languages that fail to conform to the basic pattern, predicting that among such languages language frequency will correlate with degree of consistency: those which are more consistent will be more common than those which are less consistent. And on the other hand, his attempt to formulate a set of exceptionless implicational universals is designed to distinguish those inconsistent types which are attested from those which are not.

Hawkins (1983, 41) computes that of the languages in Greenberg's 30-language sample, only 7 are consistent. But in making this computation, he follows Lehmann and Vennemann in his assumptions about the set of object patterners and verb patterners. In particular, he assumes that adjectives, demonstratives, and numerals modifying nouns and qualifiers (adverbs) modifying adjectives are object patterners, that these elements precede the word they modify in consistent OV languages and follow in consistent VO languages. But these elements do not exhibit any such tendency (cf. 2. and Dryer 1986), and numerals in fact exhibit a weak tendency in the opposite direction. OV languages outside of Asia more often place the adjective after the noun, and VO languages outside of Africa overwhelmingly place the numeral before the noun. Hence it is hardly surprising that only 7 of the 30 languages are consistent by these criteria. Nor are the 7 a random subsample: the 4 consistent OV languages are all spoken in Asia, and the 3 consistent VO languages are Niger-Congo languages, spoken in Africa. If we restrict our criteria to pairs of elements whose order does correlate with that of the object and verb (cf. 2.), it turns out that 20 of the 30 languages are consistent. (The pairs assumed here are genitive and noun, relative clause and noun, noun phrase and adposition, main verb and inflected auxiliary, main verb and subordinate verb in a construction indicating volition and purpose, and standard of comparison and adjective.) Obviously the frequency of inconsistent languages depends on one's assumptions as to what constitutes consistency.

But even with a more restricted notion of consistency, there are clear patterns to the inconsistencies. In fact, they primarily involve what Hawkins (1988) calls asymmetries, and what are called unilateral correlations in 2. For example, 5 of the 10 inconsistent languages in Greenberg's sample are inconsistent with respect to the order of main verb and subordinate verb in expressions of volition and purpose. But all 5 exceptions are OV languages in which the subordinate verb follows the main verb. Thus of the four possible types of languages varying for these two parameters, order of object and verb, and order of main verb and subordinate verb in purpose constructions, three types are well-attested in Greenberg's sample, and one is unattested, VO languages in which the subordinate verb precedes the main verb. As noted in 2., these unilateral correlations are naturally described by the use of implicational universals, in this case "If a language is VO, then it will place the subordinate verb after the main verb in expressions of purpose" (or equivalently "If a language places the subordinate verb before the main verb in expressions of purpose, the language is OV"). This is essentially Greenberg's Universal 15. Simi-

larly two of the inconsistent languages in Greenberg's sample are OV languages which place the relative clause after the noun. In fact, OV languages of this sort are more common than Greenberg's sample might suggest (cf. Hawkins 1990, Dryer 1992). But VO languages with prenominal relative clauses are quite rare. Note that both of these asymmetries involve OV languages placing subordinate verbs to the right of their heads. This is reminiscent of a conclusion of Dryer (1980): there are OV languages in which object clauses normally follow the verb, but not VO languages in which such object clauses normally precede the verb. These asymmetries seem to involve an overall preference for subordinate verbs (or clauses) to follow their heads, which conflicts with the basic pattern in OV languages. The remaining four inconsistent languages in Greenberg's sample are SVO languages in which the genitive precedes the noun. Three of these are also inconsistent in being postpositional. In fact, postpositional SVO languages are somewhat less common than this sample might suggest. On the other hand, SVO languages in which the genitive precedes the noun are quite common. This asymmetry apparently reflects the fact that in many languages the order of genitive and noun parallels the order of subject and verb rather than the order of object and verb. This is not surprising in light of the existence of other grammatical similarities between genitives and subjects. The inconsistent languages in Greenberg's sample thus fall into one of two categories: OV languages in which subordinate verbs follow their heads and SVO languages in which the genitive precedes the noun.

A further example of an asymmetry involves the position of affixes (cf. Hawkins 1988). While on the basic pattern suffixes should occur in OV languages, prefixes in VO languages, the exceptions tend to be VO languages with suffixes. This seems to reflect an overall preference for suffixes (cf. Greenberg 1957; Cutler/Hawkins/Gilligan 1986; Bybee/Pagliuca/Perkins 1990). A final asymmetry is the order of subject and verb. Although the earlier view (cf. Vennemann 1974a) was that the subject-verb relation lay outside the basic pattern, Keenan (1979) suggests that SVO order can be viewed as an inconsistent type whose not infrequent occurrence is due to a competing principle whereby the subject tends to precede other major constituents of the sentence. This view of the subject-verb relation as falling within the basic pattern is also followed by Vennemann/Harlow (1977) and Hawkins (1983). The order of subject and verb does exhibit a unilateral correlation with that of the object and verb: the subject precedes the verb significantly more often in OV languages than it does in VO languages, since OVS languages are rare.

4.2. Other Correlations with the Basic Pattern

Not all correlations with the order of object and verb involve the order of two elements. For example, VO languages exhibit a stronger tendency than OV languages to place interrogative words or phrases in content questions at the beginning of sentences. But it is difficult to describe this in terms of the order of two elements since the alternative type involves placing such phrases in the position of other phrases of their grammatical or semantic type. A number of OV languages place such phrases immediately before the verb (cf. Kim 1988), but this tendency seems restricted to languages in Eurasia.

There are also typological characteristics which correlate with the order of object and verb but which do not involve word order at all. For example case affixes are more common in OV languages than in VO languages (cf. Greenberg's Universal 41). This is partly because VO languages often use prepositional words where OV languages use case suffixes (cf. 5.2.). However, OV languages employ case affixes or adpositions to distinguish subjects from objects more often than VO languages do. SVO languages are particularly lacking in such case marking for subjects and objects, presumably because the word order is a reliable guide, even in clauses containing only one independent nominal. There also seem to be correlations between word order type and morphological type. Isolating languages tend to be SVO. Whether verb-final and verb-initial languages differ in this respect is unclear. Lehmann (1973) suggests that OV languages are more often agglutinative, VO languages inflectional, but this too remains to be tested. Finally, articles appear to occur more commonly in VO languages than in OV languages, but this tendency has yet to be documented.

4.3. Correlations outside the Basic Pattern

Although a number of pairs of elements often thought to correlate with the order of object and verb in fact do not (see 2.), some of them

do correlate with other pairs of elements that correlate with the order of object and verb. For example, the order of adjective and noun may not correlate with the order of object and verb, but it does correlate with the order of relative clause and noun. This correlation is a unilateral one: while languages with prenominal adjectives and postnominal relative clauses are common, the reverse situation is not. The order of adjective and noun also correlates with the order of article and noun, though here the correlation is with a verb patterner rather than with an object patterner, since articles are verb patterners (in contrast to relative clauses which are object patterners). Again the correlation is a unilateral one: languages with prenominal articles but postnominal adjectives are common while the reverse situation is not. Curiously, the order of adjective and noun does not correlate with the order of genitive and noun, despite the fact that both are modifiers of the noun. All four possible combinations are common, and in fact the most common type is that in which the adjective follows the noun while the genitive precedes. There are also correlations between pairs of elements neither of which correlate with the order of object and verb. For example, the orders of adjective and demonstrative with respect to the noun correlate with each other, though the correlation is unilateral; cf. Greenberg's Universal 18: "When the descriptive adjective precedes the noun, the demonstrative and the numeral, with overwhelmingly more than chance frequency, do likewise."

4.4. Complex Patterns

A few of Greenberg's implicational universals, and the majority of Hawkins', are complex in the sense that they refer to more than two terms. An example is Greenberg's Universal 5: "If a language has dominant SOV order and the genitive follows the governing noun, then the adjective likewise follows the noun." Some multi-term implicational universals, like this one, characterize patterns among inconsistent languages. The languages defined by the antecedent clause in the universal just mentioned are themselves inconsistent. The effect of the universal is thus to say that one class of inconsistent languages is more common than another.

A number of Hawkins' multi-term implicational universals are generalizations about noun modifier order in languages of a given adpositional type. By restricting attention to prepositional languages he is able to arrive at generalizations that do not hold for postpositional languages as well. He argues that there is a hierarchy among noun modifiers such that, in prepositional languages, modifiers higher on the hierarchy will not follow the noun while modifiers lower precede the noun: demonstratives, numerals > adjectives > genitives > relative clauses. This predicts, for example, that one will not find prepositional languages in which adjectives follow the noun while genitives precede. There are a few exceptions, but most languages conform to the hierarchy. Hawkins offers an explanation for the hierarchy in terms of the relative heaviness of the different modifiers.

5. Further Issues

5.1. The Notion of Basic Word Order

Word order typology often seems to assume that every language can be assigned a basic order, not only among the six possible orders of subject, object, and verb, but also for the various other word order parameters, like the order of adjective and noun, and adposition type. But there are a number of possible problems with this assumption. First, it is not always clear what is meant by basic order. Hawkins (1983) lays out three criteria: higher (text) frequency; higher frequency within the grammatical system (e. g. more adjective lexemes occurring on one side of the noun); and grammatically unmarked status. To these, a fourth criterion is often appealed to: pragmatically unmarked status. In practice these notions generally converge; cases in which different criteria point to different conclusions are not common. The notion of basic order is sometimes thought to be equivalent to deep structure order in some version of transformational grammar. But in fact there is little reason to believe the latter notion is relevant to word order typology. The assumptions of transformational grammar point to SOV as the deep structure order of Dutch and German (cf. Koster 1975). But there is little reason to say that the basic order of these languages is SOV for the purposes of word order typology. It is often not realized that the question as to what is the proper definition of basic word order is an empirical question: Which definition allows the strongest generalizations about word order correlations? For example, as is implicit in universals of both Greenberg and

Hawkins, languages which place the adjective before the noun and the genitive after the noun are rarely, if ever, SOV. If one were to classify Dutch as SOV, it would be an exception to this generalization. Yet the reason it would be an exception is clearly that it is not SOV in the standard sense; SOV order in Dutch satisfies none of Hawkins' criteria. The prominent role that SVO (or at least VO) order plays as a surface order in Dutch would seem to be linked to the order of the modifiers with respect to the noun: the structure of the Dutch noun phrase is one which is common among VO languages, but uncommon among OV languages. Because of cases like these it seems that the notion of deep structure order, whatever its theoretical merit, is irrelevant to word order typology.

But the cases of Dutch and German do point to problems identifying basic order. If they are not SOV, are we to say their basic order is SVO? SVO may have the highest text frequency, and it may be grammatically unmarked, since SOV order either requires an auxiliary or occurs in a subordinate clause, but classifying these languages as SVO misses the obvious point that they are more accurately described as basically verb-second. In other words, they fall outside the SVO/SOV taxonomy. In these and other instances in which assignment of basic order is problematic, it may be best to leave them unclassified and not force them into some single basic order.

The problem of assigning basic order is perhaps most frequently encountered in languages with flexible or so-called free word order. In all such cases, the word order is probably not literally free, but rather is governed by discourse factors (cf. Givón 1983; Payne 1987; Mithun 1987). This type of word order flexibility is especially common among clause-level constituents, but in some languages is found at other levels as well. It might be argued that such languages should be left unclassified as to basic order. However, the criteria discussed above, particularly text frequency, frequently point to one order as basic, even in such languages. It is sometimes questioned whether that is enough. Should a language with flexible order in which SOV is most common be classified the same as a language with fairly rigid SOV order? Again, the question is an empirical one: do these two kinds of languages pattern the same with respect to the word order correlations? And although the question has yet to be systematically examined, the answer appears to be that they do. For example, flexible SOV languages seem to prefer postpositions over prepositions, just as more rigid SOV languages do. There are languages in which word order is so flexible that they are not easily assigned to one of the six basic orders, such as Cayuga, an Iroquoian language (cf. Mithun 1987). But the six-way typology, despite its historical prominence, is not crucial to the basic pattern of word order correlations (see 2.). All that is necessary is whether the language is OV or VO, and perhaps whether it is SV or VS. And some languages which are difficult to assign to one of the six orders can be classified with respect to one or both of these.

Some of the literature on word order typology employs notions like *OV language* in a sense that is dependent on the other word order characteristics of the language: on this usage, a language with characteristics typical of OV languages is described as an OV language, even if the criteria for basicness fail to point to OV as the basic order of object and verb. Such a notion presupposes that it has already been established what characteristics are typical of OV languages. But as already discussed, this has not been settled, and certain properties widely assumed to be characteristic of OV languages, such as adjective-noun order, turn out not be such. Furthermore, such a notion of OV language, leads to circularity in testing universals and correlations.

5.2. Identifying the Relevant Categories

Another problem in assigning languages to a particular word order type, like SOV, or adjective-noun, is that of identifying in each language grammatical functions like subject and object and grammatical categories adjective and noun. The problems identifying subjects in some languages have been widely discussed (cf. Keenan 1976), but in practice they do not present a serious problem for word order typology. For example there is a legitimate question as to what, if anything, should be called subjects in ergative languages. But most ergative languages are either verb-initial or verb-final. Hence these languages can be assigned to the categories verb-initial or verb-final, even if they cannot easily be assigned to more specific categories like VSO. In general, semantic criteria have played a primary role in identifying subjects and objects in word order typology: agents of transitive verbs are

treated as subjects while patients of transitive verbs are treated as objects. Thus in practice an OV language has been identified as one in which patients of transitive verbs precede the verb. Again it must be stressed that whether this practice is acceptable is independent of questions about how best to define grammatical relations: rather, the question is whether identifying objects in this way leads to strong generalizations about word order. The fact that this practice was used by Greenberg in formulating the original universals suggests it does. Hence the practice is justified unless there is evidence that alternative approaches lead to stronger generalizations.

The problem presented by identifying adjectives is in many ways similar. As with other categories, Greenberg assumed an essentially semantic notion of adjective, namely as a word that modifies a noun and has a meaning corresponding to adjectives in English. But in many languages, such words do not belong to a separate word class, being either verbs or nouns. While there is rarely any problem in assigning a language to the adjective-noun category or the noun-adjective category, the question arises as to whether the class of languages that are classified by this method as, say noun-adjective, is a meaningful class, since the words being called adjectives actually belong to different grammatical categories in the different languages. Again, however, the question is an empirical one: do the various types of languages that belong to this class pattern the same way with respect to word order correlations? The answer to this question remains unanswered.

The primary problem identifying postpositions and prepositions surrounds the question of whether affixes expressing the meaning of adpositions in languages like English should be treated as adpositions. Greenberg treated such morphemes as adpositions, again employing essentially semantic criteria. Givón, given his assumptions, also treats the distinction as irrelevant, as does Vennemann (1974b). Hawkins, however, excluded such languages in constructing a sample that expanded on Greenberg's. There exist a number of exceptions to Hawkins' universals if we follow Greenberg's practice. Whether this is because the class of languages examined is simply larger, or whether adpositional words and adpositional affixes behave differently with respect to the word order correlations remains to be investigated. It should be noted that if we assume the narrower notion of adposition, excluding affixes, and if we use adposition type as the fundamental word order parameter, as Hawkins (1983) suggests, then many languages will be unclassifiable since there are many languages which lack adpositional words.

Similar questions about identifying categories in different languages, and how best to define these categories cross-linguistically, apply to a number of other elements that are relevant to word order correlations. Lehmann (1973) suggested that negative markers follow the verb in OV languages, and precede in VO languages. The position of negative markers depends, however, on their properties within each language (cf. Dahl 1979). Lehmann's claim is true (as a tendency) for negative affixes on verbs and negative auxiliaries, but not for negative particles (like English *not*). Such particles tend to precede the verb in both VO and OV languages. The fact that such particles exhibit different properties from affixes suggests that the question of whether an element is a separate word or not may be important in general. To what extent attention to such grammatical characteristics – as opposed to the largely semantic notions assumed by Greenberg – will lead to new generalizations and insights remains to be seen.

Despite the period of time that has elapsed since the appearance of Greenberg's seminal paper, few issues in word order typology have been resolved. There is no agreement as to what pairs of elements correlate in order with that of the object and verb, or how to best characterize that basic pattern, or how to explain it. It has been generally assumed that there is a basic pattern, and that assumptions has been maintained here. But even that assumption might be questioned. While there is clear evidence that certain pairs of elements do correlate with each other in order, it is possible to propose a notion of consistent OV (or VO) language that is divorced from any observable correlations we find among the world's languages (cf. 3.1., Vennemann 1981), and thus distinct from the basic pattern assumed here. On this approach we might define a consistent OV language as one that consistently places dependents before heads, regardless of whether this is common among OV languages. But of course alternative notions of consistent OV language are equally possible, such as one that consistently places arguments before functors, or one that consistently places complements be-

fore heads (without any principle for other dependents), or one that is consistently left-branching. It is quite possible that all of these are useful notions and that consistent languages differ as to what notion of consistency they operate according to. And the basic pattern described in 2. may simply reflect the fact that these different notions of consistency coincide for many pairs of elements, so that we find an observable correlation among the languages of the world for these pairs of elements. On such an approach, the notion of *inconsistent language* would have to be reassessed. A common view is that inconsistent languages are in transition from consistent OV to consistent VO or vice versa. But a language that is consistent on one notion of consistency may be inconsistent relative to another notion, so the notion of *inconsistent language* would not be well-defined. Hence this alternative view of consistent word order has important implications for understanding word order change. But whether such an approach is warranted remains to be investigated.

6. References

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