Chance and necessity in word order typology

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Greenberg (1963) was first to show that not all is possible in all languages. He also showed that there are things that some languages have to have. Since then, his universals have been refined by many others. And many others have tried to find an explanation to the problem of why the universals are as they are. In this paper I will overview Vennemann's (1972, 1974, 1981) Natural Serialisation Principle, the Cross-Category Harmony Principle proposed in Hawkins (1983), the Branching Direction Theory (BDT) proposed by Dryer (1988), the directionality parameter of case assignment proposed by Haider (1986), and the criticism these principles have had. However, provided that language is a self-organising system (see Ehala 1996), one does not need to understand Natural Serialisation or Cross-Category Harmony as mystical conspiracies which operate over the centuries upon languages. It is possible to show how serialisation works and how the typological clusters and gaps arise in the interplay of chance and necessity at the points of systemic instability, without any predesigned global blueprint.

Greenberg (1963), which is the first large scale descriptive account of typological regularities across languages, postulates 45 implicational universals concerning the relationship between the meaningful elements of language.

The first theoretical reshaping of Greenberg's universals was proposed in Lehmann's works (e.g. Lehmann (1973)). He replaced the typology of the three common main word orders - VSO, SVO and SOV - used by Greenberg (1963) to formulate his universals, by a typology where only the verb position with respect to the object was taken into account. This led to a two-way classification of verb-final languages versus all others. This typology was taken over by Vennemann (1972, 1974) who restated all Greenberg's 45 universals in respect of the VX and XV orders (X indicates in Vennemann's notation the verb complement). In these terms, Greenberg's universals seem to indicate that if the head of one type of phrase precedes its complement, the heads in other phrase types also tend to precede their complements, and vice versa: if the verb precedes its complement as in VSO languages, so does the preposition with

respect to its complement. If the object follows its head in the verb phrase, the language tends to use postpositions, too.

These regularities were accounted for by the Natural Serialisation Principle (NSP) (Vennemann 1972, 1974), according to which languages tend to serialise their operand-operator pairs following the verb position relative to its object - in VX languages operands precede operators, and in XV languages operators precede operands. (The classes of operators and operands are defined on syntactic and semantic grounds in Vennemann (1972) - broadly, what are known as heads and complements in phrase structure grammar are classified as operands and operators respectively in Vennemann's framework.) The fact that not all languages are consistent with NSP is accounted for by a hypothesis that the two pure types are the targets towards which the historical evolution of inconsistent languages is directed. So to speak, the inconsistent languages are assumed to be at the moment in a transitory stage which is temporary and leads inevitably to one of the two ideal types.

The inconsistency itself is argued to be a result of a prior change of the position of V with respect to O - a change which is mainly necessitated by phonological or morphological developments as argued in Vennemann (1974). As, according to NSP, the other patterns of serialisation are dependent on the order of V with respect of O, this leads to further changes until a consistent state is achieved again. The problem of why a change in V-O order should trigger further changes in other operand-operator pairs was given an ultimately acquisitional explanation: as children were assumed to acquire the verb-object sequences first, these patterns would subsequently influence the acquisition of other operator-operand structures by analogy with them, which, given a sufficiently long period of time, will cause the consistency-creating changes in other operator-operand pairs.

The main problem with NSP is its inability to cope with empirical evidence. According to Mallison & Blake (1981), NSP is consistently fulfilled by about 40% of languages which they studied, and the diachronic pattern of transition from one type to the other can actually be attested only in one fifth of the languages showing inconsistency.

As the problem of crosslinguistic serialisation regularities remained unsolved by NSP, a number of further attempts have been made. First, Vennemann (1981) has modified his earlier stand on natural serialisation and claims that the NSP is just an ideal typology, similar to Daniel Jones' system of cardinal vowels, the purpose of which is purely practical - to give the orientative co-ordinates for linguists. This claim is cer-

tainly weaker and has got neither the explanatory power nor the appeal of its predecessor.

Another attempt to refine the empirical validity of NSP is made by Dryer (1988), who proposes the Branching Direction Theory (BDT), according to which the two ideal orderings apply only for branching categories, not for nonbranching ones. As adjectives are argued to be nonbranching, this excludes Adj-N sequences from consideration which makes the predictions of NSP and CCH more consistent with the actual crosslinguistic data. Although BDT makes correct predictions for some nonbranching categories, as pointed out in Hawkins (1988), it does not do so for others.

A different explanation for the crosslinguistic word order regularities is proposed in the generative approach. In generative theory, the surface word order regularities are assumed to be derived from the underlying principles of grammar. According to Haider (1986) the word order patterns are related to case assignment - case is assigned under government and government is assumed to be directional, i.e. for a constituent to be assigned a case, it has to be on the proper side of a case assigning element (see Kayne 1984).

The directionality parameter of case assignment is assumed to allow two values - either government is progressive or it is regressive. This leads to two types of languages: VX and XV. By a default, the parameter value for directionality is applied to all types of constituents which leads to one of the two ideal word order types. To cope with the inconsistent languages, Haider (1986) proposes that the value for the directionality parameter may sometimes be fixed differently for one or the other category. The feature theory, discussed in the previous section, is further assumed to make more precise predictions of which categories are likely to assign case in the same direction in the inconsistent languages. As the four main lexical categories can be specified by configurations of two features [N] and [V], we can also distinguish four natural classes characterised by one feature. Thus the natural class of {N,A} is specified as [+N], {V,P} is [-N], {V,A} is [+V], and {P,N} is [-V]. If different directionality values are allowed for different natural classes, the occurring surface word order patterns could be correlated with naturalness which "will lead to an explanation why deviant value assignments ... are so rare" (Haider 1986:135).

However, as only two out of six two-class combinations ({N,V} and {A,P}) are not natural according to feature theory, the explanatory power of the naturalness argument seems to be rather modest, since there are too few case assignment combinations which could be classified as deviant. As an example, let us take a type with the word order

SVO/Pr/GenN/NAdj. In languages of this type verbs and prepositions assign case progressively, nouns and adjectives regressively. Using the natural classes, it can be said that [-N] heads assign case progressively, and [+N] heads regressively. There are no deviant case assignments, yet there are only 4 languages of this type in the 336 language sample of Hawkins (1983). Of course, if we choose some other natural classes, let us say [+V] and [-V], there are four violations to the case assignment in this type which is quite in agreement with the predictions of the naturalness argument. If this is the case, it needs to be specified beforehand which natural classes are to be taken as the basis. Yet, there seems to be hardly any universal grounds on which this specification can be made, as there is another type (SOV/Po/NGen/AdjN) where the [+V], [-V] specification reveals no case assignment violations despite the fact that languages of this type seem not to occur at all.

As we have seen, the generative explanation for the crosslinguistic serialisation patterns is no more powerful than others - they all give some principle to support the consistent ordering, but are weaker in explaining the exceptions. One possibility to avoid this is to use statistics.

The principle of Cross-Category Harmony (CCH) suggested in Hawkins (1983) is based on the same rationality as the NSP, for example, but differs from it by making explicit quantitative predictions (see (1)):

> (1) "Whatever position the operand of one phrasal category occupies in relation to all its operators will preferably be matched by the position of the operand in each of the other phrasal categories. And the more the word order co-occurrence sets of languages depart from this "ideal" harmonic ordering, the fewer exemplifying languages there are."

> (Hawkins 1983:134)

Thus, CCH predicts that the more inconsistent a particular word order is, the more uncommon it should be. However, Hawkins (1983) goes further, and postulates the Postpositional Noun Modifier Hierarchy (PoNMH) and Prepositional Noun Modifier Hierarchy (PrNMH). As they both are in principle alike, I'll stop only on PoNMH (see (2)):

> (2) PoNMH: Po & GenN & AdjN & NumN & DemN & RelN

The idea behind this principle is that the noun modifiers are ideally on the same side as the modifier of a postposition, i.e. precede the head. However, if one of the noun modifiers shows the opposite order in a given language, it is the relative clause. If two

modifiers follow the noun they are demonstrative and relative clause, if three, the numeral is added, then comes the adjective, and the last one to show different serialisation from that of the postposition is the genitive. In this last case all noun modifiers are postposed. PoNMH is a synchronic universal, but it also makes predictions about the course of possible word order changes: in postpositional languages, if the noun modifier serialisation is to change, it will start with the demonstrative order or relative clause order and then proceed to numeral order and adjective order. The last one to change is the genitive order.

As with the Natural Serialisation, The Cross-Category Harmony and both Noun modifier hierarchies are only statistical tendencies, and no general teleological trend towards either pure type cannot be proved. And I do not think there is any such global trend which drives languages towards the pure types, once inconsistency has arisen due to some reason. But on the other hand, there is statistical clustering of languages around the pure types, and certainly some languages have also shown the diachronic word order evolution predicted by NSP. It would be desirable then to have some principal explanation to this phenomenon.

Provided that language is a self-organising system, it could be possible to explain the typological clustering and the tendency toward consistent word order using the principles of self-organisation. According to this theory, the only goal that a system can have is the tendency towards a steady state. According to Rapoport (1986:182), a steady state can be arrived at as a consequence of a dynamic, nonteleological process "which can be 'explained', (i.e. modelled) without reference to future states".

Let me make it clear first that I do not think the whole language can ever lose its stability and evolve towards a new steady state. Language is a very complex system which consists of a large number of subsystems. The loss of stability can happen only in the first level subsystems - these which do not consist of further subsystems. I cannot specifiy the set of the first level subsystems yet, but I am quite sure that the modifier-head ordering system is not such a system. This means that, for this system, the two consistent word order types could not be the only possible stable states and the rest the unstable states which need to evolve into one of the two stable ones. This would be too global of an understanding of stability. If the stability would work on this level, then the NSP should be true and all languages must either be in one of the two pure types or in a transitory period between the two. But it is not so. Thus, the stability must operate on a much more local domain.

Perhaps each modifier-head type constitutes a subsystem within the whole modifier-head ordering system. The whole system in turn is structured according to Hawkins Noun Modifier hierarchies where the adpositional order is in the core and all the other subsystems located more extensively on the periphery as presented in Fig.1.
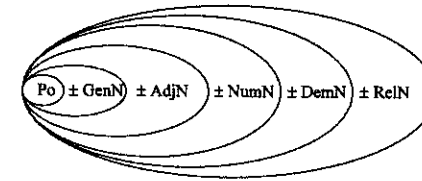
Now, according to Hawkins, a word order change starts gradually from the periphery and proceeds towards the core. According to the theory of self-organisation, in this case we do not have a single change which gradually proceeds through different head-modifier orders. Rather we have here a system with a determined set of stable and unstable states. These stable states are presented in Table 1. All other thinkable states, some of which are presented in Table 2. cannot occur. These are impossible states.

Table 1   *Stable states for the PnNM system*

	Po	GenN	AdjN	NumN	DemN	RelN
A	+	+	+	+	+	+
B₁	+	+	+	+	-	+
B₂	+	+	+	+	+	-
C	+	+	+	+	-	-
D	+	+	+	-	-	-
E	+	+	-	-	-	-
F	+	-	-	-	-	-

Table 2   *Some inherently unstable states for PoNM systems*

Po	GenN	AdjN	NomN	DemN	RelN
+	+	-	+	+	-
+	-	+	+	-	+
+	-	-	+	+	+

It is important to distinguish between the loss of stability and an impossible state. The loss of stability can affect any possible state due to some factor that makes it unstable. Impossible states, however, are states that cannot even emerge in the process of a system's evolution.

If the system is in the state A, the loss of stability can happen either in the Demonstrative-Noun ordering subsystem or in Relative clause-Noun ordering subsystem. This can happen either due to some extralinguistic factor such as the need for stylistic variation, or due to some linguistic factor such as the loss of relative clause marker. At this point the subsystem has to find a new state which could be either the state B_1 or B_2, depending on which subsystem has lost its stability. Both these states are stable, and the change ends reaching one of them.

Of course, it might happen that due to some reason, the stability is later lost again in either of these subsystems. This would lead either back to the state A or to the state C. The state C is also a stable state and the change ends there. But if the system is to C. The state C is also a stable state and the change ends there. But if the system is to change again due to some reason which makes the Num-N, Rel-N or Dem-N ordering subsystems unstable, the new stability can be reached again in the state D or back in B_1 or B_2. And so it is with every state. If the stability is lost, change can increase or decrease the consistency in word order patterns.

What this kind of model allows is that we do not need to consider word order change a single teleological development which has to lead from one consistent type to the other. But on the other hand, if such a development takes place (and we know it sometimes takes place) it is just a consequence of a set of independent changes, the causes of which are not related. And this solves the conspiracy problem - at any stable state, there are only a few possible developments open. It can happen that a language goes through all of the steps and reaches a particular state which we call the consistent word order, but certainly it does not happen because of a desing.

This would also explain the statistical correlation between the extent of inconsistency and the number of languages which show it (see (1)). As synchronic types can arise only through diachronic developments, the most inconsistent type (F) can be achieved only after five cycles of changes all leading to one direction. There are no doubt, that the number of languages having gone through five steps in one direction is smaller than those which have gone through four or three such steps. Although this fact explains why the typological clustering is how it is, it does not explain the typological gaps (impossible states in (5)), neither the fact why it is the consistent word order which is the most favoured.

One is obvious, the typological gaps exist because the changes that could lead to these states are impossible. Hovewer, this does not explain anything unless it is possible to show why such changes are impossible. According to self-organisation, changes are initiated by random fluctuations (speech errors) at the point of instability.

Fluctuations are characteristic to all self-organising systems. They are always present, but when the system is in a stable state, fluctuations die out without influencing the average state of the systems. Similarly the speech is always full of fluctuations. Most of the time they remain singular errors which do not influence the systems's state in any way. However, when the system looses its stability, one of such fluctuations starts to grow and leads the system into a new state. This means that every change starts from a fluctuation.

The logical consequence of this is that if a kind of fluctuation does not occur, it cannot initiate a change and lead the system into a corresponding synchronic state. On the other hand, if a certain type of fluctuation is more frequent than other types of fluctuations in a given system, the corresponding change is also more likely to happen when the system's stability is lost. The result is that corresponding synchronic states are more frequent across languages than others. Such states are called natural states. As fluctuations are usage phenomena, they derive from the mechanism of language production and comprehension, i.e. they have a psycholinguistic nature. Thus, if we were able to specify the psycholinguistic reasons why certain fluctuations occur, but others do not, we could explain the phenomenon of impossible and natural changes as well as synchronic typological universals. And this is precicely where chance and necessity come to influence typological possibilities. As at any point, any subsystem of language has only limited set of possible paths of change, determined by the distribution of speech fluctuations, the subsystem cannot change to any other state but the ones available, yet the actual path of evolution at the point of instability is chosen randomly by any of the fluctuations present at that moment.

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