

**STABLE STATES AND IMPOSSIBLE CHANGES:
THE LIMITS OF TELEOLOGICAL EXPLANATION
IN DIACHRONIC LINGUISTICS.**

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Abstract. The paper concentrates on the problem of cross-linguistic word-order regularities, known as Natural Serialisation Principle. It is argued that the teleological nature of this principle is due to a too broad understanding of the notion of state for a linguistic system. If the notion of state is applied to smaller subsystems of the whole word-order system, the apparent teleological tendencies within this whole can be modelled without referring to the future. Using the theory of self-organisation, the possible stable and unstable states for the system of word order are defined, and possible paths of word-order change specified. The model is tested against an unsuccessful language planning attempt in Estonian, undertaken by Johannes Aavik. It is concluded that the causes for Natural Serialisation Principle derived from the psycholinguistic constraints on language production and understanding.

Introduction

The problems of teleology in language evolution have been discussed throughout the history of modern linguistics. In the 19th century, evolutionary theories in linguistics were essentially teleological. 20th century linguists tend not to speak in terms of 'progress' or 'decay' when discussing language change. But the fact that certain changes in some languages seem to have been directed towards a particular synchronic state as a goal, has motivated linguists still to look for teleological explanations (Sapir 1921, Lass 1974). One of the most discussed cases is the Natural Serialisation Principle (NSP) (Vennemann 1972, 1974, 1981). The core of this principle is that there are two consistent types of word order for languages, either the heads precede their complements or they follow them. For example: English is largely a head-first language as show *kiss the bride* (Verb-Object, henceforth VO, head indicated in boldface), *from the house* (Preposition-Noun, henceforth PrepN) and *king of England* (Noun-Genitive, NGen), Estonian a largely head-last language as show *laua all* 'under the table' (Noun-Postposition,

NPost), *kollane liblikas* ‘yellow butterfly’ (Adjective-Noun, AdjN), *inglise kuningas* ‘king of England’ (GenN).

Of course, not all languages follow NSP consistently: large scale typological surveys have shown that there are about as many languages with inconsistent word order than those with a consistent one. Actually, English and Estonian word order is also inconsistent: English has a head-last AdjN order (*yellow butterfly*), and Estonian a head-first VO order (*suudle pruuti* ‘kiss the bride’). The inconsistent word order is accounted for by a hypothesis that the languages that have it are in a transitory stage from one pure type to the other. This stage is assumed to be temporary and to lead inevitably to one of the two ideal types.

The inconsistency itself is argued to be the 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 verb with respect of the object, this leads to further changes until a consistent state is achieved again. The problem of why a change in verb-object order should trigger further changes in other head-complement pairs is 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 head-complement 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. This has raised serious criticism towards the validity of NSP on empirical grounds. On theoretical grounds, it is hard to believe that a language may over centuries strive towards a particular structural type, while many generations of speakers have not a slightest clue of it. For these reasons NSP framework became quite stigmatised in the 1980s and ‘90s as not a serious enterprise. However, it seems that this neglect is largely caused by a too literal interpretation of teleology. In this paper I will try to define the possible stable and unstable states for the system of word order and possible paths of word order change using the theory of self-organisation. I will argue that if the notion of state is applied to smaller subsystems of the whole word-order system, the apparent teleological tendencies within this whole can be modelled without reference to the future. The model is then tested against an unsuccessful language planning attempt in Estonian, undertaken by Johannes Aavik.

Teleology in self-organisation

In the theory of self-organisation, the idea of teleology is expressed by the concept of attractor. Attractor is the stationary state towards which a system tends to evolve. The attractor state is thus the goal of a system. In closed systems, this is the state of heat death, in open systems it constitutes a kind of structure. The tendency to reach and maintain a steady state is the only goal for self-organising systems. This is called homeostasis. According to Rapoport (1986) the phenomenon of homeostasis does not necessarily assume systems themselves to have goals and purposes. In fact, a steady state can be arrived at as a consequence of a dynamic, non-teleological process “which can be ‘explained’ (i.e. modelled) without reference to future states”. (Rapoport 1986:182) If it could be possible to specify the stable states for language and to show how these states are arrived at as a consequence of non-teleological changes, the controversial notion of teleology in language could find a natural explanation.

As stability and instability are properties of states, the analysis should start with the analysis of the concept of state. Often the notion of state is regarded as so fundamental that it is left without definition. Intuitively, what is meant by state is a record of information that unequivocally characterises a given system. Thus, each state of a particular system is a collection of observables that characterise the conditions at a certain point of time. These observables are called state variables.

It should be noted that the notion of state seems to be an abstraction, a way of organising knowledge about the object of our investigation. This is best characterised by the possibility of different choices for state variables for a given system. As the state variables for particular systems are specified by researchers, the set of variables chosen can be influenced by the researcher’s point of view. As the main reason for postulating states is to make the reality more comprehensible by eliminating redundant factors, the selection of state variables from the total of available observables is inevitable. However, most systems are complex enough to make the choice of the suitable set of observables difficult, even if the researcher is theoretically unbiased.

Of course, in order to provide some reliability for the postulated state, the chosen state variables are required to show a high degree of invariance over time and other circumstances. Nevertheless, it may still be hard to determine whether a particular set of recurrent observables that are clearly necessary for the state description, are also sufficient to characterise this state. For a complex system, it may well be that an idiosyncratic property which is left out of the description, may actually be crucial for understanding the system’s behaviour. As there are no absolute criteria for the choice of state variables, this could lead to an extreme position that for any set of empirical data there exists a state description.

From the above it follows that it is theoretically possible to postulate states and systems everywhere. This makes the notion of state very general, but also quite dangerous. Not to speak of the possibility that a given set of variables may have little to do with each other, except for the state description, “every branching of

the behaviour necessitates an additional state and, in a random process, at every time instance there can be a branching point where different realisations start to differ". (Kampis 1991:131) Even if we can overcome our ignorance and always choose the correct set of state variables to characterise a particular state, the need for an infinitesimal number of successive states certainly leads the concept to absurdity. This latter position is the core from which the main criticism for the concept of state derives. It relies on the assumption that actual processes in complex systems are gradual which makes their description in terms of states ultimately impossible.

This criticism may have a fair amount of truth in it. However, as no viable alternatives seem to have been proposed to it, we should not abandon the notion, but rather try to specify its limitations and use it where it works. Clearly, whatever name is used for the concept of state, in linguistics, state descriptions are the main tool for representing the properties of language systems. In some frameworks, such as generative theory, states are assumed to be fairly abstract and discrete from each other (grammars), leaving the gradual phenomena out of their description; some others, such as the Theory of Linguistic Bifurcations (Ehala 1996) hope to show that much of the gradualness can still be successfully modelled by using the concept of state if a more fine-grained notion of state is assumed. Be this as it may, even if we concentrate only on the description of gradual phenomena, we still cannot escape state descriptions in the representation of data.

As I will try to argue in this paper, the problem with NSP (namely its weak empirical foundation) is caused by a too broad understanding of state in the system of language. As language is a very complex system, it is unlikely that it ever loses its stability as a whole and needs to evolve towards a new attractor state. Rather it seems that there are separate attractor states for various subsystems of language which may in some cases be contradictory to each other, so that evolution towards a particular stable state in one subsystem causes a loss of stability in some other subsystem. Similarly, it seems that the word order of a language does not constitute a single subsystem which may have two possible word orders – head-first or head-last, but rather it consists of further smaller subsystems, and the steady states are defined as different configurations of the states of these subsystems. Evidence from language typology gives a strong support for this view.

Stable states: evidence from word-order typology

The large-scale typological surveys of world languages that disproved NSP have provided ample material for a more fine-tuned analysis of the word-order regularities. These regularities are generalised in Hawkins (1983) as the principle of Cross-Category Harmony (CCH). CCH is based on the same rationality as NSP, but differs from it by making explicit quantitative predictions (see (1), instead of the terms head and complement, Hawkins uses operand and operator):

(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 and vice versa. 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 (Hawkins 1983:86, see (2) below):

(2)

Postp => ((A N v Rel N => Dem N & Num N) & (Dem N v Num N) => G N))

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 (Num stands for numeral, Dem for demonstrative pronoun and Rel for relative clause). However, if one of the noun modifiers shows the opposite order in a given language, it is the relative clause or adjective. If two modifiers show the opposite order, they are demonstrative and relative clause and adjective, if three, demonstrative or numeral is added, on the next stage, both of them are postposed, 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 adjective order or relative clause order and then proceed to numeral order and demonstrative 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. But on the other hand, the statistical clustering of languages around the pure types is remarkable. For example, more than half of languages belong to consistent noun modifier type, and the rest of languages to inconsistent types, so that the more inconsistent a type is, the lesser languages it has. The list in (3), based on the expanded sample of languages presented in Hawkins (1983:288), shows this bias using just two noun modifiers – genitive and adjective

(3)

Head-first	No. of languages	Head-last	No. of languages
Prep & NGen & NAdj	104	Post & GenN & AdjN	109
Prep & NGen & AdjN	30	Post & GenN & NAdj	68
Prep & GenN & AdjN	10	Post & NGen & NAdj	11
Prep & GenN & NAdj	4	Post & NGen & AdjN	0

The question is why is there such a clustering and how does it relate to the notion of stability of the system.

Let us assume that the word-order system constitutes of further subsystems, so that each modifier-head type is 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 Figure 1.

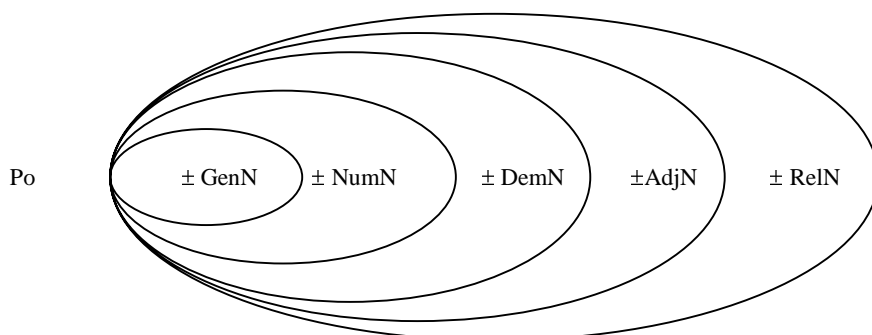


Figure 1.

Now, according to Hawkins, a word-order change starts gradually from the periphery and proceeds towards the core. This is so, if we are looking at the whole system. However, the given system is quite complex, consisting of several subsystems. It is highly unlikely that such complex systems could lose their stability as wholes. Thus, the change, proceeding from its periphery to core should not be considered a single change, the goal of which is to reach the attractor state, but rather a cascade of smaller changes that affect different subsystems. This means that there are not two possible stable states (head-first or head-last), but more: one for each subsystem. These stable states are presented in Table 1 ('+' indicates a given order '-' the reverse order). All other conceivable states, some of which are presented in Table 2 cannot occur. These are impossible states.

Table 1

Stable states for the PoNM system

	GenN	AdjN	NumN	DemN	RelN
A	+	+	+	+	+
B ₁	+	+	+	-	+
B ₂	+	+	+	+	-
C	+	+	+	-	-
D	+	+	-	-	-
E	+	-	-	-	-
F	-	-	-	-	-

Table 2

Some inherently unstable states for PoNM system

	GenN	AdjN	NumN	DemN	RelN
X	+	-	+	-	+
Z	-	+	+	+	-
Y	+	-	+	+	+

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 DemN ordering subsystem or in RelN ordering subsystem. This can happen either due to some extra-linguistic 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 B₁ or B₂, depending which subsystem has lost its stability. Both these states are stable, and the change ends when reaching one of them.

It might naturally happen that due to some reason, the stability is later lost again. 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 change again due to some reason which makes the NumN, RelN or DemN ordering subsystems unstable, the new stability can be reached again in the state D or back in B₁ or B₂. 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 gives a different angle to the teleology problem – at any stable state, there are only a few possible developments open, if the stability is lost. 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 blueprint.

This would also explain the statistical correlation between the extent of inconsistency and the number of languages which show it (see (3)). 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 is 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 similar 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 way to solve this problem is to hypothesise that the typological gaps exist because the changes that could lead to these states are impossible. This is very hard to prove, since the non-existence of change might as well be a historical accident. The only way to test this would be to induce deliberately some such changes that the theory claims to be impossible. Hardly any historical linguist has the means to conduct such an experiment, but the evidence from language planning could still give us an insight.

Impossible changes: Evidence from Estonian

In assessing previous language planning attempts, one should take into account the fact that some such attempts have failed not because of the instability of the desired state, but simply due to insufficient effort made to get the change through. Another limitation of this method of detecting unstable states derives from the modesty of most language planning enterprises – the majority of attempts to improve language have been, and are likely to remain in the domain of vocabulary. Luckily, the language reform in Estonia (which seems to be one of the most radical and largest reforms of this kind in the world) provides a good example here.

Estonian language reform – “keeleuuendus” (‘Language Renewal’ LR) – was launched by an Estonian linguist Johannes Aavik at the beginning of this century as an answer to the demand of the young radical Estonian intelligentsia for greater expressive means in language. His first publication on this topic appeared in 1905, but the beginning of the radical language reform is commonly considered to be 1912. (Tauli 1983) The theoretical principles of the reform are outlined in Aavik’s major work “*Keeleuuenduse äärmised võimalused*” (“*The extreme possibilities of language reform*”; Aavik 1924). The reform showed signs of growth until the mid-twenties and continued by its momentum (and by Aavik’s tireless efforts) well into the thirties. Having numerous supporters amongst writers and other intellectuals, Aavik’s reform was very popular in Estonia. Through the press and translations of popular thrillers into the renewed language, the idea of language reform as well as actual innovations spread into the whole community.

During the reform, Aavik (and others) proposed a number of innovations concerning orthography, vocabulary, phonology, morphology and syntax. Very many of them, some quite radical, were successful and are in everyday usage today. In this light Aavik’s failures are even more telling. First, let us give some examples of successful innovations to show to what extent language can be deliberately manipulated. The account is based on Tauli (1983).

- 1) Vocabulary: more than 800 new words borrowed during LR have come into usage; Aavik himself artificially created many new words of which about 16 are in everyday usage.
- 2) Morphology: a) Aavik introduced the *i*-plural into standard Estonian. The *i*-plural existed at the time in some Estonian dialects, but for speakers of

standard Estonian the *i*-plural was an entirely artificial form. It is used in contemporary Estonian alongside the previous plural. b) The short partitive plural form and short illative form coined from Estonian dialects have also come into standard usage as a result of LR. c) One morphological innovation modelled on the example of Vepsan (the synthetic conditional *tulnuks* instead of *oleksin tulnud* ‘I would have come’) began to spread only in the seventies and has by now come into usage mainly in the written language. d) Aavik also created on the basis of the Finnish superlative the synthetic superlative that did not have an equivalent in Estonian. The rules for this synthetic superlative are very complex and it is remarkable how this totally artificial innovation succeeded in establishing itself in the language. e) There are also some other minor morphological innovations which have been more or less successful. What is interesting in Aavik’s morphological innovations is that most of them actually decrease morphological iconicity, and combining with stem alternation in Estonian create forms which are phonologically quite diverse from each other.

- 3) Syntax: The most remarkable change induced during LR was the change of SOV in subordinate clauses. This property was considered to be due to German influence and was replaced in less than 20 years by V1 and/or V2 in subordinate clauses. Of the less important syntactic innovations, the introduction of two new absolute constructions to reduce the usage of subordinate clauses is worth mentioning, and also the expansion of the case paradigm of Estonian infinitives which created further possibilities of constructions with infinitives.

Assessing the Estonian language reform Tauli (1983:321, 325) notes:

“Aavik’s most important innovations, which concern thousands of words and the syntactic structure have all been accepted. [...] Aavik’s language reform proved indisputably that a single person can consciously influence a language, even to a great extent. Aavik’s innovations proved that there was no part of language that could not be changed deliberately. His [free creations] prove that one can change, replace, and construct freely not only lexemes but also grammatical morphemes, and that such changes and creations are accepted by the community.”

Knowing Aavik’s great success in changing Estonian, his proposals which have not come into usage could be useful in specifying the unstable states for some linguistic subsystems. However, one unsuccessful proposal is particularly illuminating for our present purposes and I will discuss it in detail.

In Estonian the genitive modifier is always preposed to the noun (*venna raamat* ‘brother’s book’. Aavik (1924) pointed out that the preposed genitive modifier could create processing difficulties. In some cases, particularly in the case of multiple genitive modifiers, the head of the construction appears so far from the beginning of the phrase that this can make the whole construction opaque, for example, his example from Aavik (1924:125):

(4)

Liitlased on nõus rahu sõlmima ainult Belgia ja teiste okupeerit riikide
 Allies have agreed peace to make only Belgium and other occupied states
ja maade restitueerimise, Elsas Lotringia Prantsusmaale tagasiandmise
 and countries restitution, Alsace-Lorraine to France back-giving
ja Saksamaa militarismi hävitamise jne. tingimusel.
 and German militarism destroying etc. **on condition.**

'The allies have agreed to make peace only on condition of restitution of Belgium and other occupied states and countries, returning Elsass-Lorraine to France, destroying the German militarism etc.'

In this example the crucial word *tingimusel* 'on condition' is the last word in the sentence following the whole list of phrases, the function of which remains unclear to the receiver until the last word in the sentence. Consequently, the meaning of the whole sentence is not building up gradually in the process of receiving, but has to be construed backwards, after the postposed head of the phrase is heard.

It may also happen that when the relative clause specifies one of several genitive complements, it may be ambiguous which complement it is related to, as shows the following example from Aavik (1924:123):

(5)

Ta sõbra tytre mehe maja, kes linnas elab.
 His friend's daughter's husband's house, who in city lives.
 'His friend's daughter's husband's house, who is living in the city.'

To overcome these obstructions Aavik suggested that a new preposition should be created which could allow postposed genitives. This prepositional genitive was not meant to replace the traditional one completely, but only in cases where a preposed genitive would make understanding difficult. He proposed a short lexeme *no* to perform this function. To give a simple illustration of this proposal, the prepositional *no* construction is structurally identical to the *of* construction in English. Thus, the example above would look like this:

(6)

Liitlased on nõus rahu sõlmima ainult tingimusel no Belgia ja teiste
 Allies have agreed peace to make only **on condition of** Belgium and other
okupeerit riikide ja maade restitueerimine, Elsas Lotringia Prantsusmaale
 occupied states and countries restitution, Alsace-Lorraine to France
tagasiandmine ja Saksamaa militarismi hävitamine jne..
 back-giving and German militarism destroying etc.

'The allies have agreed to make peace only on condition of restitution of Belgium and other occupied states and countries, returning Elsass-Lorraine to France, destroying the German militarism etc.'

Aavik himself considered the prepositional genitive to be of great benefit primarily in scientific language which in its nature is more logical, but also more complex. He (Aavik 1924:126) strongly suggests that “such prepositional expression of the genitive should necessarily be brought into usage by us, if one wants to give Estonian a truly unique flexibility” (translation mine). I do not know exactly when the proposal to introduce the prepositional genitive into Estonian was made by Aavik, but he admits (Aavik 1924) to have used it first in print in 1917, and reports that some radical Estonian poets, members of the “Siuru” group have also used his innovation occasionally in their poems. Although the prepositional genitive was propagated by Aavik and was also discussed in a meeting of the official language standardisation committee it never came into usage nor has it ever shown any signs of being used except occasionally in the most radically renewed texts at the heyday of LR. This is rather surprising in the light of the success of other syntactic and morphological innovations outlined above. And it is even more surprising, bearing in mind that some successful innovations, such as the *i*-superlative had far less functional motivation and are structurally much more complex than the unsuccessful *no*-genitive. On the other hand, as a native speaker of Estonian, I have to admit that Estonian sentences with the *no*-genitive are for some reason very hard to comprehend for me despite the fact that I use the equivalent constructions in English all the time. For that reason I tend to think that the failure of the *no*-genitive was not a consequence of insufficient effort or the ill-will of the language standardisation committee, but derives from the inherent instability of the desired endstate of this innovation.

And indeed, the head-modifier configuration Po & NGen & AdjN & NumN & DemN & Nrel. (the state Z in Table 2) which would have been created by this innovation, is typologically not attested. Thus, on the basis of cross-linguistic evidence there is reason to believe that for postpositional languages the state where adjectival complements precede nouns, but genitive complements follow, constitutes an inherently unstable state which cannot emerge as a result of a diachronic process. And Aavik’s unsuccessful attempt to introduce it to Estonian, gives an additional support to this hypothesis, the more so that his other innovations have been so successful.

Conclusion

In this paper I have tried to show that the so-called teleological changes in languages can be modelled without assuming that either the language system or its speakers need to have a pre-designed blueprint of the result of the change. Instead, the goal-state emerges as a consequence of the processes that lead the system to a stable state when its stability is lost. However, this does not explain much unless it is possible to show what these processes are and what governs them. There is an answer to this in the theory of self-organisation (Prigogine and Stengers 1984).

According to this theory, all changes are initiated by random fluctuations (speech errors, in the case of language) at the point of instability. Fluctuations are

characteristic of 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 that systems state in any way. However, when the system loses 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. 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 why some changes are impossible and some others are so common. In other words, it would help to explain the apparent teleological developments in language as a consequence of non-teleological processes of speech production and comprehension.

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