On structural analogy

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Abstract

This paper resuscitates the idea of positing parallel structures in phonology and syntax, an idea which was first presented in detail by Glossematics in the 40's and later taken up by the dependency grammarians in the 80's. Its resuscitation here is the result of analysing the initial levels of syntax and phonology in terms of monovalent components which are subject to identical laws of government and dependency. First it is shown how it is possible to analyse the ultimate thematic constituents at the syntactic level in terms of single or complex monovalent case components. Subsequently , it is shown how a similar analysis is appropriate for the description or vowel quality. This parallelism leads to the formulation of a stronger version of a more general constraint. This constraint, which has been termed the structural analogy assumption, imposes restrictions on the construction of grammars in general.

1. Introduction

What will be stated in the following pages follows naturally from several years' work on two fairly well-defined models within syntax and phonology. This work has been inspired by a school of linguistics – as I shall call it for convenience, although it is hardly sufficiently homogeneous to be called so – whose members in the 70's and 80's were associated with Edinburgh University, Scotland. The phonological model associated with this school is the model of dependency phonology (see Anderson and Ewen 1987, Durand 1986, Anderson and Durand 1987). Dependency phonology is a generative model; that is, it is the hypothesis of dependency phonology that a phonological description should posit an abstract phonological level, operate with a set of rules which connect the abstract level with the phonetic substance as well as set up a universal set of entities (*syllable features* and *segment features*) in terms of which the external as well as the internal structure of segments should be represented. But what makes this phonological model different from the classical model of generative phonology is the hypothesis that to obtain the optimal description of the phonological levels – both segmental and suprasegmental (and lexical and

post-lexical) – a specific structural relation should be invoked. This is the so-called dependency relation which is a relation that is distinguished by involving governing/dependent phonological constituents whose domain may be either segment-internal or segment-external.

The syntactic model (or one of the syntactic models) associated with the Edinburgh School is the model known as case grammar (Fillmore 1968, Anderson 1971, 1977). It is also the basic claim of case grammar as formulated within this school that syntax should be described in terms of an abstract underlying level and that rules, in particular a limited set of rules, connect this level with surface structure. Again this is not a new or exceptional claim, as these are characteristics shared by transformational generative models of various forms. But this model, like the phonological model, also deviates from the standard generative models of syntax. Firstly it deviates by hypothesizing that the ultimate constituents at deep structure are relational entities, in particular semantic/syntactic case relations. And secondly it deviates from the standard descriptions by claiming that the relations between the syntactic constituents should be described in terms of dependency relations just as in the phonology.

It should be apparent from this very brief sketch that the same structural principle underlies the syntactic and the phonological description within these two models of linguistic analysis. Both models hypothesise abstract deep structures, both models hypothesise rules which connect the abstract level with the concrete surface level, and both models employ the same structural relationship (dependency) to describe the relations between their constituents. To this we may add one more fact, which has not been mentioned so far, namely the fact that the rules which derive both the phonetic level and the syntactic surface structure are cyclic.

My object in this paper is to show that this shared structural principle between these two models of syntax and phonology may be expanded to include the ultimate constituents of syntax and phonology. This is not to say that I shall claim that the same constituents should be used to describe syntax and phonology alike. My hypothesis is that the ultimate constituents in the phonological and in the syntactic description should be structurally analogous. The establishment of such a parallelism will have implications for what Anderson has termed structural analogy (Anderson 1985, 1987). In particular, if such parallel structure can be established, a stronger version of the structural analogy assumption may be set up. My first concern must then be to establish exactly what this assumption involves. This will also introduce us to some useful terminology.

2. Descriptions of structural analogy

It has already been pointed out by members of the Edinburgh School that it is possible to posit a structural analogy between syntax and phonology. This has been formulated in terms of the so-called structural analogy assumption which is a kind of meta-law that, as it were, hovers over linguistic description in general and whose object is to ensure that a description fulfills certain structural requirements. Anderson has formulated it as follows (cf. e.g. Anderson 1987):

(1)   minimize (or more strongly eliminate) differences between levels that do not follow from a difference in alphabet or the nature of the relationship between the levels concerned

To understand this assumption it is necessary, as Anderson also does, to revive some of the terminology introduced by glossematics. in particular to revive the distinction between content plane and expression plane (cf. Hjelmslev 1963). We can summarise this as shown in (2):

(2)   grammar

          expression plane   content plane

       cenemes   prosodemes   pleremes   morphemes
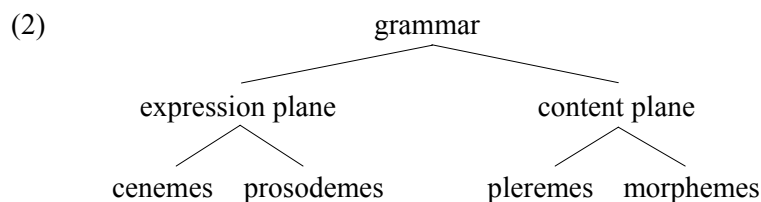
Expression plane and content plane correspond roughly to phonology and syntax respectively. Cenemes and prosodemes are Hjelmslev's terms for segments, i.e. vowels and consonants, and prosodic units, i.e. stress and tone, respectively. At the content plane pleremes are either stems or derivational elements, whereas the morpheme in Hjelmslev's terminology covers nominal morphemes and verbal morphemes. Grammar is not a term used in glossernatics, but it is the term often employed by American linguistics to cover the description of linguistic competence in general, in particular the description of pho nology, syntax and semantics.

It is not apparent from (2) that the distinction between form and substance plays an important role at either plane. But it is this distinction which leads to the different levels mentioned by Anderson. In other words, in (1) the difference between levels refers to the well-known difference between -emic and -etic levels, a distinction which is then characteristic of both the expression plane and the content plane.

The glossematic view on language is thus very similar to the ideas outlined here and defended by members of the Edinburgh School. However, the two views differ in one important respect, namely with regard to analytical approach. Anderson's approach is inductive. That is, his structural analogy assumption given in (1) is the result of many years' research on the description of phonology and syntax. Hjelmslev's approach, on the other hand, is deductive, so when he writes (Hjelmslev 1963:101)

(3)   It turns out that the two sides (planes) of a language have completely analogous categorial structure, a discovery that seems to us of far-reaching significance for an understanding of the structural principle of a language…

then this is a description of how a linguistic theory should be constructed and not the result of an examination of the linguistic substance.

Hjelmslev's approach follows from his (original) hypothesis that form does not presuppose substance. But as he abandons this view in later works (cf. Hjelmslev 1954), his view begins to converge with the one outlined here, and it seems fair to conclude that both Anderson and Hjelmslev represent (although they emphasize different analytical aspects) the view that linguistic description (in the restricted sense used here) is governed by a structural principle like the structural analogy assumption.

However, one term still remains to be explained in (1). This is the term alphabet. The notion of alphabet is important because the refinement of the structural analogy assumption which I shall propose below is dependent on an analogous interpretation of the two planes' ultimate constituents, and these constitute a subset of the alphabets.

3. The alphabets of the expression plane and the content plane

The term alphabet refers to functions, categories, elements, segments or other constituents which are needed to describe the structure of the two planes. For example, tones, syllables, segments, and distinctive features are alphabetical units at the expression plane. This list of alphabetical units is not complete, and it will vary depending on the theoretical viewpoint adopted. This is of minor importance here. What is important is that it is such systematic units which constitute the alphabets of planes. Let us now turn to those alphabets in the grammar sketched above which are relevant for the present purpose. Since it is my hypothesis that the strengthening of the structural analogy assumption which I shall propose here will affect only the

initial syntactic level and the initial phonological level, I shall concentrate on the alphabets of these two levels.

3.1 The content plane

As mentioned above, the initial sentence level is distinguished by being described by means of semantic/syntactic relations, the so-called case relations. These case relations are defined in localist terms. In very simple terms, this means that the relations between the head of the sentence and the arguments express the same motion picture no matter whether the sentence refers to a concrete or an abstract situation. Thus a very simple sentence such as (4):

(4)   Hillary gave Bill a new barbecue

which refers to a concrete situation, is claimed to contain the same relations as (5):

(5)   Hillary taught Bill the Lord's Prayer

even though (5) refers to an abstract situation. More particularly, the shared motion picture which can be said to underlie both (4) and (5) is manifested in the fact that both sentences contain an entity which is moved (a *new barbecue* and *the Lord's Prayer* respectively) from one place (*Hillary* in both sentences) to another (*Bill* in both sentences).

In the classical version (cf. Anderson 1977) the localist motion picture is expressed in terms of the case relations *ergative, locative, ablative* and *absolutive.* They are distributed among the arguments in the sentences in (4) and (5) as shown in (6) and (7) (the last argument in (7) illustrates *ablative*):

(6)   Hillary   gave   Bill   a new barbecue
       [ergative]   [locative] [absolutive]

(7)   Hillary   taught   Bill   the Lord's Prayer from the pulpit
       [ergative]   [locative] [absolutive]   [ablative]

It is the hypothesis of localist case grammar that these four relations in principle suffice as the atoms of the initial level of the content plane. The reservation *in principle* is necessary because these four case relations are able to fulfil this role only if the case relations are allowed to occur as multiple case relations. It is Anderson's hypothesis that it is necessary to resort to this solution in order to describe the post-verbal arguments in (4) and (5). That is, according to Anderson they should in fact be described as

shown in (8) and not as indicated in (6) and (7).

(8)   Hillary   taught Bill   the Lord's Prayer...
$$\begin{bmatrix} \text{absolutive} \\ \text{locative} \end{bmatrix}$$

However such a complex specification violates a fundamental property of grammatical categories such as tense, mood, number and case, namely that the members of a grammatical category are incompatible. For example, it is this property which forbids a Latin noun to be marked in the nominative and the accusative case at the same time. And it is also this property which prevents a verb in Modern English from being inflected for present and past time simultaneously. But the incompatibility criterion probably does not apply to all grammatical categories at all times in all languages. Tense and mood, for example, are possible exceptions, and case, when taken in the sense of deep case, is considered an exception not only by Anderson but also by other case grammarians (see e.g. Huddleston 1970).

The multiple case relation hypothesis, however, poses a problem. If we take a verb like *teach* such as it is used in (7) and (8), then it is trivalent: it enters into a relation with three arguments. If it enters into a threefold relation, then the complex case specification in (8) can be adequate only if the specification as a whole somehow enters into a relation with the verb. Consequently it is difficult to maintain at the same time that the case specifications individually enter into a relation with the verb. In a multiple case specification it is also a problem to determine which part of the argument *Bill* in (8) enters into an absolutive relation with the verb and which part enters into a locative relation with the verb.

It seems best, then, to reject Anderson's suspension of the incompatibility criterion for the category of case. If we do this the case relation is also made to correspond with valency as seems appropriate. And most importantly it entails that the category of case is marked as different from other categories such as, for example, tense, mood and aspect, which sometimes allow the incompatibility criterion to be suspended. The category of case does have a unique status among the grammatical categories, because, unlike the other categories, it is a prerequisite for the existence of the content plane. It is the category without which sentences would not be sentences; it is the category without which speakers would communicate in grunts.

But what do we do with the multiple case relations then? In fact, if we accept that they represent a confusion of case relation and what we might call case feature, then they may be reused. What I shall do then is to redefine

the case specifications *ergative, absolutive, locative, ablative* as case features, in particular as monovalent case features. That they are defined as monovalent means that they may either individually constitute a case relation, or enter into a combination with one another which then constitutes a case relation. When they combine it is moreover the hypothesis that this combination can involve either an asymmetric or a symmetric dependency relation. If it is an asymmetric relation, one case feature governs another case feature. If it is a symmetric relation, the two case features are equally preponderant.

It should be stressed that despite a superficial similarity, the redefinition of the case specifications proposed here entails a different status for *ergative, locative, absolutive* and *ablative* than that advocated by Anderson. As should be apparent from what was stated above, Anderson uses the term *case relation* indiscriminately for a unit which enters into a relation with the verb or for a unit which together with one or more other units enters into a relation with the verb. This is to confuse case relation and case feature. If the case labels instead are redefined as monovalent case features, then it is clear that they represent a case relation only when they occur alone.

It is my hypothesis that this redefinition of the case specifications and their ability to enter into dependency relations with one another enable us to specify the relations which arguments enter into in more detail than proposed so far. For example, given this redefinition, it is possible to distinguish among three sentence types which pose a problem for the standard localist case grammar (cf. Anderson 1977). The sentences I have in mind are:

  (9)   Hillary gave Bill a new barbecue

  (10)   Hillary made Bill a cook

  (11)   Hillary loaded Bill's limousine with hay

It is characteristic that the first post-verbal argument in these examples should be described in terms of a combination of the two features [absolutive] and [locative]. But the three arguments do not hold the same relation in all three sentences. In (9) *Bill* is what is usually referred to as an indirect object, in (10) *Bill* is what is commonly referred to as a direct object and in (11) *Bill's limousine* is neither direct object nor indirect object, but a complement with clearly locative characteristics.[1] My hypothesis is that this

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[1] In some analyses *Bill's limousine* will be analysed as indirect object and not direct object. The analysis as locative complement is preferred here because when this argument occurs

difference can be captured by invoking asymmetric and symmetric dependency relations in the case representations of these arguments. If we represent the asymmetric relation with a semicolon and the symmetric relation with a colon such that |x;y| means |x| dominates |y| and |x:y| means |x| dominates |y| and |y| dominates |x| (where |x| and |y| are two unknown monovalent components), then we may represent the case structure of the relevant arguments as below (*loc* and *abs* are abbreviations of *locative* and *absolutive*; monovalent components are represented between verticals):

(9a) Hillary gave   Bill   a new barbecue
                         |loc:abs| |abs|

(10a) Hillary made   Bill   a cook
                         |abs;loc| |abs|

(11a) Hillary loaded   Bill's limousine with hay
                         |loc;abs| |abs|

We can motivate this as follows. The symmetric relation is appropriate for (9a) because the argument *Bill* both passivises and is receiver and because it can be postponed without thereby showing stronger locative characteristics. The asymmetric relation with dependent [loc], on the other hand, is appropriate for (10a) because in this example the argument *Bill* cannot be postponed with a preposition, cf. (10b). But this is possible with the argument *Bill's limousine* in (11a) as shown in (11b)

(10b) *Hillary made a cook to Bill

(11b) Hillary loaded hay into Bill's limousine

The possibility of the postponed locative phrase in the latter then justifies the predominant [loc] feature and the impossibility of (10b). See Staun (1994, forthcoming) for further discussion.

Although I have provided only a very brief motivation for these case feature interactions, it is my hypothesis that the proposed descriptions in (9a-11a) show that if we allow the alphabet of the initial syntactic level to be monovalent case features and let them interact in dependency relations, then it is possible to express contrasts which localist case grammar so far has been unable to capture, and express these contrasts in a way which uncovers

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after the *hay*-argument it is constructed with the preposition *into* or perhaps *onto* (cf. (11b)), a state of affairs which is usually not characteristic of indirect objects.

important properties of these sentence types.

3.2 The expression plane

Let us now direct our attention toward the expression plane and examine whether the same kinds of structure may be applied to the initial level of this plane. In this examination I shall concentrate on the description of the vowel space, i.e. the description of vowel quality.

It is the hypothesis of dependency phonology that the internal description of vowels should be described in terms of monovalent features or vowel components, as they are usually termed. Moreover, it is the hypothesis that the vowel space should be described in terms of a vowel triangle and not a vowel quadrangle, as assumed in many descriptions; cf. the high–low-dimension and the front–back-dimension. The basically triangular assumption is founded on the almost universal occurrence of the three vowels /i/, /a/ and /u/ in the world's languages (cf. Maddieson 1984). Consequently, it is the hypothesis of dependency phonology that a description of the vowel space should reflect this fact, and the model therefore posits the following three monovalent components to describe vowel quality: |i| *frontness,* |u| *roundness*/*gravity,* and |a| *lowness* (vowel components are represented between verticals).

The monovalent status of these components entails that they, like the case features discussed above, may either individually constitute a vowel, or combine in dependency relations which then constitute a vowel. Thus a very simple vowel system such as the one displayed in

(12)   /i/   /u/

                        a/

will be described by the three vowel components individually. That is, /i/ |i|, /u/ is |u| and /a/ is |a| at the underlying phonological level in such a vowel system. Structured combinations, on the other hand, will be needed to describe such a set as the following found in Danish, which distinguishes five vowel heights:

(13) *mit*   'mine'   /i/ |i|

      midt   'middle'   /e/ |i;a|

      mæt   'satisfied'   /ɛ/ |i:a|

      mat   'faint'   /æ/ |a;i|

      Mahrt   (surname)   /ɑ/ |a|

In particular, as is apparent from the rightmost column, combinations of |i| and |a| will be needed for any vowel in this set, except the two peripheral qualities. These combinations involve either asymmetric dependency or symmetric dependency. Asymmetric dependency is used both in the representation for /e/ and in the representation for /æ/ (denoted by a semicolon). In the former |i| is dominant and |a| dependent, whilst in the latter the roles have been reversed: |a| is dominant and |i| dependent. This distribution reflects the fact that /e/ is closest to /i/ and hence has dominant |i|, and that /æ/ is closest to /ɑ/ and hence has dominant |a|. The vowel whose quality is midway between /i/ and /ɑ/, on the other hand, is captured in terms of a combination in which the two components are equally strong, i.e. in terms of a symmetric dependency relationship between |i| and |a| (denoted by a colon).

This account of vowel height in terms of monovalent components thus directly reflects the gradual relationship which is characteristic of such contrasts. A sound change such as the Middle English Great Vowel Shift, which raised long vowels (see e.g. Anderson and Jones 1977, Lass 1980), will then be characterised in this framework as an increase of |i|-ness (or decrease of |a|-ness). And, conversely, a sound change which involves a lowering of vowels will be described as an increase of |a|-ness (or a decrease of |i|-ness). But it should be observed that this component-based account of the vowel space is able to capture not only vowel height. It can also express natural classes. For example, front vowels are the class which contains an |i| and low vowels the class which is specified for |a(;)|, i.e. the class which has either |a| alone or dominant |a|. Thus both the scalar and the classificatory properties of vowels are expressible within this notation.

It is also the hypothesis of this vowel description that vowel systems universally will not have more than five heights. This is also borne out by the UCLA Phonological Segment Data Base (cf. Maddieson 1984) in which only less than a handful out of the 317 languages in this sample have more than five vowel heights. But as has been pointed out by Staun (forthcoming), more than five heights can also be handled by this notation, provided a given

vowel component is allowed to occur more than once in the specification for a vowel.

Generally, the component-based description of the phonological level (for a description of consonants see Anderson and Ewen 1987, Davenport and Staun 1986, and Staun, forthcoming) then competes with the classical descriptions based on either binary or scalar features. Each description has its virtues. The binary model is good at capturing classificatory properties, the scalar model is good at capturing vowel heights. It still remains to be seen whether the component-based description characteristic of dependency phonology can capture all aspects of segment classifications and contrasts, but it certainly constitutes a very strong candidate, as it can handle both scalar and classificatory phenomena in what seems to be a very elegant way.

4. Implications for structural analogy

Let us now attempt to establish the implications of the preceding discussion for a description of structural analogy. The two most important points of the above discussion are: (i) there is evidence that both the initial level of the content plane and the initial level of the expression plane could be described by means of monovalent components; and (ii) there is also evidence that to achieve an optimal description of the levels in question these components should interact in dependency relationships. Perhaps the evidence is not equally strong at the two planes. The component-based description of vowel height is nearly optimal. But it is perhaps less obvious to see that case components, interacting in dependency relationships, may capture important features of argument structure. This claim should thus be made with some caution, but apparently if the localist idea is adopted in general, there is quite strong evidence that locality occurs with varying degrees in arguments, and such facts are directly expressible in dependency terms (see again Staun 1994).

With these reservations regarding specifically the content plane in mind, it is now possible to formulate a new version of the structural analogy assumption which specifically concerns the alphabets of the two planes. It reads as follows:

(14)   minimise or eliminate if possible elementary particles at the initial levels of the content plane and expression plane which are not monovalent and which cannot interact in the same way.

The term *elementary particle* is a compromise (another term would simply be *atom)* which comprises the distinctive feature or component of phonology and the case feature of case grammar. Compared with Anderson's formulation, (14) is more narrow in so far as it is restricted to the initial levels in the description of form at the two planes. However, this possible loss of scope is compensated for by formulating an assumption which concerns the fundamental initial levels of grammar. The assumption stated in (14) can then still be said to constitute an important guideline for the way a linguistic description should be conducted.

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