

## The Sound-Meaning Relation in the Standard Theory of Transformational Grammar<sup>[\*]</sup>

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### 1. Introduction. Theoretical Assumptions and Aims

**1.1** In the present paper, we attempt to compare two simultaneous descriptions of natural language with a view to semiotic questions. The linguistic theories we have chosen to this end are, on the one hand, the standard theory of transformational grammar (TG), formulated in the mid-1960's by Noam Chomsky, and, on the other hand, an early version of the functional generative description (FGD), formulated at about the same time by Petr Sgall as an alternative to Chomsky's transformational grammar. A semiotic view refers to the way in which both theories have grasped and described the relation between units of linguistic form and meaning.

The reason we have selected two algebraic theories of language from among the various general linguistic theories may not have been graver than that both TG and FGD have included a theoretical account of the relation between form and meaning among their primary aims. Our chief effort, then, will not be to reemphasize what seems a well-established fact today, namely that the way in which both linguistic conceptions meet their primary theoretical aims is different in principle (see also Sova 2005). In the following sections we will rather focus on some of the linguistic and formal aspects directly related to, and resulting from, this difference. In particular, we intend to provide the reader with several clues regarding the extent to which both theories may be considered as capable of reflecting linguistic reality. In this respect, we will point out some of the theoretical and formal features we have come to see as either enhancing, or hindering such capability.

Our intention to demonstrate these issues on the opposition of TG and FGD has resulted from an inevitable need to choose such parallel alternatives of the generative description of language as we have had a chance to study in greater detail. Indeed, with regard to our major aim, the actual timing of both theories is irrelevant. What does matter, however, is a requirement on conceptual proximity of both linguistic descriptions, met in

this case by the empirical fact that Petr Sgall's group has formulated FGD as an alternative to the theory of Noam Chomsky.

**1.2** The semiotic analysis of the standard theory of transformational grammar and functional generative description will proceed from a set of basic assumptions and aims within which both theories developed. One way of specifying this set is to accept and pursue an a priori statement that the relevant comparative basis of both linguistic conceptions is constituted by a general, algebraic-linguistic framework, which both TG and FGD enter with a set of their own linguistic and more-or-less common non-linguistic (mathematical and logical) assumptions. Within such a framework, it seems reasonable and justified to refer to Chomsky's theory of transformational grammar and Sgall's theory of functional generative description of language as a transformational-generative approach and functional-generative approach, respectively, and to arrange the theoretical aims of both approaches along two separate levels: (1) *linguistic*, defining the transformational-generative and functional-generative approaches as two different sources of linguistic thinking; and (2) *algebraic*, defining the transformational-generative and functional-generative approaches as two theories applying the same algebraic method, i.e. the generative procedure, to language description.

We have attempted to show elsewhere that a number of features can be specified at each of these levels which in the set of basic assumptions and aims of both linguistic theories may be considered constitutive. It is not our aim to tackle the nature and manifestations of all these features below. In keeping with our major intention, we are determined to focus on two of these features that primarily define, at the linguistic and algebraic levels of both generative approaches, the relation between units of linguistic form and meaning, or simply, the form-meaning relation. These features are briefly defined as follows:

1. The form-meaning relation at the **linguistic** level is primarily defined:
  - A. by the *transformational-generative approach*, as a relation between phonetically represented signals and their semantic interpretations, conceived as a broadly syntactic level mediating between a phonetic level and a semantic level;
  - B. by the *functional-generative approach*, as a gradual relation between the signifying element (*signifiant*) and signified element (*signifié*) of linguistic sign, conceived as a system of several linguistic levels: semantic, or tectogrammatical (*TGL*), syntactic, or phenogrammatical (*PGL*), morphemic (*ML*), morphonological (*MPL*) and phonetic (*PL*), on which and between which certain relations are defined.
2. The form-meaning relation at the **algebraic** level is primarily defined:

[\*] Previously published as Sova, Radim. 2005. "The Sound-Meaning Relation in the Standard Theory of Transformational Grammar". *The Prague Bulletin of Mathematical Linguistics* 84.31-52. Praha: Univerzita Karlova. Reproduced with permission. [Editor's note]

- A. by the *transformational-generative approach*, as an input-output device consisting of a central generative component, placed on the broadly syntactic level of language, and of two interpretive components, placed on the phonetic and semantic levels of language, respectively;
- B. by the *functional-generative approach*, as an input-output device consisting of a generative component, placed on the level of sentence meaning, and several transductive components, placed on the syntactic, morphemic, morphonological and phonetic levels of language, respectively.

The primary features at both levels of generative approach are so related that the algebraic features 2A and 2B formalise the respective linguistic features 1A and 1B.

## 2. The Form-Meaning Relation in TG and FGD

Our comparison of the primary generative features will proceed from Sgall's FGD taken as a reference point against which the relevant differences of Chomsky's TG will be specified. We have resorted to this procedure, even though the genesis of both theories might justify an exactly opposite perspective, with FGD having been formulated as an alternative to TG (cf. Sgall et al. 1969, 2). Our reasoning, however, rests on a different view, reflecting the nature of the primary features 1A and 1B. With regard to the form-meaning relation, it may be argued that while in the tradition of linguistic thinking Sgall's theory is plainly classified as semiotic in view of its functional-structuralist assumptions, it is hard to attribute an equally genuine semiotic status to Chomsky's theory<sup>1</sup>. We have shown above that FGD's semiotic approach is clearly revealed by the primary linguistic feature of the functional-generative approach (*1B*). At this point we should add that the semiotic nature of FGD is further supported by its grasping the primary feature as an a priori point of departure to which formulation of the whole linguistic theory is to be adapted. In this respect, the non-semiotic nature of TG seems strongly suggested already by the fact that its primary aim at defining a form-meaning relation does not reflect an a priori assumption to which formulation of the linguistic theory should be adapted, but rather a consequence of introducing an independent subsystem of meaning – the semantic component. This was the well-known result of the critique to which the early version of TG (cf. Chomsky 1957) had been subjected.

<sup>1</sup> Chomsky's linguistic theory cannot be classified as semiotic even with regard to such of its assumptions as might be identified with isolated features of structuralism. We are chiefly referring to the theoretical influence that, apart from the explicated assumptions and aims of traditional grammar (cf. Chomsky 1964; 1965), Chomsky leaves generally unmentioned in his work but which can still be traced throughout his linguistic approach, all despite his open contempt of structural linguistics. Beside the easily traceable influence of American descriptivism, we have in mind the less-easily traceable influence of two European structural linguists, namely Ferdinand de Saussure and Louis Hjelmslev.

Claiming that the relation between the transformational-generative units of form (sound) and meaning cannot be regarded as semiotic, and that Chomsky's linguistic theory, resting on this relation, cannot as a result be attributed any sign-character, we will necessarily come up against the following question (I) and, eventually, the following question (II):

- (I) Which units and relations are used to represent the transformational-generative linguistic feature *1A* and its corresponding algebraic feature *2A*?
- (II) Notwithstanding the *a priori* assumption of a non-semiotic nature of the transformational-generative feature *1A*, are there any isolated elements or principles within the algebraic-linguistic framework of TG to which the sign-character cannot be denied?

We have attempted at providing answers to both questions in the sections below.

## 2.0. The Semantic Relation and the Syntactic Relation

**2.0.1** Specifying the primary feature *1B*, originally designated as a *semantic relation* in FGD (cf. Sgall 1967, 40), Petr Sgall resumed the ideas of the Geneva, Prague and Copenhagen schools. The corresponding primary feature *1A*, which Noam Chomsky referred to as a *sound-meaning relation* (cf. Chomsky 1972, 66) or a *sound-meaning correspondence* (cf. Chomsky & Halle 1968, 3), resembles the semantic relation in grasping the relation between units of phonetic expression and semantic content (in Hjelmslev's terminology). That even the transformational-generative relation between phonetically represented signals and their semantic interpretations (cf. Chomsky 1964a, 9) may have been inspired by European structural linguistics is implied by Chomsky's references to the Saussurean conception of linguistic sign and the *langue vs. parole* dichotomy in *Current Issues in Linguistic Theory* (1964). It can be shown, however, that this resemblance applies to mere theoretical assumption, while the transformational-generative and functional-generative methods of building a coherent linguistic theory upon this assumption are very different.

Following the functional-structuralist tradition, we will proceed from a thesis on the bilateral nature of linguistic signs, stipulating functional unity of the signifying and signified components. In FGD, such functional unity is defined as a graded system of several interrelated levels of language the units of which are seen to constitute a systematic sequence of representation relations, or form-to-function relations. This sequence allows moving between a sentence representation on the level of sentence meaning (*TGL*), i.e. from the semantic component of the linguistic sign, to a sentence representation on the phonetic level (*PL*), i.e. to the formal component of the linguistic sign, and *vice versa*. To that end, FGD employs several intermediate transitions from a linguistic function, represented by a linguistic form on an immediately lower level, to a linguistic form,

representing a function on an immediately higher level, and *vice versa*. Any set of linguistic levels with these properties will hereinafter be referred to as a *systematic sequence*.

The analysis of transformational-generative components and their systematic relations has shown that TG does not describe or formalise a form-meaning relation of a semiotic nature as it fails to ensure the functional unity of form and meaning. The absence of this fundamental semiotic principle in Chomsky's linguistic theory necessarily results in an inability of the transformational-generative units of form and meaning to constitute a systematic sequence. Although TG may be considered as disposing of a specific set of linguistic (i.e. algebraic-linguistic) levels, it is far from capable of expressing any functional unity of *signifiant* and *signifié*.

**2.0.2** Following Chomsky's formal definition of linguistic level provided in *The Logical Structure of Linguistic Theory* (1955), we will specify the linguistic level as a formal representation of a sentence in a particular stage of generation and interpretation bearing certain relation to formal representations of the same sentence in other stages of generation and interpretation. The transformational-generative levels of language may thus be defined as output strings of the phonological, transformational, categorial and semantic components, i.e. as the phonetic representation (*PR*), surface structure (*SS*), deep structure (*DS*) and semantic interpretation (*SI*), respectively, of any generated sentence. This definition is justified by the fact that a formal marker of any generated sentence can be derived on each of these levels and that certain relations between these levels exist, conceivable as specific types of generative rules<sup>2</sup>. This latter feature may be specified as follows: the *PR* and *SS* levels are related by readjustment rules (cf. Chomsky&Halle 1968, 10) and phonological rules, respectively, the *SS* and *DS* levels by transformational rules and the *DS* and *SI* levels by projection rules. It seems further convenient to refer to the *SS* and *DS* levels as *central* and to the *PR* and *SI* levels as *peripheral*, this being an *ad hoc* classification, reflecting inclusion of the former levels in the subcomponents of the central, generative component and of the latter levels in the peripheral, interpretive components.

Each generative rule, formally representing a relation between a pair of transformational-generative levels, is governed by certain formal conditions. On the one hand, there is a fundamental requirement on phrase structure derivability, consisting in the definition of a structure index for each grammatical transformation, and a requirement on

linear ordering of transformational rules, enabling their application in agreement with the principle of transformational cycle. On the other hand, there is a no less fundamental requirement resulting from the preceding two: a Boolean condition on analysability of phrase-markers derived by the transformational rules. In terms of the set of transformational generative levels, these conditions are mainly provided to ensure transition from the *DS* level onto the *SS* level, and *vice versa*; however, they are also defined to allow similar transitions between the deep structure and its respective semantic interpretation (*SI*), and *vice versa*, and between the surface structure and its respective phonetic representation (*PR*), and *vice versa*. Thus, the result should be a continuous transition from the *PR* level onto the *SI* level, and *vice versa*, i.e. a perfect systematic sequence of transformational generative levels.

**2.0.3** A closer analysis of the relations between the algebraic-linguistic levels of TG has revealed that despite the above-mentioned formal conditions and principles in place, the systematic sequence within the set of transformational-generative levels does not occur. We have identified at least three main causes:

- (1) In any generative process, generation of the syntactic description (i.e. the relation between units of the *DS* and *SS* levels) by the syntactic component is superimposed to derivation of the phonetic representation (i.e. unit of the *PR* level) by the phonological component and of the semantic interpretation (i.e. unit of the *SI* level) by the semantic component.
- (2) The internal structure of the syntactic component rests on an inconsistent differentiation of units on the *DS* and *SS* levels and means of their representation.
- (3) The syntactic component is seen to constitute an autonomous element rather than a proper relation.

We assume that a more detailed analysis of the above statements (1) – (3) provides arguments for the primarily non-semiotic nature of TG assumed above. Such an analysis is attempted in Sections 2.1 – 2.3 below.

## 2.1. Dependency Hierarchy

**2.1.1** Studies in TG often imply that a special kind of hierarchy is established between its three main components, i.e. syntactic, phonological and semantic. This hierarchy provides that the syntactic component as a generative element is functionally independent on the other two components, while the phonological and semantic components as mere interpretive elements are functionally dependent on the central syntactic component (cf. Chomsky 1964; 1965; 1966; 1972; Chomsky&Halle 1968;

<sup>2</sup> Other arguments, of purely "terminological" nature, are provided by Chomsky's frequent use of expressions such as *phrase structure level*, *transformational level* or *phonetic level* (cf. Chomsky 1966b, 53-54) and by the fact that works on TG in general often use the notion of level in reference to the surface structure and deep structure as well as the phonetic representation and semantic interpretation of sentences (cf. Chomsky 1965; 1972).

Katz&Postal 1964). The three components are thus seen to constitute a dependency hierarchy, for one can reasonably talk about logical dependency of both peripheral, interpretive components on the central, generative component. By analogy, even the relation of both underlying syntactic structures – units of the *DS* a *SS* levels –, generated by the syntactic component, and their respective two strings – units of the *SI* and *PR* levels –, derived by the semantic and phonological components, may be considered to constitute a dependency relation.

The dependency relation of the TG components and their units can be taken as a basis for grasping a special nature of the transformational-generative relation of form and meaning. The functional independence of the syntactic component on the phonological and semantic components implies that the syntactic component may virtually exist on its own, without any external phonetic or semantic representation of the underlying syntactic structures it generates. This is clearly reflected by the fact that the syntactic component generates a syntactic invariant, comprising a primary element of form – the surface structure (*SS* and *SS'*, respectively; cf. Chomsky& Halle 1968, 9-12) of any generated sentence – and a primary element of meaning – the deep structure of any generated sentence – to which only the phonological and semantic components assign their respective phonetic and semantic variants – the phonetic representation and semantic interpretation of the generated sentence.

The dependency hierarchy of transformational-generative components weakens the semiotic unity of TG by assuming segmentation inside the language system at the expense of cooperation. In the works on TG, this results in a much greater emphasis on the internal structure of each component than its external function; in other words, there is hardly any specification of how all these components cooperate in establishing the relation between units of form and meaning<sup>3</sup>. Thus, studies in TG are traditionally divided into formal descriptions of the individual syntactic, phonological and semantic components. If a theoretical description of any component in relation to any of the other ones is still provided, it usually explains how the internal structure of the syntactic component was modified as a result of certain formal changes in the internal structure of either the phonological or semantic component. What the European structural linguist is bound to miss here is any more detailed analysis that would present all the three components in an ideal functional unity, that is, explain how a systematic transition from the units of form to the units of meaning, and *vice versa*, can be achieved.

<sup>3</sup> It is this kind of linguistic description that is proper to Sgall's FGD. Despite Sgall's several modest admissions that his language description cannot be considered complete in the present stage of formulation (cf. his summary of tasks for a systematic treatment of semantics in Panevová *et al.* 1971, 19-21), one cannot fail to observe that his main emphasis has been on establishing the functional unity of the individual functional-generative components (i.e. levels of linguistic description).

The general information concerning thematic arrangement of works on transformational grammar needs be interpreted so that Chomsky admits of studying phonology independently of semantics, semantics independently of phonology and syntax independently of phonology and semantics; on the other hand, he does not admit of studying phonology and semantics independently of syntax, considering the phonetic representation and semantic interpretation of any generated sentence syntactically<sup>4</sup> motivated (cf. Chomsky 1966, 19-20). Such a relation of the component parts of the language system, accepted by Chomsky and other generativists, is in full conformity with the above-argued dependency hierarchy of transformational-generative components, providing that any phonetic and semantic variants of the generated sentence may only be studied and described depending on their respective syntactic invariants.

The conception of language system outlined in the previous paragraphs might resemble Hjelmslev's conception of dependency relation between the system, or language, and process, or text, with the former being conceivable without the latter but not the latter without the former (cf. Hjelmslev 1966, 43). In this respect, it remains unclear whether Chomsky could have been inspired by this feature of Hjelmslev's glossematics. Considering the general nature of Chomsky's treatment of the form-meaning relation, it seems rather unlikely. This is suggested by the unfeasibility of regarding the transformational-generative relation of form and meaning as semiotic in the first place, and further by the fact that zero representation of the underlying syntactic structures is not contemplated anywhere by Chomsky. Indeed, the issue of an eventual structuralist inspiration is not all that important, the chief argument being that the dependency hierarchy of TG components may be deduced from the systematic opposition of their generative (active) and interpretive (passive) role on which most works on TG<sup>5</sup> are based. It may be argued that both the latter opposition and the analogical opposition of *PR* and *SI*, on the one hand, and *SS* and *DS*, on the other hand, are a consequence of a genuinely mentalistic basis of TG.

**2.1.2** We have already argued that the formally linguistic phenomenon of dependency hierarchy in the set of TG components has a direct impact on the set of TG levels. This impact was seen to be a result of a hierarchy of relations preventing systematic transition from units of the *PR* level to units of the *SI* level, or *vice versa*. In the following paragraphs, we consider these issues in greater detail, trying to show that the dependency hierarchy of TG components establishes such a sequence of TG levels as may contradict linguistic experience.

<sup>4</sup> Chomsky uses the notion of syntax in quite a specific, broader sense, including, beside the units of traditional syntax, even the units of traditional phonology, morphonology, morphemics and lexical semantics (cf. Chomsky 1965).

<sup>5</sup> Apart from the frequently cited works by Noam Chomsky, we are referring to certain studies in generative semantics, such as Katz&Fodor 1963 and Katz&Postal 1964.

Referring to the *PR* and *SI* levels, included in the functionally dependent, interpretive components as hierarchically inferior, and to the *SS* and *DS* levels, included in the functionally independent, generative component as hierarchically superior, the set of transformational-generative levels may be preliminarily charted as follows (the arrows indicating dependency direction):

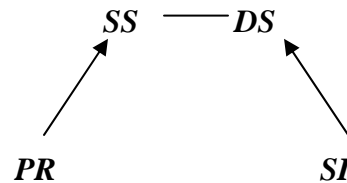


Fig. 1: Dependency relation in the set of TG levels I

Even a passing look at the relations shown in Fig. 1 suggests that continuous transition from the *PR* level onto the *SI* level, or *vice versa*, is bound to meet with inevitable obstacles. They can be summarised as follows:

- (i) A systematic transition from the lower level of *PR* is only possible to the higher levels of *SS* and *DS* but not to the level of *SI*, ranking lower than the levels of *SS* and *DS*. This suggests that units of the *SI* level may not be represented<sup>6</sup>.
- (ii) A systematic transition from the lower level of *SI* is only possible to the higher levels of *DS* and *SS* but not to the level of *PR*, ranking lower than the *DS* and *SS* levels. This suggests that units of the *PR* level may not be represented.

With regard to the set of TG components, the conditions provided under (i) and (ii) may equally be put in the following wording:

- (iii) Both components of a lower rank (functionally dependent, interpretive components, containing the peripheral levels of *PR* and *SI*) are formally interconnected only through another component of a higher rank (a functionally

independent, generative component, containing the central levels of *SS* and *DS*), being not interconnected mutually.

The dependency hierarchy of TG components and levels directly affects the semiotic phenomenon of systematic sequence. It is virtually impossible to achieve a systematic transition from the units of the level of sound to the units of the level of meaning in an uninterrupted ascending ( $PR \rightarrow SS \rightarrow DS \rightarrow SI$ ) or descending ( $SI \rightarrow DS \rightarrow SS \rightarrow PR$ ) sequence but only in an interrupted ascending-descending, and hence non-systematic, sequence.

In FGD, a specification of the systematic sequence  $PL \rightarrow MPL \rightarrow ML \rightarrow PGL \rightarrow TGL$  as ascending, and of the systematic hierarchy  $TGL \rightarrow PGL \rightarrow ML \rightarrow MPL \rightarrow PL$  as descending, is a possible and necessary precondition for meeting the primary theoretical aim at grasping and formalising the form-meaning (semantic) relation. In this sense, no such circumstances may arise as would disable the *PL* and *TGL* units to take active part in this relation. Furthermore, the functional-generative approach shows that the main obstacle blocking systematic transitions between the transformational-generative levels of form and meaning does not consist in the dependency relation as such but rather in the hierarchy of algebraic-linguistic components from which the dependency results. Thus, at the level of algebraic description, a similar type of dependency relation is found even in FGD, assuming a single formally independent (generative) component and several dependent (transductive) components. Yet, at the level of linguistic description, the dependency hierarchy of the functional-generative components does not prevent systematic transition from the units of sentence form to the units of sentence meaning, or *vice versa*. The main reason is Chomsky's and Sgall's different opinions on which part of the language system should be attributed the generative and recursive properties. While TG considers syntactic structure as initial in the process of sentence generation, FGD proceeds from the semantic structure. This is reflected by the fact that the generative component, initialising the syntactic derivation of any sentence *S*, is placed on the level of sentence meaning. As the same level (*TGL*) represents a target level during any form-to-meaning (or form-to-function) transition and a source level during any meaning-to-form (or function-to-form) transition, an uninterrupted, systematic transition from one end level to the other end level is not blocked. On the other hand, the generative component of TG is part of the syntactic component, thus representing neither a target, nor a source but always an intermediate level in any sound-to-meaning or meaning-to-sound transition. The systematic transition from one end level to the other end level is blocked by an interrupted ascending-descending sequence of algebraic-linguistic levels, described under (i) and (ii) above.

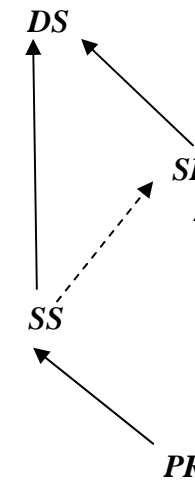
Another, more significant impact of the dependency hierarchy of TG components on linguistic relations within the set of TG levels and, as a result, on the transformational-generative relation of form and meaning, is revealed as soon as TG is studied from the inner perspective of the central, generative component. Contrary to its outer perspective, which has so far enabled us to grasp its relations to both interpretive components, the inner

<sup>6</sup> The notion of *representation* frequently used herein in relation to TG is not interchangeable with the notion of representation used within the theoretical framework of FGD. While in the former theory, representation refers to mere attribution of phonetic and semantic variants to their respective syntactic invariants, in the latter theory it designates a clearly defined notion, referring to the relation of linguistic form and function.

perspective allows analysing the syntactic component in terms of its constitutive internal relation, i.e. the relation of both of its invariant syntactic structures. This view will soon reveal an important fact, namely that the dependency relation holds not only between these syntactic structures and their respective phonetic and semantic variants, but even between the invariant structures (units of the *DS* and *SS* levels) themselves. Thus, even units of the *SS* level are logically dependent on units of the *DS* level.

The dependency relation inside the generative component directly results from the linguistic function attributed to the surface structure and deep structure, of which the latter is mere grammatical (transformational), but not a semantic, derivative of the former. Thus, irrespective of the change in order and representation of certain lexical and grammatical formatives and other formal elements, necessitated by the phonetic representation of any generated sentence, the surface and deep structures are not very different<sup>7</sup>. At any rate, they do not differ semantically since the singular transformations, connecting both structures formally and linguistically, are not believed to change meaning in TG<sup>8</sup>. It holds within any syntactic derivation that while the deep structure represents an underlying structure (formally represented by an underlying phrase-marker), the surface structure represents a derived structure (formally represented by a final derived phrase-marker). Strings derived on the central level of *SS* thus resemble those derived on both peripheral levels (*PR* and *SI*) in constituting mere interpreted structures. In this respect, the transformational subcomponent is assigned a purely interpretive role in TG (cf. Chomsky 1965, 137).

In view of the above findings, it seems appropriate to modify the preliminary set of TG levels, charted in *Fig. 1* above, as follows:



*Fig. 2:* Dependency relation in the set of TG levels II

*Fig. 2* makes it apparent that the dependency of the *SS* level units on the *DS* level units introduces quite an extraordinary hierarchy of sound and meaning into the set of TG levels. To be able to grasp this hierarchy as adequately as possible, it seems appropriate to distinguish between two kinds of dependency in this set: (i) *direct dependency*, applying to those transformational-generative levels between which specific linguistic and formal relations – i.e. specific generative rules – are defined (marked by non-dashed arrows); and (ii) *indirect dependency*, being a bypass product of the direct dependency and applying to those transformational-generative levels between which no specific linguistic or formal relations – i.e. specific generative rules – are defined (marked by dashed arrows).

The new terms will enable us to describe the relations between the TG levels in greater detail. As the semantic interpretation and phonetic representation of any generated sentence fully depend on their deep structure and surface structure, respectively, and since the *SS* level units depend logically on the *DS* level units, it can be argued that the phonetic representation of the generated sentence depends both directly on its respective surface structure and indirectly on its semantic interpretation. The indirect dependency relation helps further justify why in the set of TG levels the peripheral level of *SI* is superimposed to the central level of *SS*. Assuming that units of the *PR* level depend indirectly on units of the *SI* level and considering the relation of direct dependency between units of the *PR* and *SS* levels and units of the *SI* and *DS* levels, respectively, we may conclude that even the units of the *SS* level depend indirectly on the units of the *SI* level. Thus, a major opposition of the peripheral and central units of sound (*PR* and *SS*) and of the peripheral and central

<sup>7</sup> We are disregarding the transformations removing some typical features of deep structure (e.g. the universal symbols such as *Pas*, *N*, *I*, *Q*, *wh*; cf. Katz&Postal 1964) or introducing some typical features of surface structure (e.g. the word-boundary symbol #). In TG, these features do not reflect any significant differences between the semantic and formal units of the deep and surface structures.

<sup>8</sup> TG does not attribute any semantic relevance to grammatical transformations mainly because it fails to admit semantic relevance of the grammatical relations indicated by some typical features of surface structure (e.g. word order and sentence prosody). To FSP phenomena, which are directly governed by these features, Chomsky ascribes mere stylistic function, thus banishing them from competence into performance (cf. Chomsky 1965, 126-127). It was not until the Extended Standard Theory (EST), presented by Chomsky 1972, that significance of the surface structure features for sentence meaning was taken into account.

units of meaning (*SI* and *DS*)<sup>9</sup> arises in the set of TG levels, between which unilateral dependence (or a dependency relation) apparently holds.

It may further be argued that the dependency relation in the set of TG levels, so far implied as a secondary (effected) phenomenon, must be perceived in constant cooperation with the dependency relation in the set of TG components, so far implied as a primary (causing) phenomenon. In this respect, it probably holds that as long as a transition between the *PR* and *SI* levels is allowed by the primary dependency – in other words, if there are conditions for units of the central levels to be represented by units of the peripheral levels –, the secondary dependency will strongly tend toward representation of the *SI* level units rather than of the *PR* level units. This tendency can also be interpreted so that within the set of TG levels, the *SI* → *PR* transition is more likely to be allowed than the *PR* → *SI* transition.

These relations and hierarchies within the major opposition of the units of meaning (*SI* and *DS*) and sound (*PR* and *SS*) can be demonstrated by one peculiarity, viz. inconsistency, of TG, related to the filtering function of singular transformations (cf. Chomsky 1965, 138-139). Chomsky maintains that any deep structure proper, represented by its respective generalised phrase-marker, is mapped into well-formed surface structure by a final sequence of transformational rules. In a way, this implies that there are some deep structures from which no grammatical sentences are derived, which poses a serious theoretical problem. For even though the filtering function of the transformational subcomponent does not permit any defective units of the *DS* level (i.e. does not map them into well-formed units of the *SS* level), the defective deep structures are probably still handed over to the semantic component for interpretation (cf. Sgall 1967, 36). An existing unit of meaning is thus correlated with a nonexistent unit of form, that is, one of the possible linguistic conditions occur, under which the *SI* level units are represented while the *PR* level units are probably not. This phenomenon would support our statement that the

<sup>9</sup> Relational closeness of the *DS* and *SS* levels is clearly a result of the semantic interpretation of any generated sentence being actually determined by units found on both of them. Therefore, the *DS* level units might not be true invariants of the *SI* level units since beside the morphosyntactic elements, defining grammatical meaning, they only include some lexico-semantic elements, defining lexical meaning. The basic lexical identity is not supplied to the lexical formatives of any terminal string until the lexicon on the *SI* level where the formatives are provided with appropriate semantic indices. However, not even this condition seems to justify an interdependency relation, rather than the above-suggested dependency relation, between the units of the *SI* and *DS* levels. Chomsky frequently emphasises that the deep structure contains all relevant semantic information – lexical units as well as grammatical relations and functions (cf. Chomsky 1965, 136) – and that the role of the semantic component is merely interpretive, i.e. representational (cf. *ibid.*, 16). The idea that the *DS* level units are true invariants of the *SI* level units may further be supported by Chomsky's recurring statements, sometimes asserting that the deep structure of any generated sentence expresses its *meaning* (cf. *ibid.*, 162) and sometimes arguing that it expresses its *semantic content* (cf. *ibid.*, 136, 143). On the other hand, it needs to be admitted that, much unlike Sgall, Chomsky did not attach any theoretical importance to the difference between linguistic meaning and content, using both terms as synonyms.

relation between units of the TG levels of meaning and sound is not based on functional unity, but rather on functional disunity of the signified meaning and signifying form and that this disunity is reflected by a dominance of the units of meaning over the units of form.

**2.1.3** The individual conclusions about the nature and consequences of the dependency hierarchy in the system of TG as a whole, i.e. of the primary dependency hierarchy of the TG components and of the secondary dependency of the TG levels, may be summarised under the following two points:

- (i) The dependency relation within the set of TG components is primarily reflected by what is claimed about the units of the *PR* and *SI* levels in terms of their relation to their respective syntactic invariants. This relation is defined as direct dependency of the semantic variants (units of the *SI* level) on their deep-structure invariants (units of the *DS* level) and of the phonetic variants (units of the *PR* level) on their surface-structure invariants (units of the *SS* level). Thus, one of the consequences of the direct dependency may be a failure of TG to represent the units of the *PR* and *SI* levels under certain circumstances.
- (ii) The dependency relation within the set of TG levels is primarily reflected by what is claimed about the units of the *PR* and *SI* levels in terms of the relation holding between their respective syntactic invariants. This relation is defined as direct dependency of the surface-structure invariants (units of the *SS* level) on the deep-structure invariants (units of the *DS* level), resulting in indirect dependency of the units of the *PR* level (and their respective units of the *SS* level) on the units of the *SI* level. Thus, one of the consequences of the indirect dependency may be a tendency of TG to represent the units of the *SI* level rather than the units of the *PR* level, if favourable conditions exist for units of the *PR* and *SI* levels to be represented at all.

With regard to the primary linguistic feature of the transformational-generative approach to language (*IA*), statement (i) is at variance with this generative feature by permitting the sound-meaning relation to be realised even without the phonetic and semantic units. Also, statement (ii) directly contradicts the generative feature by suggesting that the transformational-generative units of sound and meaning do not represent equal components in their linguistic relation (such as *signifiant* and *signifié* do in any linguistic sign). This second point implies that apart from the structuralist, bilateral conception of the signifying-signified (form-meaning) relation, another conception is plausible, based on a unilateral dominance of meaning over form.

## 2.2. Linguistic Units and Means of Their Representation

The causal statement (2), provided under 2.0.3 above, may be studied at two independent levels: (i) algebraic-linguistic and (ii) linguistic. It can be shown that the findings revealed at each of these levels have specific consequences for the nature of the transformational-generative relation of sound and meaning.

**2.2.1** At the *algebraic-linguistic* level, it may be argued that TG does not always distinguish between linguistic units and the formal objects by which these units are represented. Thus, in the works on TG, major and lexical categories of the generated structures are not distinguished from their respective category symbols, lexical and grammatical formatives of terminal strings from their respective terminal symbols and deep and surface structures from their respective generalised and final derived phrase-markers. As a result, formal (algebraic) means representing the corresponding linguistic units rather than the units themselves are used in linguistic analyses or general linguistic conclusions or hypotheses.

We maintain that these cases do not involve mere terminological inconsistency but rather a consistency in blending linguistic units and means of their formal representation. This approach apparently reflects a high extent of algebraic formalisation which Chomsky has applied to language description since the beginning of his linguistic research. The range of impacts of the mathematical formalisation of TG on the formulation of some general linguistic conclusions is very wide. In order to illustrate some of the relevant differences between TG and FGD, we will briefly treat those features of the algebraic formalisation of TG which affect the transformational-generative definition of the basic formally (surface) syntactic relations.

TG defines the basic syntactic relations by the principle of syntactic subconfiguration of phrase structure (cf. Chomsky 1965, 71; Katz&Postal 1964, 49). This principle is closely bound with a formal object – the underlying phrase-marker of the generated sentence. It may have been because the theory of transformational grammar applies a virtually descriptivist, strictly binary and purely formal analysis into immediate constituents to the syntactic description of sentence, in respect of which the transformational-generative phrase-makers are defined, that the subject and predicate (i.e. the pair [*NP* – *Predicate-Phrase*]) came to be regarded as constituents of equal syntactic significance<sup>10</sup>. Formally, this is shown by a hierarchy of relations in which these constituents are dominated by a single category symbol #*S*#, which is further reflected by a generative rule introducing this symbol into the syntactic derivation:  $S \rightarrow NP \sim Predicate-Phrase$  (cf. Chomsky 1965, 106). Another consequence of the immediate constituent analysis is Chomsky's treatment

<sup>10</sup> Fully agreeing with Sgall, we consider Kuryłowicz's conception to be representative in structuralist terms. This conception is based on the definition of syntactic dependence as a relation between a head (basic member) and modifier (second member) of the syntagm (group) in which the head is seen to represent the whole syntagm in its outer relations (cf. Kuryłowicz 1948).

of any predicate-object relation as syntactically closer than any predicate-subject relation. He thus prefers the (*S*) (*V* – *O*) representation to the (*S* – *V*) (*O*) representation (cf. Chomsky 1966, 58), even though the latter better captures the valency characteristics of English: much unlike the object, the subject must be present in every English sentence<sup>11</sup>. The subconfiguration [*Predicate-Phrase*, *S*] is inadequate also because in the sentence *John saw Bill* it will specify as predicate the whole phrase *saw Bill* rather than just the sole verb *saw*. In the formal syntactic analysis carried out within the framework of TG, a finite verb is defined as the head of a dominating verb phrase (*Main-Verb-of*) and formally represented as the first member of an ordered pair [*V*, *VP*].

Within the theoretical framework of FGD, the same syntactic relations, and the subject-predicate relation in particular, are shown to constitute an entirely different hierarchy. Thus, on top of any dependency tree, there is a single predicate node to which the subject node is subordinated. This difference may be accounted for by a specific feature of FGD which TG obviously lacks: FGD clearly distinguishes linguistic units (and relations) from the means of their algebraic formalisation. This differentiation is important not just because it enables to distinguish between a linguistic and a formal description as such, but mainly because it organises both kinds of description into a clear hierarchy. In this sense, tools of the algebraic description are regarded as mere means of specifying certain linguistic functions in FGD rather than as their prerequisites, as seems to be the case of TG. As a result, the functional-generative description of syntax does not proceed from the study of category symbols and their interrelations in a particular phrase-marker but rather from the analysis of syntactic forms and their semantic functions in relevant linguistic contexts. Any formal markers – the dependency trees or their respective linear representations – are only used to represent the syntacto-semantic relations ascertained by the linguistic study.

The above issues suggest that TG overemphasises formal characteristics of its theoretical description, which sometimes distorts some of its linguistic findings. At the same time, the above observations are meant to encourage a two-fold view of TG's formal approach: (i) a formal view proper, referring to Chomsky's inconsistency in the algebraic and linguistic descriptions of language, which often affects his formulation of general linguistic conclusions; and (ii) a linguistic view, referring – much in the spirit of the descriptivist tradition – to Chomsky's emphasis on the description of linguistic form, which often affects his description of linguistic function.

**2.2.2** At the *linguistic* level, it may be argued that TG blends units of different levels which are distinguished by traditional linguistics. It is true that Chomsky was fully aware of this even as he formulated his early version of transformational grammar. He did then not believe that this feature could be subject to criticism since at the current

<sup>11</sup> The empirical fact that it is not always interpretable semantically does not of course contradict this inherently grammatical requirement; quite to the contrary, it provides evidence that filling of the subject valency is obligatory in English.



stage of research he meant to impose less strict requirements on his linguistic theory (cf. Chomsky 1957, 56). On the other hand, none of these arguments should disqualify our approach as they can hardly question our findings presented here as proof that TG is a non-semiotic linguistic theory.

We have shown above that TG lays a major emphasis on the generation of structural (syntactic) description, due to a dependency hierarchy of the TG components and levels. Chomsky defined the structural description as an initial algebraic-linguistic structure of an abstract nature generated by the syntactic component. With regard to its linguistic function, it can be characterised in the following two ways:

- (i) The structural description is an abstract structure moving between the phonetic representation (unit of the *PR* level) and semantic interpretation (unit of the *SI* level) of any generated sentence. This is a direct result of the syntactic component mediating between the phonological and semantic components.
- (ii) The structural description is an autonomous functional unit, independent on external representation. This is a direct result of the syntactic component constituting a central, generative component that is functionally independent on both interpretive components.

In the sense of (ii), the structural description is an abstract functional unit consisting of a surface structure and a deep structure which are interrelated by a sequence of singular transformations. A closer look at the linguistic relation of both abstract syntactic structures will further reveal that the opposition of the surface and deep structures can on no account be attributed a semiotic nature and be identified with the *signifié* vs. *signifiant* dichotomy, and that the sequence of singular transformations, deriving surface structures from their respective deep structures, can on no account be reasonably likened with a semiotic function (cf. Hjelmslev 1966, 60). There are at least two reasons:

- (iii) The deep structure (unit of the *DS* level), determining semantic interpretation of any generated sentence, contains a typical feature of the surface structure (unit of the *SS* level), determining phonetic representation of any generated sentence, since the lexical rule replaces complex symbols of the preterminal string with a phonological matrix of structurally identical entries of the syntactic lexicon.
- (iv) The surface structure (unit of the *SS* level), formed by a sequence of morphological elements of any generated sentence, contains a typical feature of the deep structure (unit of the *DS* level), expressing grammatical relations and functions of any generated sentence, since as a labelled tree-diagram, or labelled bracketing, it also expresses grammatical relations and functions.

Paragraphs (iii) and (iv) suggest that the structural descriptions do not respect any formal or functional differentiation of units found on different levels of the language system. This is further supported by the fact that the complex symbols of preterminal strings, generated by the categorial subcomponent of the syntactic base, are entries blending phonological, morphosyntactic and even certain lexico-semantic information. Therefore, the sequence of grammatical transformations cannot be regarded as a function relating the semantic component (i.e. the deep structure) and the formal component (i.e. the surface structure) of the linguistic sign, because the latter is a mere transformational derivative of the former.

If the opposition of the *DS* and *SS* level units cannot be identified with the *signifiant* vs. *signifié* dichotomy, a question may arise whether the functional unity of the signifying and signified could be attributed to the *DS* level unit alone. In a way, this was suggested by Paragraph (iii) above, arguing that the *DS* level unit contains both the invariant elements of meaning and the invariant elements of sound. However, a closer analysis of the syntactic component will necessarily lead to a negative answer. With regard to the process generating the *DS* level unit, it is hard to identify the deep structure of any generated sentence with the linguistic sign proper, mainly because it is impossible to clearly identify its signifying and signified components. In this respect, the preterminal syntactic string cannot be regarded as the signified component and the set of relevant lexical entries included in the syntactic lexicon as the signifying component of the linguistic sign since such identification is precluded by at least the following two conditions:

- (v) The complex symbols of each preterminal string contain several pieces of morphosyntactic information, the sum of which represents only a part of the complete semantic interpretation. Thus, expressing chiefly the grammatical but not the full lexical meaning of any generated sentence, the preterminal strings do not constitute genuine signified components of linguistic signs. Full lexico-semantic information is supplied to the *DS* level units only after the lexical formatives of the terminal strings have been assigned their respective semantic indices of the lexical entries included in the semantic lexicon.
- (vi) The lexical entries included in the syntactic lexicon do not contain sole phonological units (phonological matrices) and thus do not constitute genuine signifying components of linguistic signs. Apart from the phonological information, they also contain information of a morphosyntactic nature, structurally identical with the information related to the complex symbols of the preterminal strings.

Reasons provided under (v) and (vi) make it further clear why the idea of identifying the lexical rule (i.e. lexical transformation), inserting lexical entries into the preterminal strings, with an equivalent (if approximate) of semiotic function must be rejected. Within

the sense of (v), genuine sign-character may not be attributed to the individual entries of the syntactic lexicon either, for even though they contain a component of form (i.e. the set of phonological matrices of the individual lexical formatives), they do not contain any component of meaning. We have already argued that the linguistic meaning in TG is a combination of the morphosyntactic information included in the lexical formatives and of the lexico-semantic interpretation supplied to these formatives in the semantic component (cf. Note 9).

The sign-character of the *DS* level unit is also weakened by a feature peculiar to the syntactic theory of all the early versions of transformational grammar, TG not excluding: a double representation of syntactic structure, resulting from duplicate generation of syntactic features. Structural identity, or non-distinctness, of the complex symbols and entries of the syntactic lexicon is a precondition for defining the structure index of a substitution transformation (i.e. local substitution transformation, defined by the *is a* relation; cf. Chomsky 1965, 84). This transformation provides syntactic features of the complex symbols with an appropriate set of phonological features (parameter *D*) of those lexical entries whose set of syntactic features (parameter *C*) is non-distinct in respect of the set of syntactic features reflected by the complex symbols. Although such an approach is indeed acceptable at the formal level, it cannot be justified at the linguistic level as it fails to specify what kind of relation holds between both sets of syntactic features. In particular, Chomsky does not show how, and whether at all, the complex symbols can be defined irrespective of the structurally identical lexical entries, or *vice versa*, and does not provide any reason why an identical piece of syntactic information should be represented twice in the process of sentence generation, and hence in the system of language<sup>12</sup>. The presence of duplicate syntactic generation poses a serious semiotic problem in TG. Thus, if we were to attribute, with certain limitations, a status of *signifié* to both sets of syntactic (i.e. syntacto-semantic) features and, without limitations, a status of *signifiant* to the single set of phonological features, we would come up against two components of meaning related to a single component of form. The idea of assigning sign-character to the *DS* level unit must hence be abandoned even for this reason.

The features we have so far specified in respect of particular TG levels strongly suggest that in terms of the units and means of their representation the systematic transition from the units of form (found on the *PR* level) to the units of meaning (found on the *SI* level), and *vice versa*, will meet with obstacles. This assumption is further supported by other observations. Considering the set of four TG levels, one will necessarily face the following problems:

- (vii) Transition between the *PR* and *SS* levels reveals that units of the traditional phonetic level represent units of the traditional morphonological and morpho-syntactic levels defined on a single transformational-generative (i.e. the *SS*) level.
- (viii) Transition between the *SS* and *DS* levels reveals that units of the traditional morphonological and morphosyntactic levels represent units of the traditional phonological, morphosyntactic and lexical levels defined on a single transformational-generative (i.e. the *DS*) level.
- (ix) Transition between the *DS* and *SI* levels reveals that units of the traditional phonological, morphosyntactic and lexical levels are represented by units of the traditional semantic level (the level of sentence meaning) defined on a single transformational-generative (i.e. the *SI*) level.

The inconsistent differentiation of units on one TG level and the corresponding means of representation on the other TG level – or, in other words, the absence of a set of linguistic levels whose units would constitute a genuine representation relation – leads to the presence of units of different traditional levels on a single transformational-generative level. Thus, under (vii), the traditional phonetic units seem to represent not only functions of the traditional units of sentence form (i.e. the morphonological units) but also functions of the traditional units of sentence meaning (i.e. the morphosyntactic units, determining, before the application of grammatical transformations, the semantic interpretation of sentence in TG). In keeping with (viii), structurally more complex units of the *SS* level (i.e. morphonemes and even grammatical functions) are suggested to represent structurally simpler units of the *DS* level (i.e. phonemes of the lexical entries)<sup>13</sup>. Moreover, the set of units represented on the *DS* level is extended with some units of lexical meaning. Finally, Paragraph (ix) suggests that beside the morphosyntactic arrangement of the terminal string even the phonological distinctive features of its lexical formatives have crucial importance for the semantic interpretation of any generated sentence on the *SI* level.

It is obvious that the systematic sequence of the units of sound and meaning, or *vice versa*, is implausible linguistically in TG, because the internal structure of the syntactic component, relating these units, is not organised as semiotic to this end. In this respect, the syntactic component of TG does not distinguish linguistic functions from the means of

<sup>12</sup> Related to these issues is another question, namely whether the specification of two sources of syntactic generation – the categorial subcomponent and the lexicon – is indeed necessary and whether a single source, the lexicon, would not be sufficient. Chomsky himself must have reevaluated his syntactic approach, as later modifications of the transformational grammar (the GB theory and the Minimalist Program in particular) apply only a single transformational process (i.e.  $\alpha$ -movement) proceeding from the lexicon to the phonological and logical forms.

<sup>13</sup> It is the fact that relations between the different TG levels are not exactly defined that leads to such absurd conclusions. Even though we may assume that on the *SS* and *DS* levels only grammatical functions, rather than grammatical functions and phonemes, are immediately correlated by grammatical transformations (i.e. transformational rules), the latter possibility cannot be fully excluded either in view of the formal and linguistic criteria defined in TG.

their linguistic representation since it fails to define a set of linguistic levels whose sign-character would constantly urge them to enter into representation relations, or the form-to-function relations.

### 2.3. Elemental Nature of the Syntactic Component

While searching for possible reasons why Chomsky's linguistic theory formulated within the framework of TG cannot be regarded as semiotic, we have frequently referred to some of the classical theses formulated by structural linguistics. Thus, in 2.1.1 and 2.1.2, we observed how one particular feature of the textual analysis established by the Copenhagen glossematics was reflected within the set of TG components and levels. In 2.2.2, we used the Prague approach to linguistic levels and the form-to-function relation to pinpoint the non-semiotic character of the way in which TG defines and relates linguistic units. In the present section, we would like to turn back to Hjelmslev's hierarchy of dependencies, focusing in particular on his operational definition of the semiotic relation as a function of an interdependent nature (Hjelmslev 1966, 64-65).

We have already shown that in view of the above-quoted operational definition, the transformational-generative relation of sound and meaning and, as a result, the whole TG must be regarded as inherently non-semiotic. This was suggested by a phenomenon we referred to as dependency hierarchy of the TG components and their algebraic-linguistic levels. Now it seems that consequences of the glossematic conception of the semiotic function for the internal arrangement of the TG components may be taken still further. Considering its functional independence on the interpretive phonological and semantic components, the generative syntactic component seems to lose, to some extent, the properties of a relation (or function) mediating between the units of sound (on the *PR* level) and meaning (on the *SI* level) and rather take on a character of an independent abstract element. In the provided sense, the generative component may rather be considered as one of the terms of a mediating function, whose explicit definition is not given anywhere in TG, than the mediating function itself. If this were not the case, that is, if we were to conceive of the syntactic component not as an autonomous element, but rather as a relation in its own right, this component could probably not exist without particular elements (terms) of sound and meaning which it is supposed to relate in compliance with the primary generative feature *IA*. However, as we have tried to argue above, zero representation of the invariant structures generated by the syntactic component seems to be a result directly imposed by the primary and secondary dependency hierarchies in TG.

We may conclude that another reason why the transformational-generative relation of sound and meaning cannot be regarded as semiotic is that its relational features are considerably weakened by its elemental features.

### 2.4. The Syntactic Relation

**2.4.1** To summarise, by analysing the causal statements formulated in 2.0.3 and gradually discussed in the subsequent Sections 2.1 – 2.3, we have arrived at the

following main conclusions about the nature of the transformational-generative relation of sound and meaning:

- (i) The sound-meaning relation of TG takes on the form of an autonomous syntactic component (cf. 2.3).
- (ii) The autonomous, generative syntactic component, representing the sound-meaning relation in TG, is functionally independent on the non-autonomous, interpretive phonological and semantic components, which results in a primary dependency hierarchy of the TG components (cf. 2.1.1). A secondary dependency hierarchy, further definable as either direct or indirect, is seen to arise between units of the algebraic-linguistic levels included in these components (cf. 2.1.2).
- (iii) The autonomous syntactic component, representing the sound-meaning relation in TG, is internally disorganised in terms of linguistic units and means of their linguistic representation (cf. 2.2.2). At the same time, the linguistic units are not frequently distinguished from means of their formal representation (cf. 2.2.1).

Paragraphs (i) – (iii) supply evidence that the sound-meaning relation, formulated within TG, can be on no account regarded as semiotic in the tradition of structuralist thought. In view of Conclusion (i), arguing that TG defines the sound-meaning relation as an autonomous syntactic component, this relation may be generally referred to as *syntactic* in a broader sense. This expression seems to provide an apt opposition to the functional-generative *semantic* relation (cf. 2.0.1), capturing the fact that in contrast to Petr Sgall, Noam Chomsky places the generative procedure on the syntactic level, and reflecting, at the linguistic level, a primary emphasis of TG on phenomena classified as broadly syntactic (i.e. covering features even of other, traditionally non-syntactic levels, cf. Note 4) as opposed to the primary emphasis of FGD on phenomena classified as narrowly semantic (i.e. covering the sole features of grammatical semantics). Moreover, reference to the sound-meaning relation as syntactic seems justified by a chiefly formal conception of function which may be considered proper to the transformational-generative approach in general (cf. 2.2.1). Effects of the latter motivation are briefly treated in the following section.

**2.4.2** A primarily formal approach to the notion of function causes the transformational-generative units, levels and components to be defined solely by their relation to other units, levels and components placed in their immediate (syntactic) context. The main consequence of this contextual arrangement is that TG fails to establish a relation

between its units, levels and components and the language system as a whole. Using the formal means of TG, this condition may be expressed by the following rewriting rules:

- (A)  $PR \rightarrow SI/—SS$   
 (B)  $SI \rightarrow PR/DS—$

Rule (A) provides that the transition from the *PR* level onto the *SI* level takes place only in the right (subsequent) context of the *SS* level, even though transition over the *DS* level is also required. By analogy, rule (B) suggests that the transition from the *SI* level onto the *PR* level takes place only in the left (preceding) context of the *DS* level, even though transition over the *SS* level is also necessary. In agreement with the phenomenon of secondary dependency hierarchy, both rules presuppose a pre-systematic existence of the contextual syntactic structures *SS* and *DS* that need not be introduced by special rules as they are always generated; furthermore, the rules presuppose a pre-systematic non-existence of the strings *PR* and *SI* that must be introduced by special rules as they are not always represented.

It is beyond doubt that the strictly immediate contextual relations can be ascertained in the set of TG levels all despite the formal restrictions imposed on them. In 2.0.2, we argued that the major aim of these restrictions was to ensure the analysability of strings derived either from other previously derived syntactic structures, or directly from the underlying syntactic structure. Using the terms of Section 2.0.1, the inevitable consequence of the phrase structure analysability was supposed to be a systematic sequence of the TG levels. In terms of the present section, the notion of systematic sequence may be expressed by a formal requirement that units of one TG level be placed within a non-immediate (syntactic) context of units of all the other TG levels. Arguing, then, that units of the TG levels are not placed within such a non-immediate context, we hold in particular that TG fails to define a universal transitive relation (cf. Trnka 1990, 9), enabling the individual transformational-generative levels to be set not only within the immediate contexts of the adjacent levels but also, and indeed chiefly, within the non-immediate context of the language system. Using again the formal means of TG, these relations may be expressed by the following two rewriting rules:

- (C)  $PR \rightarrow SI/—SS/—DS$   
 (D)  $SI \rightarrow PR/DS—/SS—$

It may be obvious that should the non-immediate context of the TG level units be defined within the sense of the rewriting rules (C) and (D) – if the *PR* level unit did not have only an *SS* level unit placed in its right context and the *SI* level unit only a *DS* level unit in its left context as indicated by the rewriting rules (A) and (B) – a systematic relation would likely be established between the parts of the language system (i.e. units of the algebraic-linguistic levels) and the language system as a whole. In such a case, the

individual levels would be interconnected by a relation resembling the representation (or form-to-function) relation defined in FGD. Although Chomsky might suggest that such a relation is actually present in TG as the universal principle of transformational cycle, it can easily be shown that any analogy of this principle and the universal transitive relation in the sense of Hockett's, Lamb's or Sgall's representation relation is bound to fail. In this respect, the universal nature of the transformational cycle does not consist in its capability to ensure a uniform way of linguistic and formal representation of units found on the algebraic-linguistic levels, but rather a uniform way of interpretation of the formal structures and strings which these levels generate as their elementary units.

At least two conditions disqualify the principle of transformational cycle as a formal representation relation in the system of TG. The first condition goes back to the definition of rewriting and transformational rules: while the former rules are defined over constants, thus applying to single terminal symbols (lexical and grammatical formatives) of a certain syntactic structure, the latter rules are defined over variables, thus applying to the whole phrase-markers of a certain syntactic structure. At this point, it should be recalled that phrase-markers represent formal products of generating and deriving syntactic structures in the generative component and that the role of both interpretive components is to assign mere interpretations to these products. If, under these conditions, a systematic transition from any *PR* level unit to its *SI* level unit, and *vice versa*, is to be achieved, a problem will arise which the phonological component is unlikely to resolve. Being of a purely interpretive nature, the phonological component will not be able to generate the phrase-marker needed to subject the phonetically represented string (*PR*) and the phonologically represented string (*SS'*) of the generated sentence to the application of the phonological rules and adaptation rules, respectively, during the *PR*-to-*SS* transition, of the grammatical transformations during the *SS*-to-*DS* transition and, eventually, of the projection rules during the *DS*-to-*SI* transition. A similar problem will occur when moving in the opposite direction: the purely interpretive nature of the semantic component is likely to fail in generating the phrase-marker needed to subject the semantically interpreted string of the generated sentence (*SI*) to the application of the projection rules during the *SI*-to-*DS* transition, of the grammatical transformations during the *DS*-to-*SS* transition and, eventually, of the adaptation rules and phonological rules, respectively, during the *SS*-to-*PR* transition. It is clear that these conditions considerably restrict the representational universality of the transformational cycle. In the provided sense, the applicability of this principle as a principle of representation lasts up to a point at which the rewriting rules of the interpretive components stop merely interpreting a particular string of terminal symbols and suddenly face a task to generate a complex structure of non-terminal symbols over the terminal string.

The other condition disqualifying the principle of transformational cycle as a uniform principle of linguistic and formal representation is reflected by the existence of at least one place within the set of TG levels at which this principle is applied without a direct empirical support. This is the boundary relating the *SS* and *PR* levels. It seems evident that

in phonology, application of the sequence of phonological rules to a phonological representation of the generated sentence according to the principle of transformational cycle is only justified at the super-segmental level, i.e. when assigning different *stress contours*, whose distribution is syntactically motivated in English (cf. Chomsky&Halle 1968, 16n). However, why the principle of transformational cycle rather than a simple linear interpretation should be applied even at the segmental level is not clear (as long as we disregard an effort to achieve formal unity of all the three grammatical components, applying the transformational cycle as a uniform principle of interpretation). For that matter, the groundlessness of the principle of transformational cycle at the segmental level was admitted by Chomsky and Halle themselves (cf. Chomsky& Halle 1968, 349-350).

**2.4.3** To conclude, let us turn back to the three major features of the syntactic relation we have postulated at the beginning of this section. A question now arises whether any kind of hierarchy could be introduced into the set of features (i) – (iii), specifying the basic properties of the syntactic relation. To this end, it may be argued that these features tend toward a causal hierarchy. Thus, the major feature (i) provides one of the presuppositions of the major feature (ii) in much the same way in which the elemental nature of the syntactic relation apparently enables the autonomous syntactic component, representing the syntactic relation, to accept the generative mechanism and thus become functionally independent on both interpretive components. Furthermore, the major feature (ii) may be perceived to cause the major feature (iii) in the same way in which the functional independence of the syntactic component may be seen to cause an internal disorder of linguistic forms and functions of which the component consists. This causal hierarchy is considered a mere bypass product of the observations made with respect to the causal statements (1) – (3) and no further conclusions are drawn from it here.

### 3. Semiotic Traces in Transformational Grammar

**3.1** It should be noted that none of the conclusions drawn in Sections 2.1 – 2.4 above is likely to directly contradict any of the statements made by either Noam Chomsky himself, or by other generativists. This is mainly due to the fact that all of these partial findings lead to a single general conclusion: TG is *not* a semiotic theory. Chomsky did not obviously aim at formulating any of his theories of transformational grammar on a primary semiotic basis, this being suggested by the plain fact that not a single definition of linguistic sign has been provided anywhere in his work (cf. De Mauro 1996, 340). In this way, the absence of the notion of linguistic sign in TG, central – either in its explicit or implicit form – to any genuinely semiotic theory of language, necessarily revealed other features reflecting its generally non-semiotic character.

Following the initial question (II) of Section 2, we will now proceed to conclude whether there are any isolated features in TG to which a semiotic status cannot be denied in spite of our *a priori* assumption about the non-semiotic nature of TG. The necessity, or at least justification, to search for these features in the theory of transformational grammar

seems greatly enhanced by its genesis. We have tried to argue elsewhere that the set of transformational-generative assumptions and aims may be profitably divided, on the one hand, into theoretical aims reflecting the assumptions (sources of inspiration) which Chomsky clearly explicates and, on the other hand, into theoretical aims reflecting the assumptions (sources of inspiration) which Chomsky merely implies. The difference between both categories is as follows (cf. Note 1): while the explicated (explicit) assumptions chiefly correspond to those which Chomsky refers to as traditional, or non-taxonomic, the implied (implicit) assumptions are often – strange though it may seem – identifiable with isolated assumptions of the American or European structuralism, which Chomsky refers to as undesirable, or taxonomic, in principle. If such an approach to the genesis of TG is indeed right and the transformational-generative assumptions of the implicit nature can roughly be correlated with at least some assumptions of the European structuralism, we may reasonably ask whether certain features of sign-character, generally regarded as secondary in view of their random nature, have penetrated TG. We maintain that the most important one of them is the systematic opposition of form (sound) and meaning, which we have so far treated as the transformational-generative feature *IA* and which itself reveals another feature of sign-character, i.e. an arbitrary nature. Another semiotic trace in TG seems to be the principle of transformational cycle, though in a somewhat different way than originally intended and defined in the theory of transformational grammar. We will look at this interesting feature in greater detail below.

**3.2** There is hardly any doubt that within the theory of transformational grammar, the principle of transformational cycle may be considered universal. There are at least two reasons:

- (i) The principle represents a procedure applied both to actual transformational processes, taking place in the transformational subcomponent, and to interpretive processes, taking place in the phonological and semantic components.
- (ii) The principle represents a procedure defined both for transitions from a “transformeme” to a “transform” and for transitions from a “transform” to a “transformeme” (in a general sense, referring to input and output units of all the transformational-generative components and levels).

As a result of Feature (i), the TG levels should be interrelated in a similar way; as a result of Feature (ii), which provides a formal definition of the requirement on phrase structure analysability, two-way transitions should be enabled in the set of TG levels. Disregarding, for our present purpose, some of the theoretical inconsistencies inherent to the principle of transformational cycle (cf. 2.4.2), the universal character of this principle within the framework of TG is acceptable. On the other hand, rejected as unconvincing must be all of Chomsky’s proclamations that the transformational cycle, at least as defined

in TG, should represent a universal principle even in the general linguistic theory (i.e. universal grammar) and that it should be included among the *formal universals* (cf. Chomsky 1965, 29; Chomsky&Halle 1968, 349).

Our doubtful, if negative, position on the general linguistic status of the transformational cycle needs refining. We maintain that linguistic generality is actually not lacked by the principle in question, but that its sources are other than those specified by Chomsky and others. While the generativists consider the transformational cycle to be universal mainly because it operates as a uniform principle of derivation and interpretation of the underlying syntactic structures generated by the grammar, it can be argued in more general terms that linguistic universality (generality) of the transformational cycle is due to its feasible operation as a basic organisational principle of linguistic structure. This is to say that the transformational cycle might be actually construed as a procedure with a justifiable potential to formalise Martinet's principle of double articulation, for such construction seems to be supported by its informal and formal<sup>14</sup> definitions.

It is a well-established fact that the theory of transformational grammar in general applies the principle of transformational cycle neither to achieve the first articulation by moving from an unlimited inventory of linguistic units to their less limited inventory, nor to achieve the second articulation by shifting from the less limited inventory of linguistic units to their unlimited inventory. Thus, it is impossible to achieve a transition from the initial units of the transformational-generative description of language – i.e. sentences – to minimum units of meaning of which the sentences consist – i.e. primary linguistic signs (Martinet's monemes or Hjelmslev's signs) – or, in turn, from the linguistic signs to minimum units of a non-semiotic nature from which the linguistic signs are composed (Martinet's phonemes or Hjelmslev's figures<sup>15</sup>). Such a procedure is not utilized in TG, or in any other later theory of transformational grammar, even though it might be enabled by a reverse application of the transformational cycle in agreement with feature (ii) above. In this respect, the main difference from the existing practice of TG would be an analysis continuing even beyond the boundary of words (formatives). The transformational cycle would proceed from the outer limits of any maximum phonological phrase to its centre, marking as minimum units the elementary component parts of formatives – the (mor)phonemes – rather than the formatives themselves.

The chief impact of failing to account for double articulation phenomena in any theory of transformational grammar, and particularly in the universal grammar which Chomsky

considers his ultimate aim, is obvious. Between the transformational-generative units at both levels of linguistic segmentation (analysis), no formal or linguistic relations are exactly defined that would change the disordered set of these units into their ordered system. This is the main reason why the relations between the TG levels are uniquely definable only with respect to the linguistic complexes (i.e. complex representations of sentences) generated on these levels, and why no one-to-one relations can be established between the elementary units and formal symbols of which the complex representations consist. For instance, any relation between the complexes on the *DS* and *SS* levels is more or less uniquely defined as a transformational relation – i.e. as a final sequence of transformational rules – though the relations between grammatical formatives of any *DS* level unit and the corresponding formatives of the respective *SS* level unit are not specified as one-to-one relations, but rather in the context of the transformational change affecting the whole surface structure of the generated sentence.

The above findings lead to a conclusion that the theory of transformational grammar disposes of a tool for formal and linguistic analysis whose correct application might actually allow transition from an unlimited set of complex units to a limited set of elementary units. Put another way, a more consistent application of the tool would probably lead to a transformational-generative delimitation of genuine linguistic signs. Any conceivable restrictions related to our conclusion result from the fact that we have considered this tool in isolation from the other features of the linguistic and formal framework of TG. For instance, we might reasonably argue that the application of transformational cycle for the purpose of algebraic-linguistic analysis would much depend on whether the interpretive components of TG were capable of generating phrase-markers of their input strings (i.e. of units on the *PR* and *SI* levels). In this view, the semiotic potential of the principle of transformational cycle is compatible with the virtually non-semiotic character of TG, assumed throughout this paper, inasmuch as it is used by Chomsky as a *transformational-generative* rather than a generally *semiotic* tool.

#### 4. Conclusions

The main conclusions concerning the form-meaning relation which we have tried to present herein in the way it is described and formalised by the standard theory of transformational grammar (TG) and an early version of the functional generative description (FGD) of language are summarised in the synoptic table below:

TG	FGD
The relation between units of linguistic form (phonetic representations of generated sentences on the <i>PR</i> level) and units of linguistic meaning (semantic interpretations of generated sentences on	The relation between units of linguistic form (representations of phonetic form of the generated sentences on the <i>PL</i> ) and units of linguistic meaning (representations of meaning or sense of

<sup>14</sup> One of the formal points is provided by Chomsky&Halle 1968, 15: *The rules apply to a string dominated by a particular node A only after they have already applied to the strings dominated by each of the nodes dominated by A.*

<sup>15</sup> It should go without saying that we are not trying to identify Martinet's phonemes with Hjelmslev's figures. In this respect, we are well aware of the fact that while Martinet considered his phonemes to be sole units of form (expression), Hjelmslev regarded his figures as minimum units of both expression and content. Both terms have merely been used here to list two different kinds of linguistic unit resulting from the second articulation.

<p>the <i>SI</i> level) – i.e. the <i>sound-meaning relation</i> – is conceived as a broadly <i>syntactic</i> relation to which the following features may be attributed:</p> <p>A. The syntactic relation is an <b>independent component</b> of grammar, entering into relations with the phonological and semantic components (cf. 2.3 and (i) in 2.4).</p> <p>B. As an autonomous grammatical component, the syntactic relation shows an <b>internal disorder</b> of linguistic units and means of their representation. Thus, inside the syntactic component, units of the different levels distinguished by traditional linguistics are blended on different levels of sentence representation (<i>DS</i> and <i>SS</i> levels) (cf. 2.2.2 and (iii) in 2.4).</p> <p>C. As a closer combination of units on the <i>DS</i> and <i>SS</i> levels, the syntactic relation is superimposed to units on the <i>PR</i> and <i>SI</i> levels in any process of sentence generation. Thus, <b>logical dependency</b> arises between this combination and the sets of phonetic representations and semantic interpretations. This suggests that the syntactic relation may be represented even without the units of sound and meaning which it is supposed to relate, and that in such cases, the units of sound</p>	<p>the generated sentences on the <i>TGL</i>) – i.e. the <i>semantic relation</i> – is conceived as a <i>semiotic</i> relation to which the following features may be attributed:</p> <p>A. The semantic relation is not an independent component (element), but rather a <b>relation</b> running through the whole system of language (cf. 2.0.1).</p> <p>B. The language system, defined as a graded system of five linguistic levels (constituting a generative hierarchy <i>TGL – PGL – ML – MPL – PL</i>), shows an <b>internal order</b> of linguistic units and means of their representation. Hence, the semantic relation, running through this system, is defined as a sequence of representation relations, i.e. relations of signifying forms on any of the lower levels and signified functions on any of the higher levels (cf. 2.0.1).</p> <p>C. Running through the entire language system, the semantic relation establishes <b>logical interdependency</b> with the set of sentence representations on each of the specified linguistic levels. It follows that the semantic relation can be defined neither without units of the phonetic level (<i>PL</i>) or semantic level (<i>TGL</i>), nor without units of any of the other levels (<i>PGL</i>, <i>ML</i>, <i>MPL</i>), which it is all supposed to relate (cf. 2.0.1, 2.1.2).</p>	<p>rather than the units of meaning tend toward zero representation. The reason might be the strong psycholinguistic (mentalistic) character of TG (cf. 2.1.1 – 2.1.3 and (ii) in 2.4).</p> <p>D. The interdependency relation of the units of sound and meaning (a <i>linguistic</i> view) <b>is not distinguished</b> either from primary dependency of the interpretive phonological and semantic components on the generative syntactic component, or from secondary dependency of units on the <i>PR</i> and <i>SI</i> levels on units on the <i>SS</i> and <i>DS</i> levels (from an <i>algebraic</i> view). It means that TG does not distinguish between a linguistic and algebraic description of the language system and that it frequently blends linguistic units with means of their formal representation (cf. 2.2.1 and (iii) in 2.4).</p> <p>E. As an autonomous generative component, the syntactic component is identified with the syntactic relation of the units of sound and meaning. A direct consequence of this is an <b>ascending-descending hierarchy</b> of the TG levels, preventing systematic transition from units on the <i>PR</i> level to units on the <i>SI</i> level, and <i>vice versa</i> (cf. 2.1.2).</p> <p>F. The syntactic relation is a context, ordering elements from the set of phonetic representations (units of the <i>PR</i> level) and semantic interpretations (units</p>	<p>D. The interdependency relation of the semiotic relation and the units of each linguistic level (a <i>linguistic</i> view) <b>is distinguished</b> from dependency of the transductive components (placed on the <i>PGL – ML – MPL – PL</i>) on the generative component (placed on the <i>TGL</i>) (from an <i>algebraic</i> view). It means that FGD distinguishes a linguistic and algebraic description of the language system and that it does not usually blend linguistic units with means of their formal representation (cf. 2.2.1).</p> <p>E. As an autonomous generative component, the <i>TGL</i> is identified with one of the end elements (the element of meaning) related by the semantic relation. A direct consequence of this is both a <b>descending</b> (i.e. generative) <b>hierarchy</b> and an <b>ascending</b> (i.e. recognitive) <b>hierarchy</b> of the FGD levels, neither of which prevents systematic transition from the <i>TGL</i> onto the <i>PL</i> or from the <i>PL</i> onto the <i>TGL</i> (cf. 2.1.2).</p> <p>F. The semantic relation is not based on any contextual ordering of the elements it relates, but rather on a <b>uniform transitive relation</b> (the</p>
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<p>of the <i>SI</i> level) according to the following rewriting rules: (i) <math>PR \rightarrow SI/SS</math> and (ii) <math>SI \rightarrow PR/DS</math>. The reason may be the emphasis laid by TG on mathematical formalisation of the sound-meaning relation at the expense of its linguistic description. This results in the <b>absence of a uniform transitive relation</b> between the <i>PR</i> and <i>SI</i> levels (cf. 2.4.2).</p>	<p>representation, or form-to-function, relation), cutting across all linguistic levels the units of which it is bound to relate. The reason may be the emphasis laid by FGD on general semiotic principles (cf. 2.0.1).</p>
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