

LINGUISTICS

A NOTE ON THE REALISTIC CLAIMS OF THE TRANSFORMATIONAL GRAMMAR

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After more than 15 years of the development of TG during which numerous articles and books have been published in which language is analysed within the theoretical framework of TG and a special formalism has been developed in order to serve the goals posited by TG — a certain uneasiness can be observed among linguists and others from outside linguistics who hoped that certain problems would be solved by the new theory. This uneasiness arises in connection with the question: has transformational theory come any closer to the solution of the problems it was designed to solve? Transformational linguists claim that linguistics is a cognitive science. Its goal is the discovery and proper description of the mental reality underlying linguistic behavior. As a methodological device a parallel has been drawn between the process of language acquisition in children and the linguist's construction of a grammar. The adult speaker is supposed to have internalized the grammar of his language. This grammar is conceived of as an abstract system of rules which generate the utterances of his language. The knowledge of these rules is, according to Chomsky, at least partially innate, species specific. The discovery of linguistic universals is regarded to be equal to discovering the innate properties of the human mind involved in the working of language. Linguistics is thus supposed to contribute not only to our knowledge of language acquisition but also to the solution of the more general problem of human knowledge.

With reference to these statements, frequently quoted in the literature on TG, especially in Chomsky's writings, Botha (1968), discussing transformational theory from the point of view of the methodological classification of sciences, maintains that TG is a realistic theory (as opposed to the position of instrumentalism and descriptivism). The reality to which the linguistic theory refers is mental — the mental processes underlying the linguistic behavior of people. According to Botha (1968), TG meets both criteria of realism:

1. that it can be determined (and has to be) whether the theory is true or false,

2. that the theoretical entities used for the explanation of observable events are real.

As to the first criterion — psychological tests are to serve as ontological tests for TG. If the theory is properly constructed, it is possible to derive from it testable psychological hypotheses which can serve as a means of confirmation and falsification of linguistic hypotheses. Likewise with the theoretical constructs — in a true linguistic theory it is possible to establish behavioral correlates between theoretical constructs and mental processes. As, however, Botha emphasizes — the mentalistic claims of TG are only indirect.

Most psycholinguists understood Chomsky's dictum that grammar is to be viewed as the description of mental reality underlying speech literally and drew conclusions about the direct correspondence between grammar and psychological reality. The quotation from Saporta (1967) is representative for this tendency:

"... a linguistic description should be viewed as a partial characterization of the psychological mechanisms involved in the production and comprehension of speech; in other words, a linguistic theory must be interpreted as claiming the psychological reality of the constructs it employs". (Saporta 1967: 11)

The experiments of the psychologists were designed in accordance with the radically realistic approach to transformational theory. The basic goal of these experiments was to find out whether performative complexity mirrored the linguists' competence complexity and whether theoretical constructs such as transformations had psychological reality. The results of these experiments were in the majority of cases negative — the performance measures for sentence complexity did not correlate with the derivational history of the sentences. This however could not be a direct argument against realism of TG because the failure of these experiments could be assigned to the misinterpretation of linguists by psychologists, reflected in the fact that psychologists equated the competence model with the speech production model. Linguists never claimed that their grammar could serve as a performance model and they strongly opposed such a claim. However, Chomsky stressed that the development of transformational theory was a necessary prerequisite to any serious study of language acquisition. The question of how the competence model was to be incorporated within the performance model was, however, left open.

The most radical views about the realism of TG were expressed by Katz (1964). According to Katz, a correct language description should prove that there is an isomorphic relationship between linguistic rules and neurological processes. This extreme view has not been accepted by most linguists, yet most of them claim that a psychological content is to be associated with their formalism. Even if the assumption about the realism of linguistic theory is

not stated directly, it is implicit in some of the crucial notions with which theory operates. One such notion is that of the linguistically significant generalization. It is assumed to be an empirical concept because in order to call a generalization "linguistically significant" it has to meet the requirement of being in agreement with the linguistic intuition of native speakers. In other words, linguists assume that their generalizations about language are the same as those made (probably unconsciously) by the speakers of the language. Another such notion which is supposed to have empirical content is that of deep structure. Linguists claim that they discover deep structures and the rules relating these structures to actual sentences of a given language in the sense of discovering some properties of the organization of the human mind. The whole grammar is said to be internalized in the minds of the speakers. This means, again, that there is a correspondence between the entities postulated by linguists in their grammars and reality (represented by certain mental processes of the speakers).

In this paper we try to show that in spite of the claims made by linguists, transformational theory is not realistic, that it is instrumentalistic and that the continuation of research in the same fashion can make sense only if the goals of TG are redefined.

In order to establish whether transformational theory is realistic or not we have to answer the question: do the deep structures, intermediate structures and rules relating them have any ontological status?, i.e., do they exist in human minds? The main problem with TG is that there is no answer to this question, and more seriously, the theory is so constructed that there cannot be any answer to this question. Psycholinguistic experiments are incapable of confirmation or falsification of linguistic hypotheses because of the lack of correspondence (or interpretation) rules. In order to design properly such experiments theoretical language statements would have to be translatable into observation language statements. Only then could we speak about a model of grammar as being interpreted or interpretable. Since, however, no interpretation rules relating the hypothetical constructs to the observation terms have been established in linguistics yet, the psycholinguistic experiments performed so far do not have any value for the confirmation or disconfirmation of linguistic theory. Apart from that, as we have already pointed out, these experiments either investigated the problem of speech perception (because of the confusion of generative grammar with the speech perception model) or were based on a very simplified version of the theory, e.g., the first accounts as that of *Syntactic structures*. In both cases they were improperly designed for proving anything about the reality of theoretical linguistic constructs.

The realistic claims of TG have been questioned by Quine (1970), Hermanns (1971), Prideaux (1971) and recently at great length by Derwing (1973). Quine distinguishes the behavior fitting some rules from the behavior guided

by some rules. In view of the fact that we do not have any empirical evidence to support the hypothesis that the rules postulated by linguists guide the linguistic behavior of the speakers, linguists should confine themselves to finding rules fitting this behavior. Since there can be more than one set of such rules, each of them capable for accounting for the language data (i.e. capable of enumerating all and only grammatical sentences and assigning appropriate structural descriptions to them) there is no a priori way to decide which of these systems is "internalized" in the minds of the native speakers. Quine finds the following feature of the theory to be very controversial:

"it (the theory) imputes to the natives an unconscious preference for one system over another, equally unconscious, which is extensionally equivalent to it". (Quine 1970: 387)

Quine's concern is a methodological one: how can a linguist say that what he proposes as deep structure and rules relating it to surface structure is in accordance with the inaccurate native analysis and not an extensional equivalent. Linguists cannot prove that they have any empirical criteria by which they are guided in this choice.

Hermanns (1971) discusses the status of deep structures. The title of his article contains the conclusion: "Descriptions of deep structures are translations into artificial languages." If there are no deep structures (and how can there be any if there is no evidence of their existence) the question of what linguists mean when they say that they describe deep structures arises. According to Hermanns (and a similar view is expressed by Quine) deep structures postulated by linguists are translations of the sentences for which they stand. For the purpose of this translation a new language is being invented by linguists, for instance the language of semantic representation meeting the requirements of "natural logic" as defined by Lakoff (1970). Hermanns observes that:

"... much of the discussion in our discipline, which seemed to be about linguistic fact, was about how the ideal deep language is to be constructed". (Hermanns 1971: 72)

Linguists' deep structures are translations into another language because transformations — rules relating these structures to sentences of natural language — are meaning preserving (by definition).

Prideaux (1971) after a careful analysis of the notion of "linguistically significant generalization" came to the conclusion that this notion is not an empirical concept, but purely formal. Three conditions must be met before the linguist can claim that his description contains linguistically significant generalizations:

1. observational adequacy,
2. conflatability of rules,
3. independent motivation of at least some rules.

The second and the third criteria are internal to the theory. The first condition refers to the final output of grammar — to utterances of a given language, and not to the intermediate structures. None of these criteria provides the basis for regarding linguistically significant generalization as an empirical concept. On the contrary, such a notion is formal, based on the notations used in current grammatical theory. Prideaux draws a further conclusion — since the concept of linguistically significant generalization is crucial for defining the notion of explanatory adequacy — the criteria of evaluating grammars are not empirical either, they are formal.

The word "empirical" frequently used by transformational grammarians when they describe their theory refers only to the relation between the theory and the data. The fact that the rules of grammar are capable of generating sentences of natural language is not sufficient to assign to the theory the status of an empirical science. As has been pointed out more than once — there can be more than one grammar accounting for the data, and unless there are additional empirical criteria for choosing one of those competing grammars, the choice can be based only on formal criteria. And this is the truth about TG. Except for the condition of output correctness, the structures and rules of grammar are in fact empirically unconstrained. As Peters and Richtie (1969) and Peters (1970) indicated — the weakly constrained notion of grammatical transformation allows for the discovery of many universal bases, rather than one. The almost unlimited possibility of manipulation with rules and symbols allows the linguists to arrive at two or more transformational grammars which generate the same structural descriptions. Moreover, different structural descriptions may have the same empirical consequences. For instance, as Peters (1970) argues, the lexicalist versus transformationalist controversy concerning the derived nominals cannot be solved by an appeal to the native speakers' intuitions, because these "can be captured equally well either way" (Peters 1970: 36). Transformational grammar places no empirical requirements on the way in which a particular theory may be constructed and what kinds of constructs be used in it. The theory is accepted if only the output of this theory is testable (not the theory itself but only its output). Rules and items on which these rules operate are justified as long as they work, i.e., as long as by means of them a grammatical sentence of a natural language can be derived.

As an example of the weakly constrained nature of transformations Peters quotes the analysis of the underlying order of German. Bach (1962) postulated verb in the sentence final position in the underlying structure of German sentences. In main clauses the verb was moved to the second position transformationally. Ross (1970) on the other hand argued that SVO is the underlying order for German and that a special transformation moves the verb to the sentence final position in subordinate clauses. Linguistic theory does not provide any criterion for choosing either of these solutions as empirically

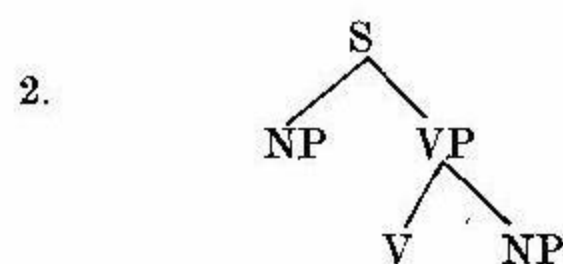
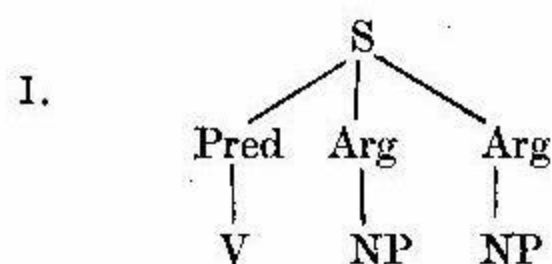
correct (or for rejecting both as empirically incorrect). Relegation to linguistic intuitions of the native speakers in such matters is ineffective, if not nonsensical, because the intuitions of the native speakers concerning more abstract structures (if there are any) are unconscious so that the speaker cannot report about them. No experimental methods for accessing them have been devised either.

If empirical criteria do not constitute an evaluation measure for the theory, what is the evaluation measure in the case of TG? If we have no way of knowing whether there is any reality corresponding to theoretical constructs, how are these constructs justified? As it appears now, the principle of maximum regularity and generality is the only criterion for the evaluation of grammatical theory. All improvements of the theory reflected in the introduction of a new rule or symbol or replacement of the old rule with some new one, followed two tendencies:

1. in case it was observed that the theory did not account for all data or accounted for them incorrectly (did not derive all sentences of a given language, or derived ungrammatical sentences) the theory was revised in such a way as to account for these data,

2. in case it was observed that the theory was uneconomical or incoherent attempts were made to liquidate these drawbacks.

The theory was changed for one of these two reasons, never because it turned out that some of its constructs did not have any counterparts in reality, simply because such evidence did not exist. Consider, for instance, the arguments for favoring form 1 of deep structure (predicate followed by arguments) rather than form 2 (subject phrase followed by predicate phrase) discussed by Harman (1970).



As Harman (1970: 27) points out: "considerable simplification results if deep structure takes the form of predicate followed by one or more arguments". For instance, the description of backwards pronominalization, passive sentences and especially of extraposition is much simpler in the new analysis. Let's consider the passive transformation. In the earlier version of TG the passive transformation moved the subject to the end of the verb phrase and put the object where the subject used to be. Since it was not clear why the original subject should end up inside the VP and not outside of it ~~attached to the S~~ node, an ad hoc solution was devised. In the revised version it was assumed

that the deep structure of passive sentences contained a constituent "Passive". This constituent appeared within the Verb Phrase because it was supposed to be a form of Manner Adverbial. In this version the transformation applied only to structures with "passive" and it moved the subject NP in place of "passive" and the object NP in place of the subject. If the new representation of the deep structure, given above as 1 is accepted, the passive transformation represents only one operation — moving the first argument to the end of the clause. The second operation — moving of the object — follows automatically as regular subject-raising (under the convention that the left-most NP is always the candidate for the surface subject). Thus it is the simplicity of the description which decides which tree diagram is to be taken as a representation of the deep structure. Simplicity and coherency of the theory, although desirable, cannot replace the empirical criteria of its evaluation. Yet these two matters are often confused. It has become even legitimate in linguistics to identify simplicity with empirical correctness. Lakoff (1970: 159) commenting on his arguments proving that the rules of grammar are the same as the rules relating surface forms of English sentences to their corresponding logical forms, states that his conclusions depend "upon a form of argumentation which just about all of the linguistics of the past decade and a half depends, namely, that if a given theory necessarily requires that the same rule be stated twice, then that theory is wrong. Not just inelegant, but empirically incorrect".

As far as the theoretical vocabulary of TG is concerned, linguists, like other scientists, when choosing the conceptual apparatus follow the following criteria:

1. the conceptual apparatus of the theory should allow the solution of as many problems as possible without constant reference to the experiential data,

2. the more sensitive conceptual apparatus the better, i.e., one is preferred which ignores the least data and which reacts to different data in a different way,

3. the conceptual apparatus is consciously restricted in such a way that it meets the condition of consistency (cannot be contradictory) and systematic elegance.

Also, TG, more than any other science, depends on the representational techniques it uses. As Toulmin (1960) puts it — doctrines are parasitic on these techniques. He gives an example from physics:

"The notion of a light-ray, for instance, has its roots as deeply in the diagrams which we use to represent optical phenomena as in the phenomena themselves: one might describe it as a device for reading the straight lines of our optical diagrams into the phenomena. We do not *find* light atomized into individual rays; we *represent* it as consisting of such rays". (Toulmin 1960: 29)

Transformational theory is dependent on its representational techniques to a much greater extent than physics and in fact is freer in its choice of these techniques than physics because linguistic models of competence are not in-

interpretable, whereas models of physical phenomena usually are. The choice of representing linguistic structures as tree-diagrams has far-reaching consequences. As Chomsky observed (1972: 63) — grammatical operations are structure dependent. This actually means that these operations are dependent on the way in which the structures are represented. The rules and constraints on them are formulated in terms of such notions as *domination*, *command*, *in construction with*, *bounding*, *lifting* (e.g. predicate or subject lifting), *lowering* (e.g. quantifier lowering) etc. All of these notions originate in the diagrams. For instance Lakoff's global constraint involving quantifiers (Lakoff 1971: 239) which states that if one quantifier commands another in the underlying structure, but not vice versa, then this quantifier must be left-most in the surface structure — makes sense only with respect to the tree diagram technique for which the notion of command is devised (A commands B if and only if the first node higher than A dominates B). An even clearer example of the way in which the theory of TG is dependent on its representational devices is Ross' formulation of his constraints, especially of the so called Pied Piping Convention:

"Any transformation which is stated in such a way as to effect the reordering of some specific node NP, where this node is preceded and followed by variables in the structural index of the rule, may apply to this NP or to any non-coordinate NP which dominates it, as long as there are no occurrences of any coordinate node, nor of the node S, on the branch connecting the higher node and the specified node". (Ross 1968: 4. 180)

Since abstract structures and the rules relating them to actual sentences of a natural language are devised almost arbitrarily, with only two conditions restricting this arbitrariness:

1. that the grammar has to enumerate all and only grammatical sentences, and 2. that it has to be constructed according to the principle of maximum regularity and coherence, we conclude that TG is not a realistic theory but instrumentalistic, i.e., is designed for the sake of convenience in description of languages. We agree with Zwicky (1971: 159) that

"... a grammar is viewed as a device for enumerating n-types of representations at n-linguistic levels without assigning any sort of reality to intermediate representations".

If transformational theory does not have any psychological significance, it cannot solve problems of a psychological nature such as the acquisition of language nor can it be helpful in discovering the speech production processes. In other words, transformational linguists have either to reformulate the goals of linguistic research or to change the theory of language. Derwing (1973) suggests the latter solution. His criticism of transformational theory concerns primarily the uselessness of this theory for the solution of the problem of lan-

guage acquisition. If linguistics wants to achieve the goals postulated by Chomsky, according to Derwing a different view of language must be accepted. Language should be viewed as an almost exclusively psychological phenomenon. He returns to the older model of the communication process in which the acts of speech are analyzed in terms of encoded and decoded messages. In his conception of linguistic research:

"...such things as the meaning or syntactic (constituent) structure of an utterance are not to be discovered in the utterances themselves (i.e. in the observable language product) ... but only in the mind of the speaker (on the encoding side) or the hearer (decoding side). That is to say, meaning and 'linguistic structure' are not entities which are somehow 'present' in actual utterances (i.e. they do not exist in an articulatory, acoustic or auditory space), but rather entities associated with or imposed upon utterances by speakers or hearers". (Derwing 1973: 304)

According to Derwing, the only way out for linguistics if it is to be a "viable" scientific discipline is to treat linguistics as a branch of psychology.

In our opinion — language can be viewed in a number of ways and various approaches to language may coexist and be complementary in the same way as various scientific disciplines coexist and are complementary. If TG gives up its psychological claims, it can develop further in the same direction it has been developing since its origin until now — i.e. in the direction of elaborating the most convenient manner for the description of languages. As its basic goal TG should regard discovering common features of languages and the description and comparison of various languages in terms of the same theoretical vocabulary.

REFERENCES

- Bierwisch, M. and Heidolph, K. (eds). 1970. *Progress in linguistics*. The Hague: Mouton.
 Bach, E. 1962. "The order of constituents in a TG of German". *Language* 38. 263 - 269.
 Botha, R. 1968. *The function of the lexicon in transformational generative grammar*. The Hague: Mouton.
 Chomsky, N. 1972. *Language and mind*. New York: Harcourt Brace Jovanovich, Inc.
 Derwing, B. 1973. *Transformational grammar as a theory of language acquisition*. Cambridge: University Press.
 Harman, G. 1970. "Deep structure as logical form". *Synthese* 21. 275 - 297.
 Hermanns, F. 1971. "Descriptions of deep structures are translations into artificial languages". *Lingua*. 71 - 77.
 Katz, J. 1964. "Mentalism in linguistics". *Language* 40. 124 - 137.
 Lakoff, G. 1970. "Linguistics and natural logic". *Synthese* 22. 151 - 271.
 — 1971. "On generative semantics". In: Steinberg and Jakobovits 1971.
 Peters, P. S. 1970. "Why there are many universal bases?" *Papers in linguistics* 2: 1. 27 - 43.
 Peters, P. S. and R. W. Richtie. 1969. "A note on the universal base hypothesis" *JL* 5. 150 - 152.

- Prideaux, G. 1971. "On the notion *linguistically significant generalization*". *Lingua* 26. 337 - 347.
- Quine, W. 1970. "Methodological reflections on current linguistic theory". *Synthese* 21. 386 - 389.
- Ross, J. R. 1968. *Constraints on variables in syntax*. Reproduced by the Linguistic Club of Indiana University.
- 1970. "Gapping and the order of constituents". In: Bierwisch and Heidolph. 1970. 249 - 260.
- Saporta, S. 1967. *Psycholinguistic theories and generative grammars*. Oregon: Oregon State System of Higher Education.
- Steinberg, D. and L. Jakobovits (eds). 1971. *Semantics. An interdisciplinary reader in philosophy, linguistics and psychology*. Cambridge: University Press.
- Toulmin, S. 1960. *The philosophy of science. An introduction*. New York: Harper and Row, Publishers.
- Zwicky, A. 1971. "Remarks on directionality". *Working papers in linguistics* 8. 156 - 163.