

CONTRASTIVE GENERATIVE GRAMMAR

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The necessity of conducting contrastive analyses (CA) for pedagogical purposes has long been recognized and a host of valuable works, both theoretical and practical has been published (cf. a survey of research in Nickel 1971). It has also been recognized that CA can provide valuable insights, pertinent not only in teaching the languages being contrasted but also in machine translation and language topology (Nickel 1971:2, König 1968:60-61). At the same time it has been felt that CA is not dependent upon any specific linguistic model as long as the two languages in question are described within the same theoretical framework. In the recent decade various theoretical frameworks have been utilized in comparing two languages for the purpose of application in teaching or in translating. Thus there exist contrastive studies in the structural framework (e.g. Kufner 1962), traditional framework (Smólska 1968), transformational (Stockwell et al. 1965) and stratificational (Snook 1971). On the other hand certain scholars are more reluctant to see in CA a possible ally in foreign language teaching by saying that the results of CA, i.e., spelling out differences and similarities between languages have less bearing upon the results obtained in the process of teaching these languages than error analysis, which is considered to provide a more reliable sort of assistance (Corder 1967). Since these matters are discussed at length elsewhere (James 1971), I shall refrain now from pronouncing any sort of judgements concerning the utility of CA, being of the opinion that the final estimate should come from psychologists, authors of textbooks, and practising teachers. Instead I am going to suggest that CA severely suffers from a lack of theory which would provide not only a conceptual framework to operate within but which would also set forth aims of CA, independent at least in the first stage, of practical applications, i.e. not geared towards either machine translation or language teaching. It is my belief that a properly constructed theory of comparing languages will yield results relevant to and applicable in, both translation and language teaching. It seems to me, moreover, that whe-

reas foreign language teaching may improve a lot if in addition to a great number of other factors the results of CA are taken into account, machine translation must rely almost exclusively on the results of properly constructed contrastive grammars. At the same time the sort of contrastive grammar constructed for the purpose of machine translation must be far more exhaustive (as complete as possible, whatever that means), explicit and explanatory. In other words it must be a generative grammar without ceasing to be a contrastive grammar.

So far no project on CA known to me has employed any notion of contrastive generative grammar. Although there exist numerous contrastive studies conducted within the framework of various variants of TG (Marton 1968a, 1970; König 1969, 1970; Dingwall 1964), the studies themselves remain taxonomic in nature in so far as they aim at producing inventories of differences and possibly similarities either between parallel places of the compared grammatical systems or, at the best, between various kinds of rules operating at various levels of derivation. Admittedly, those latter attempts, in contrast with structural contrastive studies of non-transformational orientation, aim at grasping differences and similarities at those levels of representation which have been made available thanks to the developments in TG, i.e. the levels which are sometimes referred to as deep structure.

Nevertheless, despite the various CA's conducted within the framework of TG, there have been no attempts to provide CA with a more explicit format, where explicitness would not merely refer to the way in which the contrasted systems are presented individually, but to the contrasting technique itself. One of the controversies around CA has resulted from the lack of criteria concerning comparability. This deficiency has been used as an argument against CA which has not worked out a set of criteria for deciding what is to be contrasted in the compared languages. Translation equivalence (Halliday et al. 1964, Dingwall 1964, Krzeszowski 1967, Marton 1968b) as well as "form and placement of the rules in grammar" (Hamp 1968) have been used as criteria for making decisions concerning comparability.

In the present paper I suggest that it is necessary to construct such a theory of CA which would incorporate the above two types of criteria in one integrated theory. A side product of such a theory will be that it will no longer be necessary to tackle the awkward alternative whether to compare sentences and constructions, as in the approach through translation equivalence or whether to compare grammatical systems and grammatical rules, as in the approach through form and placement of the rules. It is hoped that both ends will be met, if the theory is properly constructed.

In an earlier paper (Krzeszowski 1971) I suggested that "equivalent constructions have identical deep structure even if on the surface they are markedly different." Deep structure as conceived of by me was not to be identi-

fied with Chomsky-type structure defined in Chomsky 1965. Following Lakoff's line of argumentation (Lakoff 1968), I envisaged deep structure as a more abstract level of representation in a semantically based grammar where "deep structure" would be synonymous with semantic representation. To avoid terminological confusion, I have now abandoned the term deep structure altogether and have adopted the term "input structure" which is synonymous with semantic structure. The reasons underlying the choice of this particular term will become apparent in the subsequent paragraphs of this paper.

Thus, couched in new terms, the 1971 definition of equivalent sentences should read as follows: "Equivalent sentences (and constructions) have identical input (semantic) structure, even if on the surface these sentences (constructions) are markedly different." The identity of semantic structures for equivalent sentences in any two languages explains, at least in part, the bilingual informant's intuitions concerning the decisions as to which two sentences in two languages are equivalent and which are not. The ability to recognize equivalent sentences in two languages constitutes a part of a bilingual person's competence. It is, therefore, obvious that any theory which would assign different semantic structures to equivalent sentences would be false since it would fail to explain the bilingual informant's competence in distinguishing equivalent sentences from non-equivalent ones. It would thus fail to account for a set of most fundamental data which the investigator has at his disposal. Therefore, we require of the theory of CA as a matter of the initial postulate that it should assign identical input structures to equivalent sentences in any two languages.

In view of what has been said so far, it should have become obvious that the notion of congruence (Krzeszowski 1967), made precise by Marton (Marton 1968), although perhaps valid for various surface-bound types of CA, will be seen in quite new dimensions in CA of the format suggested here. Congruence was understood as a relation between those equivalent sentences and constructions in any two languages, which consist of the same number of equivalent formatives arranged in the same order. It appears, however, that if derivational history of equivalent sentences is taken into consideration, then *all* equivalent sentences will have to be congruent at some stage of their derivation, their congruence at the level of the semantic representation being guaranteed by the definition of equivalence itself. Superficial differences between equivalent sentences must, therefore, be attributed to different realizations of the same input structure in different languages. It appears that diversification may occur at various levels of derivation. The remoteness of the level at which the first diversification occurs from the surface suggests the extent to which the compared sentences are similar: the lower the level of the first diversification the more similar the sentences are.

Let us take a look at some examples. First of all consider the following two sentences in English and Polish, respectively:

- (1) John is always late
- (2) Jan stale sie spóźnia

These two equivalent sentences are diversified at the level of categorial component, i.e. the level at which the rules assigning grammatical categories to various portions of semantic representations operate. Both (1) and (2) have the same semantic structure consisting of the role Patient or Agent (ambiguity!) and a Predicate.¹ The categorial component assigns the categories Noun Phrase to Patient/Agent in English as well as in Polish. In contrast with Polish, however, Predicate in English is assigned the category Adjective, whereas in Polish it is assigned the category Verb. Later on a further diversification occurs whereby the linking verb "be" is inserted into the English structure, but for the purpose of the present discussion it is important to note the place at which the first diversification occurs.

Sentences

- (3) He was asked a lot of questions
- (4) Zadano mu mnóstwo pytań

are not diversified at the level of categorial component since in both of them there occurs the equal number of major grammatical categories as realizations of various semantic roles and predicates. Thus "he" of (3) corresponds to "mu" of (4), "a lot" corresponds to "mnóstwo", "of questions" corresponds to "pytań" and "was asked" to "zadano". Assuming that both sentences are derived from an underlying structure which, when spelled out in English would read as

- (5) Somebody asked him a lot of questions

where no diversification occurs yet, we observe that (3) and (4) are diversified for the first time at the level of syntactic transformations. In order to generate (3) it is necessary to apply the English passive transformation and in order to generate (4) the Polish "impersonal" transformation is applied.

Finally, a pair of sentences like

- (6) One of the signatures was illegible
- (7) Jeden z podpisów był nieczytelny

are diversified for the first time at the level of lexical insertions.

¹ This representation is grossly oversimplified, but it still illustrates the point. Among other simplifications, I have taken the liberty of representing "always late" as an unanalysable element, though a more refined analysis would reveal the presence of a quantifier or possibly even another predicate.

The material presented above, albeit very scant, leads to the conclusion that formal congruence may occur at various levels of derivation and that the level at which particular two equivalent sentences are diversified for the first time marks the extent to which such sentences are similar. In view of the foregoing discussion, we may conceive of a generative grammar of a particular natural language as of a diversifying device whose input are semantic representations of sentences generated by the universal semantic component and whose output are well-formed sentences characterizing a particular language.

Consequently, Contrastive Generative Grammar (CGG) may be construed as a device characterized by the following five postulates:

(1) If $L_1 \dots L_n$ is a set of natural languages, CGG must recursively enumerate sentences in any L_i and L_j ; this means that for every sentence the grammar must decide whether or not the sentence has been generated either by G_i or G_j , where G_i and G_j are generative grammars of L_i and L_j , respectively.

(2) For each sentence in L_i and L_j , CGG must assign one or more structural descriptions (each ambiguous sentence must receive as many structural descriptions as there are ways in which it can be disambiguated).

It will be noticed that the first two postulates characterizing CGG entail a definition of generative grammar for a particular language L_i . The remaining three postulates define CGG as a device different from something which is merely a collection of generative grammars of n languages:

(3) For each pair of sentences in L_i and L_j , CGG must determine whether these sentences are equivalent. At this point distinction between equivalent sentences and sentences which are translations must be made. The term equivalent sentences, referring to sentences which have identical input structure, is not synonymous with the term translations in the actual translation practice. Ability to recognize equivalent sentences is part of a bilingual person's competence, while ability to translate is a part of translation performance. It is significant that in actual translation practice sentences which are translations have different input structures, which phenomenon is not necessarily caused by errors in translation. Consider, e.g., the fact that the sentence "John is fishing" could be in certain circumstances a translation of Polish "Janek oddaje się swemu ulubionemu zajęciu" (more literally "John is enjoying his favourite past-time") although these two sentences are far from being equivalent on account of considerable differences in their semantic structure.

It is to be expected that equivalent sentences will have identical parts in their structural descriptions, which follows from assumption about the universality of input structure and from the empirical observations that

there exist similarities between specific grammars. Therefore, CGG must also do (4):

(4) For each pair of equivalents in L_i and L_j , CGG must specify those parts of the equivalent structural descriptions which are identical and those which are not. In other words CGG must note the level of derivation at which the first diversification occurs. It will do so by inspecting the derivation, beginning with the semantic input and moving along the successive strings, outputs of successive rules where any output of a rule (except the terminal ones) constitutes input to a successive rule.

Let I_0 be original input, common for both L_i and L_j and let $R_m^{L_i}$ and $R_n^{L_j}$ be sets of rules on L_i and L_j , respectively. Then for L_i , each $I_{p-1}^{L_i}$ will be an input to a rule $R_p^{L_i}$ whose whose output is $O_p^{L_i}$ and each $O_p^{L_i}$ will serve as input $I_p^{L_i}$ to a rule $R_{p+1}^{L_i}$, unless $O_p^{L_i}$ is terminal. In this way I_0 will be the input to $R_1^{L_i}$ whose output will be $O_1^{L_i}$ which will be input $I_1^{L_i}$ to $R_2^{L_i}$ whose output will be $O_2^{L_i}$, etc.

Similarly, for L_j each output $O_q^{L_j}$ of $R_q^{L_j}$ will serve as input $I_{q+1}^{L_j}$ to a rule $R_{q+1}^{L_j}$, unless $O_q^{L_j}$ is terminal.

In order to fulfil postulate (4) CGG will have to inspect the derivational history of each equivalent sentence, beginning with the semantic input I_0 . If a particular I_{0i} for a sentence $S_{pi}^{L_i}$ serves as input for a sentence $S_{pj}^{L_j}$, then the two sentences are equivalent (see postulate (3)). The grammar then inspects further rules operating on I_{0i} to stop at the place where the output of a rule $R_k^{L_i}$ is not identical with the output of a rule $R_k^{L_j}$. It will thus note that place of the derivation where the first diversification occurs.

(5) For each pair of pairs of sentences in L_i and L_j , CGG must determine the degree of similarity according to the relation "more similar" where this relation is equivalent to the relation "diversified at a lower level". Thus for each pairs of pairs of sentences $S_{pi}^{L_i} \leftrightarrow S_{qj}^{L_j}$ and $S_{ri}^{L_i} \leftrightarrow S_{kj}^{L_j}$, where the double arrow represents equivalence in terms of the identity of input structure, CGG must determine which of the two pairs is more similar, i.e. diversified at a lower level of derivation. Postulate (5) contains the implication that sentences which are "more similar" will share a larger number of identical rules employed in their derivations. Although the existence of this postulate has no bearing upon theory of translation, the postulate may prompt research strategies for constructing hierarchies of difficulties in the process of second language acquisition, e.g., it may clarify some problems involved in negative and positive transfer. It may also make it possible to calculate the "similarity index", i.e. the ratio of identical and different rules employed in the derivation of equivalent sentences.

The above proposal is formulated for CGG working on any two languages. It goes without saying that in principle it could be extended to an indefinite number of languages.

The proposal concerning CGG raises a number of theoretical and practical questions. Specifically, it imposes certain requirements upon the organization of generative grammar itself. Thus in order to fulfil postulate (3) CGG must be based on such a model of linguistic description in which the semantic input is universal. In order to fulfil (4), it is furthermore required that all generative grammars of particular natural languages should be based on a category-neutral semantic input represented in terms of metalanguage free of such notions as noun phrase, verb phrase, tense, modal, etc., since these grammatical categories are neither universal nor semantic. Postulate (4) can be fulfilled only if all generative grammars introduce grammatical categories at one level of derivation, i.e. the level intermediate between the semantic representation and syntactic transformations. It is, therefore, to be anticipated that the organization of each generative grammar will require at least five levels of representation: 1. semantic, where the fundamental semantic relations, i.e. the meaning of sentences is represented in the form of universal, category-neutral, semantic input to sentence derivation; 2. categorial, where language specific rules assign various categories, such as noun phrase, verb phrase, verb, adjective, tense, modal, demonstrative, etc., to various portions of the semantic representation²; 3. syntactic, where syntactic transformations arrange major syntactic categories (nouns, verbs, adjectives, adverbs) in the linear order in which they appear in actual sentences and possibly introduce some of the minor categories (prepositions, auxiliaries); 4. lexical, where lexical items are inserted from the dictionary, in which lexical entries are defined in terms of syntactic frames of grammatical categories; 5. post-lexical, where "cosmetic" transformations arrange minor syntactic categories in the linear order in which they appear in actual sentences.

Constructing a model of generative grammar which would fulfil the above requirements is a prerequisite for constructing CGG.

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² Just how these rules operate is not, at present, clear to me. See however, an interesting proposal by Paul van Buren (1971), who suggests that it should be necessary to introduce a "grafting" component which would graft language specific grammatical categories upon universal semantic representations.

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