

## Some psychological aspects of linguistic data

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In this article some aspects of the relation between linguistics and psychology are considered. It will be shown that some present day linguistic practices are dubious from the psychological point of view (section 4), whereas at the same time the psychological relevance of linguistic theory is central to the transformationalistic conception of linguistics (section 2). But even if linguistics is given a more moderate place in the psychology of language (section 3), certain types of linguistic data, namely different sorts of linguistic intuitions, deserve very careful attention in view of their psychological unreliability. Uncontrollable introspectionism should be avoided and some recommendations to this effect are made (section 5). It is especially stressed that the linguist should not rely on absolute judgment of grammaticality, but only on relative (rank order) judgments; that he should order his rules with respect to their grammatical importance; and that he should study intuitions which have a high degree of reliability, such as intuitions on cohesion.

The paper is introduced by a short historical note (section 1), which outlines the main conceptions of the relation between psychology and linguistics during the past century and a half.

### 1. An historical note

The views on the relations between psychology and linguistics are as diverse as the opinions about the relation between human mind and human language. The nineteenth and twentieth century literature on this subject is so extensive, that any short review necessarily oversimplifies the intricate matters involved. This is especially true for the present introduction, which will confine itself to a summary indication of the three most outstanding conceptions that have been proposed during this period. They are: (a) psychology should be based on linguistics, (b) psychology and linguistics are essentially independent disciplines, (c) linguistics should be rooted in psychology.

#### a) Psychology based on linguistics

It was notably STEINTHAL, who emphasized that the functioning of the mind is to a strong degree determined by the structure of language. The intimate relation between the laws of thought and the form of language makes the study of language the natural way to the study of the human mind. In his *Grammatik, Logik und Psychologie* (1855), STEINTHAL introduces psychology with a review of linguistics. (For an interesting discussion of STEINTHAL's work as well as other historical sources of psycholinguistics, see BLUMENTHAL 1970.)



STEINTHAL's views were strongly influenced by the German idealistic tradition, especially by HUMBOLDT. HUMBOLDT had described language as a creative activity of the mind. The finite means of language used by the mind for the expression of thoughts is called *Sprachform* by von HUMBOLDT, and he states (1836, p 301): "The laws of thought are strictly the same for all peoples, and the grammatical forms of language only differ within a specific range, because they depend on these laws" (see note 1 for the original text). Though it is clear from this citation that HUMBOLDT does not really base psychology on linguistics, as STEINTHAL does, HUMBOLDT explicitly remarks that the particular "choice" a language community makes within this specific range – which he calls *Innere Sprachform* – is identical with the people's *Weltanschauung* (see note 2). This basic identity of language and "view of the world" is not only characteristic of STEINTHAL's work, but also of the views of many later linguists, such as SAPIR and WHORF. Especially the latter's "linguistic relativity hypothesis" (WHORF, 1956) is a distinct and recent example of rooting psychology in linguistics: man's picture of the universe is determined by his linguistic background.

#### **b) Psychology and linguistics independent**

The statement that psychology and linguistics are independent disciplines is never motivated from an alleged unrelatedness of their objects. It is the actual approach within these disciplines which makes them independent in the view of many scholars. A good example is SAUSSURE (1916), who remarks that linguistics should be a subdiscipline of *semiology*, a (then) not existing science, which in its turn should be part of social psychology. In spite of this theoretical link between psychology and linguistics, SAUSSURE in fact proposes an extreme separation of these sciences. The absence of "semiology" as envisaged by SAUSSURE obliges the linguist to decide for himself in these matters.

BLOOMFIELD too in his later work (1933) pays only lip service to the intimate relations between psychology and linguistics. In actual practice, however, he ignored psychology completely. This virtual separation of the two disciplines was rather predominant in the American tradition until the fifties.

#### **c) Linguistics based on psychology**

Herman PAUL (1886) and the other so-called *Junggrammatiker* tried to root linguistics in psychology, by using psychological principles for the explanation of linguistic (diachronic) laws. Wilhelm WUNDT, their Leipziger fellow townsman, essentially adopted this same attitude in his psychology of language, which was an integration of the main trends of his time. Central in WUNDT's system (1900) is the idealistic notion of *Apperzeption*. Apperzeption is the conscious focussing of an image or part of an image in relation to a larger whole. A psycholinguistic example of this



process is the generation of a sentence. A sentence is the result of a hierarchical articulation of a *Gesamtvorstellung* (a “general impression”). WUNDT draws diagrams of how parts and subparts of such an image become conscious; they look very much like deep structures in modern transformational grammar.

From the empiricistic *Junggrammatiker*-tradition WUNDT uses the notation of association which is especially relevant for the explanation of morphological and phonological phenomena, the so-called *Äussere Sprachform* (see note 3).

WUNDT’s psychology-based theory of language was hardly affected by the work of his young colleague Ferdinand de SAUSSURE, who introduced the distinction of *langue* and *actes de parole*: *Langue* is a property of the language community, a system of norms and rules, to which an individual language user should adhere in order to make his *actes de parole* communicative. WUNDT did not sympathize with the idea of putting language aside as something meta-psychological.

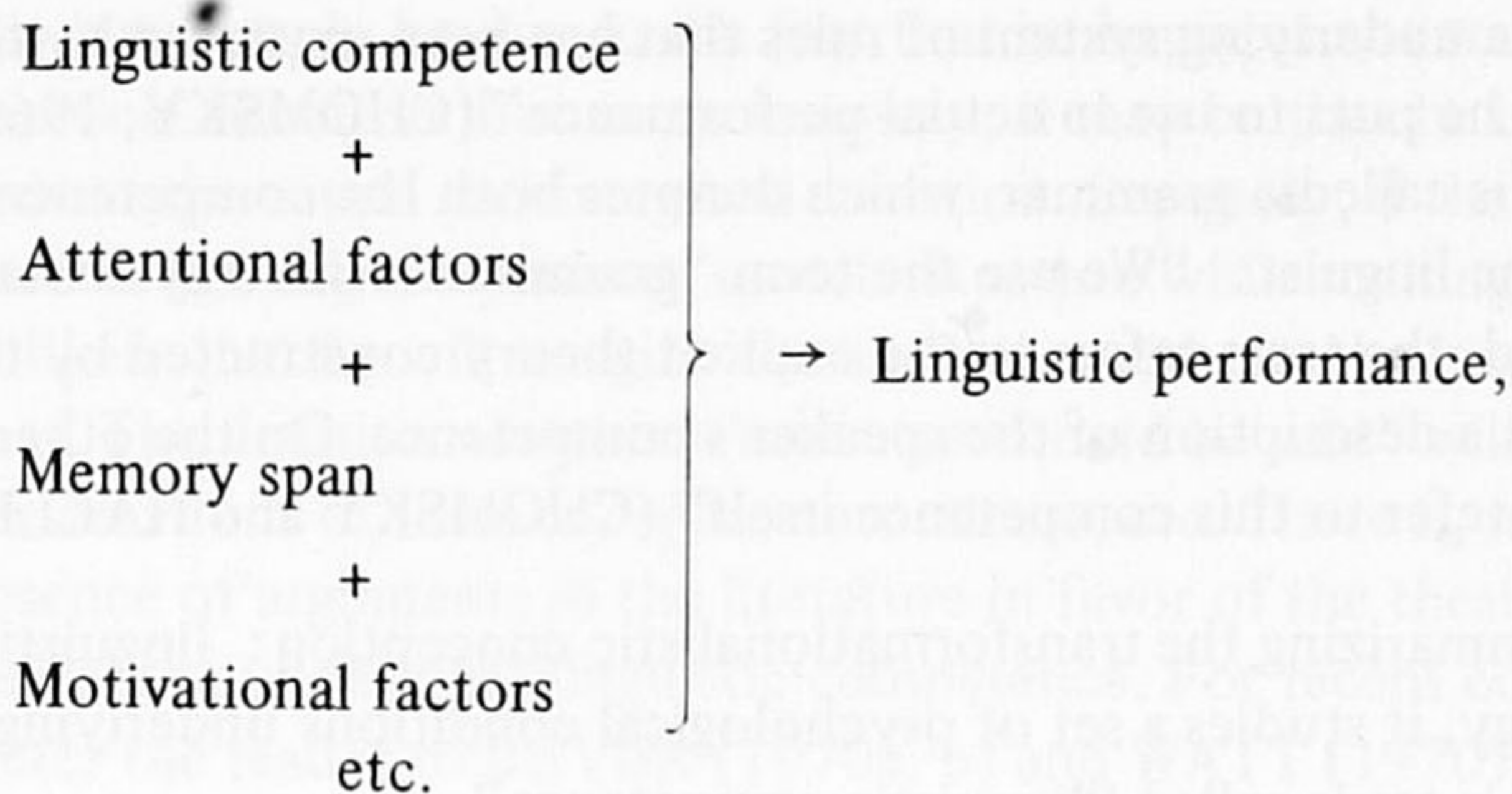
This is also true of BÜHLER (1934), who did accept SAUSSURE’s dichotomy, but who tried to give it a psychological basis by construing *langue* as a psychological “instrument” (*organon*).

Many linguists on the continent, and most of them strongly influenced by WUNDT, have at the beginning of this century tried to explain linguistic phenomena by psychological “laws”. One outstanding example was the Dutchman Van GINNEKEN (1906).

## **2. Competence and performance – the transformationalistic point of view**

After a long structuralist period during which a virtual separation of linguistics and psychology was predominant, a new shift took place during the sixties. CHOMSKY and his coworkers, as well as the psycholinguists influenced by transformational grammar, strongly stressed their viewpoint that “linguistics is a chapter of human psychology” (CHOMSKY, 1968). The essence of the relation between linguistics and psychology is the “interfacing” of competence and performance. Competence is the creative language capacity of the language user. It is the – mainly unconscious – knowledge of the language user which enables him to produce and understand an unlimited number of sentences. Performance is the actual use of this knowledge in speaking, hearing, writing and other language activities. CHOMSKY’s and the currently predominant notions among transformational linguists about the place of competence in a model of the language user, can best be summarized by some citations. ”To study actual linguistic performance, we must consider the interaction of a variety of factors, of which the underlying competence of the speaker-hearer is only one” (CHOMSKY, 1965, p. 4). Other factors are psychological variables such as attention, memory span, etc. The following scheme summarizes this point of view:





where linguistic performance involves production and perception of sentences, the judgment of sentences with respect to their grammaticality or their status to paraphrase of other sentences, etc. The linguist tries to study and explain the one factor “competence” by controlling irrelevant factors as much as possible. He will especially investigate “clear cases”, i. e. sentences which have an obvious status of grammaticality in the language. The linguist’s developing theory will in the long run also yield structural descriptions for more complicated, less clear cases. Their grammaticality will be decided by the theory, so to speak, instead of by the more or less confused informant. In short, the linguist studies linguistic performance under the aspect of linguistic competence.

The psychologist, on the other hand, studies linguistic performance under the aspect of the interaction of competence and the other psychological factors. An example is the study of how people understand multiply embedded sentences. From the clear cases (singly embedded sentences) the structure of such sentences is known. The psycholinguistic problem is how limitations of human processing capacity, such as short term memory span, push down storage capacities etc., affect the understanding of such sentences.

In this view, therefore, the linguist provides a psychological sub-theory, a theory about a relatively autonomous psychological capacity. The psycholinguist’s task is to integrate this theory in a more inclusive theory of linguistic performance.

The status of “competence”, therefore, is comparable to the place of the notion “intelligence” in psychology. It is a theoretical construct to denote a relatively autonomous factor, which underlies a large variety of human behaviours. Such constructs have to prove their usefulness. After seven decades of intelligence research, there is little doubt about the notion of intelligence in this respect. Similarly, “linguistic competence” may prove to be equally efficacious. Just as the strong interrelations between different forms of “intelligent behaviour” justify the construct “intelligence”, empirical facts about relations between various types of linguistic performance should justify the notion of “linguistic competence”. It is the linguist’s task to find the necessary empirical evidence, “to determine from the data of



performance the underlying system of rules that has been mastered by the speaker-hearer and that he puts to use in actual performance" (CHOMSKY, 1965, p. 4). This system of rules is called a grammar, which denotes both the competence itself and the theory of the linguist: "We use the term "grammar" with a systematic ambiguity. On the one hand, the term refers to the explicit theory constructed by the linguist and proposed as a description of the speaker's competence. On the other hand, we use the term to refer to this competence itself" (CHOMSKY and HALLE, 1968, p.3).

Summarizing the transformationalistic conception: linguistics is a chapter of psychology, it studies a set of psychological conditions underlying all linguistic performance, this set is called "linguistic competence".

### 3. Competence and linguistic intuitions

If one accepts for the moment the idea of one linguistic competence, which underlies all linguistic performance, the interesting question arises whether it is this competence which is actually studied in transformational linguistic practice to date. The answer is, I think, negative. It seems to me that transformational grammars are not theories of linguistic competence in this particular sense. That is, it seems necessary to reject the just mentioned "systematic ambiguity" of the term "grammar". Which, in fact, are the "data of performance" studied by linguists in the transformational tradition? They are certainly not the primary data of linguistic performance such as actual speech, verbal expression of complicated states of affairs in the informant's environment, discussions between people, and suchlike (For an interesting categorization of linguistic data, see BEVER, 1970a.) The predominantly analyzed linguistic data are of a very different, "secondary" character. They are mainly judgments of grammaticality, of paraphrase relationships, of word and phrase relations, etc. These can be called *meta-linguistic data*, i. e. judgments *about* language. The standard term for such data is: "linguistic intuitions". It follows that *a grammar* (based on such data) *is a theory of linguistic intuitions*. This in itself is not in contradiction with the transformationalistic conception. It could be the case that a theory of linguistic intuitions coincides with the theory of the hypothesized underlying linguistic competence. However, this is doubtful in view of the very special psychological status of linguistic intuitions among the data of linguistic performance. It is not at all obvious that intuitions will reveal the underlying competence. One argument pro is that the linguist or informant who considers the grammaticality of a sentence tries to imagine an actual situation of "primary" performance in order to decide whether the sentence "could be said", i. e. is grammatical. Intuitions would then be secondary reflexions of primary performance. There are two problems involved in this argument. There is, firstly, nothing known about the accuracy and completeness of such reflexions. It is not only possible, but also quite likely, that the informant will decide on the ungrammaticality of a type of sentence, which he nevertheless utters fre-



quently. This may simply be due to the fact that he happens not to imagine the appropriate practical situation. But more seriously, it may be that he is applying different standards in the actual and imagined situation. Secondly, if the linguist or informant is indeed imagining the primary speech situation while making his judgments, it is most unlikely that he will imagine the situation without the "irrelevant" psychological factors. The decision whether a sentence "could be said" will again be dependent on considerations of memory span, naturalness, etc. There is, in our opinion, a complete absence of arguments in the literature in favor of the thesis that linguistic intuitions reveal the underlying linguistic competence. For recent contra arguments we should refer the reader to BEVER (1970a, b) and WATT (1970). Under the circumstances we are not disposed to generalize the psychological importance of transformational grammars beyond their "face value", i. e. as theories of linguistic intuitions. In the following we will investigate some psychological problems involved in intuitive data of this sort (section 4), and propose a few solutions (section 5). Before going into those issues, however, we wish to make three additional remarks about grammars, intuitions and competence.

Firstly, it need hardly be argued that a grammar could be something different than a theory of linguistic intuitions. Grammars based on more primary data of linguistic performance could be (and are being) developed. Instances are grammars of dead languages. These are mainly based on samples of written utterances and only exceptionally on linguistic intuitions (These are the rare instances, where descriptions of linguistic intuitions exist in the available texts.) A more important instance is children's grammars. As an informant the child is a failure. The young child is not able to make systematic judgments about his own language. All recent work on child grammars (see McNEILL, 1970) is based on data other than intuitions. The data are samples of actual utterances, imitations, or non-linguistic performance elicited by verbal instructions ("comprehension tasks"). So, our study of linguistic intuition is only prompted by actual linguistic practice in transformational work, not by any principled conception of linguistics as necessarily a theory of linguistic intuitions.

Secondly, within the limitations of this actual practice I fully agree that a grammar is a psychological theory. Intuition is traditionally a psychological topic, and intuitive judgments are traditional data in psychology. Intuitive judgment was as basic to e. g. the Würzburg School for its study of thinking, as it is at present for theories of choice (preference judgments), subjective probability, perception (judgments of stimulus similarity), etc.

Thirdly, though I would welcome any serious effort towards empirical justification of the theoretical construct of "linguistic competence" in the sense of a system of rules, put to use in actual linguistic performance, it seems to me that the notion is not essential to linguistic theory. Even if it could not be maintained that one system of rules underlies all linguistic performance, a systematic theory of linguistic intuitions would still be possible, interesting, and necessary.



#### 4. The unreliable character of linguistic intuitions

Though the empirical basis for the transformationalistic approach to syntax is clearly intuitive judgment, CHOMSKY underlines the delicate character of intuitive judgment: "This is not to say (. . .) that his (the speaker's – W. L.) statements about his intuitive knowledge of the language are necessarily accurate" (1965, p. 8), "in short, we must be careful not to overlook the fact that surface similarities may hide underlying distinctions of a fundamental nature, and that it may be necessary to guide and draw out the speaker's intuition in perhaps fairly subtle ways before we can determine what is the actual character of his knowledge of his language or of anything else" (1965, p. 24). In *Syntactic Structures* (1957) it is emphasized that only clear cases of grammaticality or ungrammaticality should be used to test the adequacy of a grammar, and that we should be prepared to let the grammar itself decide on the many intermediate cases.

After a decade and a half of transformational grammar, however, the situation turns out to be quite different. Instead of an increasing number of cases where theory decides on sentences of intermediate grammaticality, we see on the contrary a clear increase in the use of examples of borderline grammaticality as tests for syntactic rules.

To show the seriousness of this development, we list fourteen sentences from a recent anthology in transformational linguistics (JACOBS and ROSENBAUM, 1970). In the source, each of these sentences is either marked as grammatical or as ungrammatical. It would be an interesting experience for the reader to make his own markings in the list below, and to compare them with the original markings, which are given in note 4.

- (1) Your making of reference to the book displeased the author. (FRASER)
- (2) No American, who was wise, remained in the country. (POSTAL)
- (3) They never insulted the men, who were democrats. (POSTAL)
- (4) They never agreed with us planners. (POSTAL)
- (5) The talking about the problem saved her. (FRASER)
- (6) The machine's crushing of the rock was noisy. (FRASER)
- (7) The giving of the lecture by the man who arrived yesterday assisted us. (FRASER)
- (8) Your making of a reference to the book displeased the author. (FRASER)
- (9) Her slicing up of the cake was clever. (FRASER)
- (10) John's cutting up of four cords of wood yesterday and his doing so again today was a welcome gesture. (FRASER)
- (11) John's tendency to sleep along with Mary's tendency not to do so ruined the party. (FRASER)
- (12) I didn't believe it, although Sid asserted that Max left. (LAKOFF)
- (13) I didn't believe that John would leave until tomorrow. (LAKOFF)
- (14) His criticism of the book before he read it (nounphrase). (CHOMSKY)

We used these fourteen examples as a demonstration for a group of twenty-four trained linguists. We asked them to decide which sentences were mar-



ked as “ungrammatical” in the original papers. The results of this questionnaire are given in note 5. It turned out that “ungrammatical” cases had less chance (in fact less than half) to be judged “ungrammatical” than “grammatical” cases. Though these results cannot be taken too seriously since none of these linguists was a native speaker of English (although all of them had had advanced training in English and many of them were Anglicists), they are sufficiently disturbing to caution against present day use of linguistic intuitions. It is not necessary to wait for a repetition of this experiment with native linguists in order to mention some important factors affecting judgments of grammaticality which are systematically ignored by linguists:

#### **a) Context of discourse**

For many of the examples (1) through (14) the grammaticality marking seems perfectly all right in the original papers. Without context, however, the same sentences appear to be problematic. The development of an argument in a linguistic paper influences the grammaticality judgment in a thus far uncontrolled manner.

#### **b) Comparison with other examples**

A sentence which looks grammatical in isolation may nevertheless look ungrammatical if compared with other sentences. Sentence (1) above, for example, which is predominantly judged grammatical if presented in isolation is strikingly ungrammatical if compared with sentence (8). Inversely, sentence (15) is of very doubtful grammaticality.

(15) Tom was not present, and many of the girls believed that the paper had been written by Ann and him himself.

Nevertheless Ross (see JACOBS and ROSENBAUM, 1970) marks it as grammatical by contrasting it to (16).

(16) Tom was not present, and many of the girls believed that the paper had been written by Ann and himself.

which, according to him, is ungrammatical.

Judgment in isolation is very different from judgment by contrast. Which of the two methods should be preferred? It should be noted that stable criteria are rather the exception than the rule in absolute psychological judgment. Apart from sensitivity to “pay-off” (in the case of linguistic judgment interpretable as clearly expressed expectations on the side of the linguist, especially if he is his own informant) absolute judgments show a “central tendency”: if many grammatical examples are given, one slightly less grammatical case will be judged “ungrammatical”. If a linguist wants a borderline sentence to be grammatical, he should place it at the end of a list of very ungrammatical examples. In recent texts most cases are presented in a contrasting context. In section 4 we will support this practice, but indicate some theoretical consequences of switching from absolute to contrastive judgment.



### c) The use of very unnatural and "funny" examples

Very confusing is the use of extremely unnatural and forced funny cases, which is frequent practice nowadays. Some examples from the same source (JACOBS and ROSENBAUM, 1970):

- (17) Tom steals more money than Bill does to feed his family. (HALE)
- (18) The number of dollars that a dozen eggs cost in China is greater than the number of degrees centigrade the temperature was in Chicago. (HALE)
- (19) That Tom's told everyone that he's staying proves that it's true that he's thinking that it would be a good idea for him to show that he likes it here. (LANGENDOEN)
- (20) I dreamed that I was a proton and fell in love with a shapely green-and-orange striped electron. (McCRAWLEY)
- (21) Tom thinks that I tried to get Mary to make you say that the paper had been written by Ann and him himself. (ROSS)

All these examples are cases of explicit introduction of confusing factors. This practice can only lead to an increase of the already existing unreliability of linguistic judgment. (The reader should make his own judgments of sentences 17–21. The "solutions" are given in note 6).

### d) The linguist as his own informant

It is common practice that the transformational linguist bases his arguments on his own intuitive judgments. It was already indicated that theoretical expectations will probably influence such judgments. But the linguist as his own informant is a special case of the more general practice of using *trained subjects*. There have been earlier situations in psychology where trained subjects were used for "systematic introspection". This was the case in the Würzburg studies of thinking (ACH, BÜHLER). The practice of systematic introspection was severely attacked by WUNDT (1907, 1908). Van de GEER (1957), in reviewing these discussions, questions what the subjects were actually trained in. In WUNDT's time, he says, "training was assumed to be an unlearning of bad perceiving-habits, not the learning of a specific technique of perceiving. Nowadays we are inclined to say that the subjects were trained in a specific technique, and we recognize that different training systems may lead to different results.", and further: "one serious objection can be maintained: the special training of the subjects and the impossibility to see in how far the Würzburg results are a consequence of this training. This objection is the more cogent as other studies produced results which were at variance with those of the Würzburg school (Göttingen, Cornell)." The present day situation in linguistics is quite comparable to the Würzburg situation. What implicit or explicit criteria is the linguist trained to use? Is this training different in different linguistic schools? The same fallacies of introspectionism threaten present day linguistic practice as long as the use of intuitive judgment is not protected by the necessary methodological precautions.



## 5. Some precautions

This final section will be devoted to three groups of measures which may prevent some of the above-mentioned pitfalls and extend the range of use of intuitive judgment in linguistics. The first group of measures concerns the control of factors which are extraneous to the linguistic rules under test, the second group of measures regards the special case of grammaticality judgments, whereas the last points suggest the use of other types of linguistic judgment, especially the judgment of cohesion.

### a) Controlling extraneous factors

The informant's attentional capacities should be maximally available for those aspects of the sentence, which reflect the syntactic rule under test. With respect to other aspects the sentence should be minimally complex. Any unnecessary loading of short term memory (such as in example (19)), any distracting semantic loading (such as in example (20)) should be avoided. It is often possible to construct such "natural" examples by leading a native speaker into a situation where he will produce a sentence of the type under study. One or two additional changes will yield the right case.

Though on first view linguistic training is pre-eminently aimed at directing attention to the relevant aspects of the sentence, it was argued in 4 (d) that linguistic training can as well be viewed as a training not so much in avoidance of irrelevant aspects, but in the use of special criteria which are specific for the particular linguistic school. The linguist therefore should not rely on his own intuitive judgment alone, nor on the judgments of other linguists. It seems necessary to check the intuitions of at least a few native speakers, nonlinguists, with respect to all examples in the particular linguistic study. This has the additional advantage of eliminating the effect of the context of linguistic discourse (4 (a)).

### b) The determination of grammaticality

Though it is still advisable to use "clear cases" where they can be found, it is questionable whether at the present stage of linguistic investigation interesting parts of the grammar can be studied by the use of "clear cases" alone. For cases of intermediate grammaticality we want to argue that the linguist should confine himself to the use of judgments about the *rank order of grammaticality*. That is, he should give his informant a pair of sentences and ask him which of the two is the more, and which the less grammatical. Absolute judgments should not be used in view of the unverifiable shifts in criterion discussed in 4 (b).

Such practice, of course, has consequences for linguistic theory. If a hypothetical syntactic rule  $x$  is tested by a ranking procedure, and if the actual rank order conforms to prediction, the generalization will be that sentences which respect



rule  $x$  are more grammatical than sentences which do not. Theoretically this means that addition of  $x$  to the grammar improves the adequacy of the grammar in the sense that the grammar gives a better account of *degrees* of grammaticality. This is of course less than the prediction of absolute grammaticality. But the difference is probably more apparent than real. In the first place, the linguist should in any case give an adequate description of degree of grammaticality, but secondly a slight extension of the proposed ranking procedure will eliminate all real differences between "absolute" syntactic rules and rules of degree. Rules can indeed be ordered with respect to their contribution to the prediction of grammaticality. Suppose that  $x$  and  $y$  are potential rules in the grammar, It is then possible to construct a "minimal pair" of sentences ( $S(x+)$ ,  $S(x-)$ ) with respect to rule  $x$ , i. e.  $S(x+)$  respects rule  $x$  and  $S(x-)$  differs from  $S(x+)$  in that it violates  $x$ . Similarly a minimal pair ( $S(y+)$ ,  $S(y-)$ ) can be constructed. The informant can be asked to judge whether the difference in grammaticality of the first pair is greater or less than the difference in grammaticality of the second minimal pair. From such a judgment it can be concluded which rule makes the larger contribution to the degree of grammaticality. Thus, *a ranking of rules can be obtained by a ranking of differences in grammaticality*. The seeming theoretical disadvantage, namely that one cannot conclude whether  $x$  or  $y$  respectively is or is not part of the grammar is more apparent than real because the present day linguist faces the situation that his list of rules tends to be extended more or less indefinitely in order to cope with more and more subtle cases. The advantage of keeping track of the ranking of rules, or at least of gross rankings of sets of rules, is that it gives an indication to the linguist of whether he is wasting his time on subtleties while major problems remain unsolved.

Additional advantages of such rank order information about syntactic rules concern applied linguistics. In language teaching the more important rules should receive primary attention, and a similar situation exists in the design of computational processing systems for natural language.

It should finally be remarked that judgments of rank, even if they concern a ranking of differences, are in general more easy for a subject to make than absolute judgments.

### **c) The determination of cohesion**

Some linguistic intuitions are more reliable and easier to test than others. It is not obvious that grammaticality or paraphrase intuitions should get more attention than other linguistic intuitions. One type of intuition in particular, namely about word group cohesion, has received little attention so far. It is, however, a strong candidate for reliable judgments.

CHOMSKY (1965) uses cohesion intuitions for studying rules of the base which concern relations between verb and prepositional phrase: "It is well known that in Verb- Prepositional Phrase constructions one can distinguish various



degrees of "cohesion" between the Verb and the accompanying Prepositional Phrase" (p. 101). This is demonstrated by comparing the ambiguous "he decided on the boat" with "he decided on the boat on the train" In the latter sentence "the first Prepositional Phrase ( . . . ) is in close construction to the Verb".

Various recent experiments (LEVELT, 1967, 1969, 1970, MARTIN, 1970) show that informants are reliable judges of syntactic word relatedness. Presented with a sentence such as "He has put the coat on", they very consistently judge the cohesion of "put" and "on" to be stronger than the cohesion of "coat" and "on". At first sight, such elementary judgments may appear to be of little linguistic interest. It turns out, however, that by appropriate techniques of data analysis, explicit tests of linguistic rules or sets of rules can be made. For a detailed discussion of these procedures we must refer the reader to the original sources. Suffice it to remark that the transformational linguist should seriously consider to add other, and probably more reliable, types of intuitive judgment to his stock of empirical evidence.

## Notes

- 1) Die Gesetze des Denkens sind bei allen Völkern streng dieselben, und die grammatischen Sprachformen können, da sie von diesen Gesetzen abhängen, nur innerhalb eines gewissen Umfangs verschieden sein.
- 2) Recent studies (e. g. BLUMENTHAL, 1970) sometimes stress the existence of conceptual relations between *innere Sprachform* and deep structure, and between *äussere Sprachform* and surface structure. It is interesting to notice that at least Humboldt's *innere Sprachform* is just that aspect of language in which peoples differ, whereas deep structure is considered the more universal aspect of language.
- 3) The notion of association also has relevance in Wundt's syntax. It is not always the case that parts of a sentence are essential elements of an integrated whole (such as subject and predicate). In focussing the parts of an image, the speaker may have accidental associations with other images. In this way clauses may enter a sentence which are not the result of hierarchical differentiation. This is especially the case in poetic language. This psychologically attractive distinction has been lost in transformational grammar.
- 4) "Ungrammatical" are (1), (2), (3), (5), (6), (9), (11), (12), (14).
- 5) From the 24 linguists the following numbers of judgments "ungrammatical" were obtained: for sentence (1<sup>\*</sup>): 9, for (2<sup>\*</sup>): 0, (3<sup>\*</sup>): 0, (4): 4, (5<sup>\*</sup>): 7, (6<sup>\*</sup>): 3, (7): 16, (8): 11, (9<sup>\*</sup>): 5, (10): 0, (11<sup>\*</sup>): 1, (12<sup>\*</sup>): 8, (13): 12, (14<sup>\*</sup>): 5. That is, the "ungrammatical" sentences had an average of 4.2 judgments "ungrammatical", whereas "grammatical" sentences had an average of 8.6, i. e. twice as much.
- 6) Only (17) is marked "ungrammatical".



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