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Preface

This book has proceeded from the Bressanone Conference on Psycholinguistics, organized by the Institute of Psychology of the University of Padua in July 1969, with the participation of European and American psycholinguists. A short report from the coordinators of the Conference is added as an appendix to this book, as well as a list of the papers submitted, and the list of participants. The Conference papers covered a wide range, from reports of recently completed research to comments on very preliminary data. So much of general interest had been discussed and so much progress had been made that at the end of the Conference participants agreed that publication of some sort would be justified. It was left to the discretion of the editors to determine the form and contents of this publication.

The present volume is an attempt to give a faithful reflection of the main trends in psycholinguistic research as they appeared at the Conference. Limitation to psycholinguistic research means, on the one hand, that papers which were mainly linguistic or exclusively theoretical in character are not included in this volume. On the other hand, even rather preliminary research reports are included in order to give as comprehensive a picture as possible of the empirical approaches represented at the Conference. Where it seemed feasible for a participant to give some definite report on his experimental procedures or findings, he was invited to contribute. These invitations were, in general, accepted. It should therefore be expected that several studies in this volume will in the future be published more fully. Discussions are not included as such; this would have resulted in a long delay of publication. Many contributors, however, did include the salient discussion points in the final drafts of their papers.

In spite of this, the final selection of papers is in many respects not representative for psycholinguistics to-day. Rather, this volume will serve the purpose of directing the reader's attention to various new and lively trends in psycholinguistics. It will be clear for instance, from the book as well as

from evidence scattered among linguistic and psychological journals, that psychologists and linguists have not only succeeded in meeting each other in the study of language, but also that many of them have deserted to the other field. Several psychological studies use sophisticated linguistic arguments, whereas some linguists try to explain aspects of linguistic competence by referring to general laws of cognitive organization.

We have tried to organize the papers in maximally homogeneous chapters and parts. Often this task was like describing a system of kinship terms by means of a taxonomic tree. Most papers could be categorized in different orthogonal ways, e.g. as "semantic", "developmental", "perceptual". Any partitioning would therefore require some hierarchy to such categories which, of course, would make us amenable to the criticism of arbitrarily imposing our own personal constructs on the reader. Because this dilemma is inescapable, we want to stress here that each paper should in the first place be read for its own merits. If papers are tuned to each other because of discussions at the Conference or because of later correspondance among the authors, this fact is explicitly noted in the part introductions. Also, for the reader who wants to scan the book from other points of view, the subject and name indices, which have been prepared by Mr. H. W. Campbell, may be useful.

The first criterion used for classifying the contributions was whether linguistic structure was the dependent or the independent variable. In the latter case the psycholinguist looks at performance from the point of view of linguistic notions, whether phonological, syntactic or semantic. Psychological studies of phonology and especially of syntax are usually called *Psychological Studies of Grammar*, which is the title of Part I. The semantic issues are grouped separately in Part II, *Lexical Structure and Meaning*.

Linguistic structure is more of a dependent variable in case the focus of attention is on cognitive processes, such as reasoning, understanding of causal relations, or of temporal order, etc. In these cases, the question is asked how linguistic skills are used in or interfere with such processes. The papers of this sort are grouped in Part III, *Cognition and Language*. The focus can also be on communicative disorders like aphasic syndromes, where the linguistic structure suffers as a result of neurological or functional impairment. The short Part IV, *Neurology and Language*, contains some of the studies on aphasia reported at the Conference.

Further subdivision was obtained by various other criteria. Three of the parts, for instance, have a developmental chapter. Other bases for the composition of chapters are rather unique and are explained in the part introduc-

tions. These introductions are also intended to provide the reader with some background information which may be essential for the full appreciation of certain recent developments or particular problems discussed in the papers. This information is in some cases historical, in other cases it refers to discussions which took place at the Conference.

We have also tried to give some additional structure to certain chapters by adding specially invited introductions or comments. In fact, these are the only exclusively theoretical contributions in this volume. We are grateful to Drs. Bever, Marshall and Wason, who were willing to provide these considerations.

The editors owe much to Dr. John Marshall for his cooperation at several critical moments in the editorial task. Apart from his written contributions to the present volume he has given valuable advice on various papers and matters of organization. Dr. Johnson-Laird's assistance at the organization of the chapter on language and deductive reasoning is also gratefully acknowledged. Furthermore, we want to express our sincere gratitude to all contributors for their enthusiastic cooperation in the realization of this book. We are confident that their joint efforts will provide a new impetus for many students of psycholinguistics.

Finally, we want to express our gratitude to the University of Padova for the support to the Conference, that is, indirectly, also to this book.

Groningen, February 1970

G. B. Flores d'Arcais
W. J. M. Levelt

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PART I

Psychological studies of grammar

“Psychological studies of grammar” is a convenient term to cover those studies in psycholinguistics that are mainly concerned with the applicability of grammatical constructs to theories of actual language behavior. Originally, these studies were often headed by titles such as “The psychological reality of x ”, where x could be any linguistic entity – “constituent structure”, “transformations”, “distinctive features”, etc.

The somewhat naive idea that it requires a psychologist to test the “reality” of a linguistic notion has now been abandoned. Linguistic theories are designed for the explanation of certain facts of human cognition, and linguistic constructs are psychologically real to the degree to which they contribute to the explanation of the empirical phenomena under consideration.

But having reached this level of modesty, the psychologist will not lose interest in these theories of human competence that are called grammars. As a matter of fact, there are many questions for him to ask; in some way or another they all refer to the interaction of linguistic competence and other psychological factors in actual linguistic performance and its acquisition. These other factors may include perceptual strategies, short term memory span, information retrieval from long term memory, learnability, and many others. The question, then, is whether certain linguistic notions, designed for the explanation of a particular domain of facts (i.e. intuitions about grammaticality, paraphrase, etc.), can be used more extensively for the explanation of *other* cognitive phenomena (i.e. the perception of speech sounds, memory for sentences, etc.).

Many variants of this question are found in Part I of this book. Chapter 1

relates the notion of grammaticality to various perceptual phenomena. In his paper, Bever shows that judgments of acceptability are often dependent on the perceptual complexity of sentences. Perceptual complexity in its turn is a function of the strategies a listener uses for the determination of the functional relations between the parts of a sentence. These strategies, and therefore the acceptability of certain sentences, may be less the result of "innate linguistic structure" than of more general facts of cognitive development. Various "formal" properties of language that are derived by the linguist from (among other things) acceptability judgments, have to be explained by relating them to more general behavioral constraints and cognitive development. This chapter gives important background for the reader who will appreciate a balanced view of the other studies in this part that are more characteristic examples of one-way traffic from linguistics to psychology. Chapter 2 relates the notions of deep structure, constituent structure and transformational structure to the phenomena of encoding and retrieval of syntactic information. It is an empirical issue whether the memory codes for sentences can be conveniently described in such terms. Are underlying, "logical", relations coded independently from the transformational features of the sentence? Is it possible to talk unambiguously about *the* underlying structure of a sentence in the description of syntactic memory? Do certain transformations complicate retrieval? Kurcz and Wright present experimental evidence for the importance of various linguistic variables in the organization of syntactic memory. The latter study is a preliminary report, a more detailed analysis of its data will be given elsewhere.

The third chapter is centered around the notion of ambiguity. Transformational grammar distinguishes at least three levels of ambiguity: lexical, surface and underlying structure ambiguity. As many sentences in normal life are linguistically ambiguous at one or more of these levels, the study of the processing of ambiguous sentences is crucial for the understanding of sentence perception. Moreover, ambiguous sentences represent in a way paradigmatic cases to show the adequacy of psycholinguistic models. The situation is comparable to the study of ambiguous figures for testing the existence of certain laws of visual perception. Are ambiguous sentences assimilated differently from their unambiguous counterparts, and, if so, is this difference dependent on the type of ambiguity? The central question in all three papers is: What is the role of the second interpretation if one meaning is understood? This role seems to be dependent on the likelihood of this second meaning *per sé* and on the immediately preceding linguistic and extra-linguistic context. All authors of recent psycholinguistic publica-

tions on ambiguity were present at the Bressanone Conference. Their studies have all been a cause or effect of each other. A special effort was made to discuss thoroughly the existing controversies in this area. At a meeting organized for this purpose more agreement was obtained than seemed feasible at the outset. Dr. Bever's contribution has been instrumental to this effect. Much of this discussion is incorporated in the final drafts of the papers. Still, the reader of this chapter will find some unambiguous statements about remaining differences of opinion.

Chapter 4 deals with psychological scaling approaches in syntax and phonology. Levelt's paper is an informal report of some data on the importance of the notion of underlying constituent structure for the description of subjects' judgments of word relatedness in sentences. Similar means of data analysis are used in Campbell's article in which the phonetic feature is shown to be an important code in the audio-visual perception of speech. A special introduction to this chapter explains the techniques of data analysis used in these studies.

If the relevance of certain linguistic constructs can be shown to exceed the factual domain for which they have been designed, it is obvious that the question of their genetic aspects and possible universality is of great psychological importance. The psychology of grammar has a natural developmental side. Chapter 5 presents three developmental studies, quite heterogeneous in character, that all focus on the development of grammatical competence. Renira Huxley reports a longitudinal study on the development of pronoun use in two normal English children. Tervoort notes particular difficulties in the attainment of grammatical transformations in deaf children. The accent of Slobin's paper, finally, is on the universal aspects of syntactic development, for which cross-linguistic and cross-cultural evidence is presented. It may be interesting for the reader to notice how the "naturalistic" observation method, pioneered by Roger Brown and his co-workers, and consisting in collecting *corpora* of children's spontaneous utterances with the object of constructing (partial) grammars, has become a typical procedure in developmental psycholinguistic research. This is especially apparent from Huxley's and Slobin's papers as well as from another paper in this book, namely Eva Clark's study, presented in Part III.

Though Katz and Fodor's slogan "Linguistic description minus grammar equals semantics" has gradually given way to the view that a grammar has a necessary interpretative or semantic component, some semantic aspects of the psychology of grammar are dealt with separately in Part II; they are very much of a special character.