MACROSTRUCTURES

An Interdisciplinary Study of Global Structures in Discourse, Interaction, and Cognition

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Preface

In several disciplines of the humanities and the social sciences, various notions of 'global' units and structures play an important role. In the linguistic theory of discourse, for instance, terms like 'topic,' 'theme,' 'gist,' or 'upshot' require explicit description. Similarly, in conversation analysis, we must explain what the 'point' of a dialogue is. In microsociology, concerned with the analysis of interaction in social contexts, it seems relevant to account for the fact that action and interaction can be interpreted at several 'levels' in terms of 'global actions.' Finally, in cognitive psychology and artificial intelligence, it has appeared that processing of discourse and interaction (e.g., in production, comprehension, and storage in memory) cannot properly be accounted for without the global organization of complex information.

In this book these various global structures are accounted for in terms of *macrostructures*. Macrostructures are higher-level semantic or conceptual structures that organize the 'local' microstructures of discourse, interaction, and their cognitive processing. They are distinguished from other global structures of a more schematic nature, which we call *superstructures*. These are, so to speak, the global 'form' of the macrostructural 'content.'

The theory of macrostructures sketched in this book is the result of research carried out during the last 10 years in the domains of literary theory, text grammar, the general theory of discourse, pragmatics, and the cognitive psychology of discourse processing. This research has been reported in many papers and books in which the theory of macrostructures, first of discourse and later also of speech act sequences and interaction, was gradually

developed.[1] However, the topics of these studies prevented us from studying the notion of macrostructure in a more systematic, interdisciplinary, and detailed way. Therefore we decided to resume and further develop the various ideas about macrostructures in a separate monograph. It should be stressed, however, that the theory is still in its infancy, and we do not pretend to give more than a rather rough outline; on some points we are able to be more explicit, whereas on other points we can only formulate rather speculative remarks. Both in sociology and in cognitive psychology, more empirical work is necessary to assess the nature and the role of global structures. In this book we have presented the general but informal outline of the theory and the various concepts and problems involved rather than give a more detailed analysis of macrostructures in a particular type of discourse. In this way we hope to be able to show that the notion of macrostructure is relevant in several disciplines concerned with the account of complex information processing and higher-level interpretation. Moreover, it appears that the basic principles involved in the structures and processing of discourse and (inter-)action at the level of 'global meanings' are essentially the same. Although macrostructures can be abstractly studied, for discourse and interaction, in linguistics and sociology alone, their fundamental 'interpretative' or 'conceptual' nature also requires extensive cognitive analysis. It is at this point where the empirical necessity of macrostructures is most clearly exhibited, viz., as structures that are required in the understanding, organization, and reduction of complex information. Without them, the planning and execution of complex interaction sequences and discourses, as well as their comprehension, memory representation, retrieval, and recall, would not be possible.

Although the term 'macrostructure' is rather recent,[2] similar notions have been used in the various disciplines mentioned previously. Notions such as 'topic' or 'plot' (of a story or drama) occur already in classical poetics and rhetorics, and the study of 'themes' has always been a main concern of literary scholarship. In modern linguistics the notion could only be accounted for as soon as more attention was paid to the semantic structures of discourse, e.g., in so-called text grammars. The same holds for cognitive psychology and

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[1] Fragments of a theory of macrostructures have been worked out by me especially in the following books and papers: 1972, 1973b, 1976b, 1977a, b, e, f, g, 1978e. It should be noted that on many points my original views on macrostructures have been modified in the last few years. One of the major differences has been the distinction between semantic and syntactic macrostructures. The latter are studied in this book under the concept of 'superstructures.'

[2] The first use of the term I know, and which was at the origin of my development of the notion in literary theory, has been made by the German linguist Manfred Bierwisch (Bierwisch, 1965). He thereby referred, though, to global structures of narrative that are called 'superstructures' in this book. The first published uses of the term 'macrostructure' in psychology I am aware of have been made by Bower (1974) and Kintsch (1974), although similar notions have been discussed earlier under different terms (see Chapter 6, footnote 2, p. 203).

artificial intelligence, where models, computer programs, and experiments are now being developed that have macrostructural notions. Of course, in the history of psychology similar concepts have been used, especially in the Gestalt tradition. In a certain sense, this book aims at a theoretical reformulation of some of the ideas of Gestalt psychology, viz., the idea of *holistic structures* and their specific properties. The limits of one book, however, make it impossible to give a historical analysis of the notion of 'global' structure. Such a study, in several disciplines, would require a book of its own. We shall therefore only refer to more recent uses of the notion.[3]

Especially in cognitive psychology and artificial intelligence, a number of different but related concepts have been discussed in the recent literature (e.g., *schema, frame, script,* and *scenario*). These concepts, which may be applied both in social and in cognitive theories, are taken to be specific, often conventionally determined, organizations of *knowledge*. It appears that they are important in the formation or comprehension of macrostructures, but it should be emphasized here that they should not be confused with macrostructures, which are higher-level structures in processing and representation. Although knowledge is of fundamental importance in all cognitive processes, we have argued that there are also crucial other cognitive factors that determine the production and comprehension of discourse and action (viz., various motivational structures, opinions, attitudes, values, norms, tasks, and interests). The complex mental state which in a certain context determines the actual processes of production or comprehension and which consists of knowledge and these other factors is studied briefly under the term *cognitive set*. Another notion which is accounted for in terms of macrostructures and which is particularly relevant in the production of action and the comprehension of action discourse in general and stories in particular is the notion of *plan*. Most of the notions mentioned in this paragraph have received extensive attention in artificial intelligence and in cognitive or social psychology. It has not been possible, however, to discuss the various uses and applications of these notions nor to review critically the respective theories in which they function. Except from short definitions and distinctions formulated in the perspective of our framework, the reader is referred to the studies mentioned in the footnotes for more detailed analyses of these notions.

The presentation of the theory is systematic but informal. Except for a brief discussion of the formal properties of macrorules and macrostructures in

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[3]Other work on macrostructures will not be extensively discussed and referred to in the text; names and works of relevant authors will be mentioned only in the footnotes. Since this book is not a survey, we have decided (also for esthetic reasons) not to interrupt the text with strings of names and years. All the terms, notions, and theoretical insights that have been borrowed from other authors are acknowledged in the footnotes; this also allows us to add brief comments that are only indirectly relevant to the discussion in the text.

Chapter 2, we have not tried to develop a logical formalism for the semantic structures involved. First of all, such a formalism might present difficulties for noninitiated readers in the disciplines involved. Second, the complexity of current logical proposals for the formal analysis of semantic structures is such that practical semantic analysis of longer discourses would not be feasible. Third, many kinds of semantic properties of natural language and action cannot yet be adequately treated in any formal language. Finally, the theory is not yet explicit enough to warrant formalization. For a formal analysis of some of the semantic notions used in this book, the reader is referred to current work in philosophical logic and to some of our other work. For alternative explicit notation and representation, we have to refer to current work in artificial intelligence.[4]

Although this book has an interdisciplinary orientation, it should be stressed that it has been written by a linguist. This means that the description of interaction and the cognitive processes underlying complex information prócessing sometimes has a linguistic bias. For the same reason it will be clear to sociologists and psychologists that I am only partially familiar with recent advances in theories and problems in their respective fields. They must decide what the relevance is of a theory of macrostructures in current social and cognitive models, and further development and testing of the theory in the framework of those models will clearly be their task.

It should be noted also that the systematic account of macrostructures in discourse, interaction, and cognition in this book requires a certain amount of repetitiveness, because similar principles are at work in these respective areas. The advantage of this setup is that the chapters are more or less self-contained, such that they can be read more or less independently. Since the book has been written for an interdisciplinary reading public and not only for specialists in the respective fields, this is a further reason why redundancy seems appropriate. For the same reasons we explain in the respective chapters (though briefly and hence not possibly in an adequate way) some of the major theoretical concepts being used in these respective disciplines. This means that the book can be used as an introduction into complex information-processing problems in linguistics psychology, and the social sciences.

We express the hope that this book will be a contribution to the new interdisciplinary developments in the disciplines of the humanities and the social sciences that are now commonly captured under the label of 'cognitive science.' We expect that in this way developments in discourse linguistics will be linked with those in cognitive psychology, artificial intelligence, social psychology, and sociology and that this interaction will lead to mutual

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[4]Besides the reasons given in this paragraph for keeping our investigation informal, we also intentionally want to break with the tradition both in linguistics and psychology to give more status to theoretical explorations by using the kind of formalism that is no more than a symbolic abbreviation. This does not mean that we should not be systematic and explicit though.

fertilization in theory formation. Interdisciplinary collaboration on such important domains as those of discourse, interaction, and cognition has become indispensable.

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Contents

1 The Concept of Macrostructure

1.1. INTUITIVE NOTIONS OF MACROSTRUCTURE

1.1.1. The aim of this book is to present a systematic analysis of so-called *global structures* that play a role in several disciplines of the humanities and the social sciences. Many different terms have been used to denote various kinds of such global structures. In the following chapters, we try to make explicit the notions of global structure involved in the study of discourse, (inter-)action, and cognition. It is necessary to look first at the *intuitive* concepts and terms handled by language users, as social participants in the interpretation, categorization, and communication of global structures. One of the empirical goals of a theory of global structures is an account of how people show their awareness of such structures by talking about them or by other kinds of metabehavior. Of course, this does not mean that the underlying cognitive processes and representations involved are always 'conscious.' Thus, much of the empirical evidence for the cognitive reality of global structures will have to be assessed in more indirect ways. Nevertheless, there is a sound development in the social sciences to take into account, or even to start from, the explicit indications exhibited by social participants of the ways they interpret and categorize their cognitive and social reality.[1]

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[1]Here we think of the direction in sociology that is called "cognitive sociology" or "ethnomethodology" (see Cicourel, 1973; Garfinkel, 1967; Mehan & Wood, 1975). In general, we may refer to new developments in the methodology of sociology as initiated by Berger and Luckmann (1967) and Phillips (1971), in which the interpretative nature of sociological data is discussed.

Initially, the social scientists will have access only to this kind of intuition, of their own and of their social coparticipants, and the ways it is expressed.

There is a more general methodological principle that we shall follow in this book, and it is related to the one indicated above. Whatever the more specific linguistic or sociological concepts of global structures may be, we shall assume that they have a *cognitive* basis. Thus, language use and behavior may be accounted for in independent theories, but these theories will ultimately be based on a theory of how language users and social participants perceive, interpret, know, memorize, evaluate, plan, produce, etc., their discourses and interactions. In other words, our social behavior—including our communicative verbal interaction—is determined by our *interpretations* and *representations* of social "reality." Later chapters show that global structures are the result of very fundamental cognitive principles operating in the ways we process this kind of highly complex information from the social situation.

This fundamentally cognitive approach to the study of global structures should be qualified. Although the basic principles involved in complex information processing are of a cognitive nature, at the same time language use and interaction require an account of their *social* properties. Thus, the cognitive processes and representations involved do not arbitrarily vary over individuals but are in turn determined by (our knowledge of) social interaction and social structure, in a similar way as cognition develops as a function of biophysiological properties of the organism. Hence, when speaking of the foundations of language use and interaction, we should use the notion of *social cognition* to account for the fact that our interpretations and representations in this area are essentially *conventional*.[2] The categories and rules we manipulate are developed under the constraints of all kinds of communicative interaction and cooperation. We have justified beliefs that most other participants use similar categories and rules in most social situations, and such beliefs will even be used to *normalize* our cognitive processes and representations.[3] We come back to these properties of social

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[2]The notion of "convention" used here is meant to abe a technical one, in the sense of Lewis (1968).

[3]Of course this insight is not new and is well-known in sociology (see, e.g., the relations between "objective" and "subjective" aspects of social structure as discussed in Berger & Luckmann, 1967) and social psychology (e.g., the various features of "social learning" in socialization). Yet, here I mean the development and functioning of the basic cognitive mechanisms proper, and in this sense I believe that cognitive psychology has been "socially" oriented too little, that is, its dominant paradigm (which we may call the "information processing paradigm") seems to have this lack; other orientations, such as some directions in Soviet psychology, have stressed actions as social and socioeconomic ("material") factors of cognitive development and functioning (see Leont'ev, 1972; Vygotsky, 1962). As we see later, recent work on knowledge representation (frames, scripts) recognizes this social aspect of information processing but does not really investigate this basis, for which we should consult ethomethodological studies of everyday life. It should be clear from our remarks that we favor an integration of these various directions of research.

cognition in Chapter 4 in our analysis of global structures in action and interaction. Our point here is that global structures are cognitively based but that the cognitive principles involved develop under social constraints—even if it is obvious that such social constraints again require cognitive interpretation and representation in order to play a functional role in cognitive development.

1.1.2. With these methodological principles in mind, we may now try to spell out our intuitive understanding of the concept of "global structure" and the ways we denote such structures with terms of natural language.

Our intuitive notion of global structure, first of all, is *relative*. We discern, interpret, and talk about such structures by distinguishing them from what we call *local structures*. The clearest manifestation of this distinction appears in the conceptual opposition of *whole* versus *part*, which is used in a large number of cognitive activities, from perception[4] to discourse and interaction; that is, we are able to see, treat, interpret, or use many objects or phenomena as "wholes," as cognitive *units* of some kind, with respect to the various "members," "parts," "sections," or "elements" of these whole objects. Hence, we take global structures to be a kind of *(w)holistic* structure, and we say that the parts, members, etc., "make up," "constitute," "form," or "compose" them. The intuitive "unity" of a whole then will be determined in terms of spatiotemporal continuity and its cognitive correlates (e.g., coherence) and externally by its distinction from and substitutivity with respect to other (whole) objects. Similarly, a part will be seen, interpreted, used, etc., as an object, property, etc., *of* another object, even if it may be identified for itself and in relation to other parts of the same whole object. Without analyzing the various properties of parts and wholes further, we assume here that the *part-whole relation* is an intuitive primitive, which cannot be analyzed into more basic cognitive notions. This relation may show itself in various ways, however, as we have seen, viz., as element-set, member-class, or part-whole.

The distinction between global and local structures should also be construed along another intuitive dimension, that of *point of view*, that is, we not only have objects or phenomena for which a distinction is made between their parts and their whole but at the same time this distinction may be projected in our cognitive manipulation of such objects. Thus, we may see, look at, focus upon, think of, etc., either the parts or the whole, depending on the "point of view" we take with respect to the object.

One way of showing this point-of-view dimension of the local-global distinction appears in perceptual and cognitive *distance*. We tend to see an

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[4]See the recent discussion by Miller and Johnson-Laird (1976, 47 ff. and passim) about the perceptual aspects of parts and wholes and their links with language (e.g., lexical hierarchies). These perceptual, and more "general," notions are linked to the hierarchical notion of semantic macrostructure.

object as a whole when looking from farther away than when we look at its parts. The intuitive notion of *detail* plays a role here: Parts of the whole are distinguished as details when we have a closer look at the object, whereas from a more distant point of view individual details may no longer be perceptible. In the latter case only larger parts or *outlines* of the object may be visible.

There is a slightly different way of formulating this intuitive distinction, in terms of *levels*. Instead of saying that we see, interpret, focus upon, etc., a certain object from a certain distance, we may also say that we do all this on various levels, a more *specific* or *particular* level, and a more *general* or *abstract* level, respectively. In this case the details of the *lower*, more specific level may be said to be "ignored" at the *higher*, more general level. From this particular intuitive distinction between global and local structures we see for the first time that the relation between these structures may take the form of certain cognitive *operations*, of generalization or abstraction on the one hand and of specification or particularization on the other hand. From the various intuitive ways of accounting for the global–local distinction in cognitive information processing, we later take this notion of level as our major starting point. One reason for this strategy is that in the social sciences and their philosophical foundations the notion of level is theoretically well-established: Similar to the intuitive level of "seeing" things, we have the theoretical notion of *level of description*. We shall also discover that not only for scientific discourse but also for everyday discourse we may speak of different levels of description.

Related to the other notions discussed so far, we finally have the important intuitive distinction based on the dimension of *relevance*. In this case, the parts or details of the lower, more specific levels are associated with the notion of a lower degree of relevance or *importance*, whereas the larger parts, the whole, at a more general level are associated with higher degrees of relevance or importance. Thus, details may be abstracted because at a higher level they are less important. Other notions, such as "crucial" or "central", may in that case be used in order to qualify the more general and important levels.

1.1.3.   Let us now make these various intuitive manifestations of the local versus global distinction more concrete by giving examples from the various domains we are concerned with in this book. The general domain is that of *cognition* and in particular that of *complex information processing*. The more specific domains, both linked to that of cognition, are that of *language use* and *discourse* on the one hand and that of *action* and *interaction* on the other hand.[5] The choice of these last two domains is not arbitrary. First of all,

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[5]Relevant references about the notions more or less intuitively used here are given in the respective chapters. The same holds for the other notions used below.

they represent two fundamental cognitive functions of the human organism. Second, language and discourse are inherently linked with social action and interaction: When we speak or write, we accomplish certain kinds of social acts, viz. *speech acts*, which play an important role in social interaction. In both cases complex information processing is involved, and it will be assumed that such complex information processing is not possible without the theoretical and cognitive distinction between local and global structures.

First of all, language use manifests itself in utterances that, as object types, we interpret as *discourses* or *texts* of a certain natural language. If more than one speaker is involved in the production of such utterances, we speak of a *dialogue* or *conversation*. The theoretical analysis of discourse is the object of analysis in Chapter 2. What we are concerned with here is the fact that language users implicitly and explicity make a distinction between local and global structures of discourse. On the one hand they speak of the *details* of what was said, on the other hand they use such notions as *theme, topic, gist, upshot,* or *point* to characterize the discourse, or larger fragments of it, as a whole. Thus, words and sentences are seen as the *parts* of the discourse, and the theme or topic is seen as a property of the *whole*. When people talk about such a theme or topic, at the same time they imply that details of the discourse are disregarded or *abstracted from* this account at a more *general level*: "I don't remember exactly what he said, but the upshot (his point) was...." At the same time these notions intuitively associate with that of *relevance* or *importance*: The point is the more relevant, important, central, prominent, or crucial aspect of what was said.

In these examples of notions used in everyday speech to denote global properties of discourse, we observe that the notions mainly pertain to the *meaning* or *content* of the discourse and not to the style of expression, the ordering of discourse parts, etc. This means that this kind of notion should be made explicit in *semantic* terms; to distinguish them from other kinds of global structures, we talk about *semantic global structures*. It is this type of structure that we try to make explicit in this book in terms of (semantic) *macrostructures*.

1.1.4. Besides these semantic global structures we also use terms to denote global structures of discourse and conversation that have a more *schematic* nature. In that case it is not the global meaning but rather a global schema that is involved, a schema that may be used to order or to assign other structures to the global meanings of the discourse. Notions such as *outline, construction, order,* and *buildup* are used in such cases. Schematic structures of this kind may be of a *categorical* type (i.e., built up in terms of conventional categories, just as a sentence is built up from syntactic categories). Examples of such schematic global structures are the narrative structure of a story, the argumentative structure of a lecture, or the specific schematic ordering of a

psychological paper. In all those cases we also have intuitive terms in order to denote some of the categories involved, such as *introduction, setting, background, development,* and *conclusion.* To distinguish schematic global structures, which pertain to the global "form" of the discourse, from the global meaning structures for which notions such as "theme," "topic," or "gist" are used, we use the specific theoretical term *superstructures.*[6] In Chapter 3 we try to establish the various links between these two sorts of global structures (i.e., between semantic macrostructures and schematic superstructures).

1.1.5. Utterances may be studied not only as manifestations of discourse but also as manifestations of social actions, as *speech acts.* Both in monologue and in conversation this may involve a sequence of speech acts. Also at this level, which is the object of the discipline of *pragmatics,* it makes sense to distinguish between local and global structures. The local structure pertains to the individual speech acts and their connections, whereas the global structure pertains to the sequence of speech acts as a whole. Also here we use intuitive terms such as the *point* or *upshot* of what was said, or rather done, though not referring to some global meaning but instead to the *global speech act* being performed. Thus, we may locally perform an assertion, followed by a request, but with a whole sequence of (possibly different) speech acts we may also globally perform the speech act of a request, an assertion, or a threat (e.g., in a request letter, a lecture, or a ransom note). In other words, the global structures at this pragmatic level of analysis pertain to the global *functions* of the utterance. Language users have intuitions about such global pragmatic structures. Thus, for instance in conversation, they may know that, as a whole, the speech acts of the speaker may *add up, come down to,* or function as a global request or threat. Again, we disregard details and underline the most relevant or important aspect of the utterance when we say that what he essentially *did* was to promise something.

1.1.6. Via the notion of speech act and that of global speech act we may now look for more or less similar intuitive distinctions made by social participants between local and global structures in *action* and *interaction* in general. The

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[6]This term has been chosen in order to mark clearly the differences between "semantic" and "syntactic" global structures, which are often confused in current discussions of schemata and similar notions. Moreover, the term "superstructure" has no current use in linguistics and psychology. For purists the Greek form "hyperstructures" may have been preferable as a partner for "macrostructures," but the term "hyperstructure" has been used already in linguistics to account for (syntactic) structures beyond the sentence level (cf. Palek, 1968). Note, though, that in our earlier work we also often confused semantic macrostructures and syntactic superstructures. To avoid too much heavy jargon, we shall sometimes use the more general notion of *schema* to denote superstructures of particular kinds if confusion with other types of schemata does not interfere.

distinction makes sense only if we again take on the one hand a *sequence* of actions and decide whether the sequence as a whole has certain properties. This is the case in all examples of *higher-order actions*, that is, actions that are performed, as a whole, by performing a sequence of other actions. Many social actions are of this kind, such as taking a train, eating in a restaurant, or going shopping. Such stereotypical social episodes are analyzed later in terms of *frames* or *scripts*. We also have global actions that are not inherently social, such as taking breakfast (alone), taking a bath, or repairing one's car. Essential for our discussion here is that social participants are able to handle complex sequences of actions as *one global action*, that is, they speak about such actions and interpret sequences as one action. The same holds for global *interactions*: A conversation itself is a case in point, and the same may be said for other kinds of dialogue, such as fights, duelings, interviews, or meetings; in nonverbal interactions, from moving a table together or a marriage to playing a game together. The intuitive idea that participants have about the global action being carried out appears in such questions as: " *What are you doing?*" "*What are you driving at?*" *What's the idea?*", where an observer may well see and understand what actual local action is being carried out but wants to know of which global action it is a constituent.

In actions we very clearly witness several of the intuitive aspects of the local versus global distinction previously discussed: Local actions are constituent *parts* or sections of global actions; global actions function as unified wholes, which as such in a *higher-level* sequence may be conditionally related to other global actions; and the constituent actions are indeed less *important* or more *specific* than the global action. The difference of *level* of seeing, interpretation, and description especially plays a role when we want to speak of local and global action. At a certain moment what is being carried out is, by necessity, a local act at the specific level, and this is what the observer during such a moment actually sees and interprets. However, *at the same time* another global act may be carried out, but only if the previous and the following actions, and hence a whole sequence carried out during a time period, is interpretively taken into account. In other words, the global action can be interpreted only when we change levels (or distance) of interpretation. The same may hold when we comment upon the *whole* sequence afterward and assign it a global act.

Valuable indications about the global nature of complex (inter-)action also comes from the various cognitive terms necessary to define such actions, such as *plan, intention, goal,* or *purpose*. The more precise meaning of these terms as we use them is made clear later; but it is interesting here that a term like *plan*, for instance, and also terms like *blueprint, idea, scheme, design, project,* or *sketch* may be used to *program* complex future actions. This programming will usually be *global*, that is, specify a global goal and perhaps major actions, strategies, and results, contrary to a script or scenario that specifies the precise sequence of actions to be carried out.