

## STORY COMPREHENSION: AN INTRODUCTION

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### 1. Background and aims

In this Introduction to the special issue of *Poetics* on Story Comprehension' I will pursue three different aims:

- (i) for the theorist of literature and narrative I will briefly summarize the main directions in the psychological approach to stories and indicate why such an approach is relevant in the theory of narrative;
- (ii) for the psychologist I will summarize some of the results of narrative theory, especially those which I think have been neglected in cognitive models of both psychology and artificial intelligence;
- (iii) against the background of some of my own ideas about narrative structures, discourse, and comprehension processes, I will formulate a number of problems, some modest critical remarks and some suggestions for further research.

Details about the various models of story comprehension need not be given in this introduction: most of the authors of this issue have given a very clear introductory survey of their work in this area and have sometimes also indicated where and how they differ from other proposals. The same holds for the multiple references to previous work on discourse processing in general and on story comprehension in particular (see also the general bibliography at the end of this issue).

The reason for inviting a number of psychologists, scholars from the field of Artificial Intelligence (AI) and some literary theorists, to contribute to a special issue on Story Comprehension' has been obvious: for about five years there has been a very remarkable interest in cognitive psychology and AI for the structure and understanding of stories, a type of discourse which, from other points of view (*e.g.* that of structural analysis) has been paid attention to in this journal and in poetics, semiotics and discourse studies in general. In fact, several psychologists have been inspired by some of the work on narrative which had been done in these areas. On the other hand, there is now a rather prominent wish in poetics to pay more attention to the empirical basis of various kinds of discourse types, *e.g.* to their cognitive processing and their social functions. This empirical research in the

study of literature and discourse, however, is still very scanty. This is mainly due to the lack of knowledge, with the linguist and literary scholar, about models and experimental or simulative methods of psychology and **AI**. For reasons to be specified below it seems important, therefore, to confront those interested in the theory of narrative with the highly interesting actual work on stories in psychology and **AI**. On the other hand, the more advanced work on narrative in the last decades may contain suggestions for renewal in the cognitive models. In other words, we have here an area of research which seems ripe for serious interdisciplinary collaboration.

## 2. The psychology of discourse and story processing

The interest in psychology and **AI** for stories is part of a more embracing attention for processes underlying the production and the comprehension of discourse. For several reasons, stories are attractive material for experiments and computer simulations: they may have rather simple forms, they have identifiable 'schematic' structures, they are about human action, and will often feature many other properties which are interesting for models of discourse processing.

The attention for discourse in psychology is rather recent, at least in its actual widespread form: after occasional, but sometimes seminal, studies on discourse between the thirties and the early seventies, we now witness publication of a great number of books and papers on various aspects of discourse processing. In psychology, work on discourse is a natural extension of psycholinguistic research on the syntax and semantics of sentences as it was inspired *e.g.* by generative-transformation grammar. At approximately the same time as in linguistics itself, where the development of so-called 'text grammars' began to take shape in the early seventies, the psychologist started to devise models and carry out some experiments about more 'natural' units of language use and communication. In both disciplines, for instance, it appeared that the interpretation of sentences also depends on the interpretation of other sentences within the same discourse. And more in general, there was increasing curiosity for cognitive models of more complex semantic information processing. The historical background of this interest has been sketched in several of the papers of this issue. The prominent starting point in this history of discourse psychology has been the work of Bartlett, whose classical book, *Remembering* (1932) paid extensive attention to the ways stories are understood, memorized and reproduced. In fact, Bartlett should not only be seen as the founder of an elementary theory for story comprehension and reproduction in experimental (cognitive) psychology, but also of a related theory in social psychology. With his method of 'serial reproduction' he tried to simulate in the laboratory how stories find their way in the social context (*A* tells *B*, who tells *C*, . . . *etc.*). Later, similar methods were used to study the spreading of rumors for instance (Allport and Postman 1947). Unfortunately, this social psychological branch of the original work of

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Bartlett has had much less renewed interest in actual research. After the long

of this complex nature could hardly be accounted for (*e.g.* in terms of the Stimulus-Response (S-R) paradigm), renewed interest for meaning and conceptual information processing permitted a 'rediscovery' of the basically gestaltist ideas of Bartlett. Especially the 'notion of `schema', taken as an organizing principle of knowledge and experiences, was paid attention to and formulated in more explicit ways. Similarly, it was re-emphasized that memory is not simply 'reproductive' but 'reconstructive', due to the intervening functions of such memory schemata: a language user will hardly reproduce (fragments of) a story, but add probable details (inferred from his knowledge schema), make permutations, give explanations of strange events, establish lacking coherence, familiarize what is strange, *etc.* And, what is important, not arbitrary meaning units of the story will become irretrievable ('forgotten') but especially those which do not belong to the 'gin' or 'upshot' of the story.

Most of these original findings have been confirmed in later, methodologically more adequate, theoretical models and experiments. Some of the features of these later theories of the seventies were already assessed in the precursor papers of the sixties (for a survey, *cf. e.g.* van Dijk and Kintsch 1977). I will not go into the details of these more general principles of discourse comprehension here, but will focus on the development and major ideas of story comprehension research in the seventies.

Above, I have been systematically referring to both work in cognitive psychology and artificial intelligence. Work on story processing comes from both areas, which, in fact, are now slowly beginning to merge into a larger 'cognitive science'. Although the methods of inquiry in these two branches of cognitive science are rather different (*e.g.* carrying out experiments *vs.* building and running computer programs, respectively), and although there is certainly also a difference in topics of interest, they share an important common attention for the processes of *understanding*, *e.g.* of language. The psychologist in that case will often be more interested in the precise cognitive processes, memory constraints, decoding strategies, storage capacity, retrieval conditions and contextual factors of understanding. The researcher in artificial intelligence, on the contrary, will try to satisfy the demands of a running, and hence algorithmically explicit, program which at the same time should preferably have some psychological plausibility. Thus, the precise forms of representation of semantic information, and hence of discourse, will be crucial in such programs, as well as the knowledge which is necessary to make understanding by the computer possible.

One of the earlier approaches to story comprehension in AI was made in Charniak's (1972) dissertation on children's stories. He there showed in detail the respectable amount of knowledge of the world which is necessary to understand a single sentence of a very simple children's story. He indicated that such knowledge,

*e.g.* about a birthday party, must be organized, and predictively used during the understanding of a story about such a party, especially also in those cases where world-information was not explicitly expressed in the story.

Some years later these ideas were followed by a further elaboration of the model of organized representation of this kind of knowledge of the world which plays such an important role in understanding: Minsky at **MIT** (1975) introduced the notion of *frame*, Schank (1975) at Yale adopted the notion of *script* from Abelson (1973) which led to very fruitful collaboration (see above all Schank and Abelson 1977) in which also other important notions were (re-)introduced, such as plans, goals, themes, *etc.* At the same time the group working at the University of California at San Diego (Norman, Rumelhart and others) did similar work on the organization and use of knowledge in language understanding, using the classical term of *schema*. Although there are differences between these approaches and the notions they use, the main point is that they have a common aim: the effective representation of knowledge or beliefs in the memory of language users. Schank and others in this issue show how these basic ideas further developed to a rich, though of course not yet perfect, theory about the nature and the role of knowledge in discourse processing.

Characteristic of this approach is a representation of both stories and our knowledge of stereotypical episodes (scripts) in terms of *events* and *actions*, *e.g.* formulated in Schank's 'conceptual dependency' system. This system is an elaborated combination of ideas from Fillmore's well-known 'case grammar' and ideas from the theory of 'lexical decomposition' using language independent basic semantic concepts. For our purposes it is important that a story and its memory representation are taken as a connected sequence of action or event concepts. In order to be able to understand such a sequence, motivations, reasons and causes, intentions and purposes must be identified or inferred from our knowledge of human action in given contexts. And, as we saw above, if such activities are part of socially stereotypical episodes (going to the movies, giving a party or doing an exam) our knowledge of such episodes as it is organized in scripts will help to interpret and organize the information of the text.

Of course, these important ideas about the links between knowledge organization and language understanding are not without a number of issues which still must be treated and problems which must be solved, both about discourse structures and structures of knowledge as well as about the processes and strategies of the *use* of such knowledge. We will come back to some of these problems below.

At the same time the experimental psychologists also started their work on discourse and stories. The more prominent among them present their actual views in this issue. It was striking to see that, often independently, from several sides converging hypotheses were formulated and experimentally confirmed. At the University of Colorado at Boulder Kintsch published his first book of papers on the processing and representation of meaning, including new results on discourse under-

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standing (Kintsch 1974), soon followed by several papers on story comprehension, sometimes written in collaboration with his assistants (and myself). At the same time Bower at Stanford had begun work on story processing (Bower 1974), thereby using the important concept of 'macrostructure', while Thorndyke, in the same department, came up with one of the first experimental dissertations on story comprehensions (Thorndyke 1975) basing his study on the recent text-linguistic and text-psychological results on the structures and processing of discourse and stories.

Interesting for our discussion is the appearance in psychology of *story grammars*. Especially Rumelhart's (1975) influential paper on narrative schemata set the scene for much theoretical and experimental research on stories. He thereby referred to work of the anthropologist Colby (1973) and to the undisputed originator of structural analysis of stories, Propp (1968), whose work was translated from Russian thirty years after its first publication. We will come back to this tradition in narrative theory below. Among those using story grammars in their experiments we should also mention Jean Mandler, also from the La Jolla campus of the University of California at San Diego, who, together with Nancy Johnson, also in this issue, carried out experiments about the role of story schemata in adults and children's comprehension of stories.

We will see below that we can now even distinguish two main streams of work on stories: those who work with story grammars, and those who prefer an action based on the analysis of action sequences (plans, goals, motivations, scripts, problem solving, *etc.*). The debate between the two directions can be easily followed through the papers of this issue. I hope to show below that the controversy is not fundamental: both approaches are each other's necessary complements.

In a somewhat different perspective we should finally also mention the early dissertation of Bonnie Meyer (1975) who showed that recall for discourse is determined by hierarchical textual structures. Here too there existed a link with linguistic discourse analysis: she borrowed her theoretical tools from Grimes' interesting book on discourse structures, which was only published in 1975. Grimes himself came from the 'tagmemic' linguistics school of Kenneth Pike, in which early and extensive descriptive work was done on discourse structures in many languages (*cf. e.g. Longacre 1977*).

This small survey is far from complete, but is meant to give a first introduction to the major directions of research represented in this issue. It is difficult to say when and where and by whom it was all started: Barlett's work of fifty years ago was clearly an important historical starting point. Occasional later work on stories was not really followed through. Perhaps 1972 should be singled out as the year when several earlier ideas in the areas and directions mentioned got into 'books': we have mentioned Charniak's thesis; then, in the same year, the very influential book on Human Problem Solving by Newell and Simon was published, yielding an important AI-background for later thinking about plans, strategies and problem-solving in story comprehension; thirdly, Freedle and Carroll (1972) published a series of important papers about language comprehension and the acquisition of knowledge,

which also contained first papers on discourse comprehension (*e.g.* by Crothers, Frederiksen and Freedle); finally, from my own perspective I might mention publication of my dissertation on text grammar, in which linguistic text grammars were related with story grammars, and where reference was made *e.g.* to Bartlett in order to motivate the introduction of macrostructures of stories, both in grammar and in cognitive models (van Dijk 1972). From that year on, many papers and books on discourse and stories and their processing appeared in linguistics and psychology, cross-fertilizing each other in a very fruitful way, giving rise to a now very broad and diverse framework of cognitive research.

### 3. The study of narrative: a brief survey

A model of story comprehension should not only be based on a theory of understanding, but also on a theory of narrative, because the processing of a discourse also depends on the structures of that discourse. Narrative discourse is a specific type of discourse and may, in part, be defined in terms of the conventional categories, rules and other constraints which distinguish it from other discourse types. In a cognitive perspective this means that language users must be able to recognize a story when they hear/read one, to distinguish between a story and a non-story, and to produce a story. This means that they must (implicitly) know the categories, rules and constraints defining a narrative discourse, and be able to strategically use these in processes of production and comprehension. For inessential reasons not to be specified here we may therefore distinguish between an abstract theory of narrative structures on the one hand and a theory of narrative processing on the other. The first kind of theory will typically characterize the approach taken in literary theory and discourse studies, the latter may be found in cognitive psychology and AI. Clearly, the first theory is an abstraction from the second: empirically speaking the narrative categories and rules represent our knowledge of narrative, and narrative structures are part of our cognitive representation of a narrative discourse during production or comprehension. Heuristically, however, the first theory, *viz.* the so-called *narrative grammar*, may also be used as a partial and hypothetical model for the cognitive representation of narrative if the rules and categories are not only formal devices for structural descriptions but also have so-called psychological 'plausibility'. We will return to these psychological aspects of narrative processing below, and will now focus on the theory of narrative structures.

The theory of narrative has two major orientations, the first is typical for traditional literary studies, the second came from anthropology and was later also adopted in poetics. Traditional narrative studies were essentially 'theories' of the novel — although there are also specific studies of short-stories, fables and other types of narratives (genres). Traditional narrative theory, which basically is a contemporary version of Aristotle's ideas about epic as sketched in his *Poetics*, has

been inspired by the views of Henry James, *e.g.* as expressed in the prefaces to his novels (see James 1934 for a collection). More specifically these ideas were later (re-)formulated by people like Lubbock (1965) and Forster (1927), who influenced much anglo-saxon work on narrative in the subsequent decades. This approach was rather informal and intuitive and focussed on those notions which seemed intuitively important aspects of the novel: the relation between fiction and reality, the organization of plots, the kind of characters, the parameters of time and place, the point of view of the narration (*viz.* the relations between author, narrator and represented characters), the use of symbols, and the style of the novel (see *e.g.* Stevick 1967 for a survey).

Although most certainly a number of the issues treated in this tradition were relevant for the theory of narrative, the approach was rather unsystematic. No sound definitions of concepts were given, no level distinctions in narrative texts were made and, due to the absence (at least originally) of a serious linguistics, no account of the relation between narrative structures and their verbal manifestations could be given. In other words: given a certain novel, the narrative concepts should be 'analyzed' from it in an intuitive way. Moreover, there were no oven-all narrative structures in which the various concepts would find their place. In fact, there was no theory of the very notion of a narrative: that a novel was a narrative was taken for granted, and no systematic comparison with non-literary, everyday stories, was made.

In a similar vein, post-war German literary scholarship also featured some influential studies of which the results combined with the earlier anglo-saxon tradition: *viz.* Hamburger (1968), Lámmert (1967) and Stanzel (1964), which were the major works the students in literary scholarship were confronted with in their study of narrative. Besides the notions mentioned above, these books came with interesting, though methodologically inadequate for the reasons mentioned above, views about stylistic manifestations of the perspective of narration, the relations between author and reader, types of narrators (implicit, explicit, auctorial, *etc.*), the links between time and tense, temporal shortcuts in plots, the role of flashbacks and 'previews', *etc.* Although in neighboring disciplines, such as philosophy and linguistics, methods and theories were developed which would have been able to make many of the more interesting notions more explicit (or show the irrelevance of others), this tradition is still very much alive in actual literary scholarship.

The second major direction of narrative studies in this century also was founded some fifty years ago, *viz.* by the Russian Formalists (see Erlich 1955, for an introduction). This group of literary scholars, linguists and anthropologists had a much more 'modern' approach, which in fact it had in common with the early beginnings of structural linguistics. They focussed on the 'formal' analysis of (literary) discourse — inspired also by construction principles of avant-garde art of that time — and introduced many important narrative notions, *e.g.* about the thematic structure of stories, the difference between the canonical structure of a narrative (the 'story' or 'Table') and its possible literary transformations (the 'plot' or 'sujet'). The

names associated with this work are *e.g.* Sklovskij, Éjxenbaum and Tomasevskij.

Whereas most of this original work was already done at the same time as the Russian Revolution, it only became known some fifty years later. Thus Todorov's (1965) translation was one of the highlights of the rise of structuralism in France. From our actual point of view, though, it was mainly Propp's (1928/1968) book on *The Morphology of the Folktale* which set the firm background for the later 'structural analysis of the narrative', which also mainly developed in France at first (see *e.g.* *Communications*, 8 (1966) and the introduction by Barthes (1966)). Propp's work, after its (first, rather defective) translation in 1958, was introduced in France by the anthropologist Claude Lévi-Strauss whose work influenced literary scholars very decisively in the beginning years of structuralism. Both the work of Propp himself, and that of those in France who continued it (Barthes 1966; Todorov 1969; Bremond 1973; Greimas 1966; and others), was also received positively by American anthropologists, such as Dundes and Colby. Propp's analysis of the Russian folktale was the first serious systematic analysis of 'simple' narrative structures: he distinguished a number of thematic invariants (which he calls 'functions') and devised an elementary syntax for them ('Lack', 'Arrival of the Hero', 'Departure of the Hero', 'Dial of the Hero', *etc.*), although this syntax was not very flexible. It should be noted — a point often overlooked by literary theorists — that Propp's functions are not proper narrative categories, but rather fixed themes' characterizing the specific content of simple narratives like folktales. Only sufficient abstraction from these functions allows the establishment of more general narrative categories (*e.g.* 'Initial state of balance', 'disruption' ... 're-establishment of the state of balance') (see especially Bremond 1973, for a critical and further development of the Proppian tradition). Against this background both anthropologists and literary theorists applied structural analysis to a great number of, mostly simple, narratives, such as myths, James Bond stories, *etc.* (for a survey of structuralist poetics, *cf.* Culler 1975).

In the meantime both structural and generative linguistics also became pervasive in this area. Thus, structural semantics in France was applied by Greimas (1966) in the account of Proppian narrative structures. For our discussion it is interesting to note that he uses a case grammar type of semantics, which involves a rather elaborate analysis of events and actions into predicates and various actor types, both at the level of sentences and of the text as a whole. At the same time he uses semantic lexical decomposition: he analyzes lexemes into more basic semantic primitives (*semes*). With these primitives he then characterizes the thematic structure of narratives (and of other texts for that matter). This allows reformulation of the Proppian functions in more elementary semantic terms, and more in general a link between narrative and other discourse structures, *viz.* the semantic ones. I mention this book briefly here because its French and style of writing is not easily accessible; yet, it contains several of the basic components which later will occur in more explicit theories of narrative.

Generative grammatical ideas were combined with the ideas of the structural



analysis of narrative, but this mostly occurred outside of France (where the structural paradigm was solidly entrenched and Chomsky never really got widely accepted). Thus, early on, George Lakoff wrote a paper with a generative rule system for narratives, which he 'dared' to publish only several years later (Lakoff 1972). Important in this and in other works following (see e.g. Prince 1973) was the methodological advance which consisted of the more systematic formulation of narrative *categories*, *of formation rules* and of *transformation rules*. In other words, we now slowly approached a serious *explicit* theory of narrative, that is a syntax of such a theory.

Since generative grammar did not and could not describe discourse structures, however, there was of course only an adoption of its formal set-up, but not a real connection between the linguistic and the narrative grammars. In fact, there was no formal link between the (linguistic) discourse structures and the (intuitively chosen) narrative ones. This has led several researchers, including myself, to first work out some fragments of a (generative) grammar for abstract discourse structures: a *text grammar* (cf. e.g. van Dijk 1972, 1977a; Petófi and Rieser 1973; Halliday and Hasan 1976; Dressler 1977; van Dijk and Petófi 1977). According to the fashion of the period, my own text-grammar should be an account of the native speaker's competence to produce and understand any 'grammatical' discourse of the language. So, the grammar should enumerate all and only texts underlying the possible discourses of a language, together with their structural descriptions. The rather programmatic and not yet very substantial grammatical fragments pertained on the one hand to all kinds of coherence phenomena holding between propositions of texts (PRO-forms, anides, *etc.*) and on the other hand introduced so-called 'semantic deep structures' of the text-as-whole, *viz. macrostructures*. How such global semantic structures were linked to those of the actual sentences was a problem which could not yet be solved. Important for my argument here, though, is that the postulation of semantic macrostructures permitted a serious mapping of narrative structures in the text: narrative categories did not pertain to isolated sentences or propositions, but rather to whole stretches of a text, *viz.* those dominated by a macro-proposition. Thus, a narrative system was set up and combined with the linguistic discourse structure via the semantic macrostructures. This mapping did not do more than apply a number of semantic insertion constraints. The narrative system was based on ideas from structural analysis on the one hand and new results in sociolinguistic studies of *natural narratives* (stories of personal experience) obtained by Labov and Waletzky (1967) on the other. They found that everyday stories about a serious topic ('Were you ever afraid to die?') would often consist of a canonical structure of categories like Setting, Complication, Resolution, Evaluation and Coda. This structure may of course undergo several transformations: certain categories will change place or be absent in some story. The story as a whole will in context also be preceded by a presentation category, to which one should also add Comment categories in the interaction context. It was shown that these categories were translatable into a generalized Proppian narrative syntax, so that basically this kind

of elementary grammar could be taken as a rather general and faithful account of simple narratives. It was finally — though briefly — shown that the narrative system should not only be characterized in terms of global categories, but also in terms of the more local *action and event structure*. The latter structure was defined in terms of the philosophy and logic of action (e.g. of von Wright 1967; cf. van Dijk 1976, 1977a) but not explicitly linked to the connected propositional sequence underlying the discourse, which would have made the mapping between the narrative and the discourse complete. For further details, examples, background and referents about this textgrammatical approach to narrative, see van Dijk (1972). For linguistic models of narrative, in general, see the survey of Gülich and Raible (1977).

I have taken the liberty to extend a little bit on my own contribution to the development of the theory of narrative, because it shows how various sources and ideas can fruitfully be combined and developed in a unified theoretical framework. It also will explain my further theoretical remarks to be made below. Interesting — for myself — is the fact that much of my theorizing in that period (around 1970), e.g. the formulation of the macrostructure ideas, was influenced by hunches and arguments of a cognitive nature, although I hardly knew about cognitive psychology at the time. Yet, I had by chance read a few crucial books, viz. Bartlett's, Neisser's (1967) introduction to cognitive psychology, and Miller *et al.*'s classic of 1960 about plans. In the form of their TOTE-units the latter provided me with some (though unintended) theoretical background psychology and (very) early AI for the notion of global structures and the role of plans in action, which again permitted combination of macrostructures and narrative structures. Several of the notions mentioned here were some years later also to appear in psychological and AI models of narrative, which shows a nice convergence of ideas about the matter (especially since most developments in the area were rather independent).

To close the circle of this brief survey of narrative studies and psychological work on narrative, I should, also from my perspective, mention my paper of 1975 (van Dijk 1979) in which I played amateur psychologist (with a group of literary students) by carrying out several semi-natural experiments (in the classroom) in which subjects had to recall (at various delays) and summarize the Dutch version of a Boccaccio story from the *Decameron*. One of the reasons for doing that rather primitive experiment was an empirical assessment for the notion of (semantic) macrostructure, which I had left alone since my thesis of 1972, due to a lack of appropriate theoretical or formal tools to get the link between macrostructures and microstructures explicit. The experiment clearly showed that those propositions which were theoretically the macrostructural ones in the story would be produced, especially after longer delays (three weeks and longer) and in summaries, with much higher probability. The macrostructures were obtained by a first, still rather informal, set of *macrorules*. Moreover, a narrative grammar was written, which would be the global narrative syntax for the global (macrostructural) content. Note that at the time I still spoke of 'macrostructures' both in case of the semantic ones and the narrative ones. In order to avoid confusion and to stress their distinct theoretical

nature, the categorical structure of narrative has later been taken as a type of *super-structure*, to which **I will** turn below.

Striking for this combination of a systematic and a historical survey of both story comprehension and narrative studies is that roughly at the same time David Rumelhart must have been writing his paper on story schemata which also had a story grammar, whereas Schank and others were beginning work on episode/script representation and hence also on simple 'stories', and Kintsch his experiments on meaning and comprehension of discourse, which eventually led to our further collaboration.

#### 4. Some issues from narrative (meta-)theory

In the survey given above we have seen where the more important ideas about narrative come from: Russian Formalism, French structuralism, combinations with TG-ideas and textgrammar, anthropology and sociolinguistics — now being completed by independent further research — also on narrative structures proper — in psychology and AI. Before I proceed to a brief evaluation of these latter contributions, a summary of the major theoretical issues on narrative is necessary. My contention is that if a number of distinctions are not clearly made, our theoretical thinking on narrative and discourse (and their processing models) will get — or remain — muddled. In fact, my main problem with much of recent (and classical) research is that different kinds of categories, levels, rules, *etc.* have been mixed up, and on the other hand, that 'exclusivistic' approaches were taken in a certain direction which only represented certain fragments of narrative theory. What I will say here holds for an abstract, general theory of narrative. Both for particular theories of various narrative discourse types, and for cognitive and social models, further details and other kinds of notions will be necessary.

A first important distinction which should be made is that between *discourse* and *narrative*, or more precisely between the linguistic textual structures of the discourse and the narrative structures manifested by the discourse. Narrative structures are not characterized by a (linguistic) grammar of the discourse, but are to be accounted for by a separate system of rules. In fact, as we know from comics and movies, narrative structures need not be expressed in natural language at all. This means that the link between narrative structures and the actual discourse must go via the underlying semantic or conceptual structure of the discourse (*viz.* its *lex base*). A system of narrative rules (a 'grammar') would consist *e.g.* of formation rules, transformation rules, categories and — for certain specific narrative traditions — a lexicon' of typical narrative themes, *e.g.* Propp's functions.

Note that such 'independent' systems are not at all a bizarre invention of the theorist. Not only do language users have intuitions about them, but also we are sometimes trained at school to isolate and formalize' them. Thus, linked to morphology and syntax we have well-known prosodic and metrical systems, which

can be formulated independently and then applied to the specific sound system of a given language. Then, at the level of the global organization of content, we also have this kind of *superstructures*, as I call them, in argumentative discourse, in scientific papers, *etc.* Such structures are *global schematic forms*, defined by the respective syntactic components of their respective theories, consisting of a hierarchically organized sequence of categories. The 'content' of the discourse may be inserted into the open slots of the superstructural schema. The independent nature of formal discourse schemata is perhaps best known from the very existence of logic, with its formation and derivation rules: it is the abstraction of valid forms of argumentative discourse, consisting of various kinds of premises and a conclusion (see van Dijk 1980 for details about the link between superstructures and macrostructures). In other words, we should distinguish between the (general) *form* of a narrative and its (actual) *content*, which of course is an old insight — made more salient in structuralism — which we will try to make explicit. Now, we will call a *story* any discourse which has a narrative structure. Hence, we distinguish between a *discourse type* (stories), its *narrative global form* (superstructure or schema), its *narrative global content* (macrostructures; which may be conventionalized as well, as in Propp's functions) and, of course, the actual linguistic expression of these in the form of a sequence of sentences: a discourse. The global content of a story, also called *plot*, should of course not be confused with the denotata of the story, *viz.* the sequence of events of some possible world: it is where the story is about, but about which we may also have other discourse types (*e.g.* a police protocol).

In order to see how narrative structures can at all be expressed by a natural language discourse, we should indicate how and where they are mapped on structures of the discourse. As we have already suggested above, this mapping takes place, first of all, at the macro-level: the superstructural schema is mapped on the (highest) macrostructural level of the story as a whole, *viz.* by assigning narrative categorial functions to macropropositions, *e.g.* as follows:

(1)  $M_i$  : It was a beautiful day =: Setting

Or conversely, given the narrative schema we may assign a macroproposition to one of the category slots. In other words, the narrative schema assigns a further functional/categorial organization to the sequence of macropropositions derived from the propositional text base of the discourse with the aid of macrorules (see van Dijk 1977b and, in more detail, van Dijk 1980 for definition and examples of application of these rules; see also van Dijk and Kintsch 1977; and Kintsch and van Dijk 1978).

As is usual for the links between syntax and semantics, the narrative categories have constraints on the global semantic content which they dominate. Thus, for instance, a Complication will require an 'interesting' event, often an event or action which interferes with the wishes or goals of a main protagonist, and a Resolution will dominate the (global) action of a person with the purpose to restore the original or new positive conditions.

Given these global constraints we may now make a next important theoretical distinction, viz, between an *action discourse* in general and a *story* (or narrative discourse) in particular. This means that stories are a particular kind of action discourse, but also that not all action discourses are stories. An action discourse is a discourse which is interpreted as a sequence of actions and their properties. Note, that this definition holds for the discourse, *not* for isolated sentences, which may well not be about action at all: /*t was a beautiful day . . . , She was very pretty . . . , etc.* An action discourse will, however, mostly feature action sentences. An action discourse may be about any sequence of actions, under the only condition that the discourse itself is *coherent* (cf. van Dijk 1977a). This means, roughly speaking, that the respective propositions of the discourse, expressed by the sequence of sentences, are interpreted as a related set of *facts*, e.g. events and actions in some possible world. The relation will often be *conditional*: one fact will make another fact possible, probable or necessary (and conversely, be a possible, probable or necessary condition for it). Now, whereas the macrostructures, which represent the 'theme', or 'gist' of the discourse, define the *global* coherence, the local coherence is defined in terms of these connection conditions, and some further conditions about identity or contiguity of individuals, which need not be specified here.

From these general conditions of discourse coherence it follows that action discourses are coherent if they denote 'connected' action and event sequences. Since, however, discourses for various pragmatic and cognitive reasons need not be fully explicit, they will represent only part of the actions and the events of such a sequence. In order to establish formal coherence, thus, inference processes must take place which derive 'missing link' propositions from our knowledge (scripts, frames, episodic memory, etc.). In order to understand how action sequences are 'coherent', i.e. meaningful, rational, etc., we must draw upon our general knowledge about meaningful action and interaction. That is, we will bring to bear, in action discourse comprehension, our knowledge that actions have underlying motivational structures (wishes, desires, wants, preferences, etc.), decision structures and intentional structures, which include the formation of purposes (aims) representing the local and ultimate (indirect) goal(s) which is expected to be brought about as a consequence of an action. Similarly, we know that actions may have complex component structure, e.g. consist of preparations, attempts, auxiliary actions, and results (outcomes). Finally, we know that complex action sequences must be intended globally, so that macrostructures of action, viz. *plan*, play an important role, both in the formation and the execution and control of a complex sequence (see van Dijk 1976, 1977a, and 1980 for detail). In other words, action descriptions may involve all these defining components of actions and action sequences. This kind of knowledge about human action is very general: it accounts both for the general structures of action and for conditions on 'meaningful' action, involving rationality, cooperation, goal-directedness, and motivations. In a sense there is a trade-off of these conditions with the very conditions on the coherence of action discourse: if we do not 'understand' an action sequence we will also fail to (fully)

understand its description, because we will ignore the motivations (reasons, *etc.*), goals, and internal order of the described action sequence.

Much of the work which has been carried out, *e.g. in AI*, on 'stories' actually is about action discourses more in general. It goes without saying, therefore, that the structures of such discourses, but also their processing and representation, is predominantly characterized in terms of the action structures briefly mentioned above. The models proposed, indeed, are a regular part of the semantics for action discourse, because they specify the normal or stereotypical as well as the bio-physical and cognitive aspects of the denotata of such a discourse. In other words, we are able to interpret each proposition of an action discourse in relation to other propositions of that discourse *via* the denoted action structures.

However, this is not the whole 'story', because, as we suggested above, not each action discourse is a story in the strict sense (we sometimes loosely use the term 'story' in order to denote other discourse types, even lectures or announcements, or various kinds of other action description discourse, such as 'news stories' or 'protocol?'). In other words, we will take as a story only those action discourses which in addition have a specific *narrative structure* as has been sketched above. Intuitively, 'stories' which do not have such a narrative structure will be considered as lacking a 'point'. People will ask *why* we tell this, or 'what happened'. Thus, if I describe in detail how I came home from my office, I have given an action discourse — which may be used in a police protocol — but I have not told a story in the case that nothing particular, interesting, disturbing, funny, or unexpected, *viz.* nothing 'ratable' happened. The intuitive notions used here are the possible semantic constraints on the narrative category of the Complication. In other words, we expect a real story to be about events and actions which interfere with normal or expected courses of events or actions, *e.g.* such that goals cannot be reached. Similarly, a 'real' story will contain a description of actions which took place 'next': how a person reacted to these events or actions, *e.g.* re-established the conditions for reaching a goal. We here find the narrative category of Resolution. We see that on the one hand the structure of action, and on the other hand the pragmatic conditions of informativeness and psychological needs for 'fun' or (**suspense**, unusualness, *etc.*) combine to rather fixed general categories of stories. These categories and their rules of syntax and semantics have become conventional in our culture, such that language users would notice when a story is ill-formed in many cases.

We have seen that the global narrative schema does not directly organize the sequence of propositions of a story, but its macrostructures. In other words, the additional structures of a story, as they are postulated in a story grammar do not pertain to specific descriptions of action sequences, but to sequences of macro-propositions derived from them. From this it follows, rather trivially, that if action discourses are taken a narrative schema does not play a role in processing or memory representations. On the other hand, *if* such narrative structures are present, and if these involve structures which are additional to the structure of the action

description itself, they *should* have an influence in story comprehension. This in fact has been demonstrated in many experiments. If there would not be an effect of narrative structures, we would probably have to revise *not* (only) our theory of narrative, but also our whole information processing paradigm, which assumes that organizing structures facilitate comprehension, representation and storage. On the other hand, it is also perfectly clear by now that since stories are action discourses, they must also be organized on the level of adequate action description. This means that structures are assigned both at the local level of connections (reasons-consequences, *etc.*), and at the global level of plans and ultimate goals in case of complex action-sequence description. This global level is described in terms of (semantic) macrostructures, which — if these are action macropropositions — also require connection between (global) actions or action components, such as motivations, decisions, aims, doings, and results. We conclude, therefore, that both approaches to the structure and processing of stories are necessary components of a theory, and it is pointless to mutually try to refute the relevant observations made from different perspectives. So, there is no adequate, *i.e.* complete, model of 'real' stories without some kind of narrative categories and rules, and no sound story grammar without a specification of the action structural 'content' of the narrative categories as it is represented by the story.

Regarding this last point, another (meta-)theoretical distinction is necessary. Most story grammars now in use in cognitive models analyze stories down to the level of action structure: motivations, attempts and outcomes, for instance, are terminal categories. Also, this kind of analysis links general *narrative* categories with the more general *semantic* structures of action or action description. I should think that this approach is both uneconomical and theoretically confusing. Such analyses will only be possible in very simple stories, *e.g.* in stories in which microstructures and macrostructures practically coincide. We have seen that narrative categories are mapped on semantic macrostructures, *i.e.* global content, of a discourse. This means that we cannot possibly go directly, by rules of formation or analysis, from a macro-level to a microlevel by constituent analysis, or from narrative schemata to semantic structures. Given the proper conventional narrative categories, we may formulate constraints of a semantic nature upon the macropropositions which are finally *inserted* into the terminal narrative categories (which is a kind of transformation operation). Next, macropropositions thus inserted should be linked to the micro-level of actual action description by macrorules (which are another kind of mappings). Not only from this (meta-)theoretical point of view a direct link between narrative structures and local semantic structures may be confusing, but also the precise description of action sequences *need* not be taken up in a specific story grammar. Structures of actions may be specified in a more general semantics for action discourse. One could even make a stronger claim: the analysis of the structures of (inter-)action need not even be given in a more specific semantics for action discourse, but may be formulated in a more general *theory of (inter-)action*, which would be a possible basis for such a semantics (*cf.* van Dijk, 1976, 1977a). The

same theory of action can be used as a basis for 'real' action production and understanding as well. Specific for a theory of action discourse, then, would be the theory of *action representation* in verbal or figura! **Such a more specific** theory would *e.g.* specify that not all actions of the sequence need be described, that some actions will be selected, that some actions will be described in greater detail and that, hence, there are levels and degrees of specificity or (over- and under-)completeness in description, and that, finally, actions may be described from different perspectives. Even more specific, this time not at the semantic level, would be a description of the particular styles of action discourses.

From my discussion it follows that it makes sense that important theoretical distinctions between kinds of structures, kinds of rules, levels, *etc.* be made, and that the set of theories involved in a complete description of stories should not be collapsed into an *ad hoc*, rather heterogeneous (or incomplete) model because some of these theories have a more general nature. Thus, the semantics of coherence holds for any discourse, and need not be specified for stories in particular; the theory of action is a more general basis of the semantics of action discourse, and a theory of action discourse is more general than a theory of stories.

## 5. Problems and prospects

**What** has been sketched above constitutes the background and the framework both for a more general theory of narrative and for a more particular model of cognitive story comprehension. Much of this framework has already been filled in by classical and actual theoretical and experimental work in these areas, and I hope my brief discussion has somewhat cleared up the (meta-)theoretical fuzziness which necessarily accompanies the development of new cognitive theories. This does not mean, however, that my remarks have been complete, let alone that they do not have or lead to (other) problems. Let me therefore briefly sum up some of the issues which **I think** should be investigated in the future in this domain of story comprehension. We will see that part of these problems and prospects for future research are more general tasks for a model of discourse processing and for a cognitive theory of information processing and communication.

### (a) *Narrative grammar*

Extant narrative grammars, both in discourse/literary studies and in psychology or AI, are of course only first steps in the direction of adequate grammars. Additional categories may be necessary and existing ones might be superfluous. The categories should be properly defined, and the rules made explicit in a metatheory. Few proposals have been made for a serious transformational component, accounting for possible variations of the canonical structure.



*(b) Types of narrative*

Much work has been focussing on particular types of 'simple' stories. An empirically adequate grammar should, of course, account for all kinds of narrative, ranging from everyday simple stories in conversations to complex novels. It may be the case that the various types of narrative have different categories and different formation and/or transformation rules. Cross-culturally we should further investigate whether the basic narrative rules are more or less universal or culture dependent.

*(c) Semantic constraints*

The most general constraint, it seems, of narrative categories on the (global) meaning of stories is that (i) actions of persons (or personified beings) are involved and (ii) that there is at least one 'interesting' event. Clearly, these constraints may not only vary across cultures but also across types of narratives. Thus, epics for instance were usually limited to dramatic actions of important people, and the same holds for novels of different periods which may be about certain events but not about others or require specific characteristics of protagonists, *etc.* Similarly, we will have socially determined semantic constraints in everyday stories in conversation. Such constraints need be investigated in the near future. More in general the principles of linking narrative structures with semantic structures should be further specified and formalized. Finally the (referential) semantics, also for fictional narratives (*cf.* Woods and Pavel 1979), needs further attention in order to link meaning with denotata in possible worlds.

*(d) Semantic macrostructures of stories*

Macrostructures of stories are derived from their microstructures as a function of the superstructural narrative schema. The precise content of this dependence should be further worked out.

*(e) Conditions on (narrative) action descriptions*

We have seen that stories are not merely action descriptions. There are processes of selection, emphasis, focussing, and we distinguish levels of specificity and degrees of completeness, and finally we know that stories are told from various perspectives. In general then we need a further elaboration of the various conditions for connection and coherence, both at the local and at the global level, for action descriptions in general and stories in particular.

*(f) Surface structures and style*

The underlying semantic properties of (narrative) action discourse may variously be expressed in surface structures. We should elaborate the 'surface grammar' for

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stories, accounting for the specific signals which indicate various categories, and the semantic properties of stories (mentioned under (e)).

*(g) Processes of comprehension*

Models of discourse comprehension should further be specified and tested in order to account for the role of the structures mentioned above. In particular we should further investigate how local semantic structures of action discourse are organized at higher levels and how narrative categories are recognized or assigned. Also we should establish the strategies which are used by language users in the actual construction of representations of stories, strategies which need not be the direct correlates of the more abstract and 'ideal' narrative rules or the rules of discourse coherence.

*(h) Narrative representations*

The representation of stories in episodic memory will be a function of the structures assigned during comprehension. However, there will be other 'structural' links between the representation and other episodic information, such as previous stories, other experiences and contextual knowledge (see below). We will want to know how actually the representation combines narrative structures and semantic structures in a way which seriously explains recall, reproduction, and summarizing.

*(1) The role of knowledge*

Crucial in (narrative) discourse comprehension is the role of (world) knowledge, e.g. as organized in scripts or similar conceptual structures. We will want to know in detail, how this knowledge is activated, and used, both during short term memory comprehension and during the actual representation of the story in memory. This holds both for our knowledge of particular stereotypical episodes and for the more general structures of action, and the structures of narrative. We should specify how expectations or other organizing strategies are formed during comprehension and storage.

*(1) The role of other cognitive factors*

Not only knowledge but also beliefs, opinions, attitudes, interests, norms, and values, are involved in story comprehension. These factors will also affect local comprehension, and the operation of the macrorules. They may assign relevance values to the story which may be personally and/or (sub-)culturally variable. The interaction of these factors with comprehension and storage need theoretical and experimental research if we want to arrive at a psychologically plausible model of story comprehension. The same may hold for emotional factors, differences in personality, or intelligence.

*(k) The communicative context*

Stories are not told in the laboratory but in communicative contexts of social

situations. We may tell and listen to stories because we want to impress, because we want to amuse, and because we have fun or have other pragmatic consequences drawn from the story (a story told as an advice, a threat, *etc.*).

Besides these conditions on the pragmatic functions of stories, they should satisfy a number of social conditions: both the narrator and the hearer will have certain roles, functions, or positions, and their associated rights, duties and relations, in the social context; there will be conditions on the situations in which stories may be told, and what the forms and contents of such stories may or should be. The language user must know all these contextual conditions in order to adequately and acceptably produce and understand the story *and* its functions and possible effects. This means that the various levels of understanding already discussed (local and global semantic epistemic, narrative, *etc.*) should be complemented with pragmatic and social understanding levels for narrative communication (*e.g.* the function of a particular narrative in a conversation). A complete cognitive model should both integrate a structural model of the text and a structural model of the context. For various reasons, *e.g.* those determined by the usual division of labor between disciplines, cognitive psychology has been neglecting the social factors of cognition. Since discourses and stories are inherently social phenomena, both our subjective and our theoretical understanding of them must involve a (complex) system of these social factors. This extension towards a 'social cognitive psychology' of language, discourse and communication is in my opinion the most interesting and the most urgent task of cognitive science in the near future.

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Several of the papers collected in this issue already have initiated attempts to formulate and solve some of the problems signalled above. It is natural that different approaches are claiming the highest relevance for their perspective, and it will also be true that some proposals will turn out to be less fruitful than others. Nevertheless I believe that all papers in this issue highlight important aspects of story comprehension and that, therefore, an integrated theory will need the positive theoretical and experimental results from the various approaches they represent.

More in general I would like to conclude that phenomena such as discourse and stories require an interdisciplinary approach, in which linguistics, poetics, discourse studies, experimental and social psychology and artificial intelligence — if properly integrated — will contribute significantly. For the readers of this journal, who have become familiar with interdisciplinary work in the humanities, *e.g.* between poetics and linguistics, it may be instructive to see that psychologists and scholars from artificial intelligence may play a crucial part in a fullfledged theory of narrative discourse, in which a cognitive model of processing and representation is equally important as a more abstract structural model.

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