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Strategic discourse comprehension

1. The Nótion of `strategy'

Most of the discourse comprehension models now on the market have a structural rather than a strategic character. They describe the understanding process completely or predominantly in terms of analysing or constructing representations and on the basis of *rules*. Such mies operate on structural units or categories, both on those of discourse and on those of knowledge. Although such rules may be motivated from a purely theoretical point of view in a model which accounts for grammars or memory representations of discourse, and although language users to a certain extent may said to 'know' mies of understanding (semantic interpretation), the actual processes involved rather have *strategic* nature. In this theoretical note I will briefly review the major points on which the strategic aspect of discourse comprehension is crucial for a cognitive model.

First, however, let us consider the notion of *strategy* itself. Besides its obvious military implications, the notion has been used aboye all in the framework of the analysis of games and play, e.g. in mathematical game theory and its applications. Such applications presuppose, first, that there are several players or participants in a game. The general *goal* is of course to *win* the game, that is, to have *better final results* than one's opponents. Games further have *rules* which determine which *actions are allowed* and in which order. Such rifles may be defined in general terms: they define the particular game which is played. Strategies, however, are variable, personal, *uses* of the rules, such that a player obtains a game situation that is comparatively better than the game situation of other players. Strategies typically have a certain number of *steps*. These steps are deliberately planned in order to reach the desired (better) game situation. For instance, such steps may be *moves* in the game that force the other players to take specific reaction steps, which in turn are conditional for the next steps of the first player. Also we may have strategic steps that dissimulate the 'real' strategic goals of a player: B thinks A is going to do p (reach result R(p) whereas A wants to reach R(q).

When we speak about strategies of language comprehension this metaphor from game theory is only partly useful. First, we normally do not have several players (in understanding monological discourse at least), but one language user, viz. a reader/hearer. Second, there is not a particular *final* goal

being desired, but at most a `continuous' goal, viz. (optimally) understanding a text, or perhaps the speaker or writer of the text. That is, if we would use the strategic metaphor at all, this would apply to uses of the notion that are close to that of pro*blem solving.* And in fact, especially AI-oriented models of discourse comprehension try to apply a problem solving metaphor to text understanding processes.

The analogy however is still rather weak. First we should have a more or less `difficult task'. Although some texts may be hard to understand, normal understanding is not usually *experienced* as a `difficult task'. Next, there should be a specific goal, viz. the *solution* of a problem of the performance of (some aspects of the) task. The analogy *does* hold however in the sense that the language user takes a number of steps in order to perform a *complex* task. These steps are not rule governed, but rather depend on the analysis, which may be variable and persona·, of the specific data at hand, and a planning procedure which calculates the possible or most probable results of each of the steps. The final result of comprehension being searched for by the language user, is an adequate representation of the `meaning' of the text, both semantically and pragmatically (which speech act is being performed), and, in a wider context, a representation of the (inter-)action of the speaker, and hence of the `underlying' intentions, or motivations of the speaker. On the other hand, the hearer/reader has more or less speaker-independent goals: (s)he may have the primary goal to use the information in the text within the framework of another task or goal (extension of knowledge, information necessary for own future actions, and so on).

Then, language comprehension strategies, just as other strategies, should be *optimal.* They should yield the best results with a minimum of `cose. This `cose may be formulated in terms of processing resources (time, attention, me-mory space). For instance, a reader may decide to read very carefully, but this requires specific attention (and hence does not allow cognitive or contextual `distraction' or `noise') and especially time. Hence, a just balance between speed and accuracy will be sought. Clearly, this balance will differ for each text type and context type. For the average citizen, reading the newspaper rapidly hardly has serious possible drawbacks in case some information is not read (understood) at all or only partially. For a politician this may be different. The same holds for contexts in which we should read texts with a didactic goal (e.g. memorize for exams). In other words, strategies crucially differ from text type to text type and from context type to context type. But for each communicative situation the optimal result is striven for: as fast as possible but as accurate as possible.

In this respect strategies differ from rules. Rules may yield a perfect ana-

lysis of the data, but they may be cumbersome, slow or place too high de-
mands on memory space or retrieval processes. It may be more effective, the-
refore, to follow a fast strategy which is nearly always correct (yielding good
results), and for those cases where wrong results are obtained, to apply ano-
ther strategy (or rule).

From these brief introductory remarks, we may now define a discourse
strategy, relative to the *goal* of semantic, pragmatic and interactional *under-
standing,* as a (pre-)programmed *plan* for the execution of a sequence of *steps,*
such that the end-result (understanding) is *optimal* given the (other) goals of
the language users and given the cognitive resources available (time, attention,
knowledge, interest, etc.). Typically, strategies will try to obtain satisfactory
intermediate goals which in turn are (supposed to be) optimal conditions for
the subsequent steps. In other words, a complex task such as 'understanding a
text' is split up in a number of `subtasks' (subprograms, subplans, subroutines,
etc.) which, together, are expected to yield the desired final result.

Note that strategic planning of language comprehension strategies is sel-
dom 'conscious' in normal interpretation situations. Conscious or even expli-
cit planning only takes place when the text is some semantic puzzle, for instan-
ce in the case of a riddle, a modern poem, or a scientific paper. Hermeneutics
is precisely the study of these `explicit' strategies in the interpretation of
texts.

We have assumed that there is not just one set of strategies for discourse
comprehension. For each subproblem we may have different sets. Thus, we
may have syntactic, semantic or pragmatic strategies. Characteristically, how-
ever, unlike rules, linguistic strategies are *not just* level specific. Thus syntactic
analysis may make use not only of surface structure data (word order, syntac-
tic categories, morphological information), but also and at the same time of
(partial, expected or already present) semantic and pragmatic information. In
other words, strategies are *flexible:* they may be adapted to the particular si-
tuation at hand.

In this note, I will focus attention on *semantic strategies* of discourse.
That is, those strategies that are applied in order to reach an adequate (partial)
interpretation of the text. Cognitively this means, traditionally, that -- stepwi-
se -- a semantic representation of the text is being constructed in episodic me-
mory. The adequacy of that text representation (TR) in EM is measured along
several dimensions or criteria. It may mean that the TR must be relatively
complete. This completeness may hold both for the local (detall) level and/ or
for the global (macro-) level of understanding. It may (also) mean that the TR
must be optimally *relevant:* in that case it must contain the information which
is *needed, i.e.* information which is useful for the performance of other tasks.

Third, it may mean that the TR is optimally *organized,* presuming that better organized TR allow faster retrieval than messy TR's. Fourth it may mean that the TR is optimally *embedded:* if a TR is just a loose part of EM even well-organized it may be difficult to find it back if it is not related to other episodical experiences or other cognitive information (knowledge, beliefs, opinions, attitudes or emotions). These are just four adequacy criteria. Maybe there are more. Important to stress though is that apparently (semantic) strategies are not only defined in terms of the kind of units or levels or sections they apply to (the *categorical* aspect of strategies), but also in terms of the kind(s) of *adequacy* they want to establish for the planned final result(s).

Let us now try to review a number of these semantic strategies needed in a model of discourse comprehension. In this note, the strategies will not be formally formulated. Our main concern is first to discern the major *kinds* of strategies involved. Later we then will have to make these explicit, both within a partial theory and as hypotheses or conclusions of experimental work.

2. *Sentential semantic strategies*

Since we focus attention on textual comprehension we will be brief about sentence based strategies, i.e. the understanding of words, phrases, clauses or whole sentences. These have extensively been discussed in the psycholinguistic literature. The upshot of theory and experimenta at this level is that (i) semantic interpretation makes use of various kinds of surface structure data (syntactic structures, lexical items, stress and intonation, etc.) semantic data (previous interpretations), world knowledge (expectations, probable facts), and pragmatic information (what speech act is now probably being performed?), (ii) these data are not reviewed level by level, but in an optimally combined way, and (iii) they are monitored by the final result (a semantic interpretation) aimed at, or rather by the *probable schema* of such a result (conditions on `meaningful' interpretations).

This means, for example, that if the final representation should feature the semantic category of an Agent (e.g. because the text and context suggest an action discourse, see below), surface structure will be scanned for word order (initial noun phrases will often express Agents), categories (Agents are usually expressed by noun phrases), lexical information (Agents are often human individuals), and

It will be assumed *here* that semantic representations have schematic FACT structure. That   do not simply represent the meaning or content of sentences in terms of   of (atomic) propositions, but rather in terms of a *functional diagram,* featuring a major predicate (representing a state, process,

event or action), the sequence of Participants, such as Agent, Patient, Object, Instrument, etc., together with their Modifiers, and finally categories of a circumstantial nature, representing the possible world, time, place or conditions of the major event, state or action. Such a FACT is a cognitive representation of a fact denoted by the sentence (or clause). This may mean that the linguistic information as such may not be sufficient to fin the slots of the schema: world knowledge of contextual (episodic) knowledge may be required to fin empty slots if necessary'.

Now, important for our discussion is the assumption that *sentential strategies are co-operating with textual strategies.* Sentences usually do not come alone but are part of monological or dialogical discourse. Hence, after the first sentence, their interpretation, and *hence* the strategies involved, will depend on (i) information expressed by or implied by previous sentences (ii) expectations about `what will come next' derived from previous sentences (FACTS), (iii) strategies which have proven to be successful in previous interpretations of the same text, (iv) over-all goals (in terms of final interpretations and their adequacy) of the text as a whole *(v)* over-all goals of the speech act or interaction as a whole. These strategies go vice versa: in order to interpret specific sentences we need textual information (or expectations), and in order to understand larger textual structures, e.g. sequences, we need information from the individual sentences. In both cases (directions) the processes will be both top down and bottom up (data driven), because world knowledge and structural knowledge will monitor understanding both at the sentence and at the text level, whereas in both cases also the actual information of the text is needed to fin the schematic hypotheses or to match the predictions or expectations.

3. *Local coherence*

As soon as we go beyond the sentence (or clause) boundary, the language user will have to solve a first strategic problem, viz. to establish *coherence* between the clauses or sentences interpreted along the (strategic) fines suggested briefly aboye. Of course, the major monitoring strategy is the very *assumption that* the subsequent sentences of a text *are* coherent. This assumption is the so-called `normalcy' condition on semantic interpretation, which is so strong that even in the face of lunatic, literary, children or different-culture's discourses, which need not be coherent-for-us, we at least try to establish an interpretation, i.e. to link sentences meaningfully.

The general processing model for these local coherence strategies assumes

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' For details about FACTS and FACTS-strategies, see van Dijk (1978) and van Dijk (1980a).

that each `new' clause or sentence, after interpretation, is being *linked to* a (or the) previous sentence representation. If such a link is possible and adequate (satisfies a number of coherence conditions) the conclusion is that that piece of the text *is* coherent, after which new information may be decoded and interpreted and linked to the previous information, and so on. This process is cyclical because of the memory limitations of the STM buffer, the capacity of which does not allow directly available storage of more than a couple of sentences (say two or three complex -- FACTS). Once a coherence link has been established, the oldest information may now be transferred to episodic memory, from where it may be retrieved immediately if needed for further coherence links of a more indirect nature.

This is more or less the theoretical process involved. It however is still very rough and not very strategical. In order to allow fast coherence interpretations we should assume that the process is more complex and more flexible at the same time.

Before we specify some details of these local semantic strategies, it should however be noted what kind of *textual representation* we are after. We have seen earlier that this final 'goal' of understanding is a major monitoring device for the application of strategies: if the language user does not know *what* to construct at all, how can (s)he possibly do it, let alone do it optimally? So, I will here assume that understanding discourse is also and at the same time understanding the *world*. This aspect of semantics, somewhat neglected in cognitive psychology, is important for several reasons. Not only do we need comprehension of aspects of a text, i.e. what it is *about,* but also it should be borne in mind that the speaker not (only) wants to be understood, or the text to be understood, but also the hearer/ reader to change his/ her *knowledge* about the world according to the information of the text (and speech act performed   by the utterance of the text), and possibly the hearer to change his/ her opinions or attitudes with this knowledge and/ or starts planning some action. ln other words, it is essential that the reader / hearer not only constructs a good representation of the text `itself -- so that later reference can be made to what s actually raid but also an adequate *picture* of the world, that is of the complex sequence of states (a *scene)* or sequence of events and/ or actions (an *episode),* as denoted by the text or otherwise, e.g. paratextually, referred to by the speaker.

Compared to the world picture thus being constructed by a reader/ hearer, the textual representation may be relatively incomplete or fragmentary. That is, we have processes of various kinds that map world pictures from TR's together with contextual and more general world knowledge. After all, it will happen often that a text is about the same or a similar picture, and in that case

we only need to retrieve that picture, or actualize an instantiation of it from LTM in case the picture is stereotypical (restaurant, parties, etc.). Thus, we assume that in episodic memory a language user will principally try to construct a semantic picture by means of the TR also being constructed. Of course, instead of a full `double representation' system, we may assume that the semantic TR is some form of `graph' within the world picture, possibly signalled with various surface structures (and schematic structures, see below).

For our local coherence strategies this means first of all that we will not simply try to connect two FACTS (or propositions) according to the semantic tales of discourse, but also, and above all, that we check in the world picture we already had before (experience, previous texts) or which we are now constructing, whether the two or three FACTS involved can be connected at all in the world picture. Sometimes this connection is so obvious, or has been pre-programmed (episodically or in LTM, e.g as a more general script fragment), that further analysis of TR or WR (world representation, the picture) is not necessary. This is of course a very fast strategy, but may lead to obvious errors if no minimal *side-checking* is performed (same world?, same situation? same participant? , etc.).

Against this background of episodic memory representations of both text and world, we may now try to distinguish a number of strategy types aimed at `drawing a good picture', i.e a picture that is clear, has good likeness with the `real world', is more or less complete, detailed, and useful (relevant).

3.1. A first local strategy is obvious: if a sentence in a textual sequence should be linked coherently with a previous sentence, then it is not plausible that it will first be interpreted completely. On the contrary, as soon as some first semantic category has been established, mostly a Participant (e.g. an Agent) or a Circumstantial (time, location or manner), this category may be matched with the representation of the previous sentence. Thus, a pronoun or definite noun phrase may be linked to the same individual represented in the picture WR
e.g. some person -- as an individual already identified by a noun phrase in the previous sentence. The pronoun and especially a full (definite) noun phrase will in general be sufficiently specific to (re-)identify this discourse referent in WR. If not, further information must be gathered to identify the correct referent, e.g. by analysing the most probable predicate which would fit the individual in WR, i.e. the FACT as a whole in which the individual plays a role.

Note that if the next sentence is introduced with a `new' individual expression (signalled with an indefinite noun phrase), this may mean that the individual should be constructed in WR for the first time: no need to re-identify an

individual already in WR. Similarly, time or place expressions may signal that we no longer are within the same episode, but have to change to another situation (and -- see below should construct another macroproposition): *the next day, in London, in the order* room, thus, are expressions which may change the scene for the facts being talked about.

Hence, we have partial interpretation of a next sentence, identification of the proper semantic category, and then as soon as possible the establishment of a coherence link with a previous sentence representation. This may mean, for instance, that the next FACT, now under construction, takes place in the same situation (time, location, world) and features the same participant(s). Of course, the minimal (neither sufficient nor necessary) coherence is important as a first step (!) in the linking process of the subsequent FACTS as a whole.

Note that it is precisely this strategy which presupposes the linguistic *topic-comment* articulation of sentences. The topic contains precisely the semantic information that serves as the first-coherence-link with previous discourse: usually expressed by pronouns or definite articles, it mostly will (re-)identify the individual(s) that will also appear in the FACT being constructed, whereas the comment then will denote that part of the new (next) FACT that has not yet been identified before, and for which, therefore, another kind of coherence strategy is required. This kind of link between sentential surface structure (word order, syntactic categories, but also intonation and special morphemes), semantic representation of sentences and coherence strategies not only hold for (expressions of) individuals, but also for propositions or (embedded) FACTS as wholes, for which subordinate initial clauses, nominalizations, etc. may be used to signal that this piece of information denotes part of the WR already denoted before. In general then, topic-comment articulation, presupposition and similar phenomena, serve as discourse coherence strategic data, which `point at' the location of WR the text (or TR) is *now* `about'.

This first local strategy has all the typical characteristics of a strategy: (i) it is monitored by structural characteristics of its 'goal', viz. TR/WR (i.e. identification of some Participant) (ii) it uses various kinds of data, also surface structure data of the (next) sentence, now being processed, (iii) it is hypothetical, because the assumption may be revised after further information of the sentence, (iv) it is effective, because it serves as a first (provisional) coherence link between two FACTS even if the second FACT is not yet entirely known.

3.2. What next? What is the second strategic step in the establishment of semantic coherence between subsequent sentences of a text? Assuming that a

provisional link has been established by the (re-)identification of one of the participants in the next FACT, the other elements of this FACT should now come into the picture. In this stage it is important that this next FACT gets its usual hierarchical structure. This means that the major predicate must be identified, i.e. the state, event or action in which the (given) participant is avolved. For English this implies that the (main) verb of the Verb Phrase is being interpreted, establishing at the same time the over-all schematic structure of the FACT, that is the various roles (cases) which can be expected. After a brief check with WR whether the first-linked participant can indeed be in a role --e.g. Agent of this schema, a link must be established between the main predicate and the previous FACT. A first information we have comes from morphology: the *tense* ending of the verb will indicate whether we still are within the same time dimension of the situation (scene or episode) established by the previous FACTS, whereas *person* indication (singular, plural, lst, or 2nd/ 3rd person) will indicate whether the participant is subject of the verb, and hence maybe indeed Agent of the action, or Experiencer of the event denoted by the verb. These are the usual sentence comprehension strategies, but it is interesting to note that they are text-sensitive: they do not merely indicate time or role, but also 'same time' or 'same participant' in relation to previous FACTS denoted by the text.

Proper predicate coherence establishment is a strategy that needs world knowledge. In order to decide whether some event or action can be linked to a previous one, we must know what possible relations in the world can obtain for such events or actions. Although there is a variety of such relations, we may summarize them as *conditional* and *functional relations,* respectively. Conditional relations are those that enable, make probable or necessitate facts given other (previous) facts. Functional relations are rather intensional; they specify what kind of *information* linkage there is (e.g. general vs. specific, statement vs. example, contrast, etc.). For the conditional relations, the strategy then must establish the link both ways: is the previous predicate (or FACT) a possible condition, a probable condition or a necessary condition for the actual predicate (or rather FACT-schema we are now constructing), and, conversely, is the actual predicate, or

possible, probable or necessary consequence of the previous fact(s)? This answer may be supplied in a variety ef ways, some strategically based, others rule based. First, the relation may mata ith an expectation already generated by inference from previous facts/FACTS: if somebody is said to have a gun with him (in a crime story), the i

expectation which may simply be `verified' by the interpretation of the predicate of the actual FACT. Secondly, episodic information in which the WR is

embedded may provide this kind of match: we simply remember from previous texts that there is a world picture fragment in which Americans may use their power when their oil supplies are menaced, so if we read about army movements of the USA after some blockade of a crucial tanker line, this link will be verified as `coherent'. Third, more general world knowledge -- derived from episodic knowledge -- may provide more systematic and stereotypical links between the predicate and the previous facts, e.g. in the case of frames and scripts: usual properties of previously identified individuals are now matched, or subsequent stereotypical events or actions in which they are engaged (in the usual restaurant, party, supermarket or breakfast scripts). This is where the strategic data originally come from, but part of them may already be part of WR (actualization of episodic memory or explicit expectations derived from previous parts of the text). This means that in many cases the coherence check for the predicate can be read off directly, so to speak, from WR. In other words, this fragment of TR can be accepted as coherent if the predicates are already linked (conditionally or functionally) in WR or if such a link can be established in WR given further data from EM or LTM (scripts, etc.).

Note that predicate coherence, as we suggested, goes both ways: the strategy must check whether the actual event or action is a possible (or probable or necessary) consequence of the previous one, and at the same time will check whether the previous one was a possible, probable, or necessary condition for the actual action or event:

(1) John fell from a chair. He was dead.

(2) John fell from the Eiffel Tower. He was dead.

In the first case coherence presupposes that the second fact (state) is a possible consequence of the first. This is the case, but a rather unlikely one. In the second example, John's being dead is a consequence of a rather unusual condition. In the other words, in (2) the consequence may easily be predicted given the first sentence. In fact, most texts will not even bother to mention it. In (1) this prediction is highly unlikely, and we will after the second sentence expect information about what happened exactly: how he fell, why he died, etc. In (2) we will want more information not about the consequences of the first sentence but about its conditions: how was it possible that John could fall from the Eiffel tower? But once given the first sentence of (2) the coherence match for the second one is easy: it will simply check a probable expectation inserted into WR. We may on the basis of this interpretation strategy, and for a given person or group or culture, define the *news value* of each textual continuation in terms of the probability that a link between the facts already has been or can be inferred from the previous FACTS, together with other episodic

and general knowledge information. The higher this probability the lower the news value. This strategy presupposes other local coherence strategies of a more general nature. We already assumed that tense and person endings (morphemes) signalled same time and same participant. We must also assume, however, that *next sentences denote next events or actions* (or resulting states). If not, this must explicitly be signalled y appropriate tenses, adverbials or connectives *(earlier, before, the previous* Later mentioned previous conditions are functionally interpreted (if world knowledge does not provide a possible consequence link) as in:

(3) I had a car accident yesterday. The brakes did not work.

where the situation of the brakes is not interpreted as a consequence but as condition of the accident (by scriptal which means that the coherence link is functional: the second sentence is used as an explanation of the (fact denoted by the) first sentence.

In less clear cases appropriate *connectives* must signal] the particular relation between the predicate (new FACT) and the previous FACT: for each conditional relation (both ways) we have several connectives (depending also on subordinate/ main clause structure). They typically will introduce the sentence or the clause, even before the topic (subject, Agent, Noun Phrase) information re-identifying the relevant old or new participante. This means that first a link is established for the FACTS as wholes, in other words that the *kind* of relation is now relatively important (or not predictable or inferrable given the two FACTS). Strategically, connectives are very important. Neither identical participants nor possible consequences as such are sufficient for the establishment of Coherence[2] : what we need is a relation between the FACTS as wholes; and the connectives, all other things being equal, are the most effective signals for the nature of this relationship between the facts (the FACTS in WR).

Note, furthermore, that the link between a predicate and previous FACTS need not be with an immediately preceding FACT, i.e. with the FACT denoted by the last clause or the last main clause, although this may well be a condition for the *strategy,* not for the *rules* of linear coherence. So, if no link can be established with the last (main) clause (FACT), there should be a strategy that effectively finds the appropriate FACT, either in the STM buffer, or by reinstatement from EM. With the double information at hand (looking for the most appropriate condition for the actual consequence, and vice versa) this search (in WR/ TR) may be effective because there will be few possible candidates at such a local range for this kind of `double bind'. Of course at longer

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[2] See van Dijk (1977).

text ranges this number of possibilities will be much greater. But in that case, there is a textual production strategy which `recalls' previous facts, by presupposition or in general subordinate clauses:

(4) Because the brakes of my car didn't work, I was arrested by the cops.

As for already introduced individuals such initial, subordinate clauses will simply be used as a strategic cue for the reinstatement (or search in WR) of the relevant condítion of the new FACT now beíng constructed.

3.3. The next strategy, or set of strategies, will complete the coherence analysis of the next FACT. That is, once established a link for the main predicate, we also have the provisional schema of the FACT as a whole. Essentially this means that the other participants in the FACT are reviewed for possible coherence links. Again definite noun phrases or pronouns will be cues in thís case. I don't know whether there is some ordering in the strategic construction of the (next) FACT and hence in the establishment of (further) coherence with the previous FACT. Maybe normal surface ordering of English (direct ()Hect, indirect object, complementa, representing semantic Object or Patient, Goal and other roles respectively) is a *cue* for strategic ordering.

Once analysed the *sentence as* a whole, and constructed the full next FACT, the foregoing strategies may briefly be checked for adequacy. That is, was the correct coherence established as assumed or did the full FACT yield information that should revise the original hypothesis? After ahI the first noun phrase (subject) turn out not to be the Agent (or not the sentence topic) and hence not thc primary participant being the 'bridge' for the coherence relation at all.

3.4. Local coherence is a function of global coherence. Subsequent propositíons or FACT , well be connected, according to the strategies mentioned aboye, but this is no guarantee for over-all *coherence:* there may be no line or orientation in the coherence or, in other terms, there is no topic or theme 'under' which the respective sentences are connected. This means that the next local strategy is a check with the `ongoing' macroproposition: does the next FACT belong to the same topic, or is another topíc being initiated? In fact, if no immediate coherence can be established by the strategies mentioned aboye, this may mean that a new topic is introduced, and that the next sentence/FACT is the first of a next episode.

Pan of this strategic control on global coherence has already been performed: íf the next FACT ís expected on the basis of world knowledge this may mean that this FACT is indeed also globally coherent if dominated by the

same macroproposition as the (more general) one dominating the script in world knowledge. Concretely, we know that 'John bought a ticket' is not only possible after the sentence 'John went to the station', but also that it is a next component of the series of actions together defining the global action of 'John made a train trip'.

This global coherence check may again be strategic in the sense that not the full sentence must have been understood before part of the strategy already applies. Given an Agent and the main Predicate, this may perhaps already give a cue for provisional macro-match, e.g. if the Agent of the macro-action is the same person, and if the predicate appears in the same script.

4. *Global coherence: macro-strategies* (see previous Notes on this for detail)

In the last strategy of the establishment of local coherence already appears the necessity of establishing also global coherence. According to the theory of discourse understanding, this means that language users will try to derive a global theme or topic from fragments of the text. In other words, they will construct semantic macrostructures.

Abstractly, macrostructures are derived from the text base by the application of macrorules to sequences of propositions, both those expressed by the text and those inferred from general knowledge. However, strategically this would be very impractical: a reader will seldom wait until the end of a passage or whole text before inferring the theme or topic. Not only (s)he will want to know as soon as possible what the text is about, but also a provisional macro-hypothesis is necessary to do the control, mentioned above, of local coherence. Finally, there are memory capacity constrains that force the reader to 're-duce' the textual structure as soon as possible, which means that the text base will as soon as possible be further organized by means of higher level macro-propositions.

The first question is: when and how does this 'provisional topic assignment' take place? Strategically of course this would require 'as soon as possible'. If a first sentence of an episode or text already allows a probable global topic, this topic will be taken as the provisional topic for the sequence as a whole. In general this may mean, again, the application of world knowledge because if the first sentence may be matched with a script (or episodic information), the corresponding macroproposition may be derived immediately:

(5) John went to the station. (...).

This would perhaps generate already the macroproposition 'John is making a trip by train', a hypothesis confirmed by a next sentence like 'He bought

a ticket' and disconfirmed by the next sentence 'He bought a newspaper at the newsstand and went home again'.

This will in general hold only for those sentences that express propositíons whích are components of stereotypícal scrípts. If the first sentence does not yet allow a full macro-inference, the strategy may also be partial:

(6) John got up at seven o'clock.

In this case we may of course first construct a macroproposition about the getting up or breakfast ritual, but it is unlikely that a story will be about that. So, these may at most be sub-topics introducing a major topic. As a provisional hypothesis however it may be assumed that John ís a participant, even perhaps Agent, in the main macroproposition (MACROFACT). Of course the story may after all be especially about Mary, but still it would be strange if such a story would begin with (6).

So, we assume that a macroproposition is inferred as soon as possible from the first sentence or sentence pair, or that even parts of this macroproposition may already be constructed if the first sentence(s) does not yet allow complete macro-inference. We have observed also that world knowledge is crucial in this strategy, because it must provide expectations about what may come locally and/ or what `is the case' globally, against the background of scriptal or otherwise known information about well-known components of a larger theme.

Macro-strategies are very complex. Let us merely give a summary of the most plausible ones. As we see they not only are based on semantic information, but also on other kinds of information, such as surface structure or contextual information:

a. Expectations of the hearer/ reader about the probable topic of the discourse inferred from knowledge of the hearer, the specific situation (e.g. a class, train or doctor's), the interaction context (the approaching stranger in the street apparently having lost his/her way), etc.

b. Information from previous texts in memory in similar situations, of the same person, etc.

c. Title, headings, summary, lead, etc. at the beginning of the text or the episode, all expressing directly a macroproposition or part of it.

d. Thematical sentences, key words, italics, etc. expressing or signalling what the passage is about.

e. Rhetorical structures of the passage, whích may partly predíct aspects of (next) semantic content at a global level. For instance a Contrast may organized opposite themes, a Parallelism may organize similar themes, and so on.

f. The schematic structure of the text, if stereotypical and hence pre-
programmed in the reader/hearer, will normally impose contraints on its
macro-content. This means that we may have expectations about at least
the nature of the macropredicate or partecipants (e.g. an action, human
agents, etc.). The same not only for narrative structure, but also for argu-
mentative structure, newspaper stories or psychological research reports.

We see that the basis for the inference about what to expect globally is rather
comprehensive: seldom a hearer/reader will only have to judge after the first
sentence alone; the context type, the text type and several signals (announce-
ments, titles, etc.) already give partial or full suggestions.

Once established a partial macrostructure, the inference of further ma-
cropropositions is of course still easier, because then the usual 'local' coheren-
ce conditions come into play: each macroproposition must of course, for each
macrostructural level, be normally connected with previous ones. Inference
from world knowledge and these previous macropropositions will, together
with the other cues of the strategy, yield a still better prediction of what will
come `globally'.

Clearly, this is all a combination of top down and bottom up inferencing.
The 'real' assignment of the (next) topic or theme will of course be possible on-
ly after having read part or all of the sentences of the episode that `expresses'
the topic or theme. In other words, at each step the hypothesis is more (or less)
confirmed, and finally accepted (or rejected).

5. Schematic strategies

In this model of discourse processing it will further be assumed that at
least certain classes of texts have so-called 'schematic' (super-)structures. This
means that macropropositions of the text may have a global, conventionalized
`function'. Conversations may have introductory categories (e.g. Greetings) or
final categories (Leavetaking), stories may have Setting, Complication, Reso-
lution, Evaluation and Coda, and psychological papers have conventionalized
global categories such as Theory-Hypothesis, Experiment (Subjects, Mate-
rials, etc.) and Discussion.

Arguments which have been brought forward against the development of
formal systems (e.g. `grammars') for this kind of schemata are not valid. Con-
ventional categories of this kind cannot: be explained away by reducing them
to local or global constraints on for action structures, such as motiva-
tions or goals. Local constraints on action descriptions are not the same as the

global categories of a more conventional nature. If so, an action description such as

(7) John was hungry, so he bought himself a hamburger

would be a well-formed   story, because we have a motivation and the realization of a goal. Those   ≈ries have a Complication category is not motivated by the action structure, 1 x a conventional fact of narrative discourse in our culture.

Thus, we assume that language users will try to fit the macrostructure of a text which has little further structure apart from linear coherence connections into such a conventional schema. This means that as soon as possible they will try to decide to which schematic category a part of the text belongs. Since the schematic structure is conventional, a first hypothesis is that the text has *canonical,* that is *normal* global structure. If the first sentences of an episode can be interpreted as a macroproposition which fits a first category of the schema, e.g. the Setting of a story, then it will be assumed that the present part of the text is indeed the Setting.

Next, schematic categories will need some signalling, because the language user must know where the first schematic category ends and the next is operating, e.g. a Complication after a Setting in a story. This means that if a sentence or a sequence of sentences (an episode or part of it) does no longer fit the macroproposition which has the schematic function of the first category, a next category may be actualized (since the schema is conventional in a given culture this processing has top down aspects). The inferred macroproposition will be matched with the constraints of the schematic category. Thus, a Complication must be filled with a macroproposition that denotes a problem, a difficult task, an event or action preventing the normal development or goals of a person or group.

This semantic aspect of the strategy may be completed, as is usual for strategies, with surface signals. The episode may be marked, first, with paragraph indentation, pauses, or chapter segmentation, possibly with appropriate titles, headings or announcements, Secondly, a next episode may be

6. *Strategies for knowledge use*

It has become a truism that discourse understanding is impossible without the actualization of great amounts of knowledge. Texts typically are incomplete, or, in other words, much of the information is `presupposed' or implicit in them. To understand sentences, to establish local coherence relations, to deri-

ve macrostructures or superstructures, we need information from our world knowledge as is stored in LTM.

It also hardly needs to be repeated that to address these vast amounts of information effectively, this knowledge must be organized. Concepts, thus, are related to other concepts that belong to the same `domain'; clusters of concepts are organized in frames, scripts, episodes, scenarios and similar higher order structures. These structures, such as all those of LTM (semantic memory) have a general, abstract and stereotypical nature. They must be applicable to many situations, so they may not be too particular, too rigid or too precise. They must be flexible and general, allow fast search or flexible actualization.

What we know little about though is how precisely this organized knowledge is *used* in discourse comprehension. We do not know how much is actualized (or activated), what strategies are involved in search and application, what information is not only `used' but also `represented' in a text or world representation in EM, and so on.

So, on the one hand we have the *lower bound* of comprehension requiring a minimal activation of knowledge so that sentences can be understood and minimal coherence established. On the other hand we have the *upper bound,* rather flexible and depending on subject and situation, consisting of the maximum amount of knowledge being activated for 'normal' understanding (interpretation) of a given text. Such a text contains expressions for many concepts but we know that it is extremely unlikely (or even impossible) that a language user will actualize everything (s)he knows about those concepts or the schema-like structures in which the concept is involved. To wit, in a story about a birthday party, we may have it that juice is lacking and that John briefly goes to the supermarket to get some. In order to understand the text we on-/y need to know in this case that a supermarket is a public shopping place where one can get food. All we know about supermarkets or shopping is not necessary in the understanding of the story.

Apparently, then, a first knowledge use strategy is that knowledge is addressed in so much detail as may be used for the understanding of sentences belonging to the topic (macrostructure of the text). In our example this means that we need to actualize much more about the birthday party script. As soon as, unexpectedly, an apparently unimportant episode appears to become more important (e.g. John forgot his money when he went to the supermarket, or there was a hold-up when John was there) the script may be actualized after all. I will call this strategy the *level correspondence* strategy: if in a text only high level descriptions (of events or actions) are given only high level script information is needed, and if details are given in the text, knowledge will be addressed until the corresponding level of detail in the script. The correlate of

this hypothesis runs conversely: if a concept or proposition is a higher macro-proposition of the text (a more important theme), then knowledge scripts or frames associated with this concept will be addressed 'deeper' (in more detail).

Yet, this is not sufficient. We may indeed distinguish between `activating' (addressing) knowledge on the one hand -- so that it is ready for use -- and the actual use or actualization, or application of knowledge items. Many aspects of stereotypical knowledge will thus be activated without being used.

Another question pertains to the constructive aspects of used knowledge: how much may be (partially) constructed as part of a representation of a text or of a situation?

Again, this requires a strategic solution. Too powerful and too costly, apparently, is a strategy actualizing all the addressed knowledge and constructing all of this in some representation. On the other hand, if we only had *ex post factum* actualization of script-like information, i.e. only if really needed for a match or the establishment of minimal coherence, script information would be of little help in understanding, and no predictions/expectations or top clown processing would be possible or plausible. So, the expedient strategies must be localized between these two extremes.

Before we can answer these questions, two remarks are necessary about issues a bit overlooked in stript theory. First, a script is necessarily a general, abstract and stereotypical kind of knowledge structure. So, *direct* application of scriptal information (e.g. propositions) is impossible. What we first need is *instantiation* or *particularization:* the variables of the scripts must be replaced by the constants of the text (according to global constraints on possible values for each category): that *a person* may get drunk at a party should be instantiated into the possibility that *John* gets drunk, etc. Secondly, the information of world knowledge, by its stereotypical nature, will in general (in instantiated form) be only 'background information' in a story or other text type: no need to state the obvious or well-known. The few propositions which are expressed in the text will in general just *frame* the other ones. If Peter goes to the station, buys a ticket or chooses a seat in the train this is just to (i) signal that he is making a train trip, (li) w ensure that a more or less plausible description of the 'normal world' is given, but aboye all (iii) to be able to localize the really *interesting* facts of the story, e.g. that he gets an accident, falls in love with a girl he meets, or something elle narratable. In other words, the realization of a script will in general precisely *not* define a real text. They are not the text but rather the background *texture* that makes the other facts understandable, coherent, etc.

Against this background we may try to answer the tricky questions about the amount and manner of actualization and integration of knowledge, i.e. its use in STM and storage in LM, respectively.

Corresponding to the level strategy, which states that only that level of knowledge representation will be addressed that corresponds to the *level of description*[3], we will next assume that the `amount' of knowledge actualized at each level corresponds to the *degree of completeness* of the given passage. That is, if the passage apparently much detail (instead of just selecting

at éach leve!! then it is a plausible strategy that a corresponding `degree' of pre-programmed information is actualized and used for creating possible expectations. Thus, a detailed description of a restaurant scene will simply make use of more known details of the restaurant script. Of course this completeness strategy is linked to the. descriptive level strategy: the lower (more precise) the level of description die more details we will usually get. Yet, the link between the two strategies is not direct: there may be stylistic variations ín degree of completeness for each leve!.

Then, we have the *integration* problem. The question is: is knowledge once actualized and used in STM fe* --y task of discourse comprehension, for instante local coherence establishment , also *integrated* into the episodic text representation? In the Kintsch-van Ni: (1978) model it was assumed that all and only those propositions are integrated that are necessary to establish minimal coherence, i.e. for the identification of referents or for necessary conditions (presuppositions) for interpretation of propositions expressed by the text in general. Although this seems theoretically correct, the strategies involved may be more flexible. Instead of (re-)identifying a referent or a fact from the TR ín episodic memory, the language user may símply check quíckly whether `this kind of referent or fact' may appear in `such a situation', that is directly check with scriptal knowledge, without however integrating this knowledge into TR. Only for very specífic, non-stereotypical information the reader may be forced to check with the preceding part of the TR. This strategy is faster if we assume that search in stereotypical knowledge is indeed easier than a check in a unique, perhaps very complex TR.
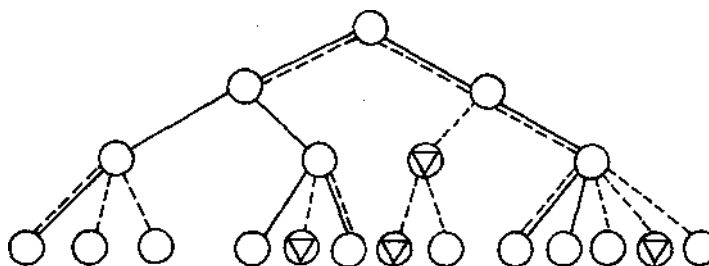
To solve this problem I have assumed earlier[4], that a double system of representation seems necessary in EM: both a TR and a representation of the situation-event-actíon denoted by the text. In that case the TR may be relatively economical, and the world representation (WR) may contain (i) a scriptal framework, actualized and instantiated from LTM and used to search for memory traces of the same kind ín EM, (ü) detailed ínferences induced by TR-information, (iii) personal associations and evaluations or previous experiences with previous situations or texts about such situations of the same kind.

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[3] See van Dijk (1977) and van Dijk (1980b).
[4] See van Dijk (1980b).

This WR, unlike the TR, need seldom be constructed from scratch: on the contrary it consists of actualized or `remembered' fragments , scriptlike or more accidental memories which need only be enriched with the actual information of the current text -- as represented in TR. Reference, missing links, relations between FACTS -- and hence conditions of coherence, and macropropositions, may be supplied by WR: as long as the picture itself remains consistent with LTM knowledge and previous experiences, the text will be acceptable and understandable. The TR itself in that case may be much more idiosyncratic: feature surface structure (stylistic) phenomena that are interesting, specific schematic or semantic organization that is not pictured in WR (e.g. literary or rhetorical transformations), etc. If these more specific textual structures do not have links with WR or with other relevant (opinion, attitude, emotion, evaluative, interactional, etc.) functions, memory for it will be short-lived, and alter longer delays only the WR-based semantic information will be retrievable as has been shown in all discourse experiments since Bransford-Franks (1972), or even since Barden (1932). Indeed, those elements of WR not corresponding to elements in TR will also be `falsely' remembered. Instead of constructing each time we read a (new) text a new TR which also features a lot of knowledge and a lot of personal memories, it therefore seems plausible to account for these phenomena with a combination of textual and world representations of which the latter is partly `old'.

The precise format of this double representation does not matter here. Instead of assuming two independent networks it might be more realistic to assume that the two structures are combined in some intelligent way. This means that some nodes and/ or paths of a representation tree for the situation may be assigned an extra signal meaning that this aspect has been expressed by the text (in a specific way). In addition those nodes or paths not yet known or remembered are now established for the first time by textual information. The picture we get then may be as follows:

Schema 1

In this schema the solid fines represent links between concepts already known from general knowledge (scrip$_t$s, frames) or known from previous experiences, whereas the dotted lines are those added by the TR. Similarly, circles denote concepts already known and triangles concepts now being inserted for the first time into the combined TR/WR.

One argument against this kind of combined representation is the possible *transformations* in the text. Of course, these may be `reduced' to normal form in TR/WR, but experimenta have shown that both surface structure style, some syntax and lexical items as well as schematic ordering may be recalled or recognized as such, for at least some time. In that case we would need a real double system with appropriate *fines of correspondence.* As soon as some concept or proposition is missing in TR it is checked in WR whether it occurs there.

The major strategy we now seem to have is apparently not one by which world information is integrated into text representations, but rather text information that is integrated into world representation. Although the precise details of this strategy are still obscure, the over-all approach seems rather plausible: we hardly ever read texts 'for their own sake' (except in literary communication or ritual situations), but rather in order to know something about the actual context or the world in general.

The prediction in that case for the *difficulty* or *readability* of a text is that the larger the correspondence between TR and WR the easier it is to understand the text. In other words, texts about situations we have little general knowledge about but also situations we have not read about or experienced at least partially before will be more difficult to understand, because in that case (i) there is no 'background knowledge' for the numerous matches each text comprehension process needs, (ii) the construction of WR must be nearly from scratch. So, a story about an everyday accident or incident will be easy to understand because it features many actions, events, objects, locations and participants we already are familiar with. But a description of a more technical nature or a description of an expedition into strange countries or worlds (as in science fiction) will be on the whole more difficult, even if the concepts as such are not unknown. Not only or not so much the concepts themselves define the difficulty of a text, but rather the newness of their combination in certain episodes or scenes.

In fact the same holds for grammatical structure, semantic structure, schemata, style, and so on. Although this criterion of `familiarity' is well-known (since Bartlett and Paul), it has not yet been integrated explicitly and from a strategic point of view in actual discourse comprehension models. It seems to be a consequent extension of the frame- or script-based models of

knowledge use, and at the same time it yields a sound basis for the very *acquisition* of frames and scripts: once combined several textual or other `experiences', the common features will slowly be generalized and abstracted and integrated as 'general' knowledge into LTM.

The model of knowledge actualization we here sketch also provides a plausible answer to the fuzzy problem of the actualization and integration of so many personal `associations'. It would make a TR very heavy indeed if all these associations were integrated into it. But in a WR we simply may combine TR-information with ah we care to activate not only from LTM-scripts (if any), but also from previous experiences (or previously read texts). Thus, reading about the recent earthquake in southern Italy, during several days in the newspapers, the representation I have of the actual respective texts will be very fragmentary or irretrievable. I simply have constructed an integrated *picture* (WR) of the whole event, consisting of e.g.

WR:

(i) general knowledge about earthquakes (and Italy) (but more organized)
  - movement of the crust of the earth
  - occur in certain parts of the world, where crust plates meet, etc.
  - have damaging effects on buildings and roads
  - have different strengths, measured on a Richter scale
  - heavy earthquakes range around 7 on this scale and up
  - can sometimes be sensed before by animals
  - Italy is a country in Southern Europe, etc.

  episodic events
  - recent earth -ve in Algeria
  - possible other earthquakes

(iii) episodic associati--ns
  - memory of the villages and landscape near Naples visited last year during a *vacation*
  - memory of   scandals of Italian bureaucratic inefficiency

(iv) opinions a?'
  - sad about the many victims
  - furious about lack of effective help

(y) emotions
  - afraid about possible fate of friends living or visiting there

TR:

(i) Macrostructure: Heavy earthquake in southern Italy
Many poor people died
Help very late and ineffective
Barren circumstances
etc.

(ii) Microstructures: Camping cars transported from North to South
Tent and blanket supplies from all over Europe
Goods could not be distributed
Goods were stolen
A church fell down on some 80 children
etc.

(iii) Other aspects: Newspaper anide, first page
Pictures of villages destroyed
etc.

We now assume that at least some aspects of TR may be integrated into WR so as to make the picture more complete. This will enrich our information about earthquakes, about disasters in Italy -- and about what to expect when we visit this region a next time. Note that much of the WR may plausibly be activated and even actualized (thought about) during reading, without necessary links with TR. Yet, if we know more about earthquakes and about Italy, that region and Italian bureaucracy, it will be easier to read the text. Also since the WR is richer it will be easier to remember it later. As we will see below, the occurrence of opinions, attitudes and emotions in WR further `engraves' the WR in EM even if the actual TR may be nearly entirely forgotten.

7. Subjective strategies

What we have reviewed so far are strategies or rather sketches or types of strategies -- in rather well known areas of a cognitive model of discourse comprehension. Although such a model is still very fragmentary, at least the kind of concepts and the kind of problems are by now familiar.

Yet, strategies of discourse comprehension are not limited to the well known areas of the map of cognition. In the last few pages we already mentioned several elements, such as personal memories or associations in EM, as well as opinions, attitudes and emotions, that also play a role in the comprehension process. That is, they may be actualized and integrated into our pic-

ture of a situation described by a text. We thereby enter the vast but only va-
guely explored continents of what has been called 'hot cognition' or what
might also be called 'soft cognition': opinions, attitudes, values, norms, fee-
lings or emotions, interest, etc. Whereas the actualization of general knowled-
ge and the various processes involved in 'general' text understanding may be
said to hold for most readers of a culture -- with variations according to know-
ledge, and experience these soft cognitions will rather define the more perso-
nal and *subjective* ways a reader responds to a text.

The problem therefore is: what are the strategies involved in this kind of
subjective interpretation of the text and the construction of 'personal pictures'
of the situation described by it?

In order to even begin to formulate the possible forms of such strategies
we need of course some idea about the geography of these lands of soft cogni-
tion. To stay in the same metaphor: it is of course not likely that this geogra-
phy is completely different from the lands we already know a bit about, e.g.
that of knowledge, goals, problem solving, etc. This means that our opinions
and attitudes will probably also be organized hierarchically, that there are
frame-or scriptlike stereotypical organizations of this kind of soft cognition,
that the activation and actualization strategies will be similar, and so on. The-
se representational aspects will be neglected here. I will merely assume that the
make up is again layered: Basic is a system of biologically founded emotions/
feelings. These have their systematic and strategic links first with more general
systems, such as those of attitudes and general opinions, but also directly with
individual memories (e.g. the fate of the victims in Italy). Then we assume that
attitudes are organizations of general knowledge and opinions about socially
relevant issues, such as abortion, nuclear energy or revolutions in South Ame-
rica. These attitudes are in turn organized in more general and basic ideolo-
gies. Thus, in discourse understanding particular opinions are formed on the
basis of more general opinions, which are fragments of more complex attitu-
des, which involve more general values and norms and a basic ideology. The
specific personal profile of all this will be called `personality'. Note that just
ke knowledge, these general opinions, attitudes and especially ideologies, are
socially `based', that is, formed and transformed in situations of social interac-
tion. Discourse understanding is of course a crucial aspect of this social aspect
of both hard and soft cognition. Social learning of our various cognitive 'sets'
has been rather underestimated by cognitive psychology, but will not further
detain us here.

But now back to discourse understanding and its strategies. A first que-
stion to be asked, then, is whether subjective beliefs, opinions, etc. determine
actual *understanding* of a text. Do we have a 'better' TR or WR, are we able

to supply missing links, interpret certain concepts, establish macro-and micro-coherence or detect schemata with this additional subjective apparatus? One aspect clearly emerges: our picture (WR) of the situation described by the text will be `richer', and hence structurally more complete, and hence better retrievable, according to basic principles of information processing.

And also, given emotionally based attitudes, opinions and wants or desires, we have of course firmer general *motivation* for the very action of reading and understanding the text: we simply have more interest, and hence more attention, and hence a more exclusive focus on the information of this particular text; we are involved and want or need the information, and so on.

These two general principles already are sufficient to explain many discourse understanding phenomena, e.g. better and longer recall. But still we may ask whether subjective understanding is `better' or more `effective' understanding, all other things (richer WR, more motivation) being equal. I think so, but it is not easy to prove, and of course depends on our notion of `understanding'. First a distinction should be made perhaps between *understanding* proper and *evaluation,* together defining the notion of *interpretation.* An evaluation involves the various soft cognitions mentioned aboye: it is the assignment of an evaluative concept (good, bad, funny, beautiful, stupid) to textual information. Yet, this is too vague. We should distinguish between an evaluation of the text proper and of the information or rather the situation denoted by the text. Textual evaluation may be about the style, rhetorics, semantic coherence or completeness, schematic ordering, etc. as such, typically so in literary communication but also elsewhere. When we read newspaper texts this will be less common, but we will rather evaluate the events denoted themselves. Hence, we have TR-evaluations and WR-evaluations, to be represented, indeed, separately. Let us provisionally limit ourselves to the latter kind of evaluation and see whether it may determine understanding proper.

As a crucial example let us take local coherence assignment. Now, assume also that such coherence links always presuppose general knowledge about relations between facts. These facts may have subjective properties, e.g. opinions of people, terrible events, and so on. Now further assume that we not only know the opinions of other people, but already have opmions, attitudes, ideologies or emotions regarding certain facts or fact types. Then, if in a text two facts are related that involve precisely those emotions or attitudes, we .must have the same kind of faci'..1£..tion as when we have 'more' knowledge **about** a subject. For instance, in dic. Italian earthquake story, we can predict or expect better how the people will feel, and hence information about this in the text, if we share their opinion' **and** attitudes towards the corrupt politidátts. If we say that we do not 'understand' those people who demonstrate

against nuclear energy or for free abortion or against American aid to fascist countries in South and Middle America, this means among other things that we do not share their opinions, attitudes or ideology. But, we have assumed earlier that understanding the world and understanding discourse are very similar things. Hence, any discourse that is about precisely these actions or events will be also better understood in the proper sense because we are able to supply more coherence relations. Thus, we may interpret a *but* or *because* better if the contrast holds for us and the cause is a cause in our opinion:

(8) There are many fascist countries in South America, because the USA protects its military and economic interests in that part of the world.

Understanding that discourse fragment seems easier if we already have the basic condition underlying the use of because. Thus, in general, we may assume, just as for knowledge, that beliefs, opinions, attitudes and ideologies will influence understanding.

The next question then is: what specific strategies may be involved in this kind of subjective understanding? Is it possible for ínstance that language users make handy shortcuts via these subjective arcas, bypassing for instance for cumbersome knowledge activation and actualization?

This indeed seems to be the case. Take again discourse fragment (8). A `full' understanding of that fragment would ínvolve actualízation of rather complex data structures about international policy, American foreign policy, military and economic aspects of capitalism, and so on. Yet, if a reader just had an attitude the USA featuring rather high in the tree the proposition `American-goverments are usually pro-fascist', or 'American governments are capitalist', and more generally `Capitalista are never systematically anti-fascist', we 1—; e a couple of general opinions that directly may be used to establish the required coherence. The mere association of the concepts 'USA' and 'pro-fascist .'ay be sufficient for understanding the coherence of this text fragment. In fas', imagine that we had *although* instead of *because* in (8): for most of us fragment would in that case become incoherent, because we cannot even imagine how military and economic dominance of the USA would normally favor antí-fascist regimes, at least not in this kind of easy shortcut way, unless we go by general opinions such as 'America is liberal', so therefore also their military and economic interests must be liberal (helping people), and hence would conflict with fascist regimes.

A similar story will of course hold for global coherence and the establishment of themes. Given our opiníons and attitudes about women's lib, we will also globally read and understand a sexy story by Boccaccío differently than without these opinions or interests. The main topic may in that case be

biased towards a topic in which the position of women in the middle ages is present. The strategy, monitored by the general opinion and attitude components, will in that case affect the macrorules of Selection, Generalization and Construction. Scenes in which women are present and subject to harassment by men will be more selected, generalizations will be made more easily about their strong or weak position and a global picture will be constructed for scenes (e.g. of seduction) which may have different global outcomes.

From these few examples it follows that not only soft cognition influences discourse comprehension in a general way supplying more information to construct TR's and WR's but that also the strategies themselves may be 'subjective' in the sense that other processes may be short-cut or biased, so that specific `wanted' representations are constructed, or that otherwise incomprehensible coherence connections may be established rapidly or not at all.

It goes without saying that this is all still extremely vague, but in the light of the prevoius sections it is not hard to imagine the role of this kind of strategies.

8. *Speech act understanding, social interaction and cognitive strategies*

Finally we will make some remarks about the proper 'place' of discourse and discourse understanding, viz. as part of the understanding of speech acts and social interaction. Discourses do not occur in isolation, so understanding them is also understanding their social functions and effects, and vice versa. Many aspects of textual structures, e.g. style and rhetoric or schematic structures, but also semantic content and coherence, depend crucially on various categories and conventions regulating the social context of communiCation.

It is plausible, therefore, that discourse understanding strategies will ultimately be based on interaction strategies or simply *be* interaction strategies. This interdependence is so ill explored that we only can give some illustrative examples for the various subdomains involved.

First speech act understanding. Given the utterance of a sentence or text in á given social context, the problem here is that the reader/hearer must assign one or more speech acts to this utterance, that is, interpret it pragmatically. Such an interpretation is not straightforward and not precisely rule-governed: the surface form or the semantic content of the utterance are of course important clues but are neither sufficient nor necessary in the assigntnent procedure. Hence we need strategies, again, taking many types of texWal and contextual information, to assign this interpretation.

The strategy involved is necessarily very complex. I assume that in the

interpretation of an utterance as a (social) action, a language user will first make an effective analysis of the *relevant context*. This means analysis for precisely those features that can make speech acts (in-)appropriate. These context features involve some cognitive ones (does speaker S. know p, want p, etc.?) and social ones (what is the social position of S, what is my social role, etc.?). This analysis will already narrow down the possible speech acts even before something was said (we do not expect orders from friends, assertions from someone about something we know he doesn't know anything about, advice from young children, etc.). That is, the speech act, taken as a social act, must be coherent with the social context and with the ongoing social interaction. This means also that the final situation of the previous action of the speaker or the hearer counts as input for the actual speech act.

After this pre-analysis of the social context we have the analysis of the text itself. Again, this will not take place for all possible details for the text as a whole: only those features that are possible signals for pragmatic interpretation will be reviewed. Although as a rule we might assume that first semantic and then pragmatic interpretation takes place, this is not a necessary strategy. Maybe surface structure information together with especially paratextual information (gestures, facework, movements, distance, etc.) are sufficient for a quick guess at the most probable speech act. An angry face or shouting in some specific social situation may mean, directly, a speech act of criticism, accusation, etc. For the definite assignment of course the semantics should be passed, at least partially, because we cannot identify a speech act without its propositional base.

At the same time as the surface structure and paratextual analysis takes place we therefore will probably have it that (as we saw earlier) the semantic interpretation already starts, which enables the pragmatic interpretation to start also, even before a sentence (let alone a text) is finished. Surface structures will contain signals for speech act class (interrogative sentence forms, for instance, in order to perform requests or questions), or more specific stylistic features may indicate evaluation (e.g. congratulation). Finally, semantic content will be analysed for main participants, especially the agent and patient of the speech act and the acts to which they pertain (orders, questions, accusations, promises, etc.), as well as for time and place (promises should be about future actions of the speaker, accusations about past actions of the hearer). With this complex set of multi-layered schematic analysis of both context and text we have tl,,. _ , -nective clues for the strategy of speech act comprehension. It hardly needs t-- said that again world knowledge, episodic knowledge and soft as described aboye, again play an important role in the interpretation of 'Correa' interpretations in principie try to represent the

intention(s), plans, purposes/ goal- underlying motivations of the speaker -- and a representation of how the speaker will probably represent the actual 'state' of the hearer. This kind of analysis of mutual representations would be impossible without mutual knowledge and opinions.

Important for our discussion is the assumption that all this hardly obeys precise rules, but rather flexible strategies, which can make use of various types of information from text and/ or context. The rules only say which general conditions of the text (e.g. certain semantic constraints, mentioned above) and the context must be satisfied. The strategy will then try to find clues as soon as possible without first going through the full analysis of each level. If the context or the paratextual performance and some very partial surface information or semantic interpretation already yields a good pragmatic guess, this may already be used 'top down' to see whether the rest of the data match this hypothesis. Unfortunately, linguistics has not yet even systematically described all the possible textual features that may be pragmatically relevant.

What we also ignore is how *speech act concepts* occur in semantic knowledge: are they just a list of (some 1000) speech acts, or is this list organized, so that activation and actualization can be effective? Or is this list of concepts part of the lexicon of a language? Or is it part of the knowledge structures we have about social actions in general? Maybe a combination of these aspects is most likely: we in general have expressions and hence conventional `meanings' for the speech acts of our culture, but at the same time the analysis of utterances as speech acts requires an analysis of action and context structures, which also involves 'social' or `interaction' knowledge.

Then, we have *macrospeech acts*. Just as we may map sequences of propositions of a text, by the macrorules, on sequences of macropropositions, the themes, of a text, we assume that sequences of speech acts are mapped onto sequences of macrospeech acts. That is, we may take a sequence of statements, as a whole, as a threat or accusation. Again, strategies are necessary to infer such global speech acts. That is, during the comprehension of a text or conversation, the hearer/reader will, on the basis of the pragmatic interpretation of some speech acts, try to make a guess about the pragmatic *point* of the sequence as a whole: what is (s)he driving at? (does he/ she want to invite me, threaten me, accuse me, etc.). In that case the respective local speech acts will be analysed also with respect to their possible end-results as conditions for the global speech'act («if I answer that I am free, after a question about whether I am free tonight, this may be a sufficient condition for him/her to want to invie me...», etc.). Language users are extremely perceptive in this kind of global nterpretation strategies of speech acts. If for instance they do not want to ha-/e the responsibility of `refusing' something the speaker is globally aiming at,

the component speech acts may already, as a counter-strategy, be such that the necessary conditions for the global speech act cannot be established («No, I am not free tonight, I have to work»). Note that the 'core' of the global speech act, e.g. the threat or request, need not be expressed in the text or conversation at all. This may either happen indirectly, or else simply by construction of the other speech acts, just as in macro-interpretation at the semantic level. Therefore this kind of macro-analysis is very powerful: it yields important interactional information although this is not directly expressed by the respective speech acts at all. The macro-speech act by definition is the most important speech act, the pragmatic and hence interactional `upshoe of what is said: local speech acts may be easily forgotten, but the global one is the major input for further (re-)actions of the hearer. This is why strategies, not only for interpretation, but also for interaction, are so important at this level. They also involve, therefore, strategies for adequate *production* of speech acts, viz. of those which are optirnally consistent with the own wishes and goals of the (next) speaker (including the goal to cooperate or not with the last speaker).

We here, finally, touch the proper social psychological and social implications of discourse strategies. Clearly, understanding a discourse correctly but also fast and easy is one thing: it makes communication efficient. Yet, at the same time the strategies, both of understanding and production, must be socially effective. They must contribute to an optimal realization of the `personality', the wishes, wants, goals, or interests of the speaker or hearer. This will mean, among other things, that we want to *influence* the hearer's knowledge, opinions, attitudes, and possibly, in directly, also his/her actions based on these, as much as possible according to one's own (speaker's) wishes and goals. This is the basis principle underlying the various *production* strategies. But also in understanding these social implications are important. We have seen that biased, subjective understanding is a possible or even necessary consequence of the role of soft cognition. In a social psychological perspective, this implies, among other things, that a hearer can interpret a text or part of a conversation according to his/her own opinions, attitudes and ideologies (or not, depending on the goal of reading). Conflicting consequences, e.g. a necessary change in that system, can in that case be avoided (maintenance of cognitive balance, avoidance of cognitive dissonance, etc.).

Similarly, not only biased understanding but also purposeful misunderstanding or not-understanding can be strategically useful in interaction. We all know the scene of the high school kid who does not `understand' the criticism of the teacher, or our lack of `understanding' the policeman who wants to give us a ticket. Not understanding means that we do not understand the speech act, and hence not the goal of the speech act, and hence try to avoid the condi-

tions for our actions as they are wanted by others, and which we cannot avoid by other means.

This means that the principies of cooperative social interaction (Grice) may only hold in conflictfree social situations. If our wishes and goals are different, we may not participate in the purposes and hence the intentions and hence the speech acts and hence the utterances of the speaker. Strategies of comprehension can regulate this social `participation' in a refined way.

9. *Provisional conclusions*

From this review of some of the types of strategy used in discourse comprehension it may first of all be concluded that at all levels of comprehension strategies play a primary role. They solve the various problems posed by the `formal' rules of interpretation: they provide meaning where apparently there is no meaning, they establish coherence before enough data have been obtained, they derive global themes that can be used to process further information top-down -- and establish global coherence. In general then, the strategies provide easy, fast and flexible means to handle vast and complex amount of textual and communicative data. The., are not tied to specific levels or units, but are able to process various kinds of data at the same time, yielding provisional hypotheses of interpretation.

Then, they are necessary to retrieve, address, activate and actualize precisely that kind and that amount of genral or episodic knowledge that is needed to understand the text. They providc a subjective background for interpretation such that the results of the interpretation can be controlled by one's own wishes, goals, opinions, attitudes or ideologies.

Finally they specify what acts can or should be understood to be performed by the speaker and how this (nrt- or mis-) understanding can be used as input for further own interaction, ft.>r the (non-)change of the own cognitive systems, for the avoidance of ce' difficulties or other socially undesired reactions that may harm our cogrIli':e balance on the one hand or our social (self-) esteem on the other hand to negative evaluation by others. In brief, strategies of comprehension are not only cognitively efficient but also socially, because they allow us to quickly, correctly, easily and aboye all flexibly act and react to the communicative context.

Our discussion of there strategies is tentative and incomplete. Moreover it is informal, sometimes speculative and therefore sometimes also vague. The function of the review is merely to discuss possible types of strategy and to link various strategies for the respective levels or dimensions of text and communi-

cative interaction. Explicit theories and especially systematic experimental testing will be necessary to formulate and to empirically assess the nature and the functions of these strategies.

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