

OPINIONS AND ATTITUDES IN DISCOURSE COMPREHENSION

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Not only knowledge but also opinions and attitudes play an important role in the comprehension and cognitive representation of discourse. To model this 'subjective understanding' we need a format for the representation of opinions and attitudes in semantic memory and strategies for their use in comprehension. It is shown how opinions and attitudes are involved in the establishment of local and global coherence and how this personal 'bias' in understanding is represented in episodic memory.

1. INTRODUCTION

One of the most important contributions of psychology and AI to the study of discourse in the last decade has been the recognition of the pervasive role of knowledge in discourse processing. It has been shown that discourse understanding involves both bottom-up and top-down processing and that many inferences must be made in order to establish local and global coherence in textual representations. Both kinds of processing presuppose large amounts of world knowledge --besides the textual and contextual information conveyed in the communicative situation. In order to access and use this information effectively, it has been assumed that knowledge must be intelligently organized. Notions such as *frame* (Minsky, 1975), *script* (Schank & Abelson, 1977) and *schema* (Norman & Rumelhart, 1975) have been proposed for the representation formats of knowledge in long term memory. At the same time, it has been shown in psychology that these kinds of knowledge organization indeed play a role in understanding and representing discourse (Bower, Black & Turner, 1979; Haberlandt & Bingham, 1982; Reiser & Black, 1982).

In this paper it will be argued that similar observations may be made for the role of other kinds of cognitive information, such as *opinions* and *attitudes*. That is, language users in natural communicative situations will not only bring to bear their knowledge about persons, objects, events, actions or episodes referred to by a text, but also organized sets of *evaluative beliefs*. The use of such beliefs will not only imply that a language user assigns evaluations to textual information, but also that the very processes of understanding may be affected. In this way, lexical search, the assignment of propositions to clauses, the establishment of local coherence between propositions and the derivation of semantic macrostructures (discourse topics) may take place under the control of a personal, subjective *bias*. And, of course, the result of these subjectively controlled processes will be a subjective representation of a discourse in episodic memory.

In order to model these processes of subjective understanding, we first need to devise an appropriate representation format for beliefs, opinions and attitudes. Despite a long research tradition in social psychology about opinions and attitudes, we still know very little about their nature and their structures. Secondly, we also need to formulate the basic principles, the rules and strategies, for the

effective use of opinions and attitudes in various cognitive tasks, such as understanding actions and episodes or the discourses about these.

It might be assumed that theory formation in this area of cognitive information processing could simply extend our current insights about the structures and the use of knowledge to such forms of 'hot' or 'soft' cognition as opinions and attitudes. And indeed, it seems plausible that there will be an analogy between the fundamental principles of organization and use in both sub-domains. On the other hand, opinions and attitudes involve evaluations and are related to values and norms, which are notions that are traditionally linked with reputedly vague things like affect and emotions. In other words, the extension from a model of objective or inter-subjective understanding to a model of subjective understanding might not be straightforward.

The discussion about the role of opinions and attitudes in discourse comprehension will take place against the background of my earlier work, partly in collaboration with Walter Kintsch, on the structures and processing of discourse (Kintsch & van Dijk, 1978; van Dijk & Kintsch, 1983). In this *strategic* model of discourse processing it has been shown how various kinds of information (textual, contextual and epistemic) are effectively used, at various levels of understanding, in the construction of textual representations in episodic memory. Strategic understanding is an on-line process accepting incomplete information from various sources and yielding semantic representations, in the form of proposition schemata, for clauses, sentences, sequences of sentences and whole discourses. This process is monitored by a control system featuring semantic macrostructures, superstructures (textual schemata, such as narrative or argumentative ones), and a representation of the actual communicative context, e.g. involving goals and perspective. It is also assumed in this model that strategic understanding not only leads to the construction of a textual representation (TR) in episodic memory, but also to the construction or up-dating of a so-called *situation model* in episodic memory. Such an episodic situation model (SM) is an integrated structure featuring traces of previous experiences about the same or a similar situation the actual discourse 'is about'. These previous experiences may be representations of previous events, actions or discourses, and will permanently up-date what we know about concrete persons, events, actions or episodes, such as the actual civil war in El Salvador. A situation model, once activated --or actually being constructed, will not only supply the necessary basis of reference and co-reference for textual expressions, but will also serve as the locus for the actual use and integration of more general knowledge needed during comprehension. We will see below that situation models will also be crucial in the use of opinions and attitudes during the comprehension of discourse.

2. SUBJECTIVE UNDERSTANDING

Recent work in AI has shown some interest for processes of subjective understanding. After earlier work by Abelson (Abelson, 1973, 1979; Abelson & Carroll, 1965) on belief systems, Carbonell, jr. developed a computer model of subjective understanding, specifically designed to process politically relevant discourse, such as newspaper stories (Carbonell, 1979). He has shown that newsstories about international political events involving the USA and the Soviet Union presuppose knowledge about the respective ideologies of the international policies of these countries. Such ideologies will not only feature general values and norms but also beliefs about mutual goals. Modelling a subjective reader of newsstories, then, means a representation of his or her beliefs, and inferred expectations, about what e.g. the American administration will decide to do in a situation in which its basic goals are threatened by actions of the Russians. Similarly, Wegman (1981) devised a computer model for the understanding of beliefs as expressed in interviews about nuclear energy. Expressions about a belief-object like nuclear energy may thus be understood as exhibiting beliefs **about** the fulfillment or blocking of goals of a

believer. These models are important first steps in our understanding of the role of speaker's and hearer's beliefs in discourse processing. Yet, they do not fully account for possible differences between knowledge and subjective beliefs, nor do they explicitly discuss the nature and representation of opinions and attitudes. And finally they only provide a partial answer to the problem of the actual psychological processes and memory constraints involved in the use of beliefs, opinions or attitudes. Abelson (1979) has listed some of the differences between knowledge and belief: (i) there is no consensus about beliefs, (ii) beliefs are often about the existence of entities (such as God), (iii) beliefs often involve 'alternative worlds' (such as a more just social world in socialist or communist belief systems), (iv) beliefs have affective or evaluative components, (v) belief systems are more 'open', and feature personal experiences, and (vi) beliefs can be held with varying degrees of certitude. This --provisional-- list contains important suggestions for a more specific representation format of beliefs, opinions and attitudes, and we will see below what additional features should be made explicit.

Before we are able to provide some further conceptual analysis of subjective cognitions, some more general remarks are in order about the very nature of subjective discourse understanding. First, a distinction should be made between a subjective understanding of a discourse and a subjective understanding of the situation a discourse is about. In the first case, the object of belief, opinion or attitude will be a direct function of the actual communicative context, and will involve an evaluation of the discourse, or some discourse properties (such as style, semantic coherence or expressed opinions), or an evaluation of the speech act performed by the utterance of the discourse, or --by attribution-- an evaluation of the speaker. In the second case, the beliefs, opinions or attitudes are formed or activated with respect to the referents, local or global, of the discourse, such as a political event, a social situation or participants in such events and situations. We have assumed above that we make a distinction between a textual representation (TR) and a situation model (SM) in episodic memory. The difference between opinions about the discourse and opinions about the referents of the discourse can be represented easily in the framework of these two kinds of episodic structures. Of course, these different kinds of evaluation may mutually affect each other: a negative opinion about a speaker or discourse may lead to a negative opinion about the topic and whence about the object of reference, and vice versa (one of the reasons why messengers of bad news risked to be killed).

Secondly, subjective understanding involves both the use of already established beliefs, opinions and attitudes, and the formation of new ones. In the first case, just as for knowledge, we assume that belief structures are accessed and selectively instantiated, and thereby control the whole understanding process, including the representation of 'factual' information. In the second case, the language user may evaluate the information, thus represented, and assign new beliefs or opinions or 'confirm' instantiated previous ones. Again, although cognitively distinct, these two processes will often be closely cooperating.

Thirdly, subjective understanding takes place both at the local and at the global level. Evaluations may be attached to single concepts or propositions, as expressed by the sentences of a discourse, but may also (or only) be assigned to higher level structures, such as the theme or topic of the discourse, or to the whole (complex) action, event or episode denoted by such a macroproposition.

Finally, just like understanding in general, subjective understanding is a strategic process. Evaluations are not assigned to sentences or discourses 'after the fact', but on line, that is at the same time as the formation of atomic and complex propositions in a text base and the activation and up-dating of a situation model. This means, first, that the assignment of opinions may be both a top-down and a bottom-up process. If, for instance, we already have a situation model about the civil war in El Salvador, featuring specific opinions, reading a news-story about a recent episode in this war may well influence, top-down, the formation of particular opinions about this episode (or about the news-story about this episode). Secondly, strategic subjective understanding will also mean that a language user will operate on incomplete extant or incoming information and thus

form hypothetical opinions, for instance based on only a few words or sentences in the discourse. This evaluative hypothesis may later of course be revised or confirmed. Thirdly, textual, contextual or already present cognitive information need not always lead to the inference of the same belief or opinion. Thus, 'our situation model about the civil war in El Salvador may contain negative evaluations about the fascist regime in that country, but a newsstory about the outcome of the elections might contain information which is subjectively incoherent with inferences drawn from this situation model: we do not expect that fascists win elections, unless we suppose the elections have not been free. Similarly, we may have a conflict between contextual information about a speaker and the information conveyed by his or her discourse. A strategic model of discourse comprehension will have to specify what the eventual representation will be, given such conflicting information. The goals and interests of the reader or listener may in such a case be decisive in the formation of a more or less 'neutral' text representation (as may be the case in a recall task for instance) or of a more personally biased up-dating of the situation model.

3. BELIEFS, OPINIONS, ATTITUDES

One of the first tasks of an adequate model of subjective understanding is an explicit analysis of such notions as *belief*, *opinion* and *attitude*. Despite a vast amount of experimental work in social psychology, a precise cognitive analysis has never been provided. The notions of opinion and attitude have usually been lumped together as 'evaluative beliefs', where evaluation is taken as a scalar concept, most often studied on the basis of sophisticated scaling techniques and corresponding experimental designs (Himmelfarb & Eagly, 1974; Fishbein & Ajzen, 1975). In recent years there has been a rather strong reaction against this traditional approach and a plea has been held for a more cognitive social psychology (Stotland & Canon, 1972; Carroll & Payne, 1976; Abelson, 1976; Cushman & McPhee, 1980). Social cognition in these approaches has been modelled in terms of e.g. frames, schemata or scripts. After the early example of Bartlett (1932), who not only used the notion of schema in order to account for discourse processing and knowledge, but also as a foundation for social psychology (see the rumor studies by Allport & Postman, 1947, inspired by him), it was above all Abelson (1973) who has been one of the main inspirators of this new approach.

Against the background of this development we would first like to make a number of distinctions between the notions involved. First, the notion of *belief*. We will indeed take this notion as the basic one. Generally speaking, each proposition (or similar structure) of an individual's cognitive system may be taken as a belief. In logical terms, this would mean that a belief is any cognitive unit which may be true or false in some possible world. More specifically, again in logical terms, such a truth value would be evaluated respective to the possible worlds accessible from the individual (see Hughes & Cresswell, 1968; Hintikka, 1971). Hence, such propositions may denote facts also in 'private' worlds, such as dreamworlds and other 'imagined' states of affairs. A proposition is essentially a semantic structure consisting of an n-place predicate, a number of arguments (in various semantic roles, such as Agent, Patient or Instrument), and overall modalities, for instance for tense or necessity (for details, see van Dijk & Kintsch, 1983). At the referential level such a proposition would be interpreted as a property of or a relation between individuals. Beliefs, taken as propositions, may be atomic, as in 'This is a knife', or a complex structure of atomic propositions, as in 'This knife was used in the murder of the postman', whereas complex propositions may again be organized in different compound and hierarchical configurations. This notion of belief is fairly general and abstract, though. In more mundane terms, beliefs are usually taken as a specific kind of personal knowledge, as e.g. specified by Abelson (1979; see above): they are non-consensual, non-certain, more open and may involve personal experiences.

We here are confronted with the usual distinction between knowledge and belief.

Already in philosophy, such a distinction has often been made (Hintikka, 1962). Thus, if we say that someone knows p , this implies that p is true, an implication which does not hold when we use the 'propositional attitude' of belief. Apart from the many philosophical, logical and linguistic intricacies involved, a model of social cognition would need to operate on the basis of beliefs. Knowledge in that case consists of beliefs which are (i) assumed by the speaker or observer to be true, or more generally (ii) which are true or verifiable with respect to the truth-criteria of a socio-cultural group. Knowledge in this sense, thus, is 'justified' belief. It follows that if we consider an individual cognitive system, there is no point to make a distinction between knowledge and belief. If however we compare individual beliefs with those of others, or with certain norms or criteria, such a distinction becomes relevant. Since persons do evaluate their own beliefs relative to those of others or to generally accepted norms or truth-criteria, they may of course also distinguish among their own beliefs between those which are merely privately held and those which are based on certain kinds of evidence, such as observation, credible sources or discourse and inference. If this evidence is estimated to be sufficient, the individual will self-evaluate his or her beliefs as knowledge. To cut a long discussion short, we will assume that in strictly cognitive terms there is no distinction between knowledge and belief, but that such a distinction becomes relevant in a model of social cognition, in which beliefs of others and of ourselves are evaluated with respect to those of others or with respect to the norms and criteria shared in a group or culture.

In this theoretical perspective, we will further assume that beliefs therefore are organized in ways which have been made explicit for knowledge, for instance in terms of frames, scripts or schemata. There is one interesting difference however. Frame- or script-like organization of knowledge presupposes that hierarchically organized clusters of propositions are about stereotypical objects or episodes: they organize general, socially shared beliefs. These are necessary to be able to participate in many social interactions, such as discourse understanding. Personal beliefs however are much less able to thus organize social interaction, although they will of course be a component in personal actions or the interpretation of actions of others. Beliefs, therefore, are much more episodic, based on personal experiences or personal inferences. As soon as more evidence is available and socially normalized, learning may take place, through processes of abstraction, generalization and de-contextualization, leading from accumulated beliefs to more general, 'accepted' knowledge of a more permanent kind.

Yet, for both knowledge and beliefs, as well as for the notion of opinion to be introduced below, we will make a distinction between *particular* and *general* cognitions. Thus, particular beliefs are about particular individuals and/or particular properties or relations. General beliefs are rather context-free, and about classes or generic concepts. Thus, 'John is \quad ' would be a particular belief (or knowledge) and 'Tigers have stripes' or 'God exists' a more general belief.

Opinions, next, will be taken as evaluative beliefs. That is, the predicate of the proposition defining an opinion must be an evaluative predicate. Although it may not always be easy to make a precise distinction between evaluative and other predicates, we assume that typically an evaluative predicate denotes a scalar property of an individual relative to some dimension (e.g. 'stupid' on the dimension of intelligence, or 'ugly' on the dimension of beauty). We will also call predicates evaluative though when they imply such a scalar value assignment. Thus, 'John is a traitor' or 'Mary cheated Larry' would be opinions if 'to be a traitor' or 'to cheat' imply negative values (e.g. on the goodness dimension).

Opinions are commonsense categories to denote personal, subjective evaluative beliefs: they embody the individually variable assignment of values to objects, persons, states, events and actions. People may have the same opinions, so that we can speak about group or public opinions, but whereas for knowledge we are expected to conform to social norms and criteria of truth, opinions are allowed to be held and to vary individually. This does not mean that opinions should not be socially accounted for, e.g. in terms of general, shared values and norms.

There may even be laws regulating the expression of opinions in social contexts, e.g. anti-discrimination or anti-libel laws. Hence, it makes sense to distinguish between opinions which are instantiations of or inferred from general norms or values (e.g. 'John is a traitor') and opinions based on purely personal preferences (e.g. 'I like this apple'), even if both types of opinions are individually held. For reasons of simplicity we will call these social and personal opinions, respectively.

As we suggested above, another distinction should be made, viz. between particular and general opinions, defined in the same way as particular and general beliefs. Thus, 'I like this apple' is a particular, personal opinion, and 'Traitors should be punished' a general, social opinion.

In order to retrieve and use opinions effectively, we should assume that they are organized. Their organizing principles, however, cannot simply be derived from those elaborated in AI for frames or scripts. Objects or episodes may be assigned conventional or stereotypical structures or properties, but their evaluation does not seem to allow a straightforward application of knowledge organization formats. We know much about houses or about episodes such as taking trains, but opinions, taken as evaluative personal beliefs may be more ad hoc, accidental and episodic: we may like this house, but not another, or may prefer on certain occasions to take a train above taking our car or perhaps, in general, like train rides. Organization becomes relevant however as soon as we have clusters of opinions about objects. Such organized packages of opinions, especially of general opinions, will be called *attitudes*. We here deviate from the definition of an attitude as an evaluation of an object (e.g. in Fishbein & Ajzen, 1975). Attitudes are schema-like organizations of general opinions. A first organization principle is hierarchy: attitudes will feature higher (more general) and lower (less general) opinions. Thus, the attitude opinion 'I am against nuclear energy' will be more general than the opinion 'Nuclear radiation is dangerous'. Higher level opinions are macropropositions (van Dijk, 1980) relative to their lower level opinions. Secondly, opinions in an attitude should be, directly or indirectly, about the same object, which implies organizational coherence for an attitude. This object will mostly be a 'social' object, that is a thing, person, group, event, issue --or types of these-- which are relevant in social interaction for social members. The attitudinal organization of opinions, thus, is related to an effective planning, execution and evaluation of our and others' social actions. We have attitudes about social groups, such as businessmen or blacks, about issues such as nuclear energy or birth control, but not about an apple or apples or other objects which are not involved in a complex system of opinions and social interactions. Thirdly, attitudes may be organized according to their prominence or relevance for an individual. A lower level opinion such as 'Waste products of nuclear plants ruin the ecological system' may well for certain individuals be more relevant or prominent than higher level ones about dangers of radiation (Rokeach, 1968, 1973).

Finally, attitudes are themselves organized in complex systems of *ideologies*. That is, there may be systematic relations, e.g. of coherence, between different attitudes, such as those about 'American foreign policy', 'social structure', 'economic power' and 'international communications', for instance within a socialist political ideology. Since attitudes organize many beliefs and ideologies organize many attitudes, ideologies are the fundamental system underlying social interaction, and will hence pertain to group membership, group interests and conflicts, and general values and norms for the actions leading to group goals. We will not further explore the nature of ideologies here, nor other general systems such as those of norms and values. Also, we will further ignore the emotional or affective basis of opinions and attitudes, regulating, among other things, the strength of evaluations and the nature of motivational structures (desires, wishes, preferences) underlying decision making and planning of action.

After this sketchy specification of the nature and organization of opinions and attitudes, we need some more insight into their use, so that below we can investigate how they are involved in discourse comprehension. As soon as we encounter an attitude object, either directly or as represented in a discourse, the corresponding attitude system will be activated. Depending on context, represented in the control system as discussed above, this attitude schema will be searched for the relevant general opinions. If a particular object or property is processed in STM, such a general opinion will be instantiated and integrated into the actual situation model. Thus, if I address the general opinion 'I am against american foreign policy', this opinion may be instantiated as 'I am against the aid given to the regime in El Salvador' as soon as the information 'american aid to the regime in El Salvador' is processed. Hence, the situation model will not only contain a model of the actual situation, including events, actions and participants, but also instantiated or inferred opinions about this situation. We have seen earlier that a general opinion may be taken up as an evaluative macroproposition in the control system and thus monitor, top down, the local opinions about individual actions or events. From this sketch of some principles of the use of opinions and attitudes we may conclude that attitudes are used only in an indirect way, that is via general opinions, which need instantiation or which allow inferences in order to become relevant for the local and global evaluation of incoming information about social objects.

4. OPINIONS AND ATTITUDES IN DISCOURSE UNDERSTANDING

In order to be able to become more specific let us now try to develop a number of hypotheses about the role of opinions and attitudes in the understanding of discourse. Above, it was already suggested that this kind of subjective understanding may involve both the evaluation of the text or the speaker, and the evaluation of the referents of the discourse, as represented in the situation model. For our discussion we will limit ourselves to the latter kind of evaluation: how do the opinions and attitudes about some object influence understanding the discourse about such an object?

As an example we will use fragments from a text which appeared in *Newsweek* (March 1, 1982, p. 16). Details about the comprehension processes involved in understanding this text are given in van Dijk & Kintsch (1983). This text is part of a vast newsflow, both in the USA and internationally, about events in Central America and in particular in El Salvador. The present text is about the situation in Guatemala, and presupposes knowledge about this situation in El Salvador. The first paragraph of this text runs as follows (we do not respect the column boundaries of the weekly and have numbered the respective sentences):

- (1) *GUATEMALA: NO CHOICES*
- (1) Compared with *the* relative shades *of* gray in El Salvador, Guatemala is a study in *black and white*.
 - (2) *On the left is a collection of extreme Marxist-Leninist groups led by what one diplomat calls "a pretty faceless bunch of people."*
 - (3) *On the right is an entrenched elite that has dominated Central America's most populous country since a CIA-backed coup deposed the reformist government of Col. Jacobo Arbenz Guzmán in 1954.*
 - (4) *Moderates of the political center, embattled but alive in El Salvador, have virtually disappeared in Guatemala --joining more than 30,000 victims of terror over the last fifteen years.*
 - (5) *"The situation in Guatemala is much more serious than in El Salvador," declares one Latin American diplomat, "The oligarchy is that much more reactionary, and the choices are far fewer."*

Let us assume that this text is read by a reader who has acquired knowledge about the events in Central America from several news sources, who is not directly engaged in any political action in or with respect to Guatemala, and has a 'leftish' or socialist ideology. Without fully spelling out all details of the opinions or attitudes of such a reader, we may partly reconstruct the evaluative, subjective understanding of this passage within the overall strategic model as it is been specified in van Dijk & Kintsch (1983):

After having activated knowledge and beliefs about the communicative situation (reading a weekly), about *Newsweek*, and about the political opinions of this weekly (and about the american media in general), the reader first will have constructed in the control system an overall representation of his or her goals and interests, e.g. with a proposition such as 'I want to know what the actual situation is in Central America'. The situation model about the communicative situation itself will feature the relevant information about the weekly and about reading weeklies and previous experiences, including opinions about this weekly. Under control of this contextual information, the reader will first process the (boldly printed, on top) title, specifying fragments of the macrostructure (topic) of this text. The major argument of the macroproposition is 'Guatemala' and the predicate is more or less vague or general, but with the contextual information that the weekly will (now) probably specify political information, a strategic choice may be made for a topic like 'There are no political choices in Guatemala'. This macroproposition will be added to the information in the control system and will control further processing. That is, first general information (knowledge and beliefs) about Guatemala will be activated (e.g. that it is a country in Central America), as well as a current state of the situation model, featuring traces of previous information about the actual political situation in Guatemala. Part of this information may be in the form of opinions, such as 'Guatemala has a fascist regime' and 'The regime systematically kills all her opponents'. If indeed such opinions are part of the situation model, they will trigger more general opinions and attitudes about the political situation in Central America, about fascist regimes, and about the role of the USA. In other words, the title alone will provisionally activate and instantiate many general and episodic opinions and will also activate some fragments of relevant attitudes (e.g. opinions about fascism in Latin America rather than opinions about fascism in Nazi Germany).

For the understanding process the activation of such opinions and attitudes will imply that besides the topical macroproposition, there may also be a topical macro-opinion stored in the Control System, e.g. 'Guatemala has a fascist regime', which will also control understanding and evaluation. Of course, another reader, with less political information or different opinions, will have no or different controlling information in the Control System or in the episodic model.

The first, metaphorical, sentence will allow only partial interpretation. The information constructed or activated so far hardly allows a complete comprehension of the color metaphors. But we know that two countries are compared, and we may infer that this comparison will probably be about the political situations in these countries (activating a POLITICS frame). 'Black and white' in this frame might in that case be interpreted as 'marked political contrast', a strategic interpretation which will indeed be confirmed by the following sentences. The scalar predicates used, even if they are metaphorical, also suggest that a political evaluation (by the journalist) is denoted. More specifically it may be inferred that the journalist thinks that the situation in Guatemala is much worse than in El Salvador. Obviously, our reader will activate his or her opinions about the respective countries, maybe involving an evaluation of El Salvador which is much less positive. If that is the case, the reader will match the own opinions with those expressed in the text, and this may lead to an evaluation of the journalist or the weekly.

The second sentence needs the activation of much political knowledge and opinions: we need to know about political parties involved, in particular about communist ones, and the evaluation of such parties by other participants in the conflict. Besides the usual processes of comprehension (which will not be detailed here), there are indications in the sentence that specifically call upon the opinions and attitudes of the reader. First, a leftist reader will activate his or her positive opinions about leftist guerrilla forces in fascist countries, and beliefs about the opinions of the USA and American media regarding such groups. The interpretation of the word 'extreme' in that case may imply an evaluation ('They find all communists extreme') confirming such beliefs. Similarly, the interpretation of the embedded opinion clause "a pretty faceless bunch of people" may conflict with the own (positive) opinion of the reader, and hence may result in a negative opinion about the cited diplomat. That the opinion of the diplomat may be believed to be congruent with an American evaluation is shown in one of the recall protocols collected for this text, in which the opinion is ascribed to an "American congressman".

The third sentence expresses information which is fairly consistent with the activated opinions and attitudes: conservative regimes are indeed entrenched elites and have been in power a long time in Central America. The CIA, next, may activate rather strong opinions, such as 'They protect the interests of American foreign policy and business' or 'They destabilize groups or governments opposed to American interests'. Part of the activated situation model around the concept CIA may for instance feature their action in Chile and other Latin American countries. That they deposed a reformist government in Guatemala, therefore, comes as no surprise and will merely instantiate these general opinions, and the information may be added to the situation model about actions of the CIA.

In the fourth sentence there may be a further conflict between the opinions of our reader and the information given in the text. On the one hand, the opinion that fascist regimes kill their opponents will be instantiated and confirmed. On the other hand, the evaluation of the centrist regime in El Salvador as 'moderate' may not be congruent with the activated opinion that also in that country the regime is responsible for many killings (according to the situation model of the reader). The interpretation of the verb 'embattled' therefore becomes problematic: in El Salvador the Christian Democrat regime is opposed by progressive forces, whereas in Guatemala it is decimated by the regime itself. Finally, the expression '30,000 victims of terror' will again be a confirmation of the expectation, derived from the FASCISM attitude schema, that fascist regimes commit mass murders.

Finally, the next sentences confront the opinion about the situation given by another (anonymous) diplomat with the opinions of the reader: the reader may agree that the situation in Guatemala is also very serious, but that 'moderates' in El Salvador are also murderous. This opinion is also not quite congruent with the denoted opinion that the choices are fewer in Guatemala, if it is believed that the political center is not a democratic solution either.

From this, still very informal, analysis of the first few sentences of the text, we may conclude that besides the usual frames and scripts, such as those around the concepts GUATEMALA, EL SALVADOR, CENTRAL AMERICA, COMMUNISM, FASCISM, CIA and USA, the reader will activate the corresponding attitudes and opinions. At some points these opinions lead to expectations that are confirmed by the information in the text. At other points, the evaluations expressed or denoted by the text are in conflict with those of the reader, especially when the evaluation of the role of the guerrilla forces and the Christian Democrats is concerned. Both the topical macroproposition and the macro-opinion, strategically formed upon the information in the title (and corresponding frames and attitudes) do organize the expressed information in the text on the one hand and the possible opinions of the reader on the other hand. At the local level, new opinions are formed, by instantiation and inference, e.g. about the role of the CIA and the fascist regime in Guatemala.

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The 'doxastic' (from Greek *doxé*, opinion) interpretation of the rest of the text runs along similar lines. Depending on the precise point of view, the information that Jimmy Carter cut military aid to Guatemala because of human rights abuses, may be evaluated positively or more or less negatively if it is believed that Carter's human rights policy was merely superficial face keeping and never really affected the fascist regimes in Latin America if fundamental American interests were involved. Similarly, against the background of opinions about the current (Reagan) administration in the US, the reader may confirm his expectation that fascist regimes in Latin America would welcome Reagan's election, as it is later stated in this text. When the reader also obtains information that a White House aide had business relations with Guatemala, the attitudes about the American foreign policy will be coupled with those about big business, an expectation derived from the more general ideological system involving coherence between capitalism and fascism.

Another interesting doxastic conflict may arise in a later sentence in which it is stated that especially Israel is the principal source of weapons and training personnel for the Guatemalan regime. For some readers such an information may be consistent with the view that Israel, because of its violent anti-PLO politics, is itself fascist or at least anti-revolutionary. For anti-fascist readers of the left who have a more positive opinion about Israel --explaining the anti-PLO policy as a necessary policy of self-defense or survival-- the information cannot easily be dealt with: how could a positively evaluated country help a fascist regime? At the local level, such an information may result in a local negative opinion about Israel (the 'criticism of friends' strategy), or higher level opinions may be activated to explain such an action (e.g. 'Israel must sell weapons in order to survive economically'). The resolution of this kind of cognitive dissonance (Festinger 1962) appears to involve several possible doxastic strategies, such as the 'exception to the rule' strategy, which allows lower level opinions to conflict with higher level ones, or the activation of other attitude schemata providing opinions which can act as 'bridges' to explain apparently incoherent facts, so that the doxastic system need not be changed. It is indeed the aim of our model to spell out in detail the complex cognitive strategies that are involved in such rather vague traditional terms as cognitive dissonance (see Abelson et al. 1968).

A final example provides the sentence about the guerrilla forces: "They may also be bolstered by assistance and training from Communist-bloc countries". This modalized ('may') proposition, suggesting communist outside help, may activate in the reader not only international POLITICS frames and attitudes, but will more in particular 'remind' him or her of a information in a situation model saying that the usual American allegations about foreign help (by Cuba, the Soviet Union) for guerrilla forces in Central America are seldom proven and rather taken as a justification to interfere in internal political situations of these countries itself. On the basis of such an opinion, the reader will be able to infer the opinion that also in Guatemala the 'international communist conspiracy' is again taken as an excuse for killing and terrorizing the people, or for aid to governments who claim to fight international communism.

The few informally analyzed examples of this text yield some insights into the role of opinions and attitudes in discourse comprehension. These results may be generalized in the following hypotheses:

- (a) Reading a politically relevant text, e.g. in the press, will usually not only activate appropriate knowledge frames or scripts, but also relevant attitude schemata.
- (b) Given information from text and context, relevant fragments of these attitude schemata may be instantiated and integrated into the situation model now activated or constructed in episodic memory.
- (c) Initial information from the text, e.g. as expressed in the title, will first lead to the formation of a (partial) macroproposition representing the topic of the text (on the basis of frames and scripts), and will secondly lead to

- the instantiation or inference of a macro-opinion from the situation model. These two types of macro-information will be inserted into the Control System and will further control comprehension and evaluation at the local level.
- (d) At the local level, we will first encounter the activation and possible actualization or formation of opinions about each concept denoted by the text, as well as about the lexical choice of the author to describe this concept.
 - (e) Such concepts are combined into propositions, denoting facts, and the reader will next evaluate each fact with respect to the attitudes and inferred opinions activated by the concepts themselves. In our text, for instance, the evaluation of the fact 'The CIA deposed a reformist government' will be a function of the attitude and hence the specific opinions and episodic information about the CIA.
 - (f) Propositions, next, are organized into sequences (a text base) which must be both locally and globally coherent. Local coherence presupposes for instance conditional (causal or other) relations between facts or functional relations between propositions (e.g. specification or contrast) (van Dijk, 1977). According to the opinions of the reader such relations may well not hold, even if the speaker/text do presuppose them. In our example, sentence (5) expresses a (functional) conclusion with respect to the previous sentences, but this conclusion may not be acceptable to the reader. In other words, from a subjective point of view, there would not be a sufficient condition for local coherence. The reader, however, also has a partial model about the opinions and attitudes of the author, and will therefore be able to assign what might be called intended or speaker coherence to the passage.
 - (g) The activation, actualization and formation of opinions is an on-line, strategic process, using various kinds of contextual information, fragments from the text, as processed linearly, together with inferences from general attitudes and episodic experiences. The various doxastic comprehension steps described above should therefore be considered to occur at several levels and in cooperation. Thus, sometimes a reader may directly activate certain opinions; in other cases 'judgement may be suspended' until a large part or the whole of the text has been read. On the other hand, this kind of after the fact, explicit (macro-)opinions probably do not exclude the possibility that less conscious activation and use of opinions and attitudes takes place and influences comprehension.

From these few hypothetical conclusions we obtain a view of discourse comprehension which is rather different from the current models. In these models it is merely the information expressed in the text together with world knowledge which leads to the construction of a textual representation. We have first stressed that natural discourse processes take place in communicative contexts, and hence involve pragmatic and interactive goals, about which the reader or hearer will have opinions and attitudes, which will determine the understanding process. Secondly, the reader will not only try to construct or up-date a situation model, but such a model will also feature specific opinions (or previous opinions) about the whole situation, about similar actions or events or the same participants. Again, also this doxastic information will be used in the local and global comprehension of the text. Doxastic comprehension takes two forms, however. On the one hand evaluative beliefs are formed about elements in the situation (or about the way the text represents the situation). These beliefs will be added to the situation model and to the controlling mechanisms. On the other hand, these opinions may also influence the other aspects of comprehension, such as the specific understanding of words (lexical search), the formation of complex propositions (which may lead to foregrounding or backgrounding of propositions --see van Dijk & Kintsch, 1983), the establishment of local coherence (conditional or functional relations may not hold for the reader), and the formation of global macrostructures (the reader may find other facts relevant or important than the text indicates). Besides a representation of the opinions of the reader in his or her model of the situation, we may therefore also have a different, personal, or 'biased' text representation.

5. EMPIRICAL IMPLICATIONS

What are the empirical implications of this theoretical sketch of the role of opinions in discourse comprehension? As yet we have little experimental evidence to substantiate the various assumptions. One of the obvious expectations would be that subjects exhibit some of the opinions formed during processing in free recall protocols. Since such opinions are not integral part of the text, they may be expressed as 'meta-statements' --which of course may be expressions of opinions formed during understanding, but which may also be formed during retrieval. In our earlier experimental work (e.g. Kintsch & van Dijk, 1975; Kintsch & van Dijk, 1978; van Dijk, 1979) we indeed find many of such evaluative meta-statements in free recall protocols. Next, we expect that opinions may influence recall elements of the text 'itself'. Thus, our main theoretical assumption has always been that macropropositions will be best recalled. However, we also repeatedly found that subjects may have a more specific retention pattern about what we called 'salient details'. In the framework of the doxastic comprehension model outlined above many of such salient details would involve the actualization of opinions. This means that a proposition which is structurally or according to world knowledge not very important, may well be in the light of underlying opinions, and even become a doxastic macroproposition. In some free recall protocols collected among Amsterdam students who read the Guatemala text during a course, immediate recall would in all cases show accurate retention of the structural detail '30,000 victims'. Similarly, in another experiment, in which immediate and delayed recalls and summaries were obtained, in several countries, for a text about the murder of ten women in a Dutch concentration camp --a text which appeared in the German weekly *Der Stern*-- similar recall for numbers which have high attitudinal function but low structural value was observed (see Note). On the basis of an analysis of the recall of macropropositions of the same text (in French), Martins (1982) found that 'affective' information was better recalled. It follows, as hypothesized above, that besides the structurally important macropropositions subjects will recall detail propositions which are linked with several, high-level, opinions, and that such detail propositions may even be accorded macro-status because of this kind of 'personal relevante'.

We here touch upon theoretical and experimental results which cannot be fully accounted for in this paper. First, if opinions and attitudes, as we assumed, are related with values and norms on the one hand and with emotions or 'affect' on the other hand, the very 'affect loadings' assigned to textual concepts or the things they denote may influence recall. Dutta & Kanungo (1975) conclude from previous research and their own experiences that, on the whole, memory is better for positively evaluated than for negatively evaluated information, according to the opinions of the subjects: subjects have better recall for the positive terms describing their own group than for the negative ones, and the reverse holds for opposed groups. Of course, such an effect need not be an encoding result, but in our terms may well also be explained in terms of the top-down inferences drawn from (positive) self-attitudes during recall. This would also better explain why negative concepts are better recalled for opposing groups (see Martins, 1981).

Another hypothesis, namely that subjects will tend to better recall the information in the text which is congruent with their own opinions and attitudes, has often been tested in the classical attitude change paradigm in social psychology (see Fishbein & Ajzen, 1975 and Himmelfarb & Eagly, 1974 for surveys) and would be a predicted outcome of traditional cognitive dissonance theory (Festinger, 1962; Abelson et al. 1968). In terms of our model, this would not be a straightforward conclusion. If indeed readers will use the general strategy and a goal which preferentially looks for information in a text which is a possible confirmation of the expectations derived from own opinions and attitudes, then indeed the result is predictable. If however the strategy would be to be critical of the opinions of others, as expressed by the text, then the results might even be the reverse. Note also that better recall for doxastically coherent information from a text can

easily be explained again by a top-down retrieval strategy monitored by the own opinions and attitudes of the subject: we may assume that subjects know their own opinions better than those of others (if different), so that similar opinions will be easier to access or reconstruct during recall.

That active generation of own opinions during discourse comprehension takes place especially in contexts and with texts in which the author exhibits a different opinion seems to be confirmed by a number of studies (see Sandell, 1977, for review and discussion) which found that attitude change in general is less when the position of the author is expressed in more intense stylistic terms. This finding was often contrary to expectation --according to a naive model of persuasion -- but would be consistent with the view that extreme opinions will often be countered by more extreme counter-opinions as a 'defense mechanism'. Without entering into the complex issue of attitude change, we may simply assume first that comprehension and recall are essential components in any process of 'doxastic learning', that is in opinion formation and change. If stylistic surface structure, together with semantic information and general textual and contextual information about the opinions of the text/author, signals --by extreme terms-- an opinion which is different from that of the reader, we will indeed expect that the reader will infer as many opinions as possible to evaluate the opinions of the author. Secondly, we assume that this process takes place during comprehension, and that both the opposed and the larger amount of inferred own opinions will become part of the situation model. Hence, the very situation model about the communicative process will better represent the fact that reader and author have opposed opinions, which alone would explain a lower probability for subsequent acceptance of the opinions of the author and hence less persuasion. But if we remain at the level of pure recall, the predictions are less clear. If the reader actualized more own opinions and if in addition such opinions are a better retrieval cue, then own opinions and opinions coherent with them will be better recalled. But if the opinions of the author are marked by the rhetorical device of 'contrast' these would also be easily retrievable. Much will in that case depend on the strategy of the reader (e.g. to acquire information, or to criticize the author).

In recent work Spiro and his associates (e.g. Spiro, Crissmore & Turner, 1982) have shown that discourse comprehension involves two kinds of processing and two kinds of representation, leading to differences in recall. Besides the usual knowledge based construction of coherent propositional text bases, they also assume an affective process to 'color' the information. They see this process as a pervasive 'overlay' of experiential information, much in the same way as we have assumed the role of beliefs and attitudes. Sometimes, a previously established affective state may simply influence the full comprehension process, and when such affective information is relevant to the information in the text (as is the case in our opinions and attitudes) it may complement the construction of a text base. In somewhat more specific terms our (sketch of a) model also assumed that on the one hand opinions and attitudes (and hence emotions) control the very comprehension process, leading to 'biased' text representations, and on the other hand that local and global opinions about the situation denoted by the text (or about the text and author themselves) are separately represented as part of the situation model. In other words, we have an (up-dated) idea what the text was about coupled with our own opinions about the things, persons, events or actions. This means that previous experiences, as represented in the episodic model, as well as initially formed macro-opinions (based on information about the author or derived from information in the title or the first sentences of the text), will indeed 'color' comprehension and further opinion formation during the actual local steps of the strategic understanding process. Bower (1980) similarly supposes that affective states will result in selective processing of information.

Despite the results of some of the experimental studies briefly mentioned above, the empirical assessment of a model of discourse comprehension in which also opinions, attitudes and ideologies are taken into account still requires much further research.

6. CONCLUSIONS

In this paper we have argued that a model of 'real' discourse comprehension not only needs representation formats and strategic principles for the use of knowledge, but also an important 'doxastic' component, featuring opinions, attitudes, and indirectly also norms, values and ideologies and their associated 'emotions'.

Such a programmatic statement implies first that we go beyond the extant models for the representation of knowledge. Some recent work on belief systems, also in AI, shows us one direction in such a complicated endeavor. Secondly, it means that cognitive psychology should finally 'go social' and develop process models, specific strategies, and memory representations which its disciplinary sister, social psychology, failed to specify despite the vast amount of work in the area of attitudes. It should indeed be realized that discourse production and comprehension is not an 'individual' affair, or a process which can be modelled only in the usual cognitive framework. On the contrary, understanding is also a component in a more complex process of communication and interaction in the social context. Texts are products of local and global speech acts performed with communicative intentions. Both in production and in comprehension, therefore, the social dimensions of knowledge, beliefs, opinions and attitudes play a role.

Conversely, such social dimensions require their own cognitive modelling. Hence the necessity to go beyond the naive statements about the nature of opinions and attitudes and devise formats for their representation and use in strategies of 'subjective understanding'. Referring to some recent other work, we have specified some of the characteristics of subjective understanding. Also we have tried to briefly indicate some essential differences between knowledge, beliefs, opinions and attitudes. Apart from such cognitive properties as 'degree of certitude', we discovered that the essential differences between knowledge and beliefs should be formulated in social terms, such as consensus and socially based truth or verification criteria.

Similarly, opinions --taken as evaluative beliefs-- show this distinction between more or less personal dimensions and social dimensions, the latter being based on culturally and socially shared values and norms. It also appeared that another dimension, viz. along such categories as 'particular' and 'general', is important in the representation and use of beliefs. A memorial consequence of this distinction has been sought in differential storage of such beliefs in episodic situation models or in more general 'semantic' memory, respectively.

Attitudes are taken as higher level organizational packages of (socially relevant) opinions. Organizational principles are not only those familiar from frame- and script theory (or its current, more flexible, versions), but may also involve notions such as personal and contextual relevance. It may be the case, by the way, that attitudes not only organize opinions, but also other beliefs (knowledge) about attitude objects, thus 'assembling' from various sources both consensual generalizations about things and facts and personal evaluations of these. Ideologies are taken as the basic, by definition also social, organizing systems of attitudes, assigning the necessary coherence between opinions about various objects, and hence, indirectly, some coherence in interpretation, decision making and action. Obviously, this is a necessary feature for any sound model of social cognition.

Against the background of our earlier work (with Kintsch) on discourse comprehension we then formulated a number of strategic processes involved in doxastic comprehension, as illustrated on the understanding of fragments of a political news-story. We have seen that in such a process general opinions from attitudes may be activated, instantiated or inferences drawn for the formation of new opinions. Eventually these are stored in the current situation model and, as part of the Control System, macro-opinions may control more local opinion formation.

The information for this kind of strategically derived doxastic propositions will be inferred from the communicative context, from 'previous experiences' as represented in the situation model, together with initial information from the text (title, first sentences). Local semantic structures and stylistic surface structure may confirm or disconfirm such expectations. At this local level, individual words or concepts will activate the respective attitude frames, and propositions their relevant general opinions. Their instantiations can in that case be matched with the information expressed in the text, leading to consent or dissent with the explicit or implied opinions of the text/author. Local coherence between propositions, finally, will in this model also be assigned in a subjectively biased way: underlying conditional or functional relations between facts or propositions may not hold for the reader.

On the whole, the process of comprehension now has a pure interpretation component and an evaluation component. These may in a sense be rather autonomous, but will also interact. On the one hand, we may have a representation of the information conveyed by the text, or by the author, but the situation model which represents what a text is about will also feature the personal opinions of the reader of this situation, its events, actions or participants. On the other hand, we also saw that the opinions may control the interpretation process, e.g. in the selection of lexical readings, the activation of alternative knowledge and beliefs, the formation of complex proposition schemata (foregrounding and backgrounding component propositions), the establishment of local coherence, and the derivation of semantic macrostructures. Indeed, the interpretation, despite the intentions of the author, may thus become subjectively biased. General communicative principles might have some external, social control on this kind of subjective variability in understanding, especially in cases where the understanding of intentions is crucial (as in conversation, job interviews or text book learning), but to a lesser or larger degree our model of comprehension always need to account for this kind of subjectivity.

The experimental evidence for our sketchy hypotheses is still skimpy. Some attention has been paid to the role of affect (a component in opinions) in recall, and some well-known results from classical work on attitude formation and cognitive dissonance can now be formulated in somewhat more satisfactory terms. Our earlier observations about the nature of personal variation in summaries and recall protocols can now partly be explained. And finally, all work done in the area of task- and goal-dependent comprehension should now be embedded in a broader framework of 'subjective' and contextually specific cognitions. Most of the experimental work, however, is still to be done, and most of our assumptions and predictions need testing.

At the theoretical level too, most work is still ahead of us. Even after some promising attempts in modelling belief systems, we still know very little about the nature and representation of opinions and attitudes, let alone about their multiple links with values, norms, ideologies and emotions, which each are notions deserving booklength theoretical analysis. Then, also the strategies used in the activation and inference procedures of opinions and the precise role of opinions in short term memory processing require further attention.

NOTE

This paper is a preliminary report of ongoing research at the University of Amsterdam on the role of opinions, attitudes and prejudice in discourse processing. It partly resumes a number of working papers (including the article in the special issue of the *Bulletin de psychologie*, ed. LeNy). Experimental evidence, collected in an international recall and summary task (Netherlands, Germany, France, USA) for a text in a German weekly, is now being analysed for differences due to variations in opinions and attitudes (about war crimes) in these countries. More specific data are collected in a project about prejudices in conversations about ethnic minorities in the Netherlands (see van Dijk, 1982).

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