

Text, context and knowledge

Teun A. van Dijk

Universitat Pompeu Fabra, Barcelona

teun@discourses.org

First draft, March 6, 2008

Abstract

Contemporary linguistics and discourse studies have largely focused on language use and discourse — and their structures — themselves, and ignored and *neglected the theory of context and its relation to text and talk*. If context was examined, this happened in a deterministic framework of objective ‘social variables’, such as ‘gender’, ‘class’ or ‘ethnicity’. However, since situational and societal structures cannot directly affect the mental processes of discourse production and comprehension, we need a *mental mediating device*, that is, special mental models (*context models*) that represent the subjective ‘*definition of the communicative situation*’ of the participants. These dynamic mental models, stored in episodic memory, control the production of variable structures at all levels and dimensions of discourse and have as their overall goal to make sure that discourse is situationally appropriate. This is also why a context theory is the basis of a theory of pragmatics. A crucial element of context models is the knowledge of the participants. It is assumed that a knowledge-device (K-device) calculates for each moment of discourse production what recipients (don’t) know. A number of epistemic strategies are being formulated that account for various situations in everyday life. On the basis of this theoretical framework some speculations are formulated about the nature of an automatic system of newswriting REPORTER. Finally we analyze in some detail a concrete example, taken from the New York Times, about the arrests of alleged terrorists in Barcelona, Spain, in order to investigate how different kinds of knowledge are expressed or presupposed in news reports.

1. Towards a new theory of context

1.1. **The development of discourse studies.** The last four decades have seen a broad development — in all disciplines of the humanities and the social sciences —

towards a new cross-discipline of discourse studies. Most of this research focuses on the structures and strategies of text and talk at various levels and dimensions of description: syntax, semantics, pragmatics, semiotics, style, rhetoric, narrative, argumentation, interaction, etc. (Schiffrin, Tannen, Hamilton, 2001; Van Dijk, 1997, 2007).

- 1.2. **Interest in context is limited.** Interest in the relations between discourse and (social) context has been limited mostly to sociolinguistics (Ammon, 2005) and Critical Discourse Analysis (CDA)(Wodak, & Meyer, 2001). In these approaches, a more or less direct link is established between social structures (for instance conceptualized as social ‘variables’ such as gender, class or age in sociolinguistics) or power relationships, on the one hand, and language variation or discourse properties, on the other hand. In these studies, the precise nature of this link between language, discourse and context is seldom made explicit, and the notion of ‘context’ hardly ever defined but usually taken for granted. In fact, if at all made explicit this link is often formulated in causal terms, so that the relations between society or situation and discourse become deterministic.
- 1.3. **Verbal context.** Other, usually formal, approaches to context define context in terms of ‘verbal context,’ that is, in terms of previous or following sentences, propositions or turns in text or talk. This notion of context will be ignored here since it is automatically accounted for in a discourse approach to language use, namely as specific kinds of discourse structures. In other words, a sentence + ‘verbal context’ approach to language use is no longer adequate after decades of discourse and conversation analysis. In this paper, I only deal with what is traditionally conceived of as the ‘social context’ or environment of language use.
- 1.4. **No direct link between social and discourse structures.** The fundamental problem of these traditional approaches to (social) context is that there is no direct link (let alone a causal link) between properties of social contexts and structures of text or talk. These are heterogeneous kinds of structures. Someone’s gender or age obviously does not directly influence their language production. Hence we need an intermediate level, an interface, that on the one hand relates to local and global social structure, and on the other hand to discourse structures and the cognitive processes of production and comprehension. This also guarantees that

the link is not causal, and that different people may speak differently in the ‘same’ situation because they interpret it differently.

- 1.5. **Defining the situation.** Instead of a direct link between society and discourse, I assume that social influences can only play a role through the *subjective definitions of the social situation by the participants themselves*. Only this guarantees that social influence on language use will be both relevant and relative to the language users. Also, since such definitions are mental representations, they easily connect to the kind of structures handled in discourse processing.
- 1.6. **Context Models.** Cognitive psychology has an excellent theoretical concept to represent subjective representations of events and situations in personal, episodic memory: mental models. Hence, contexts are *not* social situations or social structures, but mental models of what participants attend to, focus on or ongoingly find relevant in a communicative situation. We call these special models *context models* (for details, and further discussion of linguistic, cognitive, social and cultural properties of context, see Van Dijk, 2008a, 2008b).
- 1.7. **Semantic Event Models.** Context models should *not* be confused with (semantic) models that subjectively represent what a discourse is *about*, that is, the events, actions or people referred to (Johnson-Laird, 1983; Van Dijk & Kintsch, 1983). These are also part of Episodic Memory, and are at the basis of the production of text and talk (as semantic discourse plan) and the ultimate product of comprehension: understanding discourse involves the construction of a subjective model of the events talked about, on the basis of the expressions and meanings of the text and with relevant instantiations (inferences) from general, socioculturally shared knowledge. This means that event models are much richer and more detailed than texts based on them. We shall see later that context models precisely account for the fact that language users only need to express a tiny fragment of (new) information of their event models in the discourse they produce. Similarly, they also need “half a word” in order to be able to construe an event model for a discourse, and hence subjectively understand it.
- 1.8. **Architecture.** The simplest architecture of context controlled discourse processing may thus be summarized in Figure 1. Below we shall deal in more

detail with the basis of this figure – the role of knowledge management in context models.

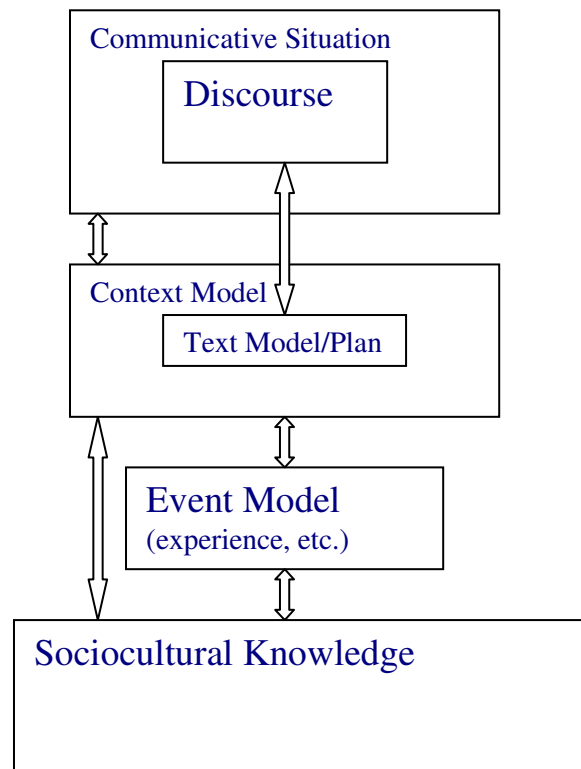


Figure 1. Simplest architecture for context controlled discourse processing

1.9. **Opinions and Emotions.** Both context models and event models not only feature knowledge about (communicative) events, but possibly also opinions and emotions about such events. What we hear from people or read in the newspaper may add emotion information to a context model (“I was furious when I talked to him”, “I am furious against you right now”) or an event model (“I was furious about what I read about Iraq”). This means that we may also retrieve and recall such event models with such evaluative opinions or emotions as a search cue: When we are pessimistic we remember more bad experiences of the past.

1.10. **Consciousness.** Context models generally operate rather automatically and in the background (i.e. in a control system supervising STM processing and its relations between Episodic Memory and Semantic Memory). That is, although permanently

active in discourse processing, they become only partly ‘conscious’ (processed in STM itself) if problems arise, for instance about the goals or the identity of the participants (for details, see Velmans & Schneider, 2007).

- 1.11. **Experience models.** Context models are special cases of what may be called models of everyday experience. These experience models self-represent agents, their environment and control their ongoing actions from the moment we wake up in the morning until we fall asleep, or lose consciousness. Indeed, in many ways such experience models probably *are* (part of) what is called consciousness. Context models are experience models in which the ongoing action is discursive.
- 1.12. **Structures of context models.** Since context models control language use (see below) online, and in STM, they must be relatively simple. Context models representing hundreds or thousands of properties of social situations obviously do not fit working memory, nor can they be activated fast enough to make split second decisions on most properties of form, such as those of syntax, lexicon or local semantics. It is therefore assumed that they consist of a simple schema that can be strategically applied to many situations, and that need only to be modified in special circumstances. The main categories of this schema are:

- **Setting: Time, Place**
- **Participants**
 - **Roles, identities**
 - **Relationships**
 - **Goals**
 - **Knowledge**
- **Action**

Each of these categories may be further specified by various subcategories, typically not more than 7 plus or minus two. E.g. Time by temporal categories such as Second, Minute, Hour, etc. Place categories may involve (this) room, house, street, city, etc. and so on. Action is the ongoing speech act or other social action now being performed by the discourse, and may also have several layers of generality of specificity: Ask a question, teach a class, supervise PhD

students, work at the university, etc. All categories dynamically represent what is *now* being defined as relevant: what I now say, here, as a professor, to this student in order to help with a thesis problem, assuming such and such a kind of knowledge, etc.

- 1.13. **Appropriateness.** The major function of context models is to make sure that discourse is *appropriate* in the communicative situation. In that sense, a theory of context models also provides *the basis of pragmatics* (see also Fetzer, 2007).
- 1.14. **Relevance.** Since context models represent what language users now find relevant in the communicative situation, they at the same time provide a theory of relevance that is more detailed and psychologically adequate than more formal approaches, such as Sperber & Wilson, 1995; see also Carston & Uchida, 1998).
- 1.15. **Dynamic.** Context models are not static, but dynamic: They continuously change during discourse production or comprehension, either because the social conditions — such as participant relations — are (seen to be) changing, or because of the change of time, and especially because of the obvious change of knowledge implied by the discourse.
- 1.16. **Planning.** Context models are not construed from scratch each time a text or talk starts, but often planned ahead, especially in institutional situations. This means that language users often only need to adapt some features of the model to the actual situation and may direct their focus rather on the very execution of the discourse itself.
- 1.17. **Context control.** Context models control discourse production and comprehension. In **production** they define first of all the relevant *genre* (a conversational story, an interrogation, writing a news story, a parliamentary debate) which conventionally relates situation with discourse structures. Then context models control what (relevant) *information* should be selected (from event models or general knowledge) for construction in the semantic structure of discourse and finally its expression and (explicit) communication. In other words, pragmatic context models control what of our semantic event models is now relevant to express (or presuppose) in text or talk. I shall come back to this crucial function of context models below. Finally context models especially control all options of *language and discourse variation* that are relevant in this situation:

*intonation or visual (semiotic) structure, syntactic structure, lexical choice, and hence style and register, and then all semantic options: more or less general or specific, vague or precise concepts, granularity, modalities, and in general what information remains implicit or presupposed, and what is made explicit or asserted. Finally, context models define the planning, execution and comprehension of speech acts, since they define the relevant conditions of speech acts (what speakers/hearers know, want, etc.). In discourse **comprehension** they define how recipients understand a discourse, that is, depending on the setting, their own relevant identities and goals, and so on — including, the representation of the context models of the speaker: what does he or she intend (want from me, etc.) now?*

- 1.18. **From text model to context model.** In ongoing discourse production, previous clauses, propositions or turns have expressed and probably communicated knowledge and changed the situation otherwise in such a way that we may say that ‘past text’ is automatically ‘known’ or available to the recipient, and hence part of the context.
- 1.19. **Semantic event models and pragmatic context models overlap.** Semantic and pragmatic models may overlap when language users explicitly speak about or refer to the current communicative situation, typically with *deictic expressions* (*I, you, here, there, now, today, modern, etc.*)(Jarvella & Klein, 1982; Brisard, 2002). Because the notion of pragmatics is often used sloppily, it should be stressed that such expressions are not therefore *pragmatic* — they refer or denote and hence belong to the domain of semantics, and do not, as such define appropriateness. However, the use of *variants* of deictic expressions may be more or less appropriate in a given situation, as we know from the personal pronouns *tu* and *vous* in French, and similar distinctions in other languages: These variants are controlled by the **Participant: Relation** category of the context model and hence are pragmatic.
- 1.20. **Theory of discourse production and comprehension.** With an explicit theory of context models we have added a crucial component to the complex theory of discourse processing of which most other components have been dealt with in discourse studies, linguistics, psychology, AI and the other cognitive sciences

(Graesser, Gernsbacher & Goldman, 2003; Van Dijk & Kintsch, 2003). After grammar (phonology, morphology, syntax, lexicon, semantics), various theories of discourse and conversation structures (semantic, narrative, rhetorical, interactional etc.), and after the generally semantically based theory of text processing, we now have entered the stage of explicitly linking discourse with its environment. That is, after defining well-formedness, meaningfulness (or truth) we now have the kernel of a general theory of appropriateness, of which theories of speech acts, politeness, self-presentation, rhetoric and persuasion, etc. are only parts.

2. Contextual knowledge management

- 2.1. **Knowledge as part of context models.** Crucial element of communicative situations is the knowledge of the participants. Since language users do not have direct access to the knowledge of other participants, they need to engage in efficient strategies geared towards ‘mind-reading’: For each proposition or speech act they must know what recipients know. Hence they must also model such knowledge as relevant part of the communicative event.
- 2.2. **K-device.** Because such dynamic management of knowledge in discourse production is a complex, ongoing process that needs to be handled with a special mechanism, I assume that context models have a special knowledge device (K-device) that does just that: At each moment of discourse, the device ‘calculates’ on the basis of available knowledge about the recipient what he or she probably knows already, and adapts the discourse accordingly, for instance by leaving known information implicit, by reminding someone of old information, or by explicitly expressing it. More than anything else beyond time, knowledge is what constantly changes during a communicative event, and hence needs special control.
- 2.3. **Epistemic heuristics.** Obviously, speakers do not (and cannot) possibly represent all knowledge of recipients in their (simple!) context models in order to produce epistemically appropriate text or talk, and hence much have recourse to a number

of (simple, fast) heuristics that solve the well-known (pseudo) problems of (the access to) Other Minds.

- 2.4. **Knowledge is social and hence shared.** These epistemic heuristics are based on the *social* nature of knowledge as being defined and shared among members of an epistemic community (Beysade, 1998; see also Goldman, 1999). That is, beliefs in a community are defined as knowledge when they are shared and ‘certified’ on the basis of the K-criteria or standards of the community — whether that of general Common Sense and general lay knowledge, or that of scientific or other specialized communities (see below for details). This fundamental social nature of knowledge implies that most of what recipients know is, for all practical purposes, (more or less) the same as what the speaker of the same community know. Hence, we need not store vast amounts of assumed recipient knowledge in our context models, and can simply use our, directly available, sociocultural knowledge as the norm for what recipients already know.
- 2.5. ***You know what I know.*** Hence, following this simple heuristic (*you know what I know*), most knowledge in discourse may (must) remain implicit because the speaker knows that the recipient can directly activate the relevant knowledge, or can make the relevant inferences from such knowledge. Indeed, this is not only true for general (generic) sociocultural knowledge, but also for many of the inferences of its instantiations in event models (if I know about war in general and know that there is a war going on in Iraq, I may assume that the recipient may infer many more propositions from those I express as ‘new’ information in discourse). We may call this heuristic the **Fundamental Epistemic Heuristic (FEH)**.
- 2.6. **Discursive consequences.** The Fundamental Epistemic Heuristic has several discursive consequences (corollaries), such as:
- **EH1. Presupposition.** If I know that recipient R is a member of my Knowledge Community KC, and hence generally knows what I know, then if I know that *p* then R knows that *p*, and I may also discursively presuppose that R knows that *p* (and so I may not or need not assert that *p*).

2.7. **Related epistemic heuristics.** Besides the basic pragmatic heuristics that assumes that recipients know what I know as a speaker if we are members of the same epistemic community, we may derive related heuristics, such as:

- **EH2. Epistemic transitivity:** If language users are members of a speech community KC1 that is itself a subset of larger speech communities KC1+1, KC1+2..., then they also know all general knowledge of these higher level (broader) speech communities.

For instance, scientists know about general, common sense knowledge, and the citizens of Barcelona share with citizens of Madrid their general national knowledge about Spain, who share their general European knowledge with other citizens of Europe, etc.

2.8. **New Knowledge.** But what about knowledge that is *not* (yet) generally known and shared, that is, *new* knowledge? How do language users know recipients do not yet have such knowledge? One obvious strategic interactional move of Lack of knowledge is: to ask. Hence, especially in interactive talk (conversations, online chats, institutional dialogues) regularly features questions such as “Did I tell know about X?”, “Did you hear this and that about Y?”, or “Did you see Z on TV” (or: “Did you read Z in the newspaper?”). In delayed written communication (as of the mass media) this is more complicated, and journalists must make a best guess about what recipients already know. Such heuristics may be something like this:

- **EH3. Ignorance Heuristic.** If I/we did not yet report that *p*, and if it is unlikely that R has had access to other sources or news media, then R probably does not yet know that *p*.

This is typically the case for nearly all breaking news on radio and TV and for news stories in the press that appear (early in the morning) when people probably have not yet watched television. Later stories in the press or on TV will already ‘semi-presuppose’ such stories, which means that they are obliquely asserted for those who don’t know yet, and recalled for those who know:

- **EH4. Doubt Heuristic.** If I do not know whether some R may have heard that *p*, and some may not, then obliquely assert (or recall) that *p*.

Such oblique assertions or reminders may have forms such as “As we reported yesterday...”, or nominalizations such as “The attack on the Twin Towers this morning...”, and so on.

Basically this also holds for personal knowledge. Language users in conversation may (under further conditions — of relevance, interestingness, time, etc.) assert all they know R does not yet know, recall what was told earlier or what R may have heard from another source.

- 2.9. **Recalling old context models.** In order for speakers to know what recipients know on the basis of earlier discourse in which they were engaged themselves, speakers need to search Episodic Memory for old context models. If such activated context models are specific (=recent) enough, speakers may remember what they told R, and may also discursively signal so with phrases such as “As I told you yesterday, ...”, or special uses of demonstratives (“The guy who...”, “this guy”...) or literal uses of discourse adverbs such as “you know”. In other words, in the construal of ongoing context models, language users addressing the same person(s) will often activate old context models, so as to take into account what was said before. The same is true for the use of *evidentials*, that is, when showing that some (reliable) information was obtained from a specific person, media or another source (“The New York Times this morning had a story that...”). Also then we are able to provide such source information only when we have (old) context models of such a communicative event, as is the case for any event we recall. This is typically the case for news writing, where journalists use and may refer to many sources.
- 2.10. **General vs. specific knowledge.** So far we did not distinguish between socially shared, public, *general*, sociocultural knowledge (such as that Iraq is a country and not football stadium, what military are, and so on, etc.), on the one hand, and public knowledge about *specific events*, as is the case for most news in the mass media. Thus, a textbook or a lecture may teach us new general knowledge, and a newspaper first of all specific knowledge, that is, event models — which may be abstracted from (and contextualized) towards more general knowledge (e.g. about civil wars if we read about these in the newspaper).

Information from *new specific* event models can generally be communicated and understood on the basis of general knowledge, and hence need no further explanation other than in terms of previous event models (causes) — which may be partly known to the recipients because of earlier reports. *New general* knowledge however, may need explanation in terms of other general knowledge (definitions, metaphors, comparisons, descriptions, etc.) — which in that case must be presupposed to be known by the recipients.

- 2.11. **General vs. Specialized/Expert Knowledge.** As suggested, new general knowledge may be learned from specialists or experts. However, upwards of the hierarchy of knowledge communities, the transitivity does not hold: Specialists do not presuppose that their non-specialized recipients know all what they know. So, they must introduce new knowledge in a special way that can be understood by a wider audience. They need to do so on the basis of (higher level, more general, socially shared) knowledge, or in terms of specialized knowledge that was explained before. This is usually a quite difficult form of communication, and not all recipients are able to understand such specialized discourse until repeated explanations, etc. There are many discourse strategies of this kind of new, general knowledge communication.
- 2.12. **Cross-cultural communication.** The same is true for cross-cultural communication between different knowledge communities. Specific knowledge of a K-community cannot be assumed to be known to the members of other K-communities (many Spanish people have little knowledge about details of everyday life in the UK most people in the UK do know about). As is the case for scientific discourse, also such discourse can only be understood if explained, and in terms of a more general, shared knowledge (and language) system and explanations based on it. We also know that this kind of communication may be conflictual if the participants do not realize these epistemic (and other, e.g. religious or ideological) differences.

3. Notes on the architecture of discourse planning and production

- 3.1. **Preparation and intertextuality.** Many discourse genres, especially organizational ones, require a phase of preparation, for instance to gather the data to be reported in a text or talk, as is the case for a news report, a lecture, a paper, a parliamentary speech, etc. Although not properly part of the discourse, but itself complex forms of discourse with their own contexts, such forms of preparation need to be examined in detail in order to understand discourses. Thus, journalists need to gather news in many ways, for instance by reading other media and the internet, reading press releases, attending press conferences and interviewing people. These communicative events are forms of discourse that have as their goal to get information for a specific future discourse (typically a report), and the structures of such discourses (reports) may reflect this preparation phase, as is the case for quotations in news reports. That is, discourse planning should be considered as part of complex *intertextual* activities.
- 3.2. **Context models as plans.** Given the fundamental role of context models in discourse processing, also the overall architecture of the planning and execution of discourse needs to be adapted. Most theoretical accounts of discourse production in AI are limited to a specification of goals (Andriessen, de Smedt & Zock, 1996), whereas I suggest that contexts must be planned and not just goals and discourse. One must plan a discourse for a specific setting (time and place), with and for specific participants, as a specific action and with specific goals and knowledge. Actually, the production of context model for a future communicative event *is a (pragmatic) plan*. In other words, instead of discourse planning, we need to examine discourse-in-context planning. In the hierarchy of planning, thus, context models must be able to influence the production of all variable structures of discourse at all levels.
- 3.3. **Genre planning.** Since genres are largely defined in terms of context properties, and only partly in terms of discourse structures, discourse-in-context planning actually involves the planning of a genre, a conventional social activity, such as writing a news report for the newspaper, going to consult a doctor, giving a lecture at a conference.
- 3.4. **Knowledge and semantic planning.** Discourse planning should not simply be conceptualized as vaguely expressing some content or knowledge. It is crucial to

specify, what kind of ‘content’ or knowledge, or beliefs, etc. are to be expressed or communicated, which ones are to remain implicit and whether the knowledge to be expressed comes from subjective event models (personal experiences) or from more general, sociocultural knowledge. All this depends, as everything else, on the context model: In news journalists express knowledge that is different from the kinds of knowledge professors teach in a lecture or class. Similarly, storytelling involves the selective (relevant) expression of event models, and scholarly articles the expression of new (general) specialized knowledge, and so on for each genre. This also means that one cannot give one planning schema for all discourse genres. Below I shall propose one for news report production.

- 3.5. **Discourse production is strategic.** Discourse production is not just linear or top-down, macro-micro, but for strategic reasons it has more complex and parallel forms of planning and production (Van Dijk & Kintsch, 1983). Normally, overall (macro) topics will control local (micro) meanings, but during the execution of local meanings, language users may be reminded of information (or be interrupted by recipients) that may make them change part of their context (their identity, goals, etc.) as well as their topics. There is a constant mutual feedback between top and bottom, macro and micro, context and text. This is obviously more likely to happen in interaction.

4. Strategies of news production

- 4.1. **Illustration.** To illustrate the theoretical framework summarized above, let me summarize how it would apply to a concrete case, namely the way a journalist is assumed to produce a news report (for empirical studies, see, e.g., Gans, 1979; Tuchman, 1978; Van Dijk, 1988a, 1988b). We have seen that the overall structure of discourse planning and production (also) depends on the genre. We design a spontaneous conversation in a different way than a news report, a scholarly article, a novel or a parliamentary speech.
- 4.2. **Preparation. News gathering.** Journalists planning to write a news report need to engage in a sequence of discursive activities whose results are purported to yield new information needed for the production of a news report, such as interviewing

witnesses or experts, reading other media or the internet, consulting encyclopedias and dictionaries, attending editorial and press conferences, reading press releases, and so on. The combined goal of these communicative events is to obtain specific information. This information is stored in an *episodic model of the news event* (possibly backed up in external notes). Together with his or her own inferences derived from this information, this is all what the journalists knows about an event, and this model will be the input of the actual production of the news report.

- 4.3. **News context planning.** As suggested above, planning a news report should rather be conceptualized as planning a complex communicative event of which the news report and its goals are a central part. Journalists plan to write a news report for an editor, for a newspaper and for an audience, and do so as journalist and as employee of a newspaper, a citizen of a country, and so on. It is this overall context model that will control actual news report planning and writing. All stages and steps of news report writing are controlled by the context model: The selection of topics, the local information to include or not, leave implicit or not, to presuppose, to recall, to hint at, etc. as well as the degree of precision or detail, and finally the lexical style and the visual lay-out of the report.
- 4.4. **Schema of news report production.** The overall schema of news report production should look more or less like in Figure 1.

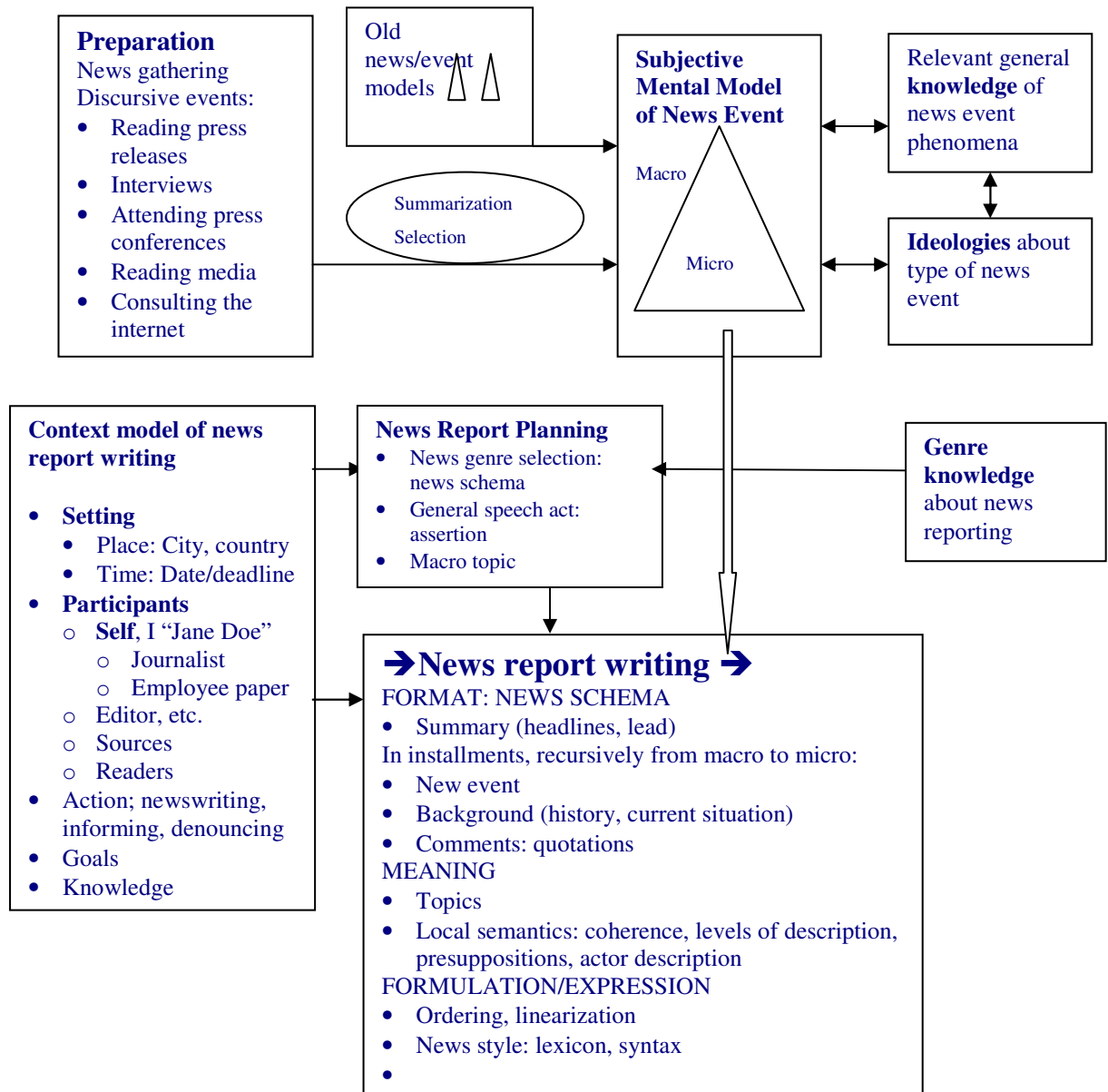


Figure 1. *Simplified schema of news report production*

5. Knowledge and News

5.1. **Definition of knowledge.** After formulating some general knowledge heuristics above we need to reflect a moment on the very concept of knowledge before we deal with knowledge and news. Unlike traditional definitions of knowledge (as in classical epistemology; for many different approaches, see, e.g., Bernecker &

Dretske, 2000) in terms of ‘justified true beliefs’, I define (social) knowledge in a more pragmatic way as *validated beliefs shared by the members of an epistemic community*. Validation takes place in terms of the knowledge **standards** of that community (often different for science than for everyday life). This means that knowledge is *not* defined in terms of ‘truth’, and not abstractly, but in terms of the beliefs called knowledge by the members of community, and act upon as such. That is, knowledge is relative, but also that relativity is relative, as it should be, because *within the community* knowledge is not relative but about ‘facts’ or ‘truths’. This even applies at the meta-level of classical epistemology which defines knowledge in terms of the truth of beliefs. Obviously, from the perspective of a different community, that knowledge may well be called mere belief or superstition. In this sense our epistemological background is moderately relativist (also relativism is relative) and contextualist (Jovchelovitch, 2007; Preyer & Peter, 2005).

- 5.2. **Knowledge and discourse.** Knowledge functions as the basis of all interaction in a knowledge community, and hence also as the basis for text and talk. This means, among many other things, that all general shared (social) knowledge may be presupposed in discourse, as we have seen above (for various formal, linguistic and cognitive approaches to presupposition, see, e.g. Beyssard, 1998; Deemter & Kibble, 2002). This is an easy and empirically sound test of what beliefs are being accepted as the ‘common ground’ (as well as the ‘common sense’) of a community (Clark, 1996). Hence knowledge, thus defined, is unlike the beliefs that are found controversial, and hence called opinions (as in the classical notion of *doxa*), attitudes or ideologies, and that define different social *groups* (Van Dijk, 1998). Applied to news production, this principle implies that journalists may presuppose in their news discourse all the knowledge shared by most of their readers (again, depending on a minimum of education, etc., that is, on the basis of social criteria).
- 5.3. **Knowledge types in news reporting.** In order to understand how journalists manage knowledge as one of the tasks in news report writing, it should first be made explicit what types kinds of knowledge they deal with. So far we only dealt with general, socially shared knowledge, but knowledge is much more diverse

than that. More generally, we need a **knowledge typology**, also for other purposes than discourse production, since not all knowledge has the same structure and function, such as:

- Declarative vs. procedural
- General vs. specific
- Abstract vs. concrete
- Social vs. personal
- Theoretical vs. empirical
- Real vs. fictional
- Macro vs. micro
- Sure vs. unsure
- Scope: global, regional, national, local, etc.
- Community: scientific vs. lay knowledge
- Object: knowledge of language, people, objects, etc.

Etc.

Although journalists also have various forms of procedural ('knowledge how') knowledge (e.g., when handling their computers, microphones, etc.), I shall only deal with declarative knowledge ('knowledge that'), although the distinction is fuzzy (knowing a language, for instance, obviously involves both).

- 5.4. **Knowledge and memory.** General, abstract and social knowledge is usually associated with 'semantic' memory, e.g., as scripts or other schematically organized beliefs. Specific personal knowledge is typically located in 'autobiographical' episodic memory, namely as mental models (Tulving, 1983). Specific, socially shared knowledge (for instance about 9/11), for instance about important historical or social events typically reported but later presupposed in news, has an ambiguous status. It has the structure of event models, but since it may be socially shared, and hence presupposed as 'facts' in discourse, it may well be stored in 'semantic memory' as (specific knowledge of the world) rather than as personal experience — although of some of these historical events we may also have a personal model (as is the case for 9/11 for many people). More likely than

not, the very notion of ‘semantic’ memory needs to be revised to account for these different types of knowledge. Conversely, also episodic memory may feature *general* and more or less abstract knowledge about my personal life, events and people I know, and not just models of specific personal experiences. This problem, however, shall not further be dealt with in this paper.

- 5.5. **Standard news and knowledge.** Given this (very brief) general account of knowledge, a standard news report in a newspaper such as *The New York Times* would typically report specific, concrete, social, real, sure knowledge about social and political specific events of various scopes: international, national and local. The question to be investigated, then, is how exactly such knowledge is presupposed, asserted, displayed, or otherwise managed in news production as part of the contextual control of news.

6. A sample analysis

- 6.1. **News event.** To examine the theory fragments proposed above in some more detail, let me analyze the epistemic strategies hypothetically underlying the knowledge management of a concrete news article, namely an article by Victoria Burnett, in the *New York Times* of January 21, 2008, about the arrests of alleged Pakistani terrorists in Barcelona, Spain (see Appendix for full text). This event had massive local coverage, also against the background of a long history of ETA terrorism and the specific attack by El Qaeda terrorists on commuter trains four years ago in Madrid, which left 191 people dead and many wounded. Local Pakistani in the popular Raval neighborhood of central Barcelona, many of whom have small businesses, emphatically denied that the arrested Pakistani were planning a terrorist attack. Despite the early upheaval on the affair in the press, no further local news reports covered the affair several weeks later.
- 6.2. **The terrorism script.** The example was also chosen because it seems to instantiate a knowledge script broadly used since 9/11, that of the (threat of a) terrorist attack, knowledge — mingled with ideologies — now widely shared in the world, and largely constructed by the mass media, rather than on the basis of personal experiences (personal models)(Greenberg, 2002; Norris, Kern & Just,

2003; Zelizer & Allan, 2003). We here have one general kind of concrete, socially shared knowledge that the journalist may presuppose to be known. The following fragments of the text may be seen as instantiations of such a script (fragments in quotes are opinions attributed to various news actors):

- (1) Intelligence agents (...) were sifting through evidence
- (2) collected during a weekend crackdown on a group of suspected Islamic militants
- (3) who the police say were plotting an attack on Barcelona.
- (4) “the detainees “belonged to a well-organized group that had gone a step beyond radicalization.”
- (5) They confiscated material for making bombs, including four timing devices,
- (6) Photographs of material found in the raids included the timing devices, a small bag of ball bearings, batteries and cables.
- (7) “you have no option but to think violent acts are being planned”
- (8) a known Pakistani militant having left Pakistan for Barcelona to help put a terrorist plot in motion.
- (9) Spanish authorities are on the alert for terrorist attacks by Islamist groups or the Basque militant group ETA. An Islamist terrorist attack on Madrid commuter trains on March 11, 2004 — three days before the last general election — killed 191 people.
- (10) the police raided the Torek Ben Ziad mosque
- (11) The group strongly proselytizes in the area and is secretive but not known among local Muslim organizations to be extremist, he said.

In other words, we here find the usual instantiations of a terrorist event (a planned attack), participants (terrorists) and their properties and relations, as well as the police and its actions, together with a reminder on past terrorist attacks in Spain and the associations with the Muslim community and immigrants from Pakistan. In other words, a standard terrorism news story, although not on a concrete attack, but on alleged plans (a “plot”) for an attack.

6.3. **Known type, new token.** Epistemically, this news story deals with knowledge of a specific event, namely (i) an arrest — and related actions — by the Barcelona police of alleged terrorists (ii) various declarations of news actors, such a minister and local people. Since the news story appears to instantiate general knowledge about police activities related to terrorism, much of the specific knowledge communicated may be predicted and expected: New is only where, when, and who engaged in this specific event. In other words, the readers already know the types, and only need new information about the ‘tokens.’

6.4. **Traces of context models.** The news story has many traces of the preparation phase as well as the context models of news production, such as the explicit identification of the journalist (Victoria Burnett), place (Madrid), and time

(January 21, 2008) as well as the newspaper (NYT) and the news sources consulted. Some deictic expressions of time, such as Sunday (line 1) presuppose context model information about the current date. Definite noun phrases, such as *the police* similarly are to be interpreted relative to the location category of the context Setting category: the police in Barcelona.

- 6.5. **Relative knowledge and ignorance.** That context models also represent what knowledge recipients probably have or not, is shown in the explanatory clause:

(1) Barcelona, the capital of the northeastern region of Catalonia

This clause about the location of Barcelona would obviously be superfluous in Spain, and most of the time in the rest of Europe, but not all readers of the NYT in the USA may know where exactly Barcelona is located. This is a very clear example of how the journalist adapts her text on the basis of her assumptions about the knowledge or ignorance of the readers.

- 6.6. **From context models to event models.** This news story also shows how in news production context models and event models are related. That is, most of the events are explicitly or implicitly attributed to local sources: media, interior minister, police and local citizens. In order for the journalist to be able to make such attributions, she must activate some of her recent context models related to this event: who said what and when (she might have been present at some of these official declarations, but it is more likely she has them from the local news media, also referred to in the text). That is, declarations are thus turned from the ‘contents’ of discursive actions represented in context models into (reported) events the news story is about. This is a well-known journalistic strategy that on the one hand enhances credibility and objectivity (if the sources are credible), whereas on the other hand it protects the journalists against reporting falsehoods: what is reported is what sources say about purported facts, not directly the facts themselves. Obviously, not all newspapers may use this criteria of reliability.
- 6.7. **A knowledge schema of a news report.** After these general informal remarks on the article and some of its contextual and epistemic properties, let me finally examine the text in more detail, and examine some of knowledge strategies engaged in by the journalist.

TEXT PROPOSITIONS	TYPE OF KNOWLEDGE
(1) <i>New York Times</i> , January 21, 2008	Context model: Setting: Time, Medium
(2) After Raids, 14 Held in Spain on Suspicion of a Terror Plot	New knowledge of specific recent international event on security/violence/terrorism
(3) By VICTORIA BURNETT	Context model: Participant roles and identities: writer, reporter, NYT employee, U.S. citizen, etc.
(4) MADRID	Context model: Setting: Location
(5) Intelligence agents on Sunday were sifting through evidence	New knowledge of specific recent local event
(6) collected during a weekend crackdown on a group of suspected Islamic militants (3)	New/recalled knowledge of a previous specific event
(7) who were plotting an attack on Barcelona	New/recalled knowledge of previous events
(8) the police say (3)	Old context model → New knowledge of specific recent speech event
(9) The police arrested 14 men and raided several apartments, two mosques and a bakery in Barcelona (6)	New knowledge about specific recent event
(10) the capital of the northeastern region of Catalonia,	General recalled geographical knowledge
(11) a security official and local Muslim representatives said (5)	Old context model → New knowledge of recent speech event
(12) The group included 12 Pakistanis, an Indian and a Bangladeshi,	New specific event knowledge
(13) they said (8)	Old context model → New knowledge of recent speech event
(14) Alfredo Pérez Rubalcaba, the Spanish interior minister, said Saturday (10)	Old context model → New knowledge of recent speech event
(15) that the detainees “belonged to a well-organized group that had gone a step beyond radicalization.”	Old Context model → New knowledge of recent opinion
(16) They confiscated material for making bombs, including four timing devices,	New specific event knowledge
(17) Mr. Rubalcaba said (12).	Old context model → New knowledge of recent speech event
(18) Local news reports said (15)	Old context model → New knowledge of recent speech event
(19) the police had also taken phone records from the mosques and the bakery.	New specific event knowledge
(20) Photographs of material found in the raids included the timing devices, a small bag of ball bearings, batteries and cables.	New specific event knowledge
(21) “When someone has timers in their home, you have no option but to think violent acts are being planned,”	Old context model → New knowledge of recent opinion
(22) he said (17)	Old context model → New knowledge of recent speech event
(23) Spanish intelligence acted with the help of information from foreign intelligence agencies,	New specific event knowledge
(24) Mr. Rubalcaba said (19)	Old context model → New knowledge of recent speech event
(25) though he did not say from which countries.	Old context model → New knowledge of recent speech event
(26) Newspaper reports on Sunday said (22)	Old context model → New knowledge of recent speech event
(27) intelligence officials based in Pakistan had	New specific event knowledge

tipped off the Spanish authorities about a known Pakistani militant having left Pakistan for Barcelona to help put a terrorist plot in motion.	
(28) Those reports could not be independently confirmed.	Old context model → New knowledge of recent speech event
(29) With a general election scheduled for March 9, the Spanish authorities are on the alert for terrorist attacks by Islamist groups or the Basque militant group <u>ETA</u> .	Old/New knowledge about current situation
(30) An Islamist terrorist attack on Madrid commuter trains on March 11, 2004 — three days before the last general election — killed 191 people.	Reminder of (important) past event
(31) Since the Madrid bombings, the Spanish police have become very aggressive in their efforts to break up suspected Islamist plots.	Old/New knowledge about current situation
(32) Groups of suspects are arrested fairly frequently,	Old/New knowledge about current situation
(33) and often many are released within five days,	Old/New knowledge about current situation
(34) which is the standard period that someone suspected of being a terrorist can be held without charge	Reminder of old general knowledge
(35) Muslim representatives based in the Raval neighborhood of Barcelona said (32)	Old context model → New knowledge of recent speech event
(36) that around 3 a.m. the police raided the Torek Ben Ziad mosque, one of the city's most prominent mosques, as well as a nearby Muslim prayer house.	New knowledge about specific recent event
(37) They also raided apartments in different parts of the city and searched a bakery in Raval late on Saturday.	New knowledge about specific recent event
(38) One prominent Muslim representative in Barcelona (35) said Sunday (36)	Old context model → New knowledge of recent speech event
(39) who spoke on the condition of anonymity because of the delicacy of the matter,	Old context model → New knowledge of recent speech event
(40) that several of those arrested belonged to Tabligh Jamaat, a group based in Pakistan.	New knowledge about specific recent event
(41) The group publicizes a benign type of revivalist Islam,	New general knowledge
(42) but is suspected by Western intelligence agencies of being a recruiter for jihadists.	New general knowledge
(43) Those arrested included one of the imams of the Torek Ben Ziad mosque and a 70-year-old man,	New knowledge about specific recent event
(44) he said (39).	Old context model → New knowledge of recent speech event
(45) The Muslim representative said (42)	Old context model → New knowledge of recent speech event
(46) Tabligh was quite active in the Barcelona area of Raval.	New general knowledge about a group
(47) The group strongly proselytizes in the area	New general knowledge about a group
(48) and is secretive	New general knowledge about a group
(49) but not known among local Muslim organizations to be extremist,	New general knowledge/opinion about a group
(50) he said (41-44)	Old context model → New knowledge of recent speech event

Table 1. *Knowledge strategies in a news report*

- 6.8. **Sources, quotations and evidentials.** One of the remarkable characteristics of this news report is that virtually all assertions of ‘facts’, and hence of what amounts to ‘new knowledge’, do not pertain directly to the very topic of the report, namely the arrests of alleged terrorists, but to the declarations of the various sources: police, minister of the Interior, and local citizens. This means, first of all, a partial expression of recent context models in the text itself: This is how the journalist, during the preparation of this report, has acquired knowledge about the arrests and its consequences. Secondly, this says something about the knowledge standards applied by a quality newspaper such as the NYT: the only ‘facts’, and the only reliable knowledge, is about what the reporter has heard or read. Indeed, what the sources claim to have happened could very well be their opinion. Thirdly, these quotations function semantically as evidentials (Aikhenval, 2004; Chafe & Nichols, 1986; Ifantidou, 2001)). Depending on the assumed credibility of the sources the states of affairs described by them may be found more or less true for the readers. Finally, the quotations fit the standard news schema category of Verbal Reactions with respect to the proper news event, namely the arrests.
- 6.9. **Validation expression.** If one of the crucial dimensions of knowledge is that they are beliefs that need to be validated by criteria or standards of the community, language users may sometimes make use of such criteria. As we have seen they do so for instance by mentioning reliable sources. A (quality) newspaper as a knowledge producer should be specifically responsible, and hence will require that information acquired from one (not necessarily reliable) source need to be checked and “confirmed”:

(22-24). **Newspaper reports on Sunday said** intelligence officials based in Pakistan had tipped off the Spanish authorities about a known Pakistani militant having left Pakistan for Barcelona to help put a terrorist plot in motion. **Those reports could not be independently confirmed.**

In other words, what local newspapers say is not sufficient as criterion, and hence the contextual signal will be added about the verification procedure of the journalists. Adding this disclaimer obviously does not contribute to the degree of ‘truth’ of the statements reported, and hence also this whole statement is not

presented as factual knowledge, but as attributed, indirect knowledge, that is, what is knowledge of others. We here find the expression and application of one of the underlying institutional norms of NYT news reporting, part of the professional knowledge of the journalist (see Siegal & Connolly, 1999).

- 6.10. **Indirect knowledge.** Given the dependence of the facts as reported on the credibility of the respective sources, the knowledge about the arrests and the alleged terrorists is in fact ‘indirect’ knowledge, that is, attributed to the sources. Obviously, if knowledge is scalar (more or less ‘sure’), this also means that indirect knowledge is less reliable because it does not satisfy all the knowledge standards (actually, in legal terms, the knowledge is only ‘hearsay’ and would not be admissible in court), and may on later occasions even be deniable. For many newspapers, declarations of the police or the minister of the interior would as such satisfy the standard knowledge criterion of reliable sources, and they might well report the facts as ‘direct’ knowledge, without attributing (all of) it to the sources. If they do attribute knowledge to sources, this may have several functions: the news sources and their reactions are themselves newsworthy, or they enhance the credibility of the news report.
- 6.11. **General geographical knowledge.** Although news discourse usually focuses on the expression of specific event knowledge (mental models), occasionally they also express general knowledge if the journalists think the readers may not have it. This is most clearly the case for proposition (6), providing geographical knowledge about the location of Barcelona. Since also many readers of the NYT may know where Barcelona is situated, this assertion of new knowledge may in fact be a reminder of old general knowledge for them. Interestingly, this fragment of general knowledge is probably the most ‘factual’ and reliable of the whole article.
- 6.12. **General political knowledge.** On the other hand, the knowledge conveyed by the following propositions mixes ‘facts’, such as the planning of a bomb attack, with an evaluative adjective “terrorist”, and hence makes the knowledge *as formulated* possibly biased, because obviously the “terrorists” themselves, as well as those who support them, probably would not describe the events in those terms:

With a general election scheduled for March 9, the Spanish authorities are on the alert for terrorist attacks by Islamist groups or the Basque militant group ETA. An Islamist terrorist attack on Madrid commuter trains on March 11, 2004 — three days before the last general election — killed 191 people.

6.13. **Knowledge and opinion.** That knowledge is relative and scalar is even more clearly visible in the following statement:

(27) Since the Madrid bombings, the Spanish police have become very aggressive in their efforts to break up suspected Islamist plots.

No doubt for the journalist and many others, such as the Spanish police itself, this might be a statement of fact, and hence an expression of what they deem to be knowledge. However, the expression “very aggressive” is obviously evaluative, which makes the whole statement an expression of opinion. Some may see “aggressive” as a negative term, whereas others may deny the fact that the police is in fact aggressive, and should be ‘really’ aggressive against terrorists. This is one of the examples where we see that even statements that appear quite factual may have an evaluative dimension by the choice of specific lexical items, and depending on who interprets them on the basis of what ideologies. That is, whether or not a statement is intended as an opinion statement, it may (nearly) always be interpreted as one, that is, represented as such in the event model or context model of the recipient.

6.14. **Event knowledge vs. general knowledge.** The same example also shows another feature of knowledge, namely that it is not easy to distinguish between specific event knowledge (mental models) and general sociocultural knowledge. Indeed, does (27) describe a specific event, namely a change in the practices of the Spanish police, defined by time (since the bombings) and time (Spain), or is this a more general, abstract statement about the Spanish police, based on inferences from its behavior in concrete cases? The same is true for the following statements:

(28-30) Groups of suspects are arrested fairly frequently, and often many are released within five days, which is the standard period that someone suspected of being a terrorist can be held without charge.

Much of this complex statement may be described as general (national) knowledge about the Spanish police, and as technical knowledge about the Spanish law on detention of suspects, knowledge readers of the NYT and many Spanish citizens would not have. However, the statements that suspects are arrested “fairly frequently” obviously depends on what the standard of frequency is. The statement “and often many are released within five days” may be intended and be interpreted as general knowledge of the Spanish police, but with the implication that this means that people are arrested on false grounds, or insufficient evidence, thus backing up the evaluative statement about the aggressiveness of the police. In other words, we here have a mixture of generalized specific event knowledge about frequent arrests, general knowledge about the police, as well as an implied opinion about the police.

Finally, a similar mixture of general knowledge expression combined with some evaluative aspects is the description of the group Tabligh Jamaat:

(36-38). (...). that several of those arrested belonged to Tabligh Jamaat, a group based in Pakistan. The group publicizes a benign type of revivalist Islam, but is suspected by Western intelligence agencies of being a recruiter for jihadists.

Although the first part is attributed to the anonymous local speaker, the description of the Tabligh Jamaat group may express new general (local) knowledge, but again the use of “benign” depends on the legal or political evaluation of the group, contradicted by the last clause. If for the journalist of the NYT “Western intelligence agencies” are a reliable and credible source, the last proposition (“TJ is a recruiter of jihadists’) would be more than a simply opinion, and hence probably true. The next clauses are in that respect express even less reliable knowledge why uttered by a local resident and a member of the same immigrant group, and hence possibly biased (according to some norm of bias attribution that may itself be biased — if not sexist or racist when women or minority speakers are presented as less reliable):

(42-45) Tabligh was quite active in the Barcelona area of Raval. The group strongly proselytizes in the area and is secretive but not known among local Muslim organizations to be extremist,

Again, much of this statement appears to be general, locally shared knowledge, but again it is combined with expressions that may have evaluative interpretations, such as “quite active,” “strongly proselytizes,” “secretive”. That they are not extremist, is a statement that is hedged by attribution (“among local Muslim organizations”) and hence at most a form of indirect local knowledge, if not a shared opinion, and hence part of the local attitudes about the group.

7. On automatic news writing: REPORTER

- 7.1. **Speculating on REPORTER.** Let me finally briefly speculate about the simulation of what journalists do when they write news reports. What would such a system, which we may call REPORTER, look like? What kind of abilities it should have? It is obvious that in the current state of our knowledge about language and discourse production, we would only be able to construe quite small parts of REPORTER. So let me just make some final remarks on some of its components.
- 7.2. **Input data: Event modeling.** Like a real journalist, REPORTER, needs data, information. We have seen that such information is acquired in various forms of news gathering, such as press releases, press conferences, interviews or the internet. For REPORTER to simulate a real journalist, it would thus need to be able to carry out an assignment, namely to search (more) information about an event known to the newspaper. REPORTER would need to read and interpret all the recent reports and other documents supplied by sources, and form of mental model of the event. This phase of news production may be seen as preparatory, and as a more or less independent sequence of communicative events, or as part of the very (complex) act of newswriting itself. In any case, this preparation consists of a form of text processing (Van Dijk, 1988b), and if REPORTER should be able to do this, it must (i) be able to distinguish relevant from irrelevant information, (ii) understand language and discourse and (iii) construct a mental model of the news event (necessarily partial because real journalists do not remember all they read either).

- 7.3. **Context modeling.** The first aim of this paper has been to show that appropriate discourse production and comprehension in real communicative situations requires that participants construe context models of the relevant properties of this situation. The first proper task of news writing for REPORTER, thus, is to build a context model of what it is doing, when, where, why, for whom, etc. We have argued that the traditional AI approach, namely to formulate (text) plans merely in terms of goals is an unwarranted simplification. REPORTER needs to know what ‘it’ is (as a system, or as simulated journalist), as a reporter, as an employee of a newspaper, etc., when and where it is, what current social actions are being engaged in when writing (reporting the news), and with what goals (e.g., informing the public, criticizing the police, etc.). That is, goals should be represented as complex communicative events, and the system should obviously have some degree of self-awareness as to its various identities (for various formal approaches to — limited — context modeling, see Blackburn, Ghidini, Turner & Giunchiglia, 2003).
- 7.4. **Knowledge modeling.** Crucial within context modeling for newswriting is how REPORTER models the knowledge of the readers. Since part of the modeling of the context involves models of the readers, this also allows some knowledge about their probable knowledge, if REPORTER knows what knowledge communities they belong to (e.g. middle class, U.S. citizens, etc.). The kind of epistemic strategies mentioned above will then operate to on what kind of knowledge is known to the readers and may hence be presupposed, recalled, or left implicit. More difficult would be to simulate what REPORTER knows about the ignorance of the readers. However, this problem may be resolved by assuming that if all or most relevant public knowledge is acquired through the mass media, then REPORTER may simply assume *that what has not been reported earlier by the same newspaper is not known* to the reader (this leaves, of course, the possible access to other sources, such as TV).
- 7.5. **Text planning.** Part of the rest of the production of news by REPORTER is more in line with the usual proposals of automatic text generation (Andriessen, de Smedt & Zock, 1996; Sharp & Zock, 2007). However, there are also a number of

more specific properties of REPORTER not found in most other systems. For instance, all further steps of news writing are controlled by the context model.

- 7.6. **Topic selection.** One of the first ways context models influence news writing is in the selection of relevant (interesting, new, etc.) information from the event model based on the data supplied by the news sources (see above). This not only means leaving implicit the model information the reader already has or can construe or infer herself, but also to leave out and downgrade less important, relevant, interesting information, and focus on, emphasize, detail, etc, important information, for instance by topic formation (the main theme of the news report) as well as topicalization: what information should come first. In other words, REPORTER thus construes a contextually controlled macro-semantic plan of the news report (Van Dijk, 1980, 1988b; Van Dijk & Kintsch, 1983). This is a feat that is not easy to accomplish, because it requires not only knowledge about discourse semantics or discourse organization, but especially what kind of (new) information is typically interesting or relevant for readers. Again, a practical shortcut in this case is again not empirically unfounded: People (learn to) find interesting what they read in the newspaper. This means that REPORTER may simulate the interests of the readers by selecting and emphasizing the kinds of topics selected and emphasized before in the same newspaper — or signalled as such by expert news sources.
- 7.7. **Global news report production.** Given these contextual constraints and semantic structures generated from the news event model, REPORTER finally needs to start writing the actual news report, by linearly realizing the various global and hierarchical rules and structures mentioned. Thus, main topics will be expressed sequentially and formulated in headlines, the macrostructure of the event in the lead, and then the most important (top level) information of each news schema category: Main Event, Background (Current Situation, History), Verbal Reactions, etc., by installments, cyclically, down to the details of each category, and depending on the maximum permitted length of the article (for detail, see Van Dijk, 1988b; Bell, 1991). Obviously, this part presupposes that REPORTER has professional knowledge about the conventional structure of news reports. Ordering and topicalization of this production may again be partly controlled by

the context model: will be topicalized, emphasized, detailed, etc. what this kind of readers of this newspapers are most interested in.

7.8. **Local production.** With this complex formal news structure and its global contents, REPORTER finally needs to actually formulate the respective words and sentences of the news report — that is, have a discourse and context sensitive grammar. This grammar is partly adapted to news report style (e.g. in headline formulation and some specific sentential topicalization structures, such as “p, the police said” instead of “the police said p”). Then lexical selection and syntax is contextually controlled by stylistic norms of formality — depending on the kind of newspaper (serious, tabloid, etc.)(Hovy, 1988). But local control by context models goes much beyond that, and may affect perspective of descriptions, ideological biases in lexical selection, who is being cited, how news actors are described (Van Leeuwen, 1996), what (interesting) details are included in descriptions of events and actors, and which are uninteresting or taboo. In other words, all these (mostly semantic) options are being controlled by elements of the context model, such as the setting, the kind of journalist (international reporter or columnist), the type of readers and their previous knowledge and interests, the current goals, and the ongoing action. Apart from the vast problem of the need for a grammar and a discourse system — not in the foreseeable future — REPORTER also needs to be able to formulate not only meaningful sentences and coherent sequences, but also in style and semantic specification that satisfies context constraints, and makes news ultimately appropriate in the communicative situation.

7.9. **What’s new?** Much of this has been proposed in many AI systems (see, e.g., Hovy, 1988). Mostly missing, however, is the way how discourse production at all levels is controlled by context models. That is, we need systems that model context in such a way that resulting discourses are not only grammatical or even meaningful, coherent and well organized, but also appropriate, as is the case for actual news reports in real newspapers — that is adapted to the communicative situation of actual newswriting. More specifically, and part of that context control, is the need to naturally manage knowledge in text and talk — when what knowledge should be asserted, expressed, implied, presupposed, recalled, hidden,

etc. given the assumed knowledge (interests, goals, etc.) of the readers.

Obviously, it will be many years before REPORTER is able to do all that, and do it well. But we have at least a better idea now of what components (capacities) the system should have, how these components are related, and what controls what.

Obviously, besides the grammar and discourse system, the detailed representation and management of relevant knowledge is the most formidable task ahead for REPORTER.

8. Conclusions

- 8.1. **A new theory of context.** Theories of language use, discourse as well as discourse processing not only need theories for the structures of text and talk, and their cognitive processing, but also a theory of context. Such a theory should not be based on an account of context in terms of 'real' and determinist social parameters, but as a form of subjective definition of the participants, that is, as a type of mental model, stored in episodic memory: context models. These models make sure that language users produce and understand discourse appropriately in a given communicative situation. This means that context models are the basis of pragmatics, and define when discourse are appropriate. Contexts are dynamic models that consist of a relatively simple schema that ongoingly controls the production of text and talk.
- 8.2. **Context control.** Context models control all variable aspects of discourse production and comprehension, including genre, style and register, in such a way that the discourse is adapted to the recipient and other aspects of the context.
- 8.3. **The architecture of discourse production.** In the general architecture of discourse production we should no longer take goals, models of specific events, or general knowledge, as the starting point of production (of what a speaker wants to say), but rather the context model: how language users represent the current communicative situation, including themselves and their recipients, the current setting, goals, roles and relations as well as current knowledge about the knowledge of the recipients. Indeed, context models even control what of the specific event models should now be expressed (while relevant, interesting,

unknown, etc.) and what event models should be left implicit (while irrelevant, uninteresting, known, inferable, etc.).

- 8.4. **Knowledge and context.** Since speakers need to know about the knowledge of recipients, their context models need to strategically apply fast heuristics that establish what recipients know. We have seen that these heuristics are based on the social notion of shared knowledge in epistemic communities: Most of recipients of the same community know is what the speaker knows. This means that the heuristics may focus on knowledge about new specific and general events, and hence on whether the recipients have had access to relevant sources — such as what the speaker/writer communicated before, or what else has recently been communicated by public media.
- 8.5. **News and knowledge.** A more specific analysis of context, knowledge and discourse of news reports first of all requires a specific schema for the acquisition and the communication of relevant (public) knowledge, involving, for instance, the role of various kinds of sources. Journalists, thus, not only build mental models of news events, but also context models of themselves as journalists and as employees of newspapers, as well as representations of editors as well as readers — and what they know, are interested in, etc.
- 8.6. **A concrete example: The variety of knowledge.** An ‘epistemic analysis’ of a concrete example, a news report in the New York Times about the arrest of alleged terrorists in Barcelona, showed several interesting things on the management of knowledge in news reports:
 - a. Most of the facts as reported, and hence presented as the only new knowledge according to the validation criteria of the NYT are discursive facts: what the various sources declared, because these are the only ‘facts’ the journalist can observe for herself. Hence, what is usually defined as the ‘news’, in this case about the arrests, is in fact indirect, attributed knowledge, and its acceptance depends on the (attributed) credibility of the sources. This not only reflects the validation criteria of the newspaper, but also protects the newspapers against slander, and other accusations, since attributed, indirect knowledge can always be denied.

- b. There is no strict distinction between episodic knowledge of specific recent events and general knowledge. As soon as situations and persons are described, such generalized statement may presuppose general knowledge, shared by the community, or a generalized personal model of the journalists.
 - c. Similarly, there is no strict distinction between knowledge and opinion. Even statements of ‘facts’ may be formulated in terms that may imply an evaluation, and hence express an opinion.
 - d. The few statements in news reports that directly express general knowledge, are background statements on geography and other generally accepted properties of a country, a social group, and so on. But even then general statements in this case may also feature evaluative aspects.
- 8.7. REPORTER. We finally speculated on the ways an automatic system of news writing, REPORTER, would have to be built in order to produce appropriate news reports. Among the many components of such a system, we highlighted how the system should construe context models that will act as the overall control for the production of news reports. More specifically we emphasized the role of knowledge management as part of such context control, since obviously news reporting is first of all about what kind of knowledge is produced, shared and presupposed in knowledge communities.

REFERENCES

- Aikhenva, A. I. U. (2004). *Evidentiality*. Oxford New York: Oxford University Press.
- Ammon, U. (2005). *Sociolinguistics. An international handbook of the science of language and society = Soziolinguistik : ein internationales Handbuch zur Wissenschaft von Sprache und Gesellschaft / herausgegeben von Ulrich Ammon ..*
- Andriessen, J., de Smedt, K., & Zock, M. (1996). *Discourse planning: Empirical research and computer models*. In: Dijkstra, Ton, & de Smedt, Koenraad (Eds.), *Computational psycholinguistics: AI and connectionist models of human language processing*. (pp. 24
- Bell, A. (1991). *The language of news media*. Oxford, UK Cambridge, MA: Blackwell.
- Bernecker, S., & Dretske, F. I. (Eds.). (2000). *Knowledge: Readings in contemporary epistemology*. Oxford: Oxford University Press.
- Beysade, C. (1998). *Sens et savoirs: Des communautés épistémiques dans le discours*. Rennes: Presses universitaires de Rennes.
- Blackburn, P., Ghidini, C., Turner, R. M., & Giunchiglia, F. (Eds.). (2003). *Modeling and Using Context. Proceedings 4th International and Interdisciplinary Conference CONTEXT 2003, Stanfors, CA, USA, June 2003*. Berlin: Springer.
- Carston, R., & Uchida, S. (Eds.). (1998). *Relevance theory: Applications and implications*. Amsterdam Philadelphia, Pa.: J. Benjamins.
- Chafe, W. L., & Nichols, J. (Eds.). (1986). *Evidentiality: The linguistic coding of epistemology*. Norwood, N.J.: Ablex Corp.
- Clark, H. H. (1996). *Using Language*. Cambridge: Cambridge University Press.
- Deemter, K., & Kibble, R. (2002). *Information sharing. Reference and presupposition in language generation and interpretation*. Stanford, Calif.: CSLI.
- Fetzer, A. (Ed.). (2007). *Context and appropriateness. Micro meets macro*. Philadelphia: J. Benjamins Pub. Co.
- Gans, H. J. (1979). *Deciding what's news. A study of CBS evening news, NBC nightly news, Newsweek, and Time*. New York: Pantheon Books.
- Goldman, A. I. (1999). *Knowledge in a social world*. Oxford, UK. New York: Clarendon Press Oxford University Press.
- Graesser, A. C., Gernsbacher, M. A., & Goldman, S. R. (Eds.). (2003). *Handbook of discourse processes*. Mahwah, N.J.: L. Erlbaum.
- Greenberg, B. S. (Ed.). (2002). *Communication and terrorism. Public and media responses to 9/11*. Cresskill, N.J.: Hampton Press.
- Hovy, E. H. (1988). *Generating natural language under pragmatic constraints*. Hillsdale, N.J.: L. Erlbaum Associates.

- Ifantidou, E. (2001). *Evidentials and relevance*. Amsterdam Philadelphia: J. Benjamins.
- Jarvella, R. J., & Klein, W. (Eds.). (1982). *Speech, place, and action. Studies of deixis and related topics*. Chichester West Sussex New York: Wiley.
- Johnson-Laird, P. N. (1983). *Mental models: Towards a cognitive science of language, inference and consciousness*. Cambridge (Cambridgeshire New York: Cambridge University Press.
- Jovchelovitch, S. (2007). *Knowledge in context. Representations, community, and culture*. New York, NY: Routledge.
- Norris, P., Kern, M., & Just, M. R. (Eds.). (2003). *Framing terrorism. The news media, the government, and the public*. New York: Routledge.
- Preyer, G., & Peter, G. (Eds.). (2005). *Contextualism in philosophy. Knowledge, meaning, and truth*. Oxford New York: Clarendon Press Oxford University Press.
- Schiffrin, D., Tannen, D., & Hamilton, H. E. (Eds.). (2001). *The handbook of discourse analysis*. Malden, Mass.: Blackwell Publishers.
- Sharp, B., & Zock, M. (Eds.). (2007). *Natural Language Processing and Cognitive Science. Proceedings of the 4th International Workshop on Natural Language Processing and Cognitive Science – NLPCS 2007*. Portugal: INSTICC Press.
- Siegal, A. M., & Connolly, W. G. (1999). *The New York times manual of style and usage*. New York: Times Books.
- Sperber, D., & Wilson, D. (1995). *Relevance: Communication and cognition*. Cambridge, MA: Blackwell Publishers.
- Tuchman, G. (1978). *Making news: A study in the construction of reality*. New York: Free Press.
- Tulving, E. (1983). *Elements of episodic memory*. Oxford: Oxford University Press.
- Van Dijk, T. A. (1980). *Macrostructures: An interdisciplinary study of global structures in discourse, interaction, and cognition*. Hillsdale, N.J.: L. Erlbaum Associates.
- Van Dijk, T. A. (1988a). *News analysis: Case studies of international and national news in the press*. Hillsdale, NJ: Lawrence Erlbaum Associates, Inc
- Van Dijk, T. A. (1988b). *News as discourse*. Hillsdale, NJ: L. Erlbaum Associates.
- Van Dijk, T. A. (Ed.). (1997). *Discourse Studies. A multidisciplinary introduction*. 2 vols. London: Sage.
- Van Dijk, T. A. (Ed.). (2007). *Discourse Studies*. 5 vols. Sage Benchmarks in Discourse Studies. London: Sage.
- Van Dijk, T. A. (2008). *Discourse and Context. A sociocognitive approach*. Cambridge: Cambridge University Press.
- Van Dijk, T. A. (2008). *Society in Discourse. How Context Controls Text and Talk*. Cambridge: Cambridge University Press.
- Van Dijk, T. A., & Kintsch, W. (1983). *Strategies of discourse comprehension*. New York London: Academic Press.

Velmans, M., & Schneider, S. (Eds.). (2007). *The Blackwell Companion to Consciousness*. Oxford: Blackwell.

Wodak, R., & Meyer, M. (Eds.). (2001). *Methods of critical discourse analysis*. London Thousand Oaks Calif.: SAGE.

Zelizer, B., & Allan, S. (Eds.). (2003). *Journalism after September 11*. London New York: Routledge.

APPENDIX

New York Times, January 21, 2008

After Raids, 14 Held in Spain on Suspicion of a Terror Plot

By VICTORIA BURNETT

MADRID — Intelligence agents on Sunday were sifting through evidence collected during a weekend crackdown on a group of suspected Islamic militants who the police say were plotting an attack on Barcelona.

The police arrested 14 men and raided several apartments, two mosques and a bakery in Barcelona, the capital of the northeastern region of Catalonia, a security official and local Muslim representatives said. The group included 12 Pakistanis, an Indian and a Bangladeshi, they said.

Alfredo Pérez Rubalcaba, the Spanish interior minister, said Saturday that the detainees “belonged to a well-organized group that had gone a step beyond radicalization.”

They confiscated material for making bombs, including four timing devices, Mr. Rubalcaba said. Local news reports said the police had also taken phone records from the mosques and the bakery. Photographs of material found in the raids included the timing devices, a small bag of ball bearings, batteries and cables.

“When someone has timers in their home, you have no option but to think violent acts are being planned,” he said.

Spanish intelligence acted with the help of information from foreign intelligence agencies, Mr. Rubalcaba said, though he did not say from which countries.

Newspaper reports on Sunday said intelligence officials based in Pakistan had tipped off the Spanish authorities about a known Pakistani militant having left Pakistan for Barcelona to help put a terrorist plot in motion. Those reports could not be independently confirmed.

With a general election scheduled for March 9, the Spanish authorities are on the alert for terrorist attacks by Islamist groups or the Basque militant group ETA. An Islamist terrorist attack on Madrid commuter trains on March 11, 2004 — three days before the last general election — killed 191 people.

Since the Madrid bombings, the Spanish police have become very aggressive in their efforts to break up suspected Islamist plots. Groups of suspects are arrested fairly frequently, and often many are released within five days, which is the standard period that someone suspected of being a terrorist can be held without charge.

Muslim representatives based in the Raval neighborhood of Barcelona said that around 3 a.m. the police raided the Torek Ben Ziad mosque, one of the city’s most prominent mosques, as well as a nearby Muslim prayer house. They also raided apartments in different parts of the city and searched a bakery in Raval late on Saturday.

One prominent Muslim representative in Barcelona, who spoke on the condition of anonymity because of the delicacy of the matter, said Sunday that several of those arrested belonged to Tabligh Jamaat, a group based in Pakistan. The group publicizes a benign type of revivalist Islam, but is suspected by Western intelligence agencies of being a recruiter for jihadists.

Those arrested included one of the imams of the Torek Ben Ziad mosque and a 70-year-old man, he said.

The Muslim representative said Tabligh was quite active in the Barcelona area of Raval. The group strongly proselytizes in the area and is secretive but not known among local Muslim organizations to be extremist, he said.