

7. The Narrative dimension of memory

As was mentioned in earlier chapters, one may, for the sake of simplicity, say that the temporal dimension of memory gives the answer to the question "When?", and the spatial dimension of memory to the question "Where?". By analogy the narrative dimension gives the answer to the questions "Why?" or "How come?"

The Narrative is perhaps the memory dimension that is particularly human, perhaps besides the complexity dimension, due to the facts that other animals do not construct work-schedules or atom-tables, and we are the only species with language at a high level. The human linguistic abilities are special, and for some theorists they are the real essence of memory. We may thus say that narratives are syntactically bound.

However, one may use any kind of symbols in order to tell something, but the point of a story is hard to convey by other media: paintings may convey elements of a story, although you may relate a lot by making drawings or paintings on cave walls. MST-theorists may say that this is actually the same as verbal episodic memory, and in one respect this is quite close to the truth. But in the following we use the term *narrative* in order to distinguish this dimension from schematic memory or the types of memory scaffolds you need to remember or use correctly equations systems or similar information on a higher level of the complexity dimension. The schedule or agenda in itself tells you nothing about why something was said, what that lead to or happened during the week of work.

It is well known that the process of understanding language involves the construction of a mental model of the situations being described ([Johnson-Laird, 1983](#); [Kintsch, 1988](#); [Morrow, Greenspan, & Bower, 1987](#); [Sanford & Garrod, 1981](#); [Van Dijk & Kintsch, 1983](#); [Zwaan, Langston, & Graesser, 1995](#); for a review see [Zwaan & Radvansky, 1998](#)). This mental model may be equated with the *context*. Without context, no basis for any narrative effort. In fact we may say that what the narrative dimension does aside to establish the obvious meaning at a lower level of so called text-base knowledge is to *contextualize* the material to be recalled.

The narrative dimension is also different from order memory in that each new step in a story is an integral part of it or even a cause of the next step, not just a position in a series of

events. This is the resultative and hierarchical character of a narrative. What is common to narrative and higher levels of complexity is a conceptual schema. What is not common is that a narrative structure involves a logical or resultative progress, sometimes explicit, but often implicit: "I had to visit the hospital in order to get my diagnosis". "Our teacher had to be replaced, otherwise we would not get any instruction at all, even if the head master is not an expert in every subject". This is why the narrative is the answer to any "Why?"

One may say that an anecdote, a tale or a story, i.e. a narrative structure, may actually be a complex type of information, and thus that memory of it may be regarded as schematic memory with temporal and order aspects. However, a story may also be extremely simple, e.g. "Today I went to the hospital, and I finally received my diagnosis to my great disappointment", "Our teacher was late today due to a car accident, and therefore the head master replaced him in the first classes. That was OK." In such narrative memories a lot of implicit information is still conveyed. In the first one the teller has awaited the diagnosis for a relatively long time, and we know that the information in the diagnosis was not hoped for.

As have been proved several times, the context is implicit, but it is not implicit in the MST way of defining memory. The context is of course consciously available. Information about the setting of the scene that is related by the mnemonist is not hidden in a subconscious level. In the communication of an episode the mnemonist will also have to take into account what the listener already knows. Therefore the narrative may be extremely short in case the listener or interviewer is well aware of the context and only asks for a small part in order to get the entire picture.

The lexical and semantic properties of *verbs* play a key role in constraining people's expectations regarding who and what the continuing discourse is likely to be about (e.g., [Altmann & Kamide, 1999, 2007](#); [Arnold, 2001](#); [Ferretti, Kutas, & McRae, 2007](#); [Hare, McRae, & Elman, 2003](#); [Kamide, Altmann, & Haywood, 2003](#); [Stevenson, Crawley, & Kleinman, 1994](#); [Van Berkum, Koorneef, Otten, & Nieuwland, 2007](#)).

In order to explain the difference between a level of the complexity dimension of memory and Narrative memory in a somewhat more concrete way, try to see the differences between remembering a golf round (played by yourself or a pro), and a foot ball match (played by your

mates or by Barcelona FC). Because the golf round follows a strict schema, the recall of it will be based on the knowledge of the general layout, that is mainly spatial, and which holes were par 3, 4 or 5. The recall of each hole may be like separate very short stories. However, because most acts during the round are routine in nature, and based on procedural learning, these "stories" are limited to a very few degrees of freedom, especially when professionals are involved. The recall of a round is also directed towards checking the final score.

The foot-ball match, on the contrary, has almost an infinity of degrees of freedom, and the succession of sequences of it follows of what happened previously. One of very few restrictions is that each halve of a game is $45 \pm X$ extra minutes. Otherwise, not much is known in advance. The resultative character of Narrative memory may be exemplified by "Man U scored already in the 15th minute, and continued with a high middle field, and were apparently not content with that" or "The defender of Spain was outed in the 70th minute, so Brazil could then take it cool. Leading by 3-0 they killed the match and rolled the ball between them".

Most spectators remembers the goals or spectacular performances by the star players especially if they end up in a goal, if a shot hit the posts, etc. Telling the story of a game of snooker is also depending on interesting events during the game: "Sullivan lost the white ball twice, but it did not affect him or his game, and he nevertheless scored above 100, an extremely fine achievement, remembering that it was his first tournament in a year". The context is important, but often taken for granted: "Only 20 left on the table, congratulations!"

On the contrary: when recalling Phil Mickelson's last round one may note that he had no boogies, but three birdies, thereby we are able to give his score: 69. If you are acquainted with the golf course that he played, you may easily recall his score at all of the holes. On the other hand, because his swing is very much the same at each green shot, it is very hard to remember them as separate movements. What you remember regarding specific shots are only the spectacular ones, i.e. shots that landed close to the flag, or the bad ones, according to general principles of encoding (von Restoff,). But when the ball reaches the green the memory of Phil's swing is erased in short term memory and what is recalled thereafter is perhaps only how and where the ball took ground. What you remember afterwards is dependent on the number of repetitions, that is how many times the shot was replayed or specific attributes.

The important difference between remembering a golf round and a foot-ball match is thus that the Narrative component has to be greater for the latter, because the story of a foot-ball match takes different turns all the time. The story of a golf round follows a prescribed or scheduled order. A salient feature of a story is thus its resultative character. The initial part leads to or results in what follows, and the end if it is a result of what happened at the turning points.

One might say that the narrative dimension is in fact only a combination of time order, item memory, and associative memory, i.e. a sum of low level information. But the capacity to formulate the sequence of events as in a story is actually not necessary in recalling the time schedule of your work or other Complexity memory, while it is paramount when trying to recall a foot-ball match. Trying to remember how early or late in a golf round Phil Mickelson scored the 3rd hole is tautologic. Nothing is really tautologic in trying to recall the crucial events early in a foot-ball match.

One might concur that the main difference then between remembering a game of golf and remembering a foot-ball match is only that the later involves a vast number of degrees of freedom. That is correct, but shows only that *eventualities* play a greater part in recalling a foot ball match, but that is the essence of narrative memory. Of course the narrative dimension of memory comes into play also in recalling a golf round, but is definitely greater in recalling a foot-ball match.

What then is the core of narrative memory: it is apparently not just the ability to tell the series of events? In the recall of a golf round it takes no memory resources, except for the basic knowledge of how they play golf, to tell in what order the holes were played. So it is not a question of "How?" as it is regarding the memory of how to prepare a meal, code JavaScript or write a memo. And it is definitely not procedural knowledge or skills, although certain skills are used during these activities.

In the well known test Logical memory in Wechsler Memory scale (see further details in the test section) the test person is questioned about certain details of a short story. It is not surprising that it is labeled "logical" memory, because the sequence of events in the story is logical. However, the narrative component does not necessary have to be logical in the really logical sense, only causative. Therefore the author finds the label somewhat misleading.

What question is it then that the narrative dimension of memory tries to answer? The interrogative pronouns *when*, *what/who*, and the adverbs *where* and *how* are already occupied by other memory dimensions. What is left is therefore such questions as "*How come?*" and "*Why?*". These questions does not just answer the question "What happened?", because this is only the initial or basic level, the *item* level, in any recollection, it is actually implicit. Even in the simplest case of a narrative a two year old child who says "The bird flew away" or "The dog barked at us", the child does something else than just recognizes a bird or a dog. The toddler formulates an event that is still on his/her mind. And the child is not just associating: bird-flight, dog-barking, because it already knows that birds flies and dogs bark. What is happening is that the child gives proof of a rudimentary narrative memory, if only a suggestive form of it. The child wants to tell everybody that the bird that previously sat on a branch now actually flew away, and that the dog who earlier this day seemed so quiet now barked at him. That is *why* it was necessary to tell everybody that the bird flew or the dog barked. See the table below regarding the *questions* to memory.

Table 2. A matrix with complexity levels* of material to be recalled at differen requests.

Levels	What/Who	Where?	When/How long ago?	How?	Why?
1	Items (M)	Landmarks	Moment	Intransitives	Phrase
2	Associate (M)	Positions	Intervals	Procedure	Sentence
3	Serial (M)	Path	Temporal order	Action	Story
4	Tabular	Map	Calendar	Activities	Composed story

*not to be confused with levels of processing

Narrative memory is dependent on linguistic capacity and language processing. The experienced mnemonist proficient in the narrative memory dimension has to be trained in a language, i.e. being able to construct not only N + P phrases, but has also the ability to tell something about an episode in the real world, and in that way introduce the listener or reader in most of the context too. Thus, in the opposite way, the context is a cue to the details of what happened in the episode that helps the narrator to communicate the necessary elements of the story.

In the more advanced forms of Narrative memory, the narrator is able to compose anecdotes, tales or stories, not necessarily true, but congruent with what the narrator wants to tell you about. Not that narrative memory is not only related to verbal or written information. The remembering of films, stage plays, musicals, etc are also based on the narrative memory dimension.

The reader might ask: is narrative memory involved in the remembering of equation solutions, because logic is involved there?

In order to solve equations one has to know the proper way of exchanging signs, i.e. algebra, make arithmetic operations, etc, i.e. follow rules and instructions earlier learned in mathematic classes. Thus he has to engage him- or herself in procedures, even if they are symbolic and relatively abstract. This is the essence of schematic memory, that is a combination of tabular memory and action rules. In narrative memory the objects involved are active, but in the manipulation of symbols according to the algebraic and other rules the digits are only representations of numbers or other entities, e.g. sets or classes. It is irrelevant that these in turn may represent concrete objects, they are on a different level of meaning as Russell would have explained it (Russell,). So the answer is "No".

The old dichotomy between episodic and semantic memory may in one way also relate to the above discussion of the difference between the memory dimensions of Complexity and Narrative. Knowledge of equations may, in terms of MST, be seen as semantic while ability to recall greaties is episodic. The author would not pursue that reasoning any further, however.

Important to be remembered is that complexity is another dimension, i.e. there may be narrative elements on a lower level of complexity as well as very complex stories such as novels or film scripts.

We have to note once more here that we do not perceive and remember the world as it is, but only in the concrete form that has meaning, i.e. as phenomena. When phenomena meets language, we get the narrative memory dimension. Other theorists may object that even at the prelinguistic stage there is a donotative stage. The author has not decided yet on that issue.

Below is a list of properties of the narratives:

1. The narrative material is mediated
2. A narrative is composed of syntactically relatively well formed/defined components.
3. A narrative is by its very nature not immediate, i.e. commonly only a factor in recent or remote memory.
4. A narrative is resultative in addition to its orderly character, and it is only in its simpler forms of it that the beginning-middle-end structure is followed. A narrative may thus not be a temporal counterpart to the episode recalled.
5. Last but not least: every narrative involves a context within which the story evolves. But the context is mostly absent.

7. 1. Contextualization

When it comes to putting something into a context we arrive at the core of the narrative dimension: an experienced chess player notices that the last move puts his king in a serious position. However, in his mind, this problematic position tells him a story similar to games encountered before. The actual configuration does not necessary have a label, i.e. we do not easily conclude that it is a simple case of associative memory, and because the player really tries to figure out how the story goes, we are not in the position to categorize it as a sort of automatic retrieval.

7. 1. 1. Thematization

7. 3. Neurophysiological studies of narrative

Using electrophysiological measures such as ERP Van Berkum et al (2007) have shown that immediately when a listener or reader encounters a phrase referential processing takes place in order to find a context in which the following words may fit.

- Bartlett, F. C. *Remembering*. Cambridge, England: Cambridge Univ. Press, 1932.
- Jackendoff, R., 2002. *Foundations of Language*. Oxford Univ. Press, New York.
- Kintsch, W. The representation of meaning in memory. Hillsdale, NJ: Erlbaum, 1974.
- Mandler, J. M., & Johnson, N. S. Remembrance of things parsed: Story structure and recall. *Cognitive Psychology*, 1977, 9, 111-151.
- Otten, M., van Berkum, J. (2008) Discourse-Based Word Anticipation During Language Processing: Prediction or Priming? *Discourse Processes*, 45, 464-496.
- Perfetti, C., Goldman, S. (1974) Thematization and sentence retrieval. *Journal of verbal learning and verbal behavior*, 13, 70-79.
- Piaget, J. Memory and intelligence. New York: Basic Books, 1973. (Originally published, 1968.)
- Teun A. van Dijk Walter Kintsch (1983) Strategies of Discourse Comprehension. New York: Academic Press
- THORNDYKE, P. W. Cognitive structures in comprehension and memory of narrative discourse. *Cognitive Psychology*, 1977, 9, 77-110.
- THORNDYKE, P. W. Knowledge acquisition from newspaper stories. *Discourse Processes*, 1979, 2, 95-112.
- DOROTHY POULSEN, EILEEN KINTSCH, WALTER KINTSCH & Premack, D. (1979) Children's Comprehension and Memory for Stories. *JOURNAL OF EXPERIMENTAL CHILD PSYCHOLOGY* 28, 379-403
- Van Berkum, J. J. A., Brown, C. M., Hagoort, P., & Zwitterlood, P. (2003). Event-related brain potentials reflect discourse-referential ambiguity in spoken language comprehension. *Psychophysiology*, 40, 235-248.
- Jos J.A. Van Berkum, Arnout W. Koornneef, Marte Ottena, Mante S. Nieuwland. (2007) Establishing reference in language comprehension: An electrophysiological perspective. *Brain research*, 1146, 158-171.
- Van Berkum, J. (2008) THE ELECTROPHYSIOLOGY OF DISCOURSE AND CONVERSATION. In Spivey, M., Joannis, M. & McRae (Editors). *The cambridge handbook of psycholinguistics*, Cambridge: CUP.

TABLE 1
GRAMMAR RULES FOR SIMPLE STORIES

Rule number	Rule
(1)	STORY → SETTING + THEME + PLOT + RESOLUTION
(2)	SETTING → CHARACTERS + LOCATION + TIME
(3)	THEME → (EVENT)* + GOAL
(4)	PLOT → EPISODE*
(5)	EPISODE → SUBGOAL + ATTEMPT* + OUTCOME
(6)	ATTEMPT → {EVENT* EPISODE
(7)	OUTCOME → {EVENT* STATE
(8)	RESOLUTION → {EVENT STATE
(9)	SUBGOAL } → DESIRED STATE GOAL }
(10)	CHARACTERS } → STATE LOCATION } TIME }

Figure 7. 1. Perry Thorndykes grammar rules for simple stories. From Thorndyke, 1977.

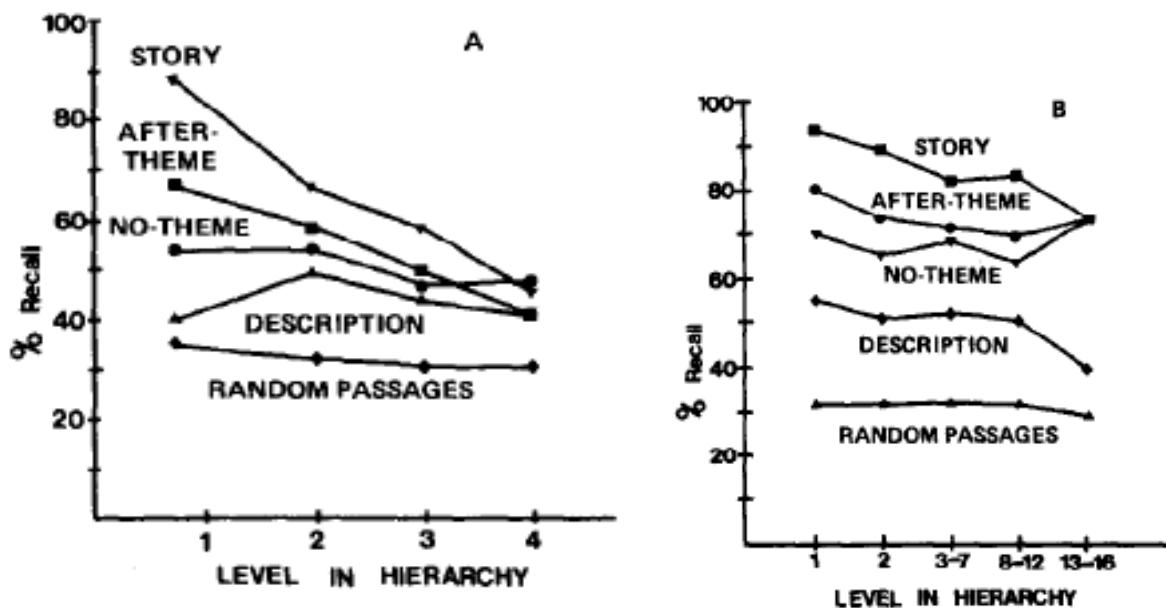


FIG. 4. Recall probabilities for propositions of passages in Experiment I as a function of location in the organizational hierarchy: (A) the Circle Island passages; (B) the Old Farmer passages.