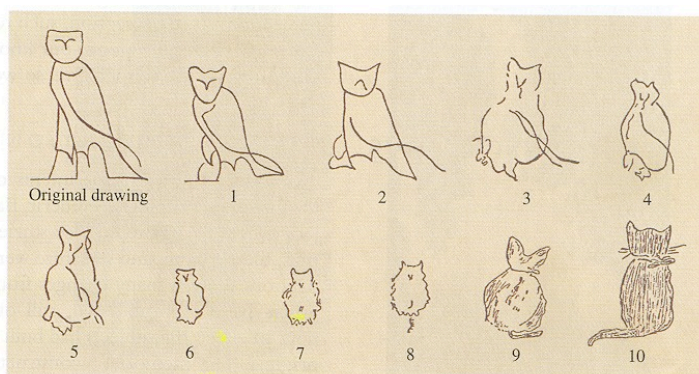


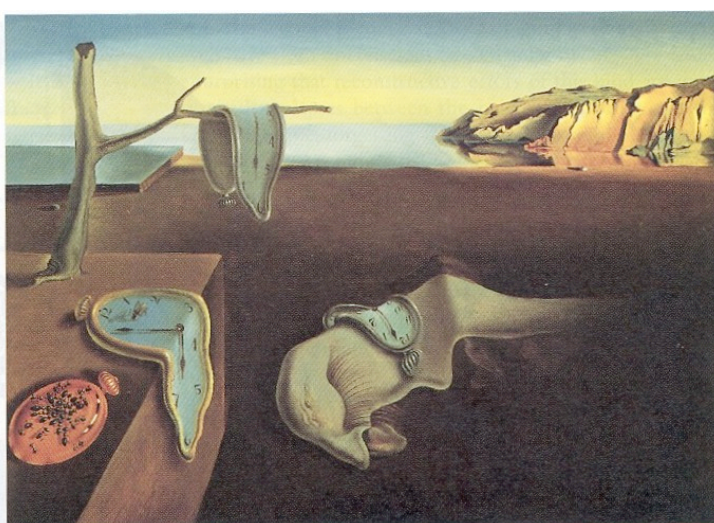
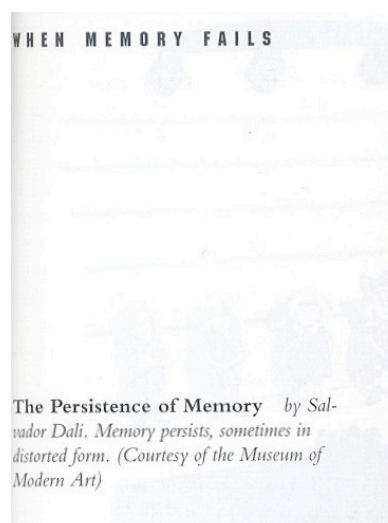
Memory distortions

The most influential experiments on memory distortions were performed by the British psychologist Frederic Bartlett almost sixty years ago. Bartlett's participants were asked to reproduce stories taken from the folklore of other cultures; thus, their content and structure were rather strange to Western ears. The reproductions showed many changes from the original. Some parts were subtracted, others were overelaborated, and still others were additions that were completely new. In effects, the participants had built a new story upon the memorial ruins of the original. This memorial reconstruction was generally more in line with the cultural conceptions of the subjects than with the story they had actually heard. For example, certain supernatural plot elements were interpreted along more familiar lines. In a variant of the same experiment, Bartlett used the method of serial reproduction. A drawing was presented to one participant, who reproduced it from memory for the benefit of a second, whose reproduction was shown to a third, and so on for a chain of up to ten participants. (Bartlett, 1932). With this technique (an experimental analogue of rumour transmission), each participant's memorial distortion became part of the stimulus for the next one down the line; the effect was to grossly amplify the reconstructive alteration.

7.12 Remembering studied by the method of serial reproduction Ten subjects were used in the experiment. Subject 1 saw the original figure and was asked to reproduce it after half an hour. His reproduction was shown to subject 2 whose reproduction was shown to subject 3, and so on through subject 10. The figure shows the original drawing and the 10 serial reproductions, illustrating a massive reconstruction process. (After Bartlett, 1932)



Reference: Bartlett, F.C. *Remembering: A study in experimental and social psychology*. Cambridge, England; Cambridge University Press.



The effect of schemas and scripts

Numerous experiments document Bartlett's claim that memories for events or narratives are strongly affected by the framework of prior knowledge in terms of which they are understood. In one study, participants were asked to read a description of a home while taking either of two different viewpoints: that of a prospective homebuyer or that of a burglar. Later recall showed that the different perspectives affected what was remembered: in the case of the 'home buyers', a leaky roof; in the case of the 'burglars', a valuable coin collection. (Anderson and Pichert, 1978). In another study, there were errors of commission. Participants were told about a person's visit to the dentist and then falsely recalled hearing some details that typically occur in a dentist's office (checking in with the receptionist, looking at a magazine in the waiting room, and so on), even though these were never explicitly mentioned (Bower, Black, and Turner, 1979).

In all these cases, participants' memory was affected by their knowledge of the world. They had some ideas of how homebuyers, burglars, and dental patients are likely to behave, and they fit their particular recollections into the general outlines of this knowledge, filling in various gaps in memory without knowing that they did so. Following Bartlett, many contemporary psychologists describe such conceptual frameworks as *schemas*. The term refers to a general cognitive structure into which data or events can be entered, most typically with more attention to broad lines than specific details.

References: Anderson, R.C., and Pichert, J. 1978. Recall of previously unrecalable information following a shift in perspective. Journal of Verbal Learning and Verbal Behavior 17:1-12.

Bower, G.H.; Black, J.B; and Turner, T.J. 1979. Scripts in memory for texts. Cognitive Psychology 11:177-220.

Eyewitness testimony

The schema-induced distortions above were not particularly damaging. The participant's memory for particular details was faulty, but that hardly mattered since the participants remembered the essence. Under normal circumstances, we remember the meaning of a statement, not its detailed phrasing. It could be argued that schematised remembering is beneficial since its efficiency lets us package, store, and retrieve more material than we could otherwise manage in a world with lots of information. However, there is a downside because sometimes this way of processing is not enough. Details might be of extreme importance in courtrooms where lawyers and judges are concerned with the accuracy of eyewitness testimony. Witnesses are sometimes quite confident of various circumstances they remember even though their recollections don't fit the actual facts. An accident occurred months ago, and its details have dimmed over time. As the witness tries to retrieve this past event, he may fill in the gaps by an inference of which he is quite unaware. In these cases, schematic distortion can have very damaging effects. A series of studies by Elisabeth Loftus and her associates has highlighted this problem of schematised memory processes in eyewitness testimony. An important factor is the way in which recall is elicited. In one study, participants viewed a brief film segment of a car accident. Immediately afterward they were asked a number of questions that were in either of two forms:

- Did you see the broken headlight?
- Did you see a broken headlight?
-

The results showed that participants who were questioned about *the* headlight were more likely to report having seen one than subjects who were asked about *a* headlight. This was so whether the film actually showed a broken headlight or not. Here the schema is provided by the nature of our language. In effect, the use of the definite article, *the*, makes the query a leading question, one which implies that there really was a broken headlight and that the only issue is whether the participant noticed it. No such preposition is made when the indefinite article, *a*, is used (Loftus and Zanni, 1975)

Loftus proposed a theory of reconstructive memory as the result of her research. In the classic study by Loftus and Palmer (1974) participants viewed a film on a traffic accident and then answered questions, including the following: "About how fast were the cars going when they hit each other?" Other participants received the same question, except that the verb hit was replaced by smashed, collided, bumped, or contacted. Even though all participants saw the same accident, the wording of the question affected the reports.

Another study showed that leading questions during a first interrogation might change how the witnessed event is reported sometimes later. Participants were again shown film segments of a car accident. Shortly afterward some of them were asked leading questions such as, "Did you see the children getting on the school bus in the film?" A week later, all participants were asked the direct question, "Did you see a school bus in the film?" In actual fact, there was no school bus. But when compared to controls, participants who were originally asked the leading questions that presupposed the school bus were three to four times more likely to say that they had seen one. It would seem that a false memory of a bus had been implanted (Loftus, 1975).

Loftus' provocative theory of reconstructive memories has aroused much controversy. Does postevent information actually alter or impair a witness' real memory, never to be retrieved again? (Loftus et al. 1989). Or do participants merely follow the experimenter's suggestion, leaving their true memory intact for retrieval under the right conditions (McCloskey & Zaragoza). As this theoretical debate rages on, the all-important practical lesson remains: Whether memory is truly altered or not, eyewitness reports are hopelessly biased by postevent information.

Here are some links to explore this fascinating issue further:

<http://faculty.washington.edu/eloftus/Articles/sciam.htm> Loftus on 'false memories'

<http://www.pbs.org/wgbh/pages/frontline/shows/dna/interviews/loftus2.html>
interview with Loftus on eyewitness testimony

<http://www.criminaljustice.org/CHAMPION/ARTICLES/98jan01.htm> application of Loftus' work in criminal justice

Children's testimony

This phenomenon raises an additional question. If adults can be misled by postevent information, what about children? In 1983, Judy Johnson complained to the police in Manhattan Beach, California, that her two-year-old son had been molested at the McMartin Pre-School by Raymond Buckey, a teacher. Before long, the police contacted other parents and charged that Ray and his mother, Peggy McMartin Buckey, had sexually abused hundreds of boys and girls. In interviews with a social worker, several children said they were forced to play 'naked games'. Some even told bizarre stories of satanic rituals in which they drank blood etc.

The question raised was whether the children were telling the truth about the abuse. There were striking consistencies in the reports of different children, but on the other hand, the social worker who conducted the interviews often prompted the children with suggestive questions, urging them to describe acts they had initially denied and scolding those who claimed ignorance. Based on the testimony of eleven children, the case went to trial. Then in 1990, after 33 months- the longest trial in American history – the jury found the defendants not guilty. As one juror explained, "I believe that the children believed what they were saying, but I couldn't tell if they were repeating what they had been told...I had a hard time picking fact from fiction". Can leading questions cause children to confuse appearance and reality? Since the McMartin case, thousands of child sex-abuse cases have inundated the courts and many defendants are convicted solely on the basis of the testimony of children.

Ceci & Bruck (1995) have investigated research on children's testimony and they concluded that just like adults, children can be influenced to make wrong testimony. Factors that influence the suggestibility of children are:

- **Age** (young children are more likely to be suggestible, to suffer from source amnesia, not being able to distinguish between fantasy and reality (especially in emotionally charged situations) and all of this will lead to confabulation (Poole and Lamb 1998).
- **Pressure to conform to expectations** (in the McMartin case, the transcripts of the interrogations were investigated, and when some children were later interviewed in that way, e.g. by saying what other kids had said, false allegations were made by many children. In the 3-year-old group over 80% claimed that what had falsely been suggested to them had happened.

see more on the McMartin case here

http://www.ipt-forensics.com/journal/volume7/j7_2_1.htm

<http://www.people.cornell.edu/pages/sjc9/1993SRCD.html>

Remembering can take many different forms, but they are all ways of recovering or locating information that has been stored.

The different forms of retrieval are:

- **Recognition** (a sensitive form of remembering where something or somebody seems familiar but we are not necessarily able to name it or identify it. This is the kind of remembering involved in multiple-choice tests).
- **Recall** is a more stringent form of remembering, and it usually involves the active searching of our memory stores. In recall, we reproduce something that has been learned earlier and often the retrieval cues are missing or very sparse. This is the kind of remembering involved in timed essays.
- **Relearning** is when something seems to be totally forgotten, but it is all the same easier to learn it a second time, e.g. a language.
- **Reconstructive memory** is e.g. when information passes from one person to another (e.g. gossip, rumours etc). This is not a simple reproduction of the past but an interpretation of the past in the light of our beliefs, schemas, expectations etc. and it often involves a distortion of objective truth. Bartlett (1932) was the first to investigate this.
- **Confabulation** refers to memory error that is often made under conditions of high motivation or arousal, and we tend to fill in missing details or combine several events. Patients with Korsakov's syndrome are very prone to confabulation.
- **Reintegration** is the recollection of past experiences on the basis of a few cues, which might be souvenirs, particular smells, melodies etc. that serve as reminders. Only small parts of the information are immediately available, and a search of memory gradually leads to the reintegration of knowledge into some coherent whole. The search is much like a detective's investigation. This kind of remembering is involved in psychoanalysis.
- **Cue-dependent memory** refers to the similarity or difference between the *state* (e.g. alcohol or no alcohol) and the *context* (e.g. the place where you learned something). It seems that remembering may be related to cues.
- **Imagery** is the basis of many kinds of mnemonics (memory aids). There is good evidence that people remember verbal material better if it is linked to a visual image. This relates both to encoding and retrieval. Some examples of mnemonics are: the method of loci, associations, rhymes etc.

It seems that remembering is not only passive retrieval. Remembering may be creative and involve reconstruction (i.e. creating a whole out of partial information). A specific context provides cues for retrieval but may also make us create information to fill gaps in recall.

The **semantic memory** (in LTM) stores meaning, not all details.

Key study: Frederick Bartlett (1932) supported the idea that all recall involves reconstruction. In the classic study, he read a story based on a Native American legend to his participants and then later asked them to retell it from memory. Bartlett developed a schema theory in his book *Remembering* (1932). He defined a schema as *an active organisation of past experiences in which the mind abstracts a general cognitive structure to represent many particular instances of those experiences*. Bartlett's book consists of an elaboration of *schema theory* and shows its application to experimental results that he had collected on memory for figures, pictures, and stories.

A fundamental assumption of Bartlett's schema theory is that all new information interacts with old information represented in the schema. This interaction was noticed by Bartlett in the errors people made in recall. The way of altering information in memory is also called '*memory distortions*'.

One of the two major methods used by Bartlett was serial reproduction (one person reproduces the original story, a second person has to reproduce the first reproduction and so on until six or seven reproductions have been made). The method is meant to duplicate, to some extent, the process by which rumours or gossip are spread or legends passed from generation to generation. One of the best known pieces of material used by Bartlett was "The War of the Ghosts", which is difficult for people from Western culture to reproduce because of its style and unfamiliar content that reflect other conventions and beliefs.

The War of the Ghosts

One night two young men from Egulac went down to the river to hunt seals and while they were there it became foggy and calm. Then they heard war cries and they thought: "Maybe this is a war party". They escaped to the shore and hid behind a log. Now canoes came up and they heard the noise of paddles and saw one canoe coming up to them. There were five men in the canoe and they said: "What do you think? We wish to take you along. We are going up the river to make war on the people": One of the young men said: "I have no arrows". "Arrows are in the canoe", they said. "I will not go along. I might be killed. My relatives do not know where I have gone. But you", he said, turning to the other, "may go with them". So one of the young men went but the other returned home. And the warriors went on up the river to a town on the other side of Kalama. The people came down to the water and they began to fight and many were killed. But presently the young man heard one of the warriors say: "Quick, let us go home; that Indian has been hit". Now he thought: "Oh, they are ghosts". He did not feel sick but they said he had been shot. So the canoes went back to Egulac and the young man went ashore to his house and made a fire. And he told everybody and said: "Behold I accompanied the ghosts and we went to fight. Many of our fellows were killed and many of those who attacked us were killed. They said I was hit and I did not feel sick". He told it all and then he became quit. When the sun rose he fell down. Something black came out of his mouth. His face became contorted. The people jumped up and cried. He was dead.

Bartlett found characteristic changes in the reproduction of the story, and Ian Hunter (1964) used the War of the Ghost in a replication of Bartlett's study and he confirmed Bartlett's finding, including

- The story becomes noticeably shorter, e.g. Bartlett found that after six or seven reproductions, it shrank from 330 to 180 words.
- Despite becoming shorter, and details being omitted, the story becomes more coherent; no matter how distorted it might become, it remains a story because the participants are interpreting the story as a whole, both listening to it and retelling it.

- The story becomes more conventional, i.e. it retains only those details which can be easily assimilated to the shared past experience and cultural background of the participants.
- The story becomes more clichéd, i.e. like a traditional story, and any individual or peculiar interpretations tend to be dropped.

Bartlett concluded that interpretation plays a large (and rather unrecognised) role in the remembering of stories and past events. We reconstruct the past by trying to fit it into our existing schemata and the more difficult this is to do, the more likely it is that elements are forgotten or distorted so that it fits. Bartlett refers to efforts after meaning, i.e. trying to make the past more logical, more coherent and generally more 'sensible', which involves making inferences or deduction about what could or should have happened. Rather than human memory being computer-like, with the output matching the input, Bartlett and Hunter believe that we process information in an active attempt to understand it. Memory is 'an imaginative reconstruction' of experience. (Bartlett, 1932).

Remembering as a cultural activity

An important implication of Bartlett's work is that memory is a social phenomenon that cannot be studied as a 'pure' process. Because he emphasised the influence of previous knowledge and background experience, remembering is integrally related to the social and cultural contexts in which it is practised. When members of Western and non-Western cultures are compared on tasks devised in psychology laboratories, such as free recall of lists of unrelated words, the people from Western cultures do better, but this is probably due to the meaninglessness of such tasks for non-Western people.

According to Mistry and Rogoff (1994), culture and memory are enmeshed skills and 'remembering' is an activity with goals whose function is determined by the social and cultural context in which it takes place. This helps to explain the phenomenal memory for lines of descent and history of Itamul elders in New Guinea, needed to resolve disputes over claims to property by conflicting clans. Bartlett himself described the prodigious ability of Swazi herdsmen to recall individual characteristics of their cattle. But since Swazi culture revolves around the possession and care of cattle, this ability is not so surprising. What these examples show is that remembering is a means of achieving a culturally important goal, rather than the goal itself.

Schema theory

- Schema theory seeks to explain our interpretation of the world from a psychological perspective, which stems from cognitive science.
- Schemas (or schemata) are cognitive structures (mental templates or frames) that represent a person's knowledge about objects, people or situations.
- The concept of schema was first used by Jean Piaget in 1926. (He suggested that children learn using existing schemas that are accommodated or assimilated). <http://muskingum.edu/~psychology/psycweb/history/piaget.htm>
- Schemas are derived from prior experience and knowledge. They simplify reality, setting up expectations about what is probable in relation to particular social and textual contexts.

- Schemas are used to organise our knowledge, to assist recall, to guide our behaviour, to predict likely happenings and to help us to make sense of current experiences.
- Schema theory predicts that we interpret our experiences by using relevant social and textual schemas. Bartlett (1932) described how schemata influence memory in his research with 'Story of the ghosts'.
- A schema can be seen as a kind of framework with 'slots' for 'variables', some of them filled-in and others empty.
- The slots are either filled in already with compulsory values (e.g. that a dog is an animal) or 'default values' (e.g. that a dog has four legs) or are empty (optional variables) until 'instantiated' with values from the current situation (e.g. that the dog's colour is black).
- When what seems like the most appropriate schema is activated, inferences are generated to fill in any necessary but inexplicit details with assumed values from the schema.
- If no relevant schema is retrieved from long-term memory a new schema is created. Explicit events and inferences, as well as new schemas, are stored in long-term memory.
- Schema-driven processing is a top-down perceptual process that guides a selective search for data relevant to the expectations set up by the schema.
- Schema-driven processing interacts with bottom-up data-driven processes (which may lead to the activation, modification or generation of a schema).
- Schema theory is consistent with the notion of both perception and recall as constructive and selective cognitive processes.
- Schemas are culturally specific: schemas for common routines vary socio-culturally- even within a single country.