Chapter 8: Everyday memory

When most people think about memory, they consider it in terms of their own everyday experience. This chapter considers how prior or new knowledge can distort our memories for stories. This can have important consequences, particularly in the case of eyewitness testimonies. Finally, we consider how we remember to carry out intended actions, or prospective memory.

It is important to study memory in the real world — everyday memory. Traditional memory research tended to be carried out under laboratory conditions and used artificial learning materials.

Cohen (2008) argued that naturally occurring memories are often memories of memories because they have been often thought about or rehearsed. Another contrast is the type of learning that occurs:

- Learning in everyday research is incidental; information learnt is relevant to the individual’s goals or interests.
- Learning in traditional memory research is intentional and determined by the experimenter’s instructions.

Neisser (1996) described everyday memory as purposeful, having a personal quality and being influenced by situation demands. Dudokovic et al. (2004) reported that participants’ goals in remembering a story affected their accuracy in retelling it. Human memory research should possess ecological validity — applicability to real life in terms of representativeness and generalisability. Traditional memory research and everyday memory research are not mutually antagonistic. There is increasing cross-fertilisation between the two kinds of research.

Traditional memory research differs from everyday memory research in several crucial ways. Everyday memory research is concerned with the content of information recalled while traditional memory research is concerned with the amount of information recalled. Learning in everyday memory is driven by an individual’s goals and interests rather than by the experimenter’s instructions. Hence, traditional memory research has often been criticised for lacking ecological validity. However, the two approaches are not mutually antagonistic and there are insights to be gained from both kinds of memory research.

- **Autobiographical memory: introduction**

There is overlap between autobiographical memory (memory for events of one’s own life) and episodic memory (memory for events that happened at a specific time and place). However, there are various differences:

- Autobiographical memory is concerned with events of personal significance; episodic memory relates to trivial events.
- Autobiographical memory typically deals with complex memories.
- Autobiographical memory extends over a longer time period.
- Autobiographical memory involves some semantic memory.

Gilboa (2004) found different patterns of brain activation within the prefrontal cortex for the two forms of memory.

**INTERACTIVE EXERCISE: Flashbulb memories**

A special type of autobiographical memory is a flashbulb memory. Flashbulb memories are clear and long-lasting autobiographical memories for important, dramatic or surprising events. Brown and Kulik (1977) argued that these memories were unique in their longevity and accuracy, and that a special neural mechanism “prints” details of such events permanently in the memory system. Flashbulb memories contain information about:

- informant
- place
- event
- individual’s own emotional state
- emotional state of others
- consequences of the event for the individual.

Rimmele et al. (2012) looked at flashbulb memories for 9/11. They looked at memory one week and three years after the event. They found consistency for location and informant to be higher than for their own reaction.

WEBLINK: Flashbulb article

- Memories across the lifetime

Rubin et al. (1986) looked at infantile amnesia (lack of memories for first three years of life) and the reminiscence bump (lots of memories from between the ages of 10 and 30 years). This may occur for a number of reasons:
  - Infants do not have a sense of self with which to memorise information (Howe & Courage, 1997).
  - Without language, memories are hard to express in language later on (Fivush, 2010).
  - Neurogenesis (Josselyn & Frankland, 2012), whereby the hippocampus is not developed until about 2–3 years of age.

INTERACTIVE EXERCISE: Reminiscence bump

A reminiscence bump is where people remember a disproportionately large number of memories from their early adulthood and is found in several different cultures (Conway et al., 2005). Bernstein et al. (2011) found that older individuals showed a reminiscence bump for positive memories, but not negative ones. This may be interpreted in terms of a life script (cultural expectations concerning major life events). Life scripts are emotionally positive and occur during the ages of 15–30.

WEBLINK: Modelling the reminiscence bump

RESEARCH ACTIVITY: Memory for personal events

Recollection of autobiographical memories by older individuals typically shows evidence of infantile amnesia, a reminiscence bump and a retention function. Infantile amnesia occurs in part because the cognitive self only emerges towards the end of the second year of life. The reminiscence bump reflects superior memory for a period of one’s life during which there is consolidation of the self. Specific autobiographical events can be accessed most readily by what information, followed in order of decreasing usefulness by where, who and when information.

- Theoretical approaches to autobiographical memory

Conway and Pleydell-Pearce’s (2000) self-memory system model suggests that we possess a self-memory system consisting of an autobiographical knowledge base and the current goals of the working self:
  - Autobiographical knowledge is arranged into lifetime periods (thematic and temporal knowledge), general events and event-specific knowledge.
  - The working self is concerned with the self and what it will become in the future.

There is a distinction between ways in which autobiographical memories can be accessed:
  - Generative retrieval, actively and intentionally through interaction with the working self.
  - Direct retrieval, formed outside the influence of working self and experienced spontaneously.

Conway and Pleydell-Pearce (2000) studied retrograde amnesia and their findings suggest that event-specific knowledge is more vulnerable to loss/disruption than knowledge about lifetime periods or general events. Woike et al. (1999) found that personality type can affect autobiographical recall. Agentic personality types tended to
recall agentic memories and communal personality types recalled more communal memories. Uzer et al. (2012) found evidence to suggest direct retrieval was faster but less vocal than generative retrieval. Generative retrieval was associated with activation in the prefrontal cortex and direct retrieval was associated with activation in the left hippocampus, according to Addis et al. (2012).

Conway and Pleydell-Pearce (2000) and Conway (2005) proposed a comprehensive theory of autobiographical memory. Limitations of the theory are that autobiographical memory may be more complex in terms of brain regions recruited than assumed. It is unclear how the working self interacts with the autobiographical knowledge base, whether there is a clear distinction between generative and direct retrieval, and the extent to which autobiographical memories contain episodic and semantic information.

There is evidence that the ventromedial prefrontal cortex plays a major role in the retrieval of real autobiographical memories (Svoboda et al., 2006). Buchanan et al. (2006) identified that the amygdala plays an important role in retrieving autobiographical memories potentially due to their emotional content. St Jacques et al. (2011) identified four brain networks involved in autobiographical memory retrieval:

1. **Fronto-parietal network** – associated with adaptive controlled processes.
2. **Cingulooperculum network** – construction of autobiographical memories and goal maintenance.
3. **Medial prefrontal cortex network** – construction and elaboration of autobiographical memories and self-referential processing.
4. **Medial temporal lobe network** – construction and elaboration of autobiographical memories associated with declarative memory.

Depressed individuals are more likely to produce over-general memories (Liu et al., 2013). Depressed people tend to show a less integrated sense of self, as indicated by greater compartmentalisation, because they show little consistency in their use of positive terms across their lifetime (Dalglish et al., 2011).

- **Eyewitness testimony**

Many people believe eyewitness testimony despite the fact it is highly unreliable. Eyewitness testimony can be distorted by confirmation bias – event memory is influenced by the observer’s expectations. Lindholm and Christianson (1998) found participants’ expectations of the likely ethnicity of the criminal affected their memory for the identity of the perpetrator. Bartlett (1932) argued that our memory is influenced by expectations because we possess numerous schemas in long-term memory that distort memory.

**WEBLINK:** Bartlett’s War of the Ghosts story

Tuckey and Brewer (2003a, b) found people recalled information relevant to the bank-robbery schema (male, wears disguises, dark clothes) better than information irrelevant to it. They also interpreted ambiguous information as being consistent with their schema.

Eyewitness memory can be distorted by subsequent questioning or misleading post-event information (retroactive interference). Loftus and Palmer (1974) showed that eyewitness descriptions were affected by information implicit in the question, for example whether the verbs “hit” or “smashed into” were used. Eyewitness memory can also be distorted by information presented before the event (proactive interference). Lindsay et al. (2004) showed that eyewitnesses made more errors recalling information when they had previously heard a similar narrative. However, memory distortions are more common following misinformation about peripheral features than about central features (Dalton & Daneman, 2006).

**WEBLINK:** Loftus and Palmer

Misleading post-event information may distort eyewitness reports due to source misattribution (Johnson et al., 1993). A memory probe activates overlapping memory traces from various sources. Source misattribution
occurs when memories from one source resemble those from another. Prull and Yockelson (2013) found the misinformation effect was much smaller when participants were given a source-recognition test. This is possibly due to reconsolidation (Chan & Lapaglia, 2013). Edelson et al. (2011) have demonstrated that the misinformation effect was due to increased connectivity between the hippocampus and amygdala during the presentation of misleading information, suggesting that reconsolidation was taking place. Wright and Loftus (2008) identified other factors that can lead eyewitnesses to be misled by post-event information:

- **Vacant slot explanation** – related information from the original event was not stored in memory.
- **Blend explanation** – information from the original event and post-event information are combined together in memory.

Anxiety is known to interfere with memory. Loftus et al. (1987) showed participants two films, one involving a gun. Memory for details unrelated to the gun was poorer in the film involving the gun. This is the weapon focus effect. Pickel (2009) suggests people attend to stimuli that are unexpected in the current situation and this impairs memory. Deffenbacher et al. (2004) found culprits’ faces were identified more often and details were remembered more often in low-anxiety conditions. Valentine and Mesout (2009) found highly stressed participants showed lower recall for a person they encountered in the Horror Labyrinth at the London Dungeon.

The eyewitness memory of older adults is less accurate than that of younger adults and is more susceptible to misinformation (Jacoby et al., 2005). Wright and Stroud (2002) found an “own age bias”, with both younger and older adults being more accurate at identifying a culprit of similar age to themselves due to experience with people of other ages (Harrison & Hole, 2009).

**Face recognition**

Eyewitness accuracy for faces is generally quite poor (Valentine et al., 2003). Ross et al. (1994) found an effect of unconscious transference, in which a face is correctly recognised as having been that of someone seen before, but incorrectly judged to be responsible for a crime. Accuracy of eyewitness identification depends in part on the other-race effect, in which same-race faces are recognised better than other-race faces. According to the social-cognitive hypothesis, *ingroup* faces are processed more thoroughly than *outgroup* faces. Shriver et al. (2008) found evidence for this effect in which the context (impoverished or wealthy) affected face recognition. Megreya et al. (2011) found evidence to suggest that perceptual processes are also involved in the other-race effect, given that their participants could not accurately match other-race faces presented simultaneously as well as own-race faces.

There are important differences between laboratory studies and real-life crimes: in laboratory studies, events are observed by eyewitnesses; in real-life crime, evidence is provided by the victim. It is less stressful to watch a video of a crime than to experience one in real life. Laboratory eyewitnesses generally observe the event passively from a single perspective. Eyewitnesses to a real event may move around or interact with the criminal. In laboratory research, the consequences of a mistake are trivial. In real life, they can be a matter of life or death.

However, there is evidence that artificial laboratory conditions do not distort findings. Witnesses to real-life events are more inaccurate in their memories than those observing under laboratory conditions (Ihlebaek et al., 2003). This means that inaccuracies observed under laboratory conditions are an underestimate of real-life memory deficiencies.

**WEBLINK:** [The Eyewitness Identification Research Laboratory at the University of Texas](http://www.ewi.uta.edu/)

Eyewitness memory is influenced by many factors, including confirmation bias, weapon focus and post-event information. Misinformation may distort eyewitness memory because of misinformation acceptance or because of source misattribution.
• Enhancing eyewitness testimony

The format of the line-up (simultaneous or sequential) also affects chances of mistaken or correct identification (Steblay et al., 2011). Eyewitnesses adopt a more stringent criterion with sequential line-ups. Warning eyewitnesses that the culprit may not be in the line-up reduces the chances of mistaken identification (Steblay, 1997).

The cognitive interview was developed to improve eyewitness testimony and is based on four rules (Geiselman & Fisher, 1997):

- Eyewitness recreates the context of the crime.
- Eyewitness reports everything he/she can remember.
- Eyewitness reports details of incident in various orders.
- Eyewitness reports events from various perspectives.

The enhanced cognitive interview involves creating rapport between the interviewer and interviewee (Fisher & Geiselman, 1992). Memon et al. (2010) carried out a meta-analysis showing that the cognitive interview produced a large increase in the number of details reported but also increased the number of incorrect details reported. The cognitive interview also is not susceptible to misinformation after the interview, but is before (Memon et al., 2009).

The cognitive interview is more effective than other interview techniques in obtaining as much accurate information as possible. In spite of its success, the cognitive interview has several limitations: the small increase in incorrect information is cause for concern; context reinstatement can have a negative effect on recognition memory (Wong & Read, 2011); and the cognitive interview is typically less effective at longer retention intervals and under highly stressful situations.

CASE STUDY: Cognitive interview and eyewitness confidence

Eyewitness confidence often fails to correlate with accuracy, probably because many eyewitnesses have mistaken beliefs about their ability at eyewitness memory. The probability of misidentification on an identification parade is greater when the eyewitness is not warned that the culprit may not be in the line-up, or when the line-up is simultaneous rather than sequential. The cognitive interview (based on the assumptions that memory traces are complex and can be accessed in various ways) leads eyewitnesses to produce many more accurate memories at the expense of a small increase in inaccurate memories.

• Prospective memory

Most studies of human memory have been on retrospective memory – the ability to remember events experienced in the past or knowledge acquired previously. Prospective memory involves remembering to carry out intended actions. Zogg et al. (2012) indicate five stages in prospective memory:

1. intention formation;
2. retention interval;
3. cue detection and intention retrieval;
4. intention recall;
5. intention execution.

Prospective memory differs from retrospective memory as follows:

- Prospective memory is concerned with when rather than what we know.
- Prospective memory is relevant to plans and goals.
- More external cues exist for retrospective memory.
- Prospective memory research is focused on the use of memory.
Prospective memory can be divided into:

- *time-based prospective memory*, which involves remembering to perform a given action at a particular time.
- *event-based prospective memory*, which involves remembering to perform an action in the appropriate circumstances.

Sellen et al. (1997) found performance was better in an event-based task than in a time-based task. They argued that event-based tasks are easier because intended actions are more likely to be triggered by external cues. Hicks et al. (2005) argued that the specificity of the prospective memory is more important than its type. More processing resources are required when an individual’s intentions on a prospective memory task are ill-specified.

Prospective memory is essential for everyday life. Dismukes and Nowinski (2006) reported that almost all of pilot memory errors were due to failures of prospective memory. Failures of prospective memory were most likely when the pilot was interrupted while carrying out a plan of action. Interruptions can seriously impair prospective memory. Even the provision of explicit reminders is not always effective. Rather, time to retrieve the intention of returning to the task is important. Cuttler & Graf (2009b) suggest that obsessive-compulsive disorder is in part due to poor prospective memory.

Prospective memory can be time-based or event-based. Event-based prospective memory is often better, because the intended actions are more likely to be triggered by external cues. The extent to which attentionally demanding processes are involved in a prospective memory task depends on its importance and complexity. There is evidence that these attentional processes may occur in the frontal lobes and related structures.

- **Theoretical perspectives on prospective memory**

According to Smith and Bayen’s (2005) *preparatory attentional and memory processes* (PAM) theory, prospective memory requires two processes:

1. a capacity-consuming monitoring process;
2. retrospective memory processes.

Einstein and McDaniel (2005) proposed the *multi-process theory* according to which various cognitive processes can be used to perform prospective memory tasks. They argued that cue detection would typically be automatic under some conditions:

- Ongoing processing directs attention to relevant aspects of the cue.
- Cue and target are associated.
- Cue is salient.
- Intended action is simple.

Frontal brain systems are involved in planning or monitoring for cues (McDaniel & Einstein, 2011).

Scullin et al. (2013) developed this framework into the *dynamic multi-process framework*. Two cognitive processes exist:

1. monitoring
2. spontaneous retrieval.

Cue expectation determines which process will be used.

Prospective memory cues can be noticed without conscious monitoring (Knight et al., 2011). McDaniel et al. (2013) argued that the monitoring required to perform the non-focal task would involve top-down attentional control. As a result, there would be *sustained* activity in the anterior prefrontal cortex, an area associated with attentional control. In contrast, the lesser demands of the focal task would mean there would be only *transient* activation in the relevant brain areas (e.g., anterior prefrontal cortex).
Burgess et al. (2000) considered prospective memory in patients with frontal lobe damage. They argued:

- Right dorsolateral prefrontal cortex is involved in planning and creation of intentions.
- Rostral prefrontal cortex (BA10) is involved in maintaining intentions.
- Anterior and posterior cingulates are involved in the retrospective component of prospective memory.

In a meta-analysis, Gilbert et al. (2006) found BA10 was associated with episodic memory retrieval, coordinating two processing demands, and self-reflection.

Rummel et al. (2012) found participants who had received implementation intention instructions performed better on a prospective-memory task (e.g., detecting peach or tennis within an ongoing task). They hypothesised this occurred because implementation intentions produced relatively automatic retrieval of intentions.

We have a reasonable understanding of the similarities and differences between event- and time-based prospective memory. There is real-world evidence that failures of prospective memory are more likely with interruptions. We are beginning to understand the roles of attentional and automatic processes in prospective memory. Limitations of this research are that laboratory participants lack the strong incentive to perform intended actions, the difference between prospective and retrospective memory are sometimes exaggerated, and there are differences between prospective memory in the laboratory and in the real world (e.g., long-term intentions).