

Levels of Processing

- Levels of Processing Theory
 - Gus Craik and Bob Lockhart
 - Focus on the types of processing that we do in order to store and retrieve items from memory
 - Maintenance Rehearsal: simply memorizing something
 - * Maintain and hold the information until to use it without transforming it to any other type of code
 - * DOES NOT promote good memory
 - Elaborative Rehearsal: elaborate on the meaning of something
 - * allows us to transform information into a deeper code
 - * DOES promote good memory
 - both physical appearance task and rhyming task are shallow
 - meaning-based task is deep
 - * Memory would be better for meaning based item, than for PA and rhyme items
 - * Alan Baddeley have argued that it is a circular or tautologous theory and cannot be falsified.
 - * Level of processing provided a useful, novel way of conceptualizing memory

Reconstructive Nature of Memory

- Memory Schema – Bartlett – ask to read a story and their memory for the story
- their memories for the story begin to become distorted, and these distortions were consistent with items in their own cultures
- A schema is a framework for organizing memory, and our own schemas are consistent with out prior life experience
- Flashbulb Memories:
 - held to be clear, vivid memories for some important event.

- whether they are special, accurate memories. → memory tends to link to history
- Eyewitness Memory:
 - Elizabeth Loftus and Palmer (1974)
 - Watch Film clips and provide a question by answer it in different verbs. Then asked participants if they see a broken glass after a week. Some people say yes, even there is no broken glass at all
 - Conclusion: Different people gives different verbs that has different speed.
 - people who had received the stronger verbs were more likely to misremember broken glass than weaker verbs
- False Memory
 - Deese in 1920s (made popular by Roediger and McDermott)
 - ask participants if they remember spider: 40% participants say yes and they are confident in these false memories
 - Cabeza using brain imaging techniques showed
 - * Despite an individual's belief in a false memory, the brain regions activated by the false memories are different from the regions activated by the real memories

Amnesia

- Scoville and Milner: profound memory loss after surgery on temporal lobes and hippocampus to control severe epilepsy(癲癇) → improve epilepsy retained his intelligence and his perceptual abilities but cannot form new memory
- Clive wearing: cannot form new memory
- Anterograde amnesia: inability to form new memories; affect long term memory but not short term memory; be able to keep information active in STM but not able to transfer it into LTM
- Retrograde amnesia: loss of memory for past events (varied for how far back in time from person to person)

- Alzheimer's disease
- Korsakoff's syndrome: brain damage resulting from a lack of B vitamins due to alcohol abuse
- car accident, fall
- Does not affect social skills, language, or any previous skills that we have mastered
- affect episodic or autobiographical in nature

Semantic Memory Each of us has a unique episodic memory given our unique existence and experience

- general collection of world knowledge, language, etc
- tend to be similar between people who have had the same general experience
- Stored in semantic memory:
 - Collins and Quillian's hierarchical semantic network
 - * concepts are organized into hierarchies
 - * an important characteristic of this model is cognitive economy (means that a concept shares all the characteristics of the concept it is stored under)
 - Spreading Activation:
 - * when a concept is activated, all of its characteristics are activated and activation also spreads between the links to related concepts
 - * spreading activation allows to activate associated concepts in memory

Implicit versus Explicit Memory

- Explicit memories: consciously recall: linked to a particular period of time
- Implicit memories: a memory test not aware of taking/ no deliberate or conscious attempt to remember something
- Warrington and Milner:
 - test: explicit tests (free recall and recognition), implicit tests (word fragment identification and word stem completion)

- amnesics(失忆者) would likely not consciously recall but they show the evidence of studying those before → form a implicit or unconscious memory

Reading

levels of processing theory of memory

- depend on the initial encoding of the information to be remembered (Craik and Lockhart)
- focuses on the different kinds of cognitive processing that people perform when they encode and retrieve information
- Assumption: retention and coding of information depends on perceptual analysis done on the material at encoding
- improvement in memory comes from greater depth of analysis of the material
- Incidental Learning: any learning that happened to occur inadvertently
- Craik and Tulving (1975)
 - memory processed semantically best, then processed acoustically
 - Memory is best for more deeply processed information
 - view memory as a continuum of processes
- Bower and Karlin: study memory for faces
 - participants who rated faces for "honesty"(requires deep semantic processing) showed better memory than according to gender
- Stein and Bransford(1979)
 - sentences that specified more precisely the relation of the target word to the context are found likely to increase the probability of recalling the target word
- Baddeley (1978)
 - without a more precise and independent definition of depth of processing, the usefulness of the theory was limited

- level of processing help to reorient the thinking of memory researchers, drawing their attention to the importance of the way material is encoded

Reconstructive nature of memory

- Frederick Bartlett
 - believe in the real world, memory largely uses world knowledge and schemata (framework for organizing information)
 - reject LTM as a warehouse where material stored unchanged until retrieval; memory as an active and often inaccurate process that encodes and retrieves information so as to "make sense"
 - * schemata: large unit of organized information used to representing concepts, situations, events, and actions in memory
 - at retrieval time this knowledge and organizational information is used to reconstruct the material
 - ask to read a story and recall after a long time period
 - * participants unintentionally introduced distortions during recall to make the material more rational and more coherent from their own point of view (schemata)

• Autobiographical Memory

- Marigold Linton's
 - * record memorable things every single day and write it down
 - * suggested that real-world memories are much more durable than those of most lab experiments
- Brewer (1988)
 - * 8 cooperative undergrads to serve in a demanding multiweek experiment – record time, location, actions and thoughts when beeper is on
 - * better than Linton's: involves separating the experiment from the participants
 - * test three times: once at the conclusion of the data acquisition period, once about 21 months later, once about 41 months later

- * Found: events that occurred in a unique or infrequent location were better remembered than occurrences in frequent actions; rare actions are more likely to be recalled than frequent actions
- * More distinct the mental representation of an event the more likely it is to be recalled

- **Flashbulb Memory**

- people are finding a way to link themselves to history
- strong emotions produced by the event prompt people to retell their own stories of where they were; over time the memories can become distorted

- **Eyewitness Memory**

- the testimony would have a disproportionate effect on your behaviour
- relying on memory to create composite facial images of the perpetrator is also wrought with problems
- our ability to recognize past scenes or events can be biased by the type of questions asked after viewing
- Loftus (1975): people's memories can be altered by presenting misleading questions
- Bransford and Franks:
 - * participants had not stored a copy of the actually presented sentences
 - * they abstracted and reorganized the information in the sentences, integrating the ideas and storing the integration
 - * they cannot distinguish between the presented sentences and their own integration

- **The recovered/false memory debate**

- both recovered/false memory vs eyewitness testimony
 - * alleged witnessing of an event → distorting information
 - * eyewitness testimony: focused on recall for the past days, weeks or months

- * false or recovered memories: focus on recall for the several years to several decades earlier
- memories of traumatic events can be repressed – buried in the unconscious mind for long period of time
- The courage to heal : sexual abuse;
- Loftus and Pickrell: false memories of events that ever happened to be somehow implanted
 - * 24 people in this study
 - * first interview relatives of participants → generates three true events when age 4 to 6, create a false memories(lost in the shopping mall) for the fourth story
 - * ask participants to recall as much details as possible about four events
 - * Suggested: false memories can be formed through suggestive questioning, and they offered a speculative account of the mechanism responsible
- Hyman, husband, and billings: induce about 25% participants to falsely "recall different childhood events
- Garry and Wade: narratives were more effective in inducing false memories
- Pezdek: existing evidence for therapist-implanted memories is quite weak (p193)

Amnesia

- people suffering from memory disorders
- K.C.
 - damage to his temporal lobes → anterograde and retrograde amnesia on explicit tests of episodic and autobiographical memory
 - Lost all the past memory but be able to maintain many other cognitive capacities, perception, language and reasoning skills
 - K.C. remember nothing of the circumstances in which he had learned of this shocking news, including time, people how he reacted
 - have some memory for major events but lack personal meaning for him

- his memory has qualities of both retrograde and anterograde amnesia
- Anterograde Amnesia
 - memory deficit extending forward in time from the initial point of memory loss, has five principal features
 - * Anterograde amnesia affects LTM but not working memory
 - * Anterograde amnesia affects memory regardless of the modality (regardless of whether the information is visual, auditory, kinesthetic, olfactory, gustatory or tactile)
 - whether the testing memory is free recall, cued recall, or recognition, they are all hampered.
 - * Anterograde amnesia spares memory for general knowledge but generally impairs recall for new facts and events
 - * Anterograde amnesia spares skilled performance
 - * Anterograde amnesia patients do learn a skill, they show hyperspecific memory
- Retrograde Amnesia
 - loss of memory for information acquired and stored
 - all amnesic patients seem to show at least some retrograde amnesia
 - * temporal extent: the time span for which memory is lost can vary enormously in retrograde amnesia
 - Korsakoff's, Alzheimer's Parkinson's or huntington's disease → likely to exhibit temporally extensive amnesia with loss of memory acquired and stored for several decades
 - bilateral ECT: a procedure temporally limited retrograde amnesia
 - damage to hippocampal region can also cause retrograde amnesia
 - * retrograde amnesia is observable: the episodic ones that are compromised
 - the temporal extent of the retrograde amnesia often shrinks slowly over time, with the most remote memories being the most likely to return
 - * it typically spares information that was "overlearned" before the onset

- * not to affect skill learning
- personal memories, memories for events are lost, and others are not suggests multiple memory system exist.
- Structure in the brain known as the hippocampus plays a important role in both learning and retrieving information
- **memory consolidation**
 - * standard model: storage of information requires hippocampus link to different aspects
- **Multi memory trace**
 - * hippocampus is always involved in storage and retrieval of episodic information, but that following multiple re-activations of the same event factual information from episodes is extracted and integrated with semantic memory stores.
- **McGaugh**
 - * suggest amygdala, involved in processing of emotion in the memory consolidation process
- hierarchical Semantic network model
 - * cognitive economy:
 - properties and facts are stored at the highest level possible.
 - Collins and Quilian
 - semantic memory is analogous to a network of connected ideas
 - the collection of nodes associated with all the words and concepts knows about semantic network
 - The closer a fact or property is stored to a particular node, the less time it should take to verify the fact and property
 - * Meyer and Schvaneveldt: if related words are stored close by one another and are connected to one another in a semantic network, then whenever one node is activated or energized energy spreads to the related nodes.
 - lexical decision task: participants see a series of letter strings and are asked to decide asap if the letter strings form real words.

- * spreading activation: the idea that excitation spreads along the connections of nodes in a semantic network
- * Connectionist Models:
 - network must be taught to develop patterns of activation through many trials with training examples
 - the connections between units have weights that are all set at random and neutral values
 - Activation weight result in the units they connect becoming active or not
 - one node has been activated, then the second layers might got activated, until the output is compared to target.
 - The network connections are then adjusted in this direction, all other connections are incrementally decreased.
- Implicit vs explicit memory
 - explicit memory: consciously recollected
 - * requires conceptual processing
 - implicit memory: memory that is not deliberate or conscious but shows evidence of prior learning and storage
 - * requires perceptual processing
 - Semantic priming vs Repetition priming
 - * semantic priming: exposure to one word facilitates the recognition or other cognitive processing of a semantically related word
 - * repetition priming: facilitation of the cognitive processing of information after a recent exposure to that same information
 - nonword show no or little repetition priming relative to real words
 - priming is greater for words that share the same morphology or roots of meaning than for words that are visually or aurally similar
 - effects could persist as long as an entire week
 - explicit task: recall consciously or recognize the words previously presented
 - implicit task: not reminded of the prior presentation of words but asked to guess the word being presented

- amnesic participants performed more poorly than anon-amnesic participants on the explicit task, but quite similar on implicit memory tasks.
- dissociative: performance on one task appears independent of performance on another
- process dissociation framework
 - * implicit memory and explicit memory represent two distinct memory systems
 - * Jacoby: implicit memory tasks of the sort used by Schacter, Warrington and Weiskrantz and others are not necessarily pure measures of any memory system
 - * false frame experiment
 - show a list of names of non-famous people
 - one group study with full attention, others in a divided-attention task
 - given a new list of name includes famous people and previous list and new non-famous people, then ask to judge the fame of each name on the new list
 - result: divided-attention condition were more likely to falsely attribute fame to those names that had been previously studied
 - cause: full-attention: they consciously used that information to identify names that were nonfamous
 - divided-attention: unable to consciously elaborate, did not have clear memory only have fuzzy familiarity
 - automatic memory process