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CUET · PSYCHOLOGY · CLASS XI · CODE 324

Human Memory

CUET unit: Cognitive Processes (Memory)

By **UniDrill** · NCERT-grounded study material

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📌 Snapshot

- Chapter 6 builds the cognitive-psychology core of CUET Psychology: how information is encoded, stored and retrieved, and why we forget.
- It introduces the Atkinson-Shiffrin Stage Model (sensory, short-term, long-term) and the alternative Craik-Lockhart Levels of Processing view.
- It classifies long-term memory (declarative vs procedural; episodic vs semantic) and adds Baddeley's working memory and special phenomena (flashbulb, implicit, autobiographical).
- It explains forgetting via trace decay, interference (proactive/retroactive) and retrieval-failure, plus Ebbinghaus's curve and Freud's repressed memories.
- Closes with mnemonics (keyword, method of loci, chunking, first-letter, PQRST) — a frequent CUET source for example-based MCQs.

📖 Detailed Notes

2.1 Core concepts

Memory is one of the most central topics in cognitive psychology — a system that allows information to be retained and recalled over a period of time. Memory comprises **three independent but interrelated stages — encoding, storage and retrieval** (NCERT §Nature of Memory, p. 96). **Encoding** is the first process by which an external stimulus (an event, object, sound or image) is registered by the sensory system and converted into a form that the memory system can use; **storage** is the process through which encoded information is retained over time so that it remains available for future access; and **retrieval** is the process by which stored information is brought back into conscious awareness to perform a cognitive task such as recall, recognition or problem-solving (NCERT §Nature of Memory, pp. 96-97). Without successful encoding there can be no storage, and without retrieval the contents of storage remain functionally useless — students should remember the strict ordering encode → store → retrieve.

The first systematic experimental work on memory was undertaken by **Hermann Ebbinghaus** (1885), who used lists of meaningless **CVC (consonant-vowel-consonant) nonsense syllables** so that prior associations would not contaminate the results; his data produced the now-famous **Curve of Forgetting** showing that forgetting is steepest in the first hour after learning and then levels off (NCERT §Introduction, p. 96; §Nature and Causes of Forgetting, p. 103). Building on this

experimental foundation, **Richard Atkinson and Richard Shiffrin (1968)** proposed the **Stage Model** of memory, drawing an analogy between human memory and a computer with both temporary RAM-like and permanent disk-like stores (NCERT §Information Processing Approach, p. 97). According to the Stage Model, information passes sequentially through three memory stores. **Sensory Memory** has very large capacity but holds information for less than one second; it contains modality-specific registers called the **iconic** register (for visual stimuli) and the **echoic** register (for auditory stimuli) that store an exact replica of the stimulus (NCERT §Sensory Memory, p. 98). **Short-term Memory (STM)** can hold only a small amount of information for approximately 30 seconds and is primarily encoded **acoustically** (in terms of sound); unless rehearsed continuously it is lost (NCERT §Short-term Memory, p. 98). **Long-term Memory (LTM)** has practically unlimited capacity, is encoded **semantically** (in terms of meaning), and information once entered is theoretically never truly forgotten — apparent forgetting from LTM is in fact a failure of retrieval rather than a loss of the trace (NCERT §Long-term Memory, p. 98).

Several **control processes** govern the flow of information between these stores. **Selective attention** transfers information from the sensory register into STM by allowing only the attended stimuli to enter; **maintenance rehearsal** keeps information active in STM through silent or vocal repetition; **chunking** expands STM's famous **7 ± 2** capacity by grouping smaller units into larger meaningful chunks; and **elaborative rehearsal** transfers information from STM into LTM by linking new content to already-stored associations so that the new information acquires deeper meaning (NCERT pp. 98-99). NCERT emphasises that elaborative rehearsal (not mere repetition) is the route into LTM.

There are major **alternatives and modifications** to the Stage Model. **Alan Baddeley (1986)** reconceived STM as **Working Memory** — an active mental workbench rather than a passive store — with three components: the **phonological loop** (which stores sound-based information and decays in roughly 2 seconds), the **visuospatial sketchpad** (which stores visual and spatial information) and the **central executive** which organises information flowing between the loop, the sketchpad and LTM and allocates attentional resources (NCERT Box 6.1, p. 98). Strong evidence against a strict serial Stage Model comes from the **KF case reported by Shallice and Warrington (1970)**: damage to the left cerebral hemisphere left this patient's LTM intact but severely impaired his STM — a result that contradicts the strict Atkinson-Shiffrin claim that information must pass through STM to reach LTM (NCERT §Levels of Processing, p. 100). Building on similar critiques, **Fergus Craik and Robert Lockhart (1972)** proposed the **Levels of Processing** view, according to which retention depends less on the store information passes through and more on the **depth** at which it is processed. They identified three levels — **structural** (shallowest, e.g., noticing the shape of letters), **phonetic** (intermediate, processing the sound) and **semantic** (deepest, processing the meaning) — with semantic encoding producing the most durable memory traces (NCERT §Levels of Processing, p. 100).

LTM itself is not a single store. **Declarative memory** holds facts, names, dates and other content that can be described verbally, while **procedural memory** stores skills such as riding a bicycle or tying a knot that are difficult to put into words. **Endel Tulving** further divided declarative memory into **episodic memory** (autobiographical, dated, emotionally coloured memories of personal life events) and **semantic memory** (the storehouse of general knowledge, concepts and rules that is affect-neutral and not tied to a particular time) (NCERT §Types of Long-term Memory, pp. 100-102). Box 6.2 introduces three additional varieties: **flashbulb memories** — vivid, photograph-like memories of arousing or surprising events; **autobiographical memory** including **childhood amnesia** (the typical inability to recall events from the first four to five years of life); and **implicit memory** that influences behaviour outside conscious awareness (NCERT Box 6.2, p. 101). Each of these is assessed using a different experimental task — **free recall and recognition** for facts and episodes, the **sentence verification task** for semantic memory and **priming** for implicit memory (NCERT Box 6.3, p. 103).

The remainder explains why we forget. Ebbinghaus's curve shows forgetting is maximal in the first nine hours, especially the first hour (NCERT Fig. 6.2, p. 103). **Trace Decay (disuse) theory** holds that memory traces simply fade with non-use but is refuted by the finding that learners who sleep after encoding forget less than those who stay awake (NCERT p. 104). **Interference theory** distinguishes **proactive interference** (old learning blocks recall of new) from **retroactive interference** (new learning blocks recall of old) (NCERT pp. 104-105; Table 6.1). **Tulving's retrieval-failure theory** locates forgetting in the absence of appropriate retrieval cues (NCERT p. 105). Box 6.4 covers **Sigmund Freud's** notion of **repressed memories** — traumatic experiences pushed into the unconscious — and the **fugue state** in which severe repression leads the person to assume a new identity (NCERT Box 6.4, p. 105). Memory can be improved through **mnemonics**: **image-based** strategies include the **keyword method** (learning a foreign word via a similar-sounding English keyword) and the **method of loci** (placing items at familiar locations in sequence) (NCERT pp. 105-106), while **organisation-based** strategies include **chunking**, the **first-letter technique** (e.g., VIBGYOR) and **Thomas and Robinson's PQRST** study method (Preview, Question, Read, Self-recitation, Test) (NCERT pp. 106-107).

2.2 Definitions to memorise

Term	Definition	Page
Encoding	Process by which information is recorded and registered for the first time so the memory system can use it.	96
Storage	Process through which information is retained and held over a period of time.	97
Retrieval	Bringing stored information into awareness for use in cognitive tasks.	97
Sensory Memory		98

Term	Definition	Page
	Large-capacity store lasting less than a second; includes iconic and echoic registers.	
Iconic register	Sensory store for visual information.	98
Echoic register	Sensory store for auditory information.	98
Short-term Memory	Store holding small amounts of information for ~30 seconds, encoded acoustically.	98
Long-term Memory	Permanent storehouse of vast capacity; information encoded semantically.	98
Selective attention	Control process moving information from sensory register to STM.	98
Maintenance rehearsal	Silent/vocal repetition to retain information in STM.	99
Elaborative rehearsal	Linking new information to existing LTM associations for permanent retention.	99
Chunking	Combining smaller units into larger meaningful chunks to expand STM (7±2).	99
Working Memory	Multi-component active workbench view of STM (phonological loop, visuospatial sketchpad, central executive).	98
Phonological loop	Working-memory component storing sound-based information for ~2 s.	98
Visuospatial sketchpad	Working-memory component storing visual/spatial information.	98
Central executive	Working-memory component allocating attention and organising information.	98
Levels of Processing	View by Craik & Lockhart that retention depends on depth (structural < phonetic < semantic).	100
Declarative memory	LTM for facts/events that can be described verbally.	101
Procedural memory	Memory for skills/procedures (e.g., riding a bicycle); not easily described verbally.	101
Episodic memory	Memory of biographical, personal life experiences; usually emotional.	101
Semantic memory	Memory of general knowledge, concepts, rules; affect-neutral and resistant to forgetting.	102
Flashbulb memory	Vivid, detailed memory of an arousing or surprising event.	101
Implicit memory	Memory retrieved automatically, outside conscious awareness.	101
	Past learning interferes with recall of subsequent learning.	104

Term	Definition	Page
Proactive interference		
Retroactive interference	New learning interferes with recall of past learning.	104-105
Fugue state	Disorder resulting from extreme repression in which a person assumes a new identity.	105
Mnemonics	Strategies (image-based or organisation-based) used to improve memory.	105

2.3 Diagrams / processes to remember

- **Fig. 6.1 – Stage Model of Memory (p. 97):** Information → Sensory Memory (iconic/echoic, capacity large, duration < 1 s) → (Attention) → Short-term Memory (small capacity, < 30 s) → (Elaborative Rehearsal) → Long-term Memory (unlimited capacity, up to lifetime). The arrows show the strict serial passage that the Stage Model claims is necessary; the KF case (p. 100) is the famous counter-example.
- **Fig. 6.2 – Ebbinghaus's Curve of Forgetting (p. 103):** A steeply descending curve in the first hour (with marked points at 20 minutes, 1 hour and 8.8 hours), followed by a long, slow plateau — visual proof that most forgetting happens immediately after learning and that very little additional material is lost once the first day has passed.
- **Table 6.1 – Designs for Retroactive vs Proactive Interference (p. 104):** Retroactive — Experimental: Learns A, Learns B, Recalls A; Control: Learns A, Rests, Recalls A. Proactive — Experimental: Learns A, Learns B, Recalls B; Control: Rests, Learns B, Recalls B. Remember: in retroactive designs A is recalled (new B hurts old A); in proactive designs B is recalled (old A hurts new B).
- **Working Memory model (Box 6.1, p. 98):** Baddeley's three-component diagram — Central Executive at the top organising and allocating attention, with two slave systems below: the Phonological Loop (sounds, ~2 s) on one side and the Visuospatial Sketchpad (visual/spatial) on the other, both interacting with LTM via the executive.

2.4 Common confusions / NTA trap points

- **STM is encoded acoustically, LTM semantically** — but later research shows STM can also encode semantically and LTM acoustically (p. 99). NTA likes to flip this.
- **Maintenance vs Elaborative rehearsal**: maintenance only repeats (keeps info in STM); elaborative links to existing LTM (transfers info to LTM). Don't swap.
- **Proactive (forward) vs Retroactive (backward) interference**: proactive = old hurts new; retroactive = new hurts old. Easy to invert under pressure.

- **Episodic vs Semantic**: episodic = personal events, emotional, dated; semantic = general facts, affect-neutral, not dated.
- **Forgetting in LTM is retrieval failure, not loss** — information in LTM is "never forgotten" (p. 98); a trap when paired with trace-decay statements.
- **Levels of Processing** was proposed by **Craik and Lockhart (1972)**, not Atkinson-Shiffrin or Baddeley.
- **KF case (Shallice & Warrington, 1970)** is the counter-evidence to the Stage Model — STM impaired but LTM intact.
- **Iconic = visual; Echoic = auditory** — students often reverse these because "echo" is auditory but the modality names are easy to swap under pressure.
- **Capacity numbers**: Sensory = very large, STM = 7 ± 2 chunks, LTM = unlimited; duration: Sensory < 1 s, STM ~ 30 s, LTM up to lifetime.
- **Method of loci ≠ keyword method**: loci uses imagined spatial locations; keyword uses sound-similarity to a known word.
- **PQRST** = Preview, Question, Read, Self-recitation, Test (Thomas & Robinson); do not confuse with the SQ3R study scheme.
- **Freud's repressed memories** lead to the **fugue state** when extreme — not to amnesia from physical brain damage.

2.5 Thinkers and theories at a glance

Name	Theory / Contribution	Key idea	NCERT page
Hermann Ebbinghaus	Curve of Forgetting	First systematic experiment on memory using CVC nonsense syllables; rapid initial forgetting, then plateau	96, 103
Richard Atkinson & Richard Shiffrin	Stage Model of memory (1968)	Three serial stores — sensory, short-term, long-term — with control processes	97
Alan Baddeley	Working Memory model (1986)	STM as active workbench: phonological loop + visuospatial sketchpad + central executive	98
Fergus Craik & Robert Lockhart	Levels of Processing (1972)	Retention depends on depth of processing — structural < phonetic < semantic	100
Tim Shallice & Elizabeth Warrington	KF case study (1970)	Patient with damaged STM but intact LTM disproves strict Stage Model	100
Endel Tulving			101, 105

Name	Theory / Contribution	Key idea	NCERT page
	Episodic-semantic distinction; retrieval-failure theory	Declarative LTM splits into episodic vs semantic; forgetting is failure of appropriate retrieval cues	
Sigmund Freud	Repressed memories / fugue state	Traumatic memories pushed into the unconscious; extreme repression produces fugue state	105
George Miller	Magic number 7 ± 2 (chunking)	STM capacity is about seven items, expandable by chunking	99
Thomas & Robinson	PQRST study method	Mnemonic organisation method — Preview, Question, Read, Self-recitation, Test	107

🎯 Practice MCQs

📊 PYQ Alignment

Human Memory is among the most frequently tested Class XI Psychology chapters in CUET, typically contributing 5-8 MCQs per paper. NTA favours direct recall of the three stages, the Stage Model parameters (capacity/duration of each store), distinctions between rehearsal types, episodic vs semantic vs procedural memory, the two types of interference, and example-based identification of mnemonics (especially keyword method, method of loci, and PQRST).