Cognition

AP Psychology

Perception

Unit 1 ended with **sensation**, the detection of a stimulus. **Perception** is what the brain does next: it organises and interprets that information. The same signal can be perceived in more than one way.

Two directions of processing work together:

- **Bottom-up processing** starts from the raw sensory information and builds upwards.
- **Top-down processing** starts from what you already expect and know.

Internal filters shape perception. A **schema** is a mental framework built from past experience. A **perceptual set** is a readiness to see something in a particular way. External filters matter too: **context** and cultural expectations change what people report seeing.

Gestalt psychology described how the brain groups parts into wholes: **closure** (filling in gaps), **figure and ground** (separating an object from its background), **proximity** (grouping things that are close), and **similarity** (grouping things that look alike).

Attention sits between sensation and perception. It is limited, so some information is lost:

- **Selective attention** focuses on one input. The **cocktail party effect** is hearing your own name across a noisy room.
- **Inattentional blindness** is failing to see something visible because attention was elsewhere; **change blindness** is failing to notice that something has changed.

Depth, Constancy, and Movement

To perceive a three-dimensional world from a flat retinal image, the brain uses **depth cues**.

Binocular cues need both eyes. **Retinal disparity** is the small difference between the two images; the greater the difference, the closer the object. **Convergence** is the inward turn of the eyes for near objects.

Monocular cues work with one eye: **relative clarity**, **relative size**, **texture gradient**, **linear perspective**, and **interposition** (a nearer object blocks a further one).

Perceptual constancy keeps an object looking the same even when its retinal image changes - a door stays rectangular as it swings open. The brain can also perceive **apparent movement** when nothing actually moves, which is why a series of still frames looks like a film.

BINOCULAR — needs both eyes

retinal disparity — the two images differ
convergence — how far the eyes turn inward
both fail beyond a few metres

MONOCULAR — one eye is enough

interposition — what blocks what
relative size, **texture gradient**
linear perspective, **motion parallax**
these are what a flat picture uses

The test is mechanical: **cover one eye**. Whatever still works is monocular, and that is the half a painting can use

Thinking and Problem-Solving

Concepts are the basis of thought, and a **prototype** is the best example of a concept. People build and change schemas through **assimilation** (fitting new information into an existing schema) and **accommodation** (changing the schema to fit new information).

Two ways to solve a problem:

- An **algorithm** is a systematic procedure. The course contrasts searching possible solutions until a correct one is found with using a shortcut. Exhaustive search succeeds when the possibilities can all be checked, a solution exists within them, and the checker works. Algorithms are not always exhaustive or slow.
- A **heuristic** is a mental shortcut. It is fast but can lead to error - the **representativeness heuristic** judges by how well something matches a prototype, and the **availability heuristic** judges by how easily examples come to mind.

Worked search comparison. A classroom puzzle has eight possible answers, A–H, exactly one correct answer and a reliable checker. Testing A, then B and continuing in order systematically covers the possibilities. Starting with D because similar puzzles used D is a heuristic: it may save time but may mislead. The guarantee of the systematic search depends on the finite set, the included solution and the checker.

Worked judgement comparison. Judging cycling accidents to be common because vivid crash reports come easily to mind illustrates availability: ease of recall alone does not establish frequency. Assuming a quiet person who likes books must be a librarian illustrates representativeness: resemblance to a prototype replaces consideration of other relevant information. Identify the cue used, rather than assuming every shortcut gives a wrong answer.

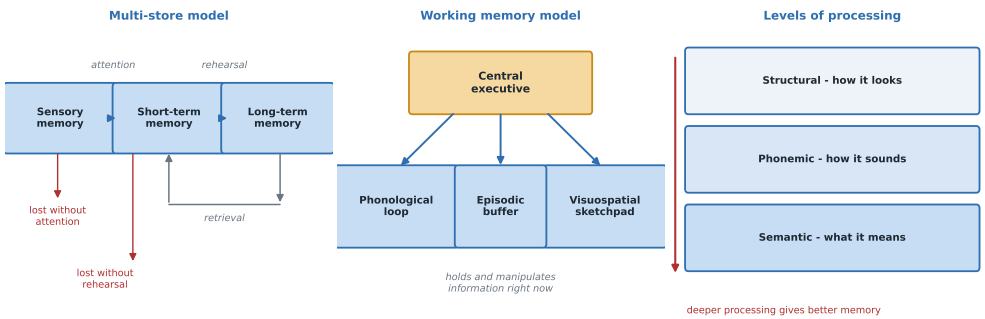
Thinking can also get stuck. A **mental set** is the tendency to repeat a solution that worked before. **Functional fixedness** is seeing an object only in its usual use. The **gambler's fallacy** (believing a run must end) and the **sunk-cost fallacy** (continuing because of what is already spent) both hinder good decisions.

Executive functions let people generate, organise, plan, and carry out goals. **Creativity** involves **divergent thinking** (generating many ideas) rather than **convergent thinking** (narrowing to one answer).

THE SHORTCUT	WHAT IT SUBSTITUTES	SOUNDS LIKE
AVAILABILITY	how easily an example comes to mind, for how common it is	*"Plane crashes are everywhere — I saw two on the news."*
REPRESENTATIVENESS	how typical it seems, for how likely it is	*"He is quiet and reads a lot, so he must be a librarian."*
ANCHORING	the first number heard, for a considered estimate	*"It was listed at 900, so 700 is a bargain."*
CONFIRMATION BIAS	evidence that agrees, for all the evidence	*"Everything I have read supports it."*

Every one of them swaps a **hard** question for an easy one.
Naming the swap is what identifies the heuristic in a scenario

Memory Systems



The three examinable memory models: information flows through stores, is actively held in working memory, and is remembered better when processed deeply

Memory is divided by how information is processed.

Explicit memory can be described to others. It splits into **episodic memory** (personal events) and **semantic memory** (facts). **Implicit memory** is harder to describe, and includes **procedural memory** (skills such as riding a bike). **Prospective memory** is remembering to do something later.

Long-term potentiation is the biological basis: synaptic connections grow stronger with repeated use.

Three models are examinable:

- The **multi-store model** proposes **sensory memory** (including **iconic** and **echoic** stores), **short-term memory**, and **long-term memory**.
- The **working memory model** treats the middle stage as active, not a waiting room. It has a **phonological loop**, a **visuospatial sketchpad**, and a **central executive**.
- The **levels of processing model** says deeper processing gives better memory: **shallow** processing of appearance, then sound, then **deep** processing of meaning.

Worked model comparison. Noor briefly sees route directions, repeats the street names while planning turns, and recalls the route the next day. The multi-store model helps distinguish sensory, short-term and long-term demands. The working memory model explains active processing: the phonological loop supports the names, the visuospatial sketchpad supports the mental route, and the central executive coordinates attention. The levels of processing model predicts a benefit from connecting a street name's meaning to a familiar place, compared with only noticing its shape or sound. These are model applications, not proof that a memory moves through literal boxes.

Encoding and Storing

Encoding gets information into memory, and how you encode changes how well you remember.

- **Mnemonic devices** such as the **method of loci** aid encoding.
- **Chunking** groups items into meaningful units, which raises how much short-term memory can hold.
- The **spacing effect** shows that spreading study over time beats **massed practice** (cramming).
- The **serial position effect** means items at the start (**primacy**) and end (**recency**) of a list are remembered best.

Storage differs by system. **Maintenance rehearsal** repeats information to hold it; **elaborative rehearsal** links it to what you already know and works better.

A few people show **highly superior autobiographical memory**, which suggests biological differences. Storage can also be impaired: **Alzheimer's disease** and **infantile amnesia** both limit what can be stored or recovered.

Retrieving and Forgetting

Retrieval takes two forms: **recall** (producing information without cues) and **recognition** (identifying it among options). Recognition is easier, which is why a multiple-choice question feels easier than an essay.

Retrieval improves with matching conditions. **Context-dependent memory** works better in the same place; **state-dependent memory** works better in the same physical state; **mood-congruent memory** recalls material matching your current mood. Practising retrieval helps too - the **testing effect** shows that testing yourself beats rereading.

Forgetting has several causes. The **forgetting curve** shows loss is fastest right after learning. **Encoding failure** means it never got in. **Interference** can be **proactive** (old learning blocks new) or **retroactive** (new blocks old). **Retrieval failure** includes the **tip-of-the-tongue phenomenon**.

Memory is also **reconstructive**, not a recording. The **misinformation effect** occurs when later information changes what a person remembers. **Source amnesia** is remembering the information but not where it came from.

> **Worked example: 2025 Article Analysis Question, Part F.** After viewing a video, participants received summaries with different amounts of misinformation. Mean correct responses were 74% in the low-misinformation group and 63% in the high group; mean misled responses were 19% and 30%, respectively. An original worked response is: "Participants in the high-misinformation group chose misleading answers on 30% of responses, compared with 19% in the low group. This supports the misinformation effect because more later misleading detail was reflected in participants' reports of the earlier video." The difference is 11 percentage points. The misled category specifically identifies answers matching the later false details. The official criterion requires an accurately interpreted specific finding linked to the concept; a definition alone or an unexplained number is insufficient for both points. A relevant qualitative finding can also supply evidence.

ENCODING FAILURE — it never got in, so it was never forgotten

STORAGE DECAY — the trace weakens over time

RETRIEVAL FAILURE — it is there, and the cue is missing

INTERFERENCE — another memory is in the way, from before or after

The tell is what happens with a **cue**. If a prompt recovers it, the memory was stored and the failure was retrieval

Intelligence and Testing

Psychologists still disagree about how to define **intelligence**. **Spearman's g** proposes one general ability; other theories propose several, including **fluid intelligence** (reasoning with novel problems, which declines with age) and **crystallised intelligence** (accumulated knowledge, which does not).

Early tests produced an **intelligence quotient (IQ)** by dividing mental age by chronological age. Modern scores are compared with a **normal curve** of the population.

Any psychological assessment must meet **psychometric principles**:

- **Standardization** - the test is administered and scored using consistent procedures and conditions. Norm-based interpretation additionally uses an appropriate comparison group.
- **Validity** - it measures what it claims to. **Construct validity** and **predictive validity** are both examinable.
- **Reliability** - it gives similar results each time, checked by **test-retest reliability** and **split-half reliability**.

Worked testing comparison. A proposed spatial-reasoning test uses the same instructions, time and conditions for everyone: this supports standardization. Similar results across occasions support test-retest reliability; agreement between comparable halves supports split-half reliability. If its items mainly measure vocabulary, it has a construct-validity problem for spatial reasoning despite consistent scores. To assess predictive validity for later spatial-design course performance, compare scores with an appropriate, independently measured course outcome. Repeating the test tomorrow does not answer that prediction question. Judge validity for the stated construct or use.

The course describes general increases in **IQ** scores over time across much of the world (the **Flynn effect**), linked to societal factors such as nutrition, health care

and socioeconomic conditions. Scores vary more *within* groups than *between* them, and **stereotype threat** can lower performance when a person fears confirming a negative stereotype about their group.

Exam tips

- Keep **sensation** and **perception** apart: detecting is sensation, interpreting is perception.
- **Bottom-up** starts with the stimulus; **top-down** starts with expectation. Say which the scenario shows.
- Learn the interference pair by direction: **proactive** means old material acts forward onto new.
- For **encoding** questions, name a specific strategy - chunking, spacing, elaborative rehearsal - not "studying harder".
- On testing questions, separate **reliability** from **validity**. A test can be reliable and still measure the wrong thing.
- Use a specific finding and explain how it supports or refutes the concept. A relevant qualitative result can also supply evidence.

Vocabulary card meanings

Gestalt psychology: A school that studies how the mind organises parts into wholes. Selective attention: Focusing on one stream of information and filtering others. cocktail party effect: Noticing one's own name in a noisy room one was not consciously following. Inattentional blindness: Failing to see a visible object because attention is on something else. change blindness: Failing to notice a change in a scene. depth cues: Clues the visual system uses to judge how far away things are. relative clarity: A depth clue in which hazier objects seem farther away. relative size: A depth clue in which the object casting a smaller image seems farther, if the two are known to be similar. Perceptual constancy: Seeing an object's size, shape, or colour as stable despite a changing image. representativeness heuristic: Judging probability by how much a case resembles a typical example. availability heuristic: Judging probability by how easily examples come to mind. Functional fixedness: Seeing an object only in its usual use, which blocks a new solution. Executive functions: The set of skills for planning, updating, and inhibiting. convergent thinking: Narrowing possibilities toward a single correct answer. Explicit memory: Memory one can consciously declare, such as facts and events. episodic memory: Memory for personal events, tied to a time and place. semantic memory: Memory for facts and meanings, apart from the moment they were learned. Implicit memory: Memory shown in performance, without conscious recollection. procedural memory: Memory for how to carry out skills, such as riding a bicycle. Prospective memory: Remembering to do something in the future. short-term memory: A limited store that holds information briefly unless it is rehearsed. long-term memory: A store that can hold information for a very long time. phonological loop: The working-memory part that rehearses sounds and words. visuospatial sketchpad: The working-memory part that holds images and locations. central executive: The working-memory part that directs attention and coordinates the other parts. massed practice: Cramming practice into one unbroken session. primacy: Better memory for items at the beginning of a list. recency: Better memory for items at the end of a list. elaborative rehearsal: Remembering by linking new material to meaning one already has. infantile amnesia: The lack of conscious memories from the first few years of life. recall: Bringing information back with few or no cues present. state-dependent memory: Easier remembering when the body's state matches the state at learning. mood-congruent memory: Easier remembering of material that matches one's current mood. Encoding failure: Never storing the information, so it cannot later be found. Retrieval failure: Having stored information but being unable to get it out. tip-of-the-tongue phenomenon: Feeling one knows a word while being unable to produce it. reconstructive: Rebuilding a memory from fragments, which can introduce errors. intelligence: The capacity to learn, reason, and solve new problems. Spearman's g: A proposed general mental ability that underlies performance on many tasks. fluid intelligence: The ability to solve new problems without relying on stored knowledge. crystallised intelligence: Knowledge and skills accumulated through experience and education. intelligence quotient (IQ): A score that compares mental-test performance with an age group. normal curve: A symmetrical, bell-shaped distribution of scores. psychometric principles: The measurement rules used to build and judge psychological tests. Standardization: Giving a test in a uniform way and comparing scores with a reference group. Construct validity: Evidence that a test really measures the concept it claims to measure. predictive validity: Evidence that a test score forecasts a later outcome. test-retest reliability: The degree to which a test gives similar scores when repeated. split-half reliability: The agreement between two halves of the same test. Flynn effect: The rise in average intelligence-test scores across generations. stereotype threat: Worse performance when a person fears confirming a negative group stereotype.