

Cognition

AP Psychology ■ Unit 2

AP Psychology



What we will cover

- 1 Perception
- 2 Depth, Constancy, and Movement
- 3 Thinking and Problem-Solving
- 4 Memory Systems
- 5 Encoding and Storing
- 6 Retrieving and Forgetting

1

Perception

Perception

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

- **Bottom-up processing** 自下而上加工 starts from the raw sensory information and builds upwards.
- **Top-down processing** 自上而下加工 starts from what you already expect and know.
- **Selective attention** 选择性注意 focuses on one input. The **cocktail party effect** 鸡尾酒会效应 is hearing your own name across a noisy room.
- **Inattentional blindness** 无意视盲 is failing to see something visible because attention was elsewhere; **change blindness** 变化盲视 is failing to notice that something has changed.

Perception, continued

Internal filters shape perception. A **schema** 图式 is a mental framework built from past experience. A **perceptual set** 知觉定势 is a readiness to see something in a particular way.

External filters matter too: **context** 情境 and cultural expectations change what people report seeing.

The Gestalt grouping principles

figure and ground 图形与背景

one part is seen as the object, the rest as background – and it can flip

closure 闭合

the brain **fills in gaps** to complete a familiar shape

proximity 接近性

things close together are grouped as one

similarity 相似性

things that look alike are grouped as one

perceptual constancy 知觉恒常性

an object looks the same even as its retinal image changes – a door stays rectangular as it swings

Gestalt 格式塔心理学's claim is that the whole is grouped **before** the parts are examined. Perception is organised, not assembled.

2

Depth, Constancy, and Movement

Depth, constancy, and movement

Monocular cues

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

Binocular cues

Need *both*: **retinal disparity**, the small difference between the two images (the bigger the difference, the closer the object), and **convergence**, the inward turn of the eyes for near objects.

Perceptual constancy

An object keeps looking the same even as its retinal image changes – a door stays rectangular as it swings open.

Apparent movement

The brain perceives motion where none exists, which is why a series of still frames looks like a film.

To build a three-dimensional world from a flat retinal image, the brain uses **depth cues** 深度线索 – and a painter can use only the monocular half.

Depth cues: cover one eye

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

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Thinking and Problem-Solving

A systematic search or a shortcut?

A classroom puzzle has eight possible answers

Exactly one of the answers A–H is correct, and a checker identifies a correct answer when tested. Lin tests A, then B, and continues in order until the checker accepts one. Kai starts with D because similar puzzles often used D.

Which method systematically covers the possibilities? Which relies on a shortcut?
What assumptions make the systematic method certain to find the answer?

Why the search works in this example

Lin uses an **algorithm** 算法: a systematic procedure. In this finite puzzle, testing every answer covers all eight possibilities, and the checker recognises the correct answer.

Kai uses a **heuristic** 启发式: prior experience suggests a starting point. It may save time if D is correct, but it may mislead when this puzzle differs.

Lin's guarantee depends on the stated conditions: the answer is in A–H, the checker works, and the search can finish. An algorithm does not always require exhaustive search, and it is not always slower than a shortcut.

The CED's search example contrasts systematic coverage with a mental shortcut. State why the method fits this problem.

Concepts, schemas, and the two kinds of thinking

concepts 概念

the basis of thought – mental categories

prototype 原型

the **best example** of a concept; a robin is a better prototype for 'bird' than a penguin

assimilation 同化

fitting new information *into* an existing schema

accommodation 顺应

changing the schema because the new information will not fit

executive functions 执行功能

generating, organising, planning and carrying out goals

divergent 发散思维 vs
convergent 聚合思维

generating many possible answers, against narrowing to the single correct one – **creativity** 创造力 needs the first

Assimilation keeps the schema and bends the fact; accommodation keeps the fact and bends the schema. Say which happened.

Thinking and Problem-Solving, continued

Thinking can also get stuck. A **mental set** 心向 is the tendency to repeat a solution that worked before. **Functional fixedness** 功能固着 is seeing an object only in its usual use.

The **gambler's fallacy** 赌徒谬误 (believing a run must end) and the **sunk-cost fallacy** 沉没成本谬误 (continuing because of what is already spent) both hinder good decisions.

What information drives the judgement?

Two judgements to explain

A: After seeing vivid reports of bicycle crashes, a learner judges cycling accidents to be very common because those stories come to mind easily.

B: A learner assumes a quiet person who likes books must be a librarian because that person matches an image of a librarian, while ignoring how common different occupations are.

Which judgement relies on ease of recall, and which relies on resemblance to a typical example? Explain the possible error in each.

Availability and representativeness

A illustrates the **availability heuristic** 可得性启发式: vivid examples are easy to recall, but ease of recall alone does not establish the frequency of cycling accidents.

B illustrates the **representativeness heuristic** 代表性启发式: resemblance to a **prototype** 原型 replaces a judgement based on all relevant information. Matching an occupational image does not establish the person's occupation.

Both are shortcuts, but their cues differ. A uses accessible examples; B uses perceived similarity.

Identify the cue in the scenario. A shortcut can sometimes help, so its presence alone does not prove the final judgement is wrong.

Heuristics, and the error each makes, in detail

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

A **heuristic** 启发式 is a mental shortcut.

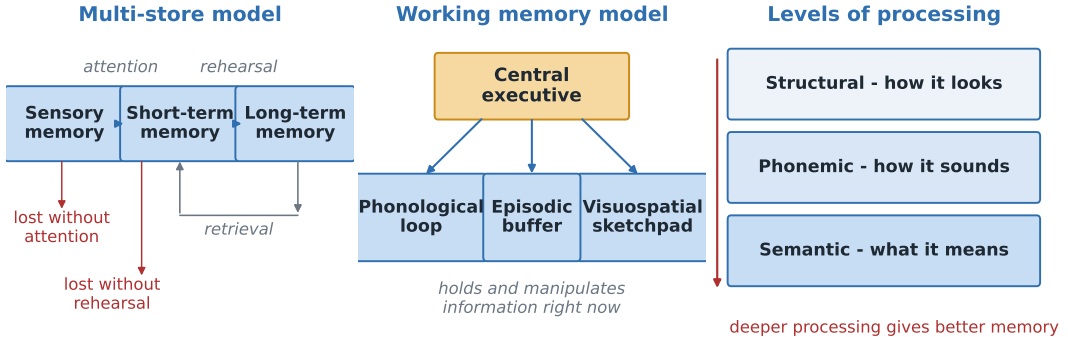
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Memory Systems

Three models of the same journey

Three models of one journey: multi-store, working memory, and levels of processing.

Three models of the same journey, in detail



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

Memory models explain different features

Reading and remembering a route

Noor briefly sees directions on a screen, repeats the street names while planning the turns, and recalls the route the next day. She also links one street name to a familiar place.

Which model helps discuss interacting stores over time? Which helps discuss actively holding words while using a mental map? Which predicts a benefit from thinking about meaning?

Stores and active processing

The **multi-store model** 多重存储模型 distinguishes **sensory memory** 感觉记忆, **short-term memory** 短时记忆 and **long-term memory** 长时记忆. **Iconic** 图像记忆 and **echoic** 声像记忆 refer to visual and auditory sensory stores. Noor's brief view, current holding and next-day recall illustrate different time demands.

The **working memory model** 工作记忆模型 explains active processing. The **phonological loop** 语音回路 supports holding the street names; the **visuospatial sketchpad** 视空间模板 supports the mental route; the **central executive** 中央执行系统 coordinates attention between them.

These are models, not a direct view of a memory travelling through literal boxes.
The scenario supports application, not proof of a model.

The depth of encoding

The same street name, three study tasks

Notice its printed shape. Decide whether it rhymes with another word. Explain how its meaning connects with a place you already know.

The **levels of processing model** 加工水平模型 distinguishes processing of appearance, sound and meaning. The first is shallowest; processing meaning is deepest in this account.

It predicts an advantage from meaningful encoding, rather than simply seeing the word longer or repeating it more often.

Choose the model that explains the feature asked about: storage over time, active processing, or the depth of encoding.

The kinds of long-term memory

explicit 外显记忆

can be **described** to others – also called declarative

episodic mem-ory 情景记忆

a kind of explicit memory: **personal events** – your first day of school

semantic mem-ory 语义记忆

the other kind: **facts and meanings** – the capital of France

implicit mem-ory 内隐记忆

cannot easily be described: **procedural memory** 程序性记忆 for skills like cycling, and conditioned responses

long-term potentia-tion 长时程增强

the biological basis – synaptic connections **grow stronger with repeated use**

Amnesia patients who cannot recall meeting you yesterday can still improve at a skill they do not remember practising. That dissociation is why the categories exist.

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Encoding and Storing

Encoding and Storing

Storage differs by system. **Maintenance rehearsal** 保持性复述 repeats information to hold it; **elaborative rehearsal** 精细复述 links it to what you already know and works better.

- **Mnemonic devices** 记忆术 such as the **method of loci** 位置法 aid encoding.
- **Chunking** 组块 groups items into meaningful units, which raises how much short-term memory can hold.
- The **spacing effect** 间隔效应 shows that spreading study over time beats **massed practice** 集中练习 (cramming).
- The **serial position effect** 系列位置效应 means items at the start (**primacy** 首因效应) and end (**recency** 近因效应) of a list are remembered best.

Encoding and Storing, continued

A few people show **highly superior autobiographical memory** 超常自传体记忆, which suggests biological differences.

Storage can also be impaired: **Alzheimer's disease** 阿尔茨海默病 and **infantile amnesia** 婴儿期遗忘 both limit what can be stored or recovered.

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Retrieving and Forgetting

Retrieving and Forgetting

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

Practising retrieval helps too – the **testing effect** 测试效应 shows that testing yourself beats rereading.

Memory is reconstructed, not replayed

reconstructive 重构的

each recall **rebuilds** the memory from fragments, and can alter it

misinformation effect 错误信息效应

information encountered *after* the event changes what a person remembers of it

context-dependent 情境依赖记忆

recall is better in the **place** where the learning happened

state-dependent 状态依赖记忆

recall is better in the same **physical or mood** state

source amnesia 来源遗忘

remembering the content but not **where it came from** – the root of many false memories

This is why eyewitness testimony is unreliable, and why the wording of a question can change the answer a witness gives.

Later misinformation and memory accuracy

2025 Article Analysis Question: selected results

Participants watched a video, then received summaries with different amounts of misleading detail. Mean response percentages were:

Summary condition	Correct	Misled
Low misinformation	74%	19%
High misinformation	63%	30%

Explain how a specific finding supports or refutes the misinformation effect. Connect the result with information received after the event.

A finding connected to the memory process

Original worked response: Participants in the high-misinformation group chose misleading answers on 30% of responses, compared with 19% in the low-misinformation group. This supports the **misinformation effect** 错误信息效应: more later misleading detail was reflected in participants' reports of the earlier video.

The difference is 11 percentage points. The correct-answer comparison, 63% versus 74%, also shows lower accuracy, but the misled category directly identifies answers matching the later false details.

The official Part F criterion requires an accurately interpreted specific result linked to the concept. Neither a definition alone nor an unexplained number earns both points.

Four failures, all called forgetting

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

The named causes of forgetting

Forgetting curve

Loss is fastest *right after* learning, then levels off – which is why review works best early.

Encoding failure

It never got in. No cue can recover what was never stored.

Interference

Proactive: old learning blocks new. **Retroactive:** new learning blocks old.

Retrieval failure

Stored but unreachable – including the **tip-of-the-tongue phenomenon**.

Cue-dependent recall

Context-dependent 情境依存记忆, **state-dependent memory** and **mood-congruent memory**: recall is better when the place, the physical state or the mood matches.

Prospective memory

Remembering to *do* something later – the kind an alarm exists to rescue.

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

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Intelligence and Testing

Consistent scores for the wrong skill

A proposed spatial-reasoning test

Everyone receives the same instructions, time limit and room conditions. Scores are similar when the test is repeated and when its two halves are compared. But most items ask students to remember word definitions, and scores mainly reflect vocabulary knowledge.

What evidence concerns administration, consistency and the intended skill? Does evidence for one property establish all three?

Standardization, reliability and validity

Consistent instructions and conditions support **standardization** 标准化. They do not show that the questions measure spatial reasoning.

Similar scores across occasions support **test-retest reliability** 重测信度; agreement between comparable halves supports **split-half reliability** 分半信度. Both concern consistency of measurement.

The mismatch between vocabulary items and the intended spatial skill raises a **construct validity** 构念效度 concern. A repeatable vocabulary score can still be unsuitable for that purpose.

Psychometric principles 心理测量学原则 require separate evidence. Reliable scores alone do not establish **validity** 效度 for an intended use.

Evidence for a future prediction

The proposed use changes

A school wants the test to predict later performance in a spatial-design course. What additional evidence would be relevant?

Predictive validity 预测效度 concerns how well the scores predict the specified later outcome. Compare test scores with an appropriate, independently measured course outcome.

Repeating the test tomorrow checks consistency, not prediction of course performance. A relationship with vocabulary alone does not establish this new use, and a prediction does not guarantee each student's outcome.

State the intended construct or outcome before judging validity.

Intelligence and Testing, continued

Early tests produced an **intelligence quotient (IQ)** 智商 by dividing mental age by chronological age.

Modern scores are compared with a **normal curve** 正态曲线 of the population.

Every psychological test must clear three bars

reliability 信度

the test gives **consistent** results – across time (test–retest) and across items (split-half)

validity 效度

the test measures **what it claims** to: construct validity, and predictive validity

standardisation 标准化

consistent administration and scoring; norm-based interpretation additionally needs an appropriate comparison group

Spearman's *g* 一般智力因素

one general ability behind all mental tasks – other theories propose several independent abilities instead

Flynn effect 弗林效应

generational IQ-score increases across much of the world reflect societal factors; **stereotype threat** 刻板印象威胁 can lower performance

A test can be reliable and still invalid – consistently measuring the wrong thing. Reliability is necessary, never sufficient.

Theories of intelligence, and reconstructive memory

Spearman's g 一般智力因素

one **general ability** underlying performance on all mental tasks

multiple intelligences

Gardner – several independent abilities, from linguistic to bodily-kinaesthetic

the triarchic theory

Sternberg – analytical, creative and practical intelligence

why the disagreement lasts

the theories differ on **how many things** intelligence is, and the tests were built on the first answer

context-dependent memory 情境依赖记忆

recall is better in the **place** where the learning happened

the misinformation effect

later information reshapes the memory, because recall **rebuilds** rather than replays

An intelligence test measures what its designers decided intelligence is. That circularity is the standing criticism, and it is examinable.

Fluid and crystallised intelligence

The disagreement

Psychologists still disagree about how to *define* intelligence. **Spearman's g 一般智力因素** proposes one general ability; other theories propose several.

Fluid intelligence

Fluid intelligence reasons with novel problems – and it **declines** with age.

Crystallised intelligence

Crystallised intelligence is accumulated knowledge and vocabulary – and it does **not**.

Two kinds of thinking

Divergent thinking generates many ideas (creativity); **convergent thinking** narrows to the one right answer.

An age curve that falls and one that does not, inside the same person – which is why a single IQ number hides more than it shows.

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.

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Recap

Unit 2 – key takeaways

1

Sensation

detect; perception interprets

2

Processing

bottom-up from stimulus; top-down from expectation

3

Memory

proactive: old onto new; name a real encoding strategy

4

Tests

reliable $\neq$ valid – can measure the wrong thing well

Check yourself

- 1 Detecting a tone vs recognising a tune – which is perception?
- 2 Old French making new Spanish harder: which interference?
- 3 Can a test be reliable but not valid?
- 4 Name one encoding strategy other than “study harder”.

Answers: recognising the tune ■ proactive ■ yes ■ chunking / spacing / elaborative rehearsal