

Cognition
AP Psychology • Unit 2

AP Psychology

Cognition

What we will cover

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Perception

2

Depth, Constancy, and Movement

3

Thinking and Problem-Solving

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Memory Systems

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Encoding and Storing

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Retrieving and Forgetting

1

Perception

Cognition
└ 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.
- **Inattention 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.

Cognition
└ Perception

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.

Cognition
└ Perception

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.

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Depth, Constancy, and Movement

Depth, constancy, and movement

Monocular cues	Work with <i>one</i> eye: relative clarity , relative size , texture gradient , linear perspective , and interposition (a nearer object blocks a further one).
Binocular cues	Need <i>both</i> : 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

Thinking and Problem-Solving

Two ways to solve a problem:

- An **algorithm** 算法 tries every possible solution and is guaranteed to work, but is slow.
- A **heuristic** 启发式 is a mental shortcut. It is fast but can lead to error – the **representativeness heuristic** 代表性启发式 judges by how well something matches a prototype, and the **availability heuristic** 可得性启发式 judges by how easily examples come to mind.

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 <i>into</i> 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.

Heuristics, and the error each makes

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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	"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."

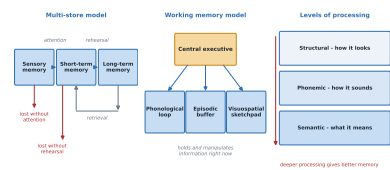
A **heuristic** 启发式 is a mental shortcut.

4 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

CognitionMemory Systems

Memory Systems

Memory is divided by how information is processed.

- The **multi-store model** 多重存储模型 proposes **sensory memory** 感觉记忆 (including **iconic** 图像记忆 and **echoic** 声像记忆 stores), **short-term memory** 短时记忆, and **long-term memory** 长时记忆.
- The **working memory model** 工作记忆模型 treats the middle stage as active, not a waiting room. It has a **phonological loop** 语音回路, a **visuospatial sketchpad** 视空间模板, and a **central executive** 中央执行系统.
- The **levels of processing model** 加工水平模型 says deeper processing gives better memory: **shallow** processing of appearance, then sound, then **deep** processing of meaning.

CognitionMemory Systems

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

CognitionEncoding 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.

CognitionEncoding and Storing

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 im-paired: **Alzheimer's dis-ease** 阿尔茨海默病 and **infan-tile amnesia** 婴儿期遗忘 both limit what can be stored or re-covered.

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Retrieving and Forgetting

CognitionRetrieving 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.

CognitionRetrieving and Forgetting

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.

CognitionRetrieving and Forgetting

Worked example – the 2025 Article Analysis Question

A study gave a summary with 20%, 50% or 80% misleading sentences, then asked about a video. Correct responses fell from 74% to 63%. **“Explain how at least one finding supports or refutes the misinformation effect.”**

■ **Full marks:** “Participants in the high misinformation condition answered 63% correctly against 74% in the low condition. Because more misleading detail lowered accuracy, the finding supports the misinformation effect, in which information received after an event changes the memory of it.”

■ Quote the data, *then* name the concept it supports.

A restated definition with no number does not answer **Explain**. The command word wants the finding *and* the link.

CognitionRetrieving and Forgetting

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

Encoding failureIt never got in. No cue can recover what was never stored.

InterferenceProactive: old learning blocks new. Retroactive: new learning blocks old.

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

Cue-dependent recallContext-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 memoryRemembering 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.

7 Intelligence and Testing

Cognition Intelligence and Testing Intelligence and Testing Any psychological assessment must meet psychometric principles 心理测量学原则: ■ Standardization 标准化 – the test is given under consistent procedures and scored against a comparison group. ■ Validity 效度 – it measures what it claims to. Construct validity 构念效度 and predictive validity 预测效度 are both examinable. ■ Reliability 信度 – it gives similar results each time, checked by test-retest reliability 重测信度 and split-half reliability 分半信度.	Cognition Intelligence and Testing 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.
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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 administered and scored identically, and compared against a representative norm 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 IQ scores have risen worldwide over generations – societal, not biological; and stereotype threat 刻板印象威胁 can lower a score on the day causes 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.
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Cognition Intelligence and Testing Fluid and crystallised intelligence The disagreement Psychologists still disagree about how to <i>define</i> 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.	Cognition Intelligence and Testing 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. ■ When data are given, quote a figure before naming the concept. Findings-based parts award the link between the number and the term.
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Recap

Cognition
└ 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

Cognition
└ Recap

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