

Evidence-led oral teach-back

ANONYMIZED PUBLIC EDITION

AP Psychology

Unit 1 - Spoken Explanation

Conceptual case review and personalized-style repair tasks

Concept -> Mechanism -> Scenario -> Evidence

What this public example shows

This source-grounded public case documents common strengths and gaps observed in six AP Psychology Unit 1 speech submissions. The report converts that evidence into teach-back upgrades, clear criteria, retrieval practice, and new verification prompts.

EVIDENCE BOUNDARY

Six short oral explanations cover Topics 1.1-1.6. A separate research-methods presentation was not available. Unobserved knowledge is not automatically a misconception.

Publication safeguards

- No learner name, grade, school, contact details, video filenames, identifying dates, scores, or verbatim transcript archive.
- Content summarizes evidenced strengths and instructional next steps; it does not claim a verified learning gain.
- Original individualized learner documentation and recordings are not included in this public edition.

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Evaluation scope and safeguards

Assessment design

The original task expects a closed-text oral explanation from sparse keywords. Strong performance connects definitions, relationships, neural or behavioral mechanisms, an applied scenario, and a research boundary.

100-point instructional rubric

Concept accuracy Correct AP terms, definitions, and distinctions	30 PTS
Relationships and mechanisms Why and how concepts connect across a causal or functional chain	25 PTS
Scenario application A new concrete example and a justified prediction	15 PTS
Research and evidence Design-specific inference, variables, sampling, and limitations	10 PTS
Organization From big idea to explanation, scenario, and qualification	10 PTS
English expression Meaningful grammar, vocabulary, and academic clarity	10 PTS
SCORING CAUTION The individualized numerical score is intentionally omitted from this public case. Speech recognition can misidentify terms; accent and disfluency are not scored as learner weaknesses.	

Evidence map: six short talks

Observed topic coverage

- 1.1 Heredity x Environment: genetic predispositions, experience, and an anxiety example.
- 1.2 Nervous System: CNS/PNS, voluntary and involuntary regulation, test-related heart-rate scenario.
- 1.3 Neural Firing: threshold, all-or-none response, neurotransmitter communication, drug influence.
- 1.4 Brain: amygdala, hippocampus, plasticity, and musical-instrument practice.
- 1.5 Sleep: roughly 24-hour rhythm, REM dreaming, attention and memory consequences.
- 1.6 Sensation: environmental stimuli, transduction, absolute threshold, adaptation to smell.

Not demonstrated in submitted talks

- Detailed drug mechanisms and synaptic termination; full brain network and lesion predictions.
- NREM/REM stage sequencing, sleep disorders, JND/Weber, and sensory-system distinctions.
- No separate research-methods teach-back; do not infer inability from non-submission.

INTERPRETATION

The evidence supports partial foundational understanding but not yet sustained, connected AP-level explanation. These are performance observations, not a fixed ability label.

Topic 1.1 | Heredity and Environment

Demonstrated understanding

The talk defines heredity in terms of inherited genes and environment in terms of family and experience. It uses anxiety as an example to convey that biological vulnerability does not operate alone.

Mechanism to extend

- Distinguish predisposition from destiny: a genetic tendency may affect risk, not guarantee an outcome.
- Explain why similar genetic backgrounds may lead to different outcomes under different environments.
- Use twin, family, and adoption studies to discuss evidence, not proof of a single genetic cause.
- Add the evolutionary perspective as a testable explanatory lens, without claiming every behavior is adaptive.

STRONGER TEACH-BACK

Biological predispositions can influence vulnerability. Environmental demands and learning history may then alter how that vulnerability appears. Similar genes do not ensure the same outcome, and observational family studies do not by themselves establish causation.

Fresh oral check

Explain two individuals with similar inherited tendencies but different levels of stress and social support. Predict possible outcomes while qualifying your conclusion.

Topic 1.2 | Nervous System

Demonstrated understanding

The talk distinguishes brain/spinal cord as the CNS from peripheral pathways and connects voluntary movement to the somatic system and involuntary heart regulation to the autonomic system.

Mechanism to extend

- Draw the hierarchy: Nervous system -> CNS / PNS -> PNS somatic / autonomic -> autonomic sympathetic / parasympathetic.
- Sympathetic activity supports action readiness; parasympathetic activity contributes to calming and recovery.
- Explain changing heart rate before, during, and after a demanding exam as a sequence.

EVIDENCE CAUTION

The automated transcript appears to repeat 'parasympathetic' for both activation and recovery. This may be a self-correction or recognition error. Confirm from audio before assigning a concept penalty.

Fresh oral check

Without reading a script, draw the nervous-system tree and use a presentation-day scenario to connect structure, function, and bodily consequence.

Topic 1.3 | Neural Communication

Demonstrated understanding

The talk correctly identifies threshold and the all-or-none firing principle. It also recognizes that neurotransmitters participate in communication across a synapse and drugs may affect it.

Missing mechanism chain

- Input at dendrites and soma changes membrane potential.
- Reaching threshold initiates an action potential; crossing threshold does not scale the event's size.
- The signal propagates along the axon and reaches the terminal.
- Neurotransmitters enter the synaptic cleft, bind receptors, and alter firing likelihood.
- Signals can terminate through reuptake or breakdown; refractory periods limit rapid refiring.
- Use one detailed drug mechanism: agonist, antagonist, or reuptake inhibitor.

STRONGER TEACH-BACK

A neuron may fire once membrane potential reaches threshold. At the axon terminal, released neurotransmitters bind target receptors. Excitatory or inhibitory effects influence subsequent firing, and reuptake or enzymatic degradation helps end the signal.

Fresh oral check

Draw and explain a six-step signaling chain. Compare a neurotransmitter with a blood-borne endocrine hormone, then explain a reuptake inhibitor.

Topic 1.4 | Brain and Plasticity

Demonstrated understanding

The talk associates amygdala with emotional processing, hippocampus with new memories, and brain plasticity with skill practice. An instrument-learning example appropriately illustrates experience-dependent adaptation.

AP-level expansion

- Brainstem/medulla: survival functions; cerebellum: coordination and procedural learning.
- Thalamus: sensory relay; hypothalamus: homeostasis and endocrine regulation.
- Hippocampus: forming new explicit memories; amygdala: emotional salience and threat.
- Broca/Wernicke: speech production versus language comprehension.
- Frontal, parietal, temporal, and occipital lobes: different processing roles.
- Explain six or more structures via function -> impairment prediction; avoid rigid localization claims.
- Distinguish EEG temporal activity from fMRI blood-flow-based spatial estimation.

FRESH ORAL CHECK

Predict how damage affecting new explicit-memory formation differs from altered fear reactivity. Add one example of partial neural reorganization after injury.

Topic 1.5 | Sleep and Rhythms

Demonstrated understanding

The talk describes a roughly 24-hour circadian rhythm, associates REM with vivid dreaming, and links insufficient sleep to reduced focus and recall.

Important additions

- Separate the circadian rhythm (daily timing) from shorter NREM/REM cycles.
- NREM progresses through N1, N2, N3; deep N3 tends to be more common early in the night.
- REM features relatively wake-like electrical activity and substantial muscle atonia.
- REM can occur repeatedly, often in longer bouts later in the sleep period.
- Explain possible REM rebound after deprivation without overgeneralizing all sleep loss.
- Differentiate insomnia, narcolepsy, sleep apnea, REM behavior disorder, and sleepwalking.
- Avoid saying all dreams occur only in REM sleep.

FRESH ORAL CHECK

Connect an evening light-exposure change to circadian timing, then explain how altered sleep might affect attention and memory the following day.

Topic 1.6 | Sensation

Demonstrated understanding

The talk identifies sensation as detecting external input, defines transduction as converting physical energy into neural signals, gives the 50% criterion for absolute threshold, and explains sensory adaptation with a lingering odor.

Distinctions to master

- Sensation: detect and transduce. Perception: organize and interpret sensory information.
- Absolute threshold: detection about half the time. Difference threshold (JND): smallest detectable change.
- Weber's law: noticing differences often depends on proportional rather than fixed change.
- Rods versus cones; trichromatic color coding versus opponent-process channels.
- Sound frequency/pitch and amplitude/loudness; cochlear transduction.
- Vestibular balance versus proprioceptive limb position; taste/smell chemical senses.

FRESH ORAL CHECK

Explain why a light stimulus can be detected without being interpreted correctly. Then contrast a 50%-detection threshold with a just-noticeable difference.

Research methods | Not submitted

Coverage versus proficiency

A separate research-methods segment was not included in the supplied set. Its absence creates a coverage gap, not evidence of poor mastery. A new short segment is needed to assess research reasoning fairly.

Required comparisons

- Experiment versus correlation: manipulation and assignment versus observed association.
- Random sampling versus random assignment: representativeness versus condition balance.
- Independent and dependent variables; operational definitions that make measures precise.
- Case study versus naturalistic observation; limitations on causal claims.
- Correlation coefficient: sign shows direction, magnitude shows linear association strength.
- Mean versus median, especially for skewed distributions and extreme values.

SAMPLE TEST

A correlation of $r=+0.46$ between sleep duration and test performance does not by itself establish that increased sleep caused higher scores. Alternative explanations and measurement quality still matter.

English expression clinic

Preserve meaning without penalizing fluency

The examples below are normalized from automated transcription. They illustrate clearer academic expressions but do not prove that every captured word was a speaker error.

- Instead of 'more likely to anxiety': 'more likely to experience anxiety' or 'at increased risk of anxiety'.
- Instead of 'the hippocampus help for new memories': 'the hippocampus helps form and consolidate new explicit memories'.
- Instead of 'it become less sensitive': 'we become less sensitive to a constant stimulus'.
- Instead of vague 'drugs change communication': 'a reuptake inhibitor prolongs signaling by limiting neurotransmitter clearance'.
- Instead of a broad statement about biology: 'inherited predispositions and environmental conditions interact to shape behavior'.

Speak in conceptual relationships

- Definition: 'X refers to ...'
- Mechanism: 'This occurs because ...'
- Example: 'In a situation where ..., we would expect ...'
- Contrast: 'Unlike X, Y ...'
- Research boundary: 'This association does not demonstrate causation because ...'

FEEDBACK RULE

Judge conceptual meaning and grammar that changes meaning. Do not grade pronunciation, accent, speaker hesitations, or transcript artifacts as weaknesses.

Targeted seven-day retrieval plan

Day 1-2 | Build chains

- Redraw the CNS/PNS hierarchy and the complete neural signaling mechanism from memory.
- After a short contextual re-read, close the long source and explain from five keywords.

Day 3-4 | Predict consequences

- Choose six brain structures; for each, provide function, plausible impairment, and a limitation.
- Connect circadian timing, NREM/REM, sleep loss, and two distinct disorders.

Day 5 | Sensory distinctions

- Teach threshold versus JND, transduction versus perception, and rods versus cones.

Day 6 | Research reasoning

- Record the missing two-to-three-minute research-methods teach-back with a new scenario.

Day 7 | Blind transfer

- Record six revised topics without reading the contextual paragraphs.
- Complete new MCQ plus scenario questions; revisit only misses 24 hours later.

MASTERY CRITERION

A concept is not considered mastered merely because the same explanation was rehearsed.
Verify it using a different situation after a time delay.

Fresh student check | Questions 1-4

Answer without consulting the long contextual passage. For each item, record a first choice, exact reason, tempting distractor, and decisive flaw.

Q1 | Heredity x environment

Two siblings share many genetic factors but respond differently under different classroom demands. Which inference is best supported?

- A. The inherited predisposition must have been absent in one sibling.
- B. Heredity and environment may interact in behavior.
- C. The environment determines all behavioral differences.
- D. A single sibling comparison demonstrates gene-level causation.

Q2 | Autonomic nervous system

Before an exam, a student's heart rate increases and later returns toward baseline. Which explanation is most defensible?

- A. The spinal cord alone initiates all voluntary movement.
- B. Both changes are controlled solely by the somatic system.
- C. Sympathetic mobilization followed by parasympathetic recovery.
- D. CNS and PNS are two branches of the autonomic system.

Q3 | Neural firing

A neuron receives stronger stimulation after it already reached firing threshold. What follows from the all-or-none principle?

- A. The amplitude of each action potential increases indefinitely.
- B. Stronger input guarantees a larger individual action potential.
- C. The synaptic cleft disappears while the signal is transmitted.
- D. An individual action potential retains its standard size once triggered.

Q4 | Brain systems

A person has particular difficulty forming new explicit memories after an injury. Which structure is most relevant?

- A. Hippocampus.
- B. Amygdala.

Fresh student check | Questions 1-4 / CONTINUED

- C. Medulla.
- D. Occipital cortex.

Fresh student check | Questions 5-8

Q5 | Sleep

Which statement correctly distinguishes circadian rhythm from sleep stages?

- A. Circadian rhythm sets approximate daily timing; NREM/REM describes recurring stages.
- B. Circadian rhythm is another name for the roughly 90-minute sleep cycle.
- C. REM is always the deepest NREM stage.
- D. Dreams are impossible outside REM.

Q6 | Sensory threshold

A person can detect a weak sound only about half the time. This most directly illustrates:

- A. Weber's law.
- B. Absolute threshold.
- C. Opponent-process coding.
- D. Kinesthetic sensation.

Q7 | Research design

Researchers measure sleep duration and exam performance but do not manipulate sleep. What is the strongest justified claim?

- A. Longer sleep caused the better score.
- B. Random assignment automatically eliminated confounds.
- C. The measured variables are associated; causation is not established.
- D. The study necessarily generalizes to every school.

Q8 | Sensation versus perception

A light stimulus is converted into neural signals and is then interpreted as a familiar face. Which ordering fits?

- A. Perception followed by transduction.
- B. Hearing followed by smell.
- C. Sensory adaptation followed by threshold.
- D. Sensation/transduction followed by perceptual interpretation.

The student edition deliberately excludes solutions and explanation keys.