# The Simple AP® Psychology Unit 1 Cheat Sheet



## 1.1 Heredity & Environment

### Nature + Nurture

**Nature vs. nurture**: genes vs. experience. Today: both interact to shape behavior.
**Genotype**: genes you carry. **Phenotype**: traits you actually show (genes + environment).
**Epigenetics**: environment (stress, diet) turns genes on/off w/o altering DNA.

### Evolutionary Perspective

**Natural selection**: traits that help survival + reproduction get passed on (Darwin).
**Evolutionary psych**: explains behaviors (e.g., fear of snakes, mate choice) as adaptations.

### Research Designs

| Study | Compares | Shows |
|---|---|---|
| Twin | MZ vs. DZ | MZ closer |
| Adoption | Bio vs. adopt. | Like bio kin |
| Family | Close/far kin | Risk ↑ w/ kin |

**MZ (identical) twins**: ~100% same genes. **DZ (fraternal)**: ~50%, like siblings.
**Twins reared apart**: still alike despite different homes → points to strong genetic role.
**Heritability**: share of trait *differences in a group* due to genes. Higher when env. is uniform.
**Eugenics**: discredited push to "improve" humans by controlling who reproduces.

⚠ Heritability describes variation in groups, never one person's trait or score.

✓ FRQ: name the design (twin, adoption), then say what result points to genes.

## 1.2 Nervous & Endocrine Systems

### Divisions

**CNS** = brain + spinal cord. **PNS** = all nerves outside CNS; links CNS to body.
**Somatic NS**: voluntary; skeletal muscles.
**Autonomic NS**: automatic; heart, glands, organs.

| Feature | Sympathetic | Parasympathetic |
|---|---|---|
| Role | Fight or flight | Rest & digest |
| Heart rate | ↑ | ↓ |
| Digestion | ↓ | ↑ |

⚠ Sympathetic = stress ("S"). Parasympathetic = peace ("P"). Don't ever mix up the two.

### Reflexes & Neuron Types

**Sensory** neurons: body → CNS. **Motor**: CNS → muscles. **Interneurons**: link them.
**Reflex arc**: sensory → spinal cord → motor. No brain needed → fast (hand off hot stove).

### Endocrine System

**Endocrine system**: glands send **hormones** through blood. Slower than NTs, lasts longer.

| Hormone/Gland | Effect |
|---|---|
| Pituitary | Master gland |
| Adrenaline | Fight-or-flight boost |
| Melatonin | Makes you sleepy |
| Leptin / Ghrelin | Full / hungry |
| Oxytocin | Bonding, trust |

✓ Racing heart + sweaty palms → sympathetic NS + adrenaline. Calm after → parasympathetic.

## 1.3 The Neuron & Neural Firing

### Neuron Parts (signal path)

**Dendrites** (receive) → **soma** (cell body, sums input) → **axon** (carries the signal) → **terminals** (release NTs) → **synapse** (gap to the next cell).
**Myelin sheath**: fatty insulation → faster signal. Lost in **multiple sclerosis** → slowed control.
**Glial cells**: support + protect neurons.

### Action Potential

| Step | What happens |
|---|---|
| Resting (−70mV) | Inside negative |
| Threshold | Enough input → fires |
| Depolarization | $Na^+$ rushes in |
| Repolarization | $K^+$ flows out |
| Refractory | Brief reset pause |

**All-or-none**: neuron fires fully or not at all. Stronger stimulus → fires more often.
**Excitatory** signals → more likely to fire. **Inhibitory** → less likely. Fires once input passes threshold.

⚠ A stronger stimulus never makes a "bigger" action potential; it fires more often.

### At the Synapse

**Neurotransmitters (NTs)**: chemicals that cross the synapse and bind to **receptors**.
**Reuptake**: sending neuron reabsorbs leftover NT → signal ends. Blocking it → NT lingers.
**Neural transmission**: electrical inside a neuron, chemical (NTs) between neurons.

⚠ NTs only cross the synapse; the action potential travels down the axon.

## 1.3 Neurotransmitters & Drugs

### Key Neurotransmitters

| NT | Role |
|---|---|
| Dopamine | Reward, movement |
| Serotonin | Mood, sleep |
| Norepinephrine | Alertness |
| Glutamate | Main "go" signal |
| GABA | Main "stop" signal |
| Acetylcholine | Muscles, memory |
| Endorphins | Pain relief |

### How Drugs Act

**Agonist**: mimics or boosts an NT → ↑ effect.
**Antagonist**: blocks receptor → ↓ effect.
**Reuptake inhibitor**: NT stays in synapse longer (SSRIs ↑ serotonin to treat depression).
**Imbalances**: low dopamine → Parkinson's; low serotonin → depression; low ACh → Alzheimer's.

| Class | Effect | Examples |
|---|---|---|
| Stimulants | ↑ activity | Caffeine |
| Depressants | ↓ activity | Alcohol |
| Opioids | Pain relief | Morphine |
| Hallucinogens | Distort senses | LSD |

**Tolerance**: need more for same effect.
**Withdrawal**: discomfort on quitting. **Addiction**: compulsive use despite clear harm.
**Physical dependence**: body needs the drug.
**Psychological**: cravings, use to cope.

⚠ Alcohol is a depressant: it slows the CNS.

## 1.4 The Brain: Structures

### Brainstem & Hindbrain (basic survival)

**Medulla**: heartbeat, breathing. **Pons**: sleep, movement. **Reticular activating system**: alertness.
**Cerebellum**: balance, coordination, timing. Alcohol impairs it → basis of roadside sobriety tests.

### Limbic System & Forebrain Core

| Structure | Function |
|---|---|
| Thalamus | Sensory relay |
| Hypothalamus | Hunger, thirst, temp |
| Hippocampus | New memories |
| Amygdala | Fear, emotion |
| Corpus callosum | Links hemispheres |

**Limbic system**: emotion, drives + memory (hippocampus, amygdala, hypothalamus).

⚠ Thalamus = relay. Hypothalamus = regulator.

**Hypothalamus** runs the "4 F's": feeding, fighting, fleeing, mating. Also body temp + hormones.

### Cerebral Cortex (lobes)

| Lobe | Main job |
|---|---|
| Frontal | Plans, judgment, movement |
| Parietal | Touch, body position, space |
| Occipital | Vision |
| Temporal | Hearing, language input |

**Prefrontal cortex**: planning, impulse control; matures last (mid-20s). **Phineas Gage**: frontal damage → personality change.

✓ Lost balance → cerebellum. No new memories → hippocampus. No fear → amygdala.

## 1.4 Cortex, Plasticity & Brain Tools

### Specialized Areas

**Motor cortex** (frontal): movement.
**Somatosensory cortex** (parietal): touch.
**Broca's area**: speech production (damage → slow, halting speech). **Wernicke's**: understanding (damage → fluent but meaningless speech).
**Association areas**: link sensory + motor info for thinking, planning, judgment, memory.

### Hemispheres & Split Brain

**Contralateral**: left brain controls right body, and vice versa. **Left** = language; **right** = spatial, faces.
**Split brain**: corpus callosum cut → halves can't share info, act separately (Sperry, Gazzaniga).

⚠ No one is "left-brained": both hemispheres work together on nearly every task.

### Plasticity

**Neuroplasticity**: brain rewires after damage or learning; strongest in kids. **Neurogenesis**: new neurons form, even in adults (hippocampus).

### Tools to Study the Brain

| Tool | Shows |
|---|---|
| Case study | Damage effects |
| EEG | Electrical waves |
| fMRI | Activity (blood flow) |
| PET | Activity (glucose) |
| MRI / CT | Structure only |

✓ Activity during a task → fMRI or PET. Sleep stages → EEG. Structure only → MRI/CT.

## 1.5 Sleep

### Consciousness & Rhythms

**Circadian rhythm**: ~24-hr body clock set by light; melatonin ↑ in dark → makes you feel sleepy.

### Sleep Stages (EEG)

| Stage | Waves | Features |
|---|---|---|
| NREM 1 | Theta | Light sleep |
| NREM 2 | Spindles | Most of night |
| NREM 3 | Delta | Deep sleep |
| REM | Beta-like | Dreams |

**Cycle** ≈ 90 min, 4–6 per night. **REM**: active brain, paralyzed body; more REM by morning. **REM rebound** after missed REM sleep.

### Why Sleep & Dream

**Why sleep**: restore body, consolidate memory, release growth hormone, save energy.
**Activation-synthesis**: dreams = brain making sense of random firing. **Consolidation**: sleep stores memories. **Freud**: wish fulfillment.

### Sleep Disorders

| Disorder | Key sign |
|---|---|
| Insomnia | Can't fall/stay asleep |
| Narcolepsy | Sudden sleep attacks |
| Sleep apnea | Breathing stops |
| Sleepwalking | NREM 3, not REM |
| REM behavior | Acts out dreams |

⚠ Sleepwalking + night terrors = NREM 3. Nightmares = REM (body paralyzed).

## 1.6 Sensation

### Core Principles

**Transduction**: receptors turn stimuli (light, sound, pressure) into neural signals for brain.
**Absolute threshold**: weakest stimulus detected 50% of time. **JND**: smallest change noticed.
**Weber's law**: JND = constant % of original.
**Sensory adaptation**: constant stimulus fades.
**Signal detection**: noticing depends on stimulus strength + expectations, fatigue, motivation.
**Sensory interaction**: senses combine (smell → taste). **Synesthesia**: one sense triggers another.

### Vision & Hearing

**Light path**: cornea → pupil → lens → **retina**. **Blind spot**: where the optic nerve exits eye.
**Rods**: dim light, edges. **Cones**: color, detail.
**Trichromatic** + **opponent-process** → color.
**Sound**: eardrum → ossicles → **cochlea** (hair cells → signals). **Place theory** → high pitch; **frequency** theory → low pitch. Loud noise kills hair cells.

| Hearing loss | Damage to |
|---|---|
| Conduction | Eardrum, bones |
| Sensorineural | Hair cells, nerve |

### Chemical & Body Senses

**Taste**: sweet, sour, salty, bitter, umami. **Smell**: skips thalamus → tied to memory + emotion. **Gate-control**: spinal "gate" blocks pain. **Vestibular**: balance. **Kinesthesis**: body position.

⚠ Sensory adaptation (receptors fade) ≠ habituation (brain learns to ignore it over time).