Nervous system and brain structures

AP PSYCHOLOGY DUMP SHEET

Achievable

Nature and nurture = heredity and environment

- **Behavior =** genes + life experience; heritability ≠ immutability.
- **Studies:** twin, family, adoption designs to separate genetic vs environmental effects.
- **Evolutionary perspective:** behaviors shaped by natural selection (adaptive value); some applications (eugenics) are ethically problematic.
- **Diathesis—stress:** genetic vulnerability + stress → disorder.

Nervous system and neurobiology

- **Major divisions:** CNS = brain & spinal cord; PNS = somatic (voluntary) + autonomic (involuntary → sympathetic = arousal, parasympathetic = calm).
- **Neuron basics:** dendrites → soma → axon → terminal; glia support.
- **Action potential sequence:** resting potential → threshold → depolarization (all-or-none) → refractory period → reuptake of NTs.
- **Reflex arc:** sensory → interneuron → motor (fast, spinal).
- **Key neurotransmitters:** dopamine (reward/movement), serotonin (mood/sleep/appetite), norepinephrine (arousal/alertness), glutamate (excitation/learning), GABA (inhibition/calming), ACh (muscle/learning), endorphins (pain relief), substance P (pain).
- **Hormones with neurotransmitter-like roles:** epinephrine (adrenaline), leptin (satiety), ghrelin (hunger), melatonin (sleep), oxytocin (bonding).
- **Drug actions:** agonists boost/mimic, antagonists block, reuptake inhibitors increase synaptic neurotransmitters. Tolerance → possible addiction/withdrawal.
- **Drug categories:** stimulants, depressants, hallucinogens, opioids.

Brain structures and functions

- Brainstem = life support; RAS = arousal/attention; cerebellum = balance & procedural learning; reward pathways = motivation/pleasure.
- **Limbic system:** hippocampus (memory consolidation), amygdala (emotion/fear), hypothalamus (homeostasis /endocrine), thalamus (sensory relay), pituitary (hormones).
- **Cortex:** two hemispheres connected by corpus callosum; lobes — frontal (executive, motor), parietal (sensory integration), occipital (vision), temporal (auditory/language).
- **Language:** Broca's = production; Wernicke's = comprehension. Damage → aphasia.
- **Plasticity:** brain can rewire after injury/learning.
- **Methods:** EEG, fMRI, lesion/case studies, split-brain experiments.t

Consciousness and sleep

- **Circadian rhythm** ≈ 24 hours; disrupted by jet lag / shift work.
- **Sleep stages:** NREM1 → NREM2 → NREM3 (deep) → REM (dreaming, muscle atonia). REM increases across night; deprivation → REM rebound.
- **Sleep functions:** restoration + memory consolidation. Theories: activation-synthesis (random activity) vs consolidation (processing).
- **Common disorders:** insomnia, narcolepsy, sleep apnea, REM behavior disorder, somnambulism.