



Nature and nurture = heredity and environment

- ✓ **Behavior** = genes + life experience; heritability ≠ immutability
- ✓ **Studies:** twin, family, and adoption designs separate genetic from 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:** resting potential → threshold → depolarization (all-or-none) → repolarization → refractory period; neurotransmitters released at the terminal, then cleared by reuptake
- ✓ **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; directs the pituitary's hormones), thalamus (sensory relay)
- ✓ **Cortex:** two hemispheres connected by the corpus callosum; lobes — frontal (executive, motor), parietal (sensory integration), occipital (vision), temporal (auditory/language)
- ✓ **Language:** Broca's = production; Wernicke's = comprehension. Damage → aphasia
- ✓ **Plasticity:** the brain can rewire after injury or learning
- ✓ **Methods:** EEG, fMRI, lesion/case studies, split-brain experiments



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 the night; deprivation → REM rebound
- ✓ **Sleep functions:** restoration + memory consolidation. Dream theories: activation-synthesis (random activity) vs consolidation (processing)
- ✓ **Common disorders:** insomnia, narcolepsy, sleep apnea, REM behavior disorder, somnambulism