PSYCH 1000

This guide contains notes on *"Psychology: Frontiers and Applications"* Fourth Canadian Ed. by Passer, Smith, Atkinson, Mitchell and Muir.

INTRO TO PSYCH CHAPTER 1

Psychology is the scientific study of *behavior* and the *mind*.

directly observable actions and responses

internal states and processes that cannot be seen

FIELDS OF PSYCHOLOGY *And the % of psychologists in that field*

Clinical psychology: the study and treatment of mental disorders — 43%

Counseling — 11%

School Psychologists — 7%

Educational Psych — 5%
how do students learn, how can we help people learn

Experimental Psych: — 8%
The study of human learning, senses, perception & motivational through experiments. Opposite of clinical psychology.

Cognitive psychology: mental processes, mind as info processor

Biopsychology: the effect of genes & hormones on behavior

Industrial-organizational Psych: — 7%
Workplace psych - leadership, teamwork, satisfaction, motivation and performance

Social Psych: — 4%
- People's influence on each other
- Behavior in groups
- Impressions
- Love, prejudice, help & aggression

Developmental Psych: — 4%
The study of human physical, physiological and social development across a lifespan

Personality Psych: — 2%
Identify core personality traits and how they relate and influence behavior

PSYCHOLOGY'S GOALS

To ***describe*** how people behave
To ***explain*** and understand causes of behavior
To ***predict*** how people will behave
To ***influence*** behavior to enhance human welfare

Basic research: knowledge for its own sake
Applied research: designed to solve specific practical problems

LEVELS OF ANALYSIS

Biological
Brain processes, genetics

Individual / Psychological
Thoughts, feelings, motives

Environmental / Cultural
Past and current physical and social environment

Mind-body dualism
The mind is a spiritual entity separate from body. If you believe this, it is impossible to learn about the mind by studying the brain.

vs

Monism
Mental events corresponds to physical events in brain. This philosophy allows us to learn things about the mind by studying the brain.

British empiricism: all ideas and knowledge are gained through the senses

Structuralism
Analysis of the brain's structure in terms of basic elements.

vs

Functionalism
Study the functions of consciousness rather than structure - *why are we conscious?*
How do mental processes help us *adapt*.

MODERN PSYCHOLOGICAL PERSPECTIVES

BEHAVIORISM

- Forget the "mind" - focus on actual observable behavior
- Discuss how behavior changes under various conditions
- Focus on *external environment* in governing actions
- **Law of effect:** *Learning* is key to how experience shapes behavior
- **Cognitive behaviorism:** experience & environment affect behavior by giving us the info we need to behave effectively

PSYCHODYNAMIC PERSPECTIVE

- Pioneered by Freud
- Studies the behavior within the inner workings of the mind, emphasizing unconscious processes.
- Follows the struggle between the conscious and the unconscious.
- Looks for unresolved conflict
- Uses **psychoanalysis**: analysis of unconscious psychological forces

HUMANISTIC PERSPECTIVE

- Pioneered by Carl Rogers
- Focus on values and *choice* - reaction to the Freudians
- Helps people "fulfill their full potential"
- Came up the idea of "self concept"

SOCIOCULTURAL PERSPECTIVE

- Examines how social environment (other people) affects behavior, thoughts, feelings
- **Cultural psychology:** examines how culture (values, beliefs, behavior, traditions) are passed on and the similarities/differences across cultures

BIOLOGICAL PERSPECTIVE

- Examines how brain processes and other bodily functions regulate behavior
- **Behavioral neuroscience**: examines brain processes that underlie behavior, senses, emotions, thoughts.
- **Evolutionary psychology**: examines how evolution shapes behavior
- **Sociobiology**: social behaviors are the products of evolution, as they better allow the passing of genes (aggression, competition, nurturing)

COGNITIVE PERSPECTIVE

- Examines mental processes, humans as info processors
- **Gestalt psychology** - based on the idea that the mind perceives things as a whole rather than in parts (gestalt means 'whole')
  - These were the early cognitive Psychologists
  - Focus on perception and experience
  - Look at how people think and remember
  - Study biological, environmental and psychological - total experience
- **Cognitive neuroscience**: examine brain activity of cognitive tasks

PIONEERS OF PSYCHOLOGY

Wilhelm Wundt - Father of psychology. Started giving out degrees in psychology. First psychological lab. Was a structuralist.

William James - Founded second psychology lab. Wrote the first textbook. Wrote a lot about behavior. Was a functionalist.

Sigemund Freud
Pioneered psychoanalysis. Trained as medical doctor. Was trying to understand hysteria (anatomically impossible physiological problems). Determined that they must be psychological.

John B. Watson - Founded behaviorism. Believed that humans are products of learning.

Thorndike - organisms learn through the consequences of their actions *(law of effect)*. Behaviorist.

Skinner - Says learning is about punishment and reward.

Carl Rogers - Humanistic. Created Rogerian therapy.

Ivan Pavlov - Medical researcher. Realized that dogs salivate before food is shown to them because they learn to associate *him* with food. Discovered Classical Conditioning.

Piaget - Studying how kids develop intelligence - kids don't think like adults. Piagetian theory is named after him.

Maslow - Humanistic. Believed we all have an inborn force towards "self-actualization". Came up "pyramid of needs".

METHODOLOGY CHAPTER 2

SCIENTIFIC PROCESS

1. **Identify** question of interest
2. **Gather** info and form hypothesis
3. **Test** hypothesis by conducting research
4. **Analyze** data, draw tentative conclusions, report findings
5. **Build** a bold of knowledge, ask further questions, conduct more research, develop and test theories

DESCRIPTIVE RESEARCH

Naturalistic observation - observe behavior in a natural setting, attempting to avoid influencing behavior.

Case study - in-depth study of one individual, group or event.

Survey methods - surveys and questionnaires.

- ***population*** - all individuals we are interested in
- ***sample*** - subset drawn from the larger population
- ***representative sample*** - reflects important characteristics of population
- ***stratified random sampling*** - if 45% of the population is male, then 45% of random sample spaces would be for males

CORRELATIONAL RESEARCH

Correlational method - determine degree of relationship between two or more variables. Not manipulating the variables, just observing existing data. *ex Relation between grades and TV watching.*

Bidirectionality problem - does X cause Y or does Y cause X? Or do both influence each other?
Third variable problem - third variable causes both but makes them seem correlated

- As ice cream sales increase, so do shark attacks. Does ice cream cause shark attacks? Or is a third variable - *summer time* - causing both.

Correlation coefficient - number between 1 and -1 that indicates direction and strength of correlation. (-0.78 is strong negative, +0.12 is weak positive, 0 is none).

- **positive correlation** - higher scores on one variable cause higher scores on the other
- **negative correction** - higher scores on one variable cause lower scores on the other

EXPERIMENTAL RESEARCH

Experimental method - only way to determine ***causality***.

1. Manipulate the ***independent variable*** *(ex. TV watching hours)*
2. Measure the ***dependent variable*** *(ex. Grades)*
3. Control extraneous factors

- **Control between subjects** - control and experimental groups are separate people
- **Control through repeated measures** - same group does experiment twice, once without independent variable and once with it.
  - **Counterbalancing** - vary the order of conditions in “repeated measure” experiments to remove advantages or “order effect”

INTERNAL VALIDITY

Degree to which experiment supports causal conclusions - *is the experiment designed and conducted well?*

- **Confounding of variables** - two variable are intertwined so we cannot determine which caused the change in dependent variable. The confounding variable is the external variable that interferes with the dependent variable.
- **Placebo effect** - if the % of patients that improve from the drug doesn't differ from the % that increases from the placebo, the improvement is just the placebo effect.
- **Experimenter expectancy effects** - subtle/unintentional ways researchers influence participants in favor of hypothesis
- **Demand Characteristic** - cues in the actual experiment that convey the hypothesis to the participants. The participants try to "help" the experimenter.
- **Double-blind** - when neither subject nor tester know the which experimental condition the subject is under - this is the gold standard.
- **Incomplete disclosure** - not telling a subject what you are actually testing them about

Experimenter tests if people are more aggressive the presence of weapons. Puts a weapon in the corner and then another person frustrates them. They may realize their aggression is being tested. Study unintentionally convey's hypothesis to subjects.

EXTERNAL VALIDITY

Degree to which study can be generalized to other populations, settings and conditions

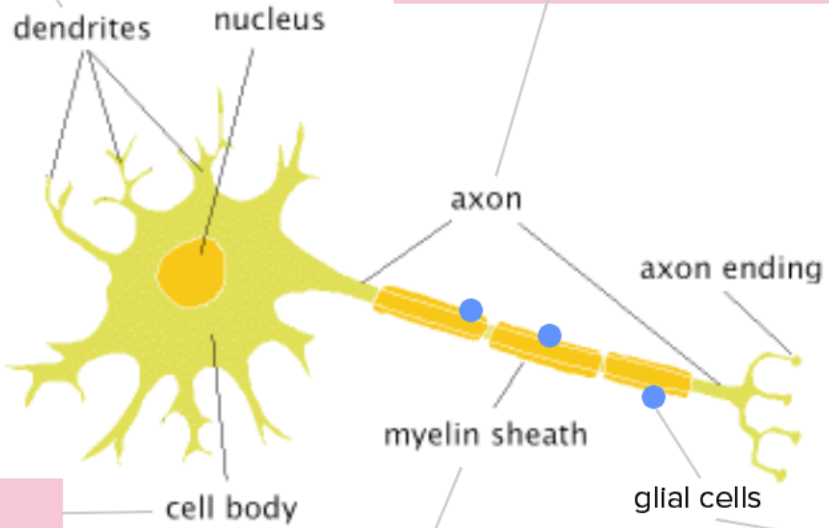
- **Replication -** repeating a study to see if the original findings can be duplicated
- **Meta-analysis -** statistically combining the results of different studies to examine their overall significance
- **Cross cultural replication -** do findings generalize across cultures

BIOLOGICAL FOUNDATIONS CHAPTER 3

Neurons - basic building blocks of nervous system

Collect messages from other neurons and send them to the cell body

Sends electrical impulses to other neurons, muscles, glands. They generate **action potentials**.

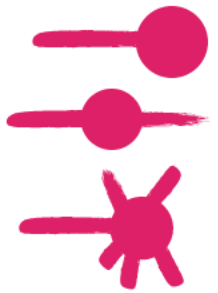


Biochemical structures that keep the neuron alive, carry genetic info - AKA *soma.*

Fatty insulation layer derived from glial cells that cover some axons. Make action potentials travel down the axon **faster**. Broken up into **nodes of ranvier.**

Hold neurons in place, make food for neurons, absorb toxins

Shapes of Neurons



Blood-brain barrier
Prevents substances (like toxins) from entering the brain. Made up of glial cells.

ACTION POTENTIALS

Neurons communicate through electrical signals called **actions potentials.**

Resting potential - at rest, the difference in charge between the inside and outside of a neuron is **-70 millivolts**. The proteins on the inside are mostly negatively charged, and positively charged sodium surrounds it.

Action potentials - a sudden reversal in neuron membrane voltage called depolarization. The charge inside the neuron goes from -70mv to **+40mv**. This is caused by the neuron being electrically stimulated.

1. The neuron is electrically stimulated.
2. *If* the cell reaches the **threshold** of **-55mv,** it opens its sodium channels.
3. The positively charged sodium flows in and depolarizes the neuron.
4. For a period of time, the cell cannot be excited again as resting potential is restored. This is called the **absolute refractory period**.
    a. The cell closes its sodium channels and opens its potassium channels. Potassium is also positively charged, and the cell is trying to dump positive charge to restore equilibrium. This is called **repolarization.**
    b. The cell will briefly go *below* its resting potential state as it purges itself. This state is called **hyperpolarization**.
5. After the absolute refractory period, the cell enters the **relative refractory period**, when it can fire but only if the stimulus is strong enough.

The way that neurons code the *intensity* of sensation is through the frequency of firing. Although, there is a limit to how fast they can fire due to the absolute refractory period.

All or none law - action potentials either happen an full intensity, or not at all. If they don't reach the threshold, the action potential does not happen.

Graded potentials - changes in neuron charge that *do not* reach action potential threshold

NEUROTRANSMITTERS

Neurotransmitters are chemicals that travel across the synapse to excite (EPSP) or inhibit (IPSP) other neurons. Whether the excite or inhibit depends on the neurotransmitter & the receptor receiving it.

The **synapse** is the space between the axon of one neuron and dendrite of the connecting neuron. The neurons aren't physically touching, but they communicate through this space.

This space was discovered when scientists were puzzled by the length of the *reflex arc*. It was taking longer than expected for messages to travel, so they suspected there was gaps on the way.

LIFE CYCLE OF A NEUROTRANSMITTER

- Formed in the neuron
- Stored in **synaptic vesicles** in axon terminals
- When the action potential comes down axon, they are released into fluid between neurons
- The bind to the **receptor sites** of the receiving neuron's membrane (specific transmitters fit specific receptors)
- The receiving neuron either
  a. is exited by excitatory transmitters (inflow of positive ions)
  b. is hyperpolarized by inhibitory transmitters (outflow of positive ions, or inflow of negative ions)
- Later deactivated by either other chemicals in the synaptic space (**neutralization)** or by **reuptake** by presynaptic axon (the one that released it)

Glutamic acid
- Excitatory
- Involved in all behavior, learning & memory

GABA
- Inhibitory
- Anxiety & motor control.
- Alcohol makes the brain more sensitive to it.

Neuromodulators
- Circulate brain and decrease/ increase sensitivity of neurons.
- Involved in eating/sleep/stress.

Dopamine
- Motivation, reward, pleasure
- Voluntary motor control
- Thought process
- Not enough is related to Parkinson's and depression
- Too much causes schizophrenia.

Endorphins
- Reduce pain, increase well being
- Bind to same receptors as opiates
- Act as pain-relievers in severe injury.

Norepinephrine (NE)
- Involved in arousal and eating
- Inhibitory & also excitatory depending on receptor

Acetylcholine (ACh)
- Memory & muscle activity.
- Lack of it causes Alzheimer's.
- Botulism and Curare (a poison) blocks its release from axon, causes paralysis.
- Black widow venom causes a torrent of it, causing convulsions.

Serotonin
- Mood, eating, sleep, sex.
- Depression & sleep/eating disorders are treated by blocking reuptake/ deactivation of serotonin so that it's effects keep going

DRUGS

Antagonist - drug that inhibits activity of a neurotransmitter (prevents synthesis/storage/release, blocks receptors)

vs

Agonist - drug that increases activity of a neurotransmitter (enhances synthesis/ storage/release, mimics it, or prevents reuptake/deactivation)

Alcohol
Stimulates GABA, inhibits glutamic acid. Causes slowing of neural activity.

Caffeine
Antagonist for adenosine, a chemical that inhibits excitatory transmitters (and causes tiredness).

Rohypnol & GHB
Date rape drugs, powerful sedatives that enhance GABA

Amphetamine
Increase dopamine and norepinephrine activity by increasing production and preventing reuptake.

Nicotine
Mimics ACh and stimulates dopamine (responsible for motivation and reward - causes addiction)

Cocaine
Stimulates release of dopamine, prevents its re-uptake.

Q. **Synaptic Transmission...**

a. occurs only in the central nervous system
b. occurs instantaneously
c. does not involve chemical communication
d. explains the delay in the reflex arc

d. (←Tilt screen to see answer)

Q. **A new viral disease has been found that actually destroys the myelin sheath around a neuron. What is the likely result?**

a. Slower neural conduction
b. faster neural conductions
c. a lowering of threshold
d. decrease in Hebbian synapses
e. lower graded potentials

a. (←Tilt screen to see answer)

NERVOUS SYSTEM

Sensory neurons - send messages from sense organs to brain
Motor neurons - send messages from the brain to muscles/organs
Interneurons - the most abundant neurons, have a connective function

Peripheral Nervous System

Neurons that connect muscles, glands and sensory receptors.

Somatic Nervous System

Consists of sensory and motor neurons. They form sensory and motor nerves.

Autonomic Nervous System

Make up glands and the involuntary muscles of organs. Also involved in motivation, emotional behavior and stress response.

Sympathetic Nervous system

Responsible for fight-or-flight: in a stressful situation it speeds up your heart, dilates pupils, increases oxygen etc.

Parasympathetic Nervous System

Slows down body, returns you to rest. Both work together to maintain ***homeostasis***.

Central Nervous System

Neurons in the brain and spinal cord.

Spinal Cord - nerves enter and leave the Central Nervous System through the spinal cord. The vertebrae of your spine protect the nerves.

Some response can be triggered from the spinal cord without the brain, called **spinal reflexes**. For example, the response you get when you touch a hot stove by accident. You react to this before it even reaches the brain - which is good because its faster.

THE BRAIN

HINDBRAIN

Medulla
Right off of the spinal cord. Regulates ***heart rate, respiration***. Without it working, you die.

Pons
Bridge between the nerve impulses of the higher and lower levels of the nervous system. Vital for life. Involved in sleep/dreaming.

Cerebellum
Muscular ***movement coordination, learning & memories***. Regulates movements that require timing. Alcohol affects this and makes you uncoordinated. Physical damage to the cerebellum results in jerky movements, trouble walking.

MIDBRAIN

- Clusters of sensory & motor neurons, and fibre tracts.
- Relay centre for visual/auditory system.
- Control eye movements.

Reticular formation
Gatekeeper of the brain. Alerts higher brain of messages, and decides where to block/allow them.
- Some anesthetics disables the part that sends messages to the higher brain.
- The blocking/allowing function helps you block out distractions.
- Stimulation can produce instant sleep or wakefulness.

FOREBRAIN (CEREBRUM)

Thalamus
Sensory relay station/switchboard. From here, sensations go to higher brain regions and form perceptions. Dysfunction plays a role in schizophrenia.

Basal ganglia
Controls ***voluntary motor control*** (in contrast to cerebellum). In Parkinson's, the neurons that supply it with dopamine die.

Hypothalamus
Incredibly important to keeping you alive. ***Controls biological drives***: sex drive, temperature regulation, hunger, eating, drinking, aggression. Damage can cause no sex drive, or obesity. Controls hormone secretions.

Limbic system - Help to satisfy motivation and emotional urges caused by the hypothalamus. Responsive for *goal directed sequences*. If this is damaged, small distractions prevent you from carrying out organized tasks.

Stimulation makes people extremely happy - critical for motivation and reward. This activates neurons in the **nucleus accumbens**. Coke, meth, nicotine release dopamine to this part of the brain. So do food and sex cues.

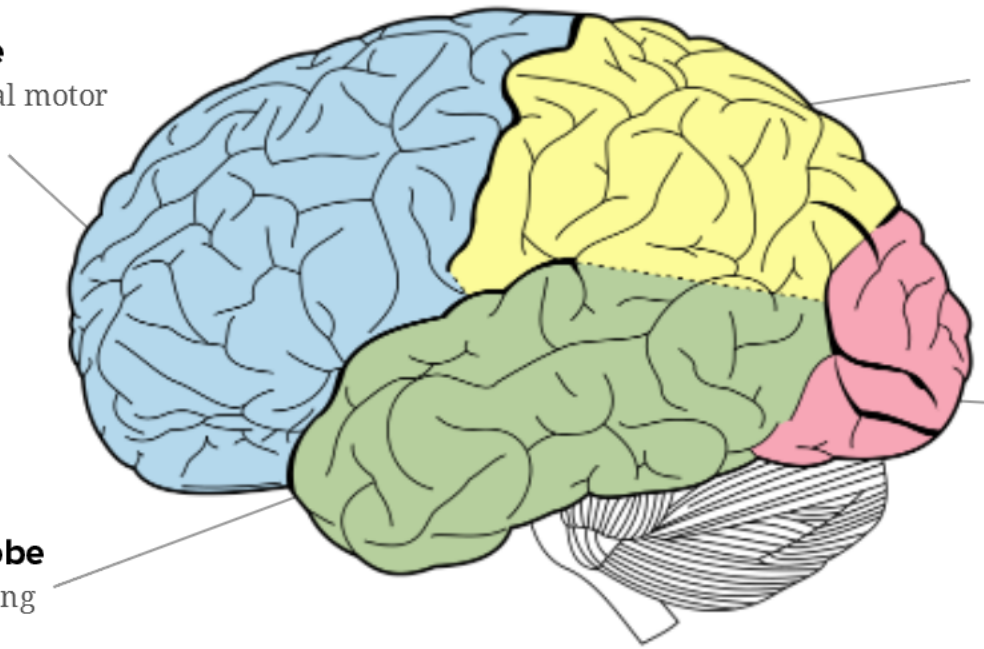
Hippocampus
Forms and retrieves ***memories***. Damage prevents long term memory formation.

Amygdala
Organizes ***emotional response*** patterns (aggression, fear). Can produce unconscious emotional responses.

CEREBRAL CORTEX

Frontal lobe
Speech/skeletal motor functions

Parietal lobe
Controls touch



Occipital lobe
Controls vision

Temporal lobe
Controls hearing

Frontal Lobe

Motor cortex
Each part of it controls a part of your body's voluntary movements *(more complex movements have more parts in the cortex)*. The right hemisphere controls the left side of your body, and vice versa.

Prefrontal cortex
"Executive function" - goal-setting, judgement, strategic planning, impulse control.

- Insane murderers lack this function.
- Prefrontal lobotomies tried to "calm" people by destroying this
- Damage results in loss of ability to plan a sequence of events, and judge order of future/past events. Also, stop feeling apathy.

Broca's area
Controls speech, motor movements of speech and grammar/word choice. Damage to it still lets you understand speech, but not speak yourself.

Parietal Lobe

Somatic sensory cortex
Same thing as motor cortex but regarding touch. The cortex is map-like - specific areas are responsible for specific body parts. More sensitive areas of the body have more cortex devoted to them (fingers, lips tongue).

The sensory cortex learns from experience - if you learn braille, the fingertip portion gets bigger.

Occipital Lobe

Each eye sends info to both hemispheres.

Dorsal side - sends information about orientation and movement of objects to the parietal lobe.

Ventral side - sends information about recognition to the temporal lobe.

There have been cases where people know how to pick up objects, but do not recognize them, due to ventral side damage.

Temporal Lobe

Each ear sends info to both hemispheres.

Wernicke's area
Responsible for language comprehension. In contrast to Broca's area on the frontal lobe, which is responsible for language production.

Association cortex - involved in thought, memory and perception - highest level mental functions

- Called "silent areas" because electrical stimulation does not cause experiences/responses. This is the source of the **myth** that "we only use 10% of our brains".
- The association cortex makes up 75% of cerebral cortex

Brain Imaging

- **CAT scans** - x-rays, pictures
- **PET scans** - inject radioactive glucose into the blood to see brain activity
- **MRIs** - expose to very strong magnetic field
  More detailed than CAT scans - best structural information. Cab watch the brain live.

BRAIN HEMISPHERES

Corpus Callosum - connects the two hemispheres of the brain
Lateralization - greater localization of a function on one side of the brain

Left hemisphere

- Verbal/speech, language
- Math, logic
- Positive emotions
- Damage may cause **aphasia** - partial or total loss of ability to communicate (to understand or to express)

Right hemisphere

- Mental imagery
- Music and artistic functions,
- Spacial relationships
- Negative emotions
- Damage results in spacial problems - inability to recognize faces/routes

- Both hemispheres can do all functions, they just work faster in the functions they are specialized for.
- In split-brain patients (those with a severed Corpus Callosum), different sides of the brain even have different opinions. But in normal people, the brain works as a whole, not as a collection of localized units.
- The brain develops according to its environment. If you play an instrument involving left hand movements for a long time, your right hemisphere sensory areas get larger. Chinese people process language more in the right hemisphere because their language is more picture like.
- Especially earlier in life, brain damage can be fixed by the neurons reassigning function **(plasticity)**.
- In left handed people, language may be localized in either side of the brain, or both

PSYCH WITH MIKE

NEURAL DISORDERS

Apraxia - inability to perform smooth motor movements
- Can preform all the actions required, but cannot do them in order.

Agnosia - inability to interpret sensory information
- Eyes/ears/etc are working properly, but the association area can't make sense of them

Aphasia - speech disorder
- **Broca's** - expressive aphasia: difficulty in stringing words together (apraxia)
- **Wernicke's** - receptive aphasia: difficulty in understanding (agnosia)

HEMISPATIAL NEGLECT

- Caused by a stroke to the right hemisphere - almost unheard of with damage to the left
- Parietal and temporal lobes are affected
- Ignore contralateral (opposite side) spacial field
  - If you said draw something, they ignore the left side of your drawing
- Only found in humans

SPLIT BRAIN OPERATION

- Person suffering from severe epilepsy
- Corpus callosum is severed deliberately to prevent seizures from spreading across hemispheres
- If you flash something quickly on the right visual field, and you ask them what they saw, they can answer you verbally.
- If you flash it on the left visual field, they ***can't*** answer you verbally. They can only write it down.
- In real life though, these people function fine cause they can just turn their heads.

Q. **We would expect a 1 year old to recover more traumatic brain damage more quickly than an adult. Why?**

a. Young children have stronger immune systems
b. Young children have more synapses
c. Young children have smaller brains
d. Adults engage in riskier behavior
e. Adults are less lateralized

b. (←Tilt screen to see answer)

GENES & BEHAVIOR CHAPTER 4

Genotype - specific genetic makeup of an individual
Phenotype - resulting characteristics/ behavior caused by their genotype

You cannot infer genotype from phenotype. Outward characteristics may not indicate underlying genetic contribution.

Chromosome - tightly coiled molecule of DNA, carries genes
- Every cell has 46 chromosomes, except sex cells which have 23

Genes/Karyotype - hereditary blueprints, which act by influencing protein synthesis in the body
- The environment can influence protein synthesis as well. Genes determine range of possibilities, but not degree of expression. Genes can make you tall, but difference between 5'11 and 6'2 is environment.

Alleles - alternate forms of a gene that produce different characteristics
- **Homozygous** alleles have predictable phenotypic outcome
- **Heterozygous** alleles have different possible outcomes
- **Dominant** alleles produce their effect in either homozygous or heterozygous mode
- **Recessive** alleles produce their effect only in homozygous mode

Polygenic transmission - several genes influence one phenotype
Recombinant DNA procedures - combine DNA from two organisms and put them back into one
Gene knockout - alter a specific gene so it stops doing anything

Heritability coefficient (h^2) - number *between 0 and 1* indicating how much you can attribute a trait in a population to genetics, rather than environment
- 1 means variation is due to genetics, 0 means it is due to environment
- Heritability refers to variance within *groups*, not individuals. If IQ was heritable for a group, it doesn't mean *your* IQ was inherited.

Concordance - inheritance of the same trait by two related individuals

Adoption study - compare adopted people to their biological parents vs adopted parents
Twin studies - study identical or fraternal twins to determine heritability of certain traits

Q **You have dark hair (a dominant trait). If we we examined your karyotype, we would find that you alleles for hair color were...**

a. homozygous
b. heterozygous
c. mixed
d. on different chromosomes
e. a or b above

e. **(←Tilt screen to see answer)**

MINNESOTA TWIN STUDY

Landmark study following twins that were separated at birth. Genetic factors accounted for 39-58% of personality variation. Unique personal experiences accounted for 36-56%. Family environment did not matter.

Genetics also influence attitudes, especially to sports, roller coasters, books, abortion and the death penalty. That doesn't mean there's a "roller coaster" gene; genetic make-up can make you more likely to be nauseous or dizzy, for example.

PSYCH WITH MIKE

Genetic Similarity

Identical twins - 100%
Fraternal twins - 50%
Parent, sibling - 50%
Grandparent, aunt - 25%
1st cousin - 12.5%

Galton

1869 - studies the relatives of intelligent people

- Believed natural sons of smart people did better than adopted ones
- Measured simple motor and sensory abilities
- Believed that intelligence was unitary (mental quickness)
- Results were disappointing, but he did invent the correlation coefficient in the process

Sir Cyril Burt

- Conducted large scale study of twins reared apart
- He reported that the heritability coefficient of intelligence was 1 - i.e. All variation in intelligence is due to genetics
- Turns out ***he made the data up***

Bouchard

- Estimated that the heritability coefficient of intelligence was 0.72 by studying twins.
- *Scarr & Carter* later responded that simply believing you are an identical twin is a big environmental factor. Twins who weren't identical, but thought they were, had more similar intelligence.

PSYCH WITH MIKE

GENETIC DISORDERS

PKU
- 1 in 10,000
- Lack of enzyme that converts Phenylalanine to Tyrosine
- Results in brain damage and mental retardation
- Effectively treated by diet, but not after 1 month

Sex-Linked Disorders
- Disorders found on the X or Y chromosomes
- Men are more susceptible than women because there's less info on the Y chromosome. Examples include...
  - Baldness
  - Red-green color blindness
  - Hemophilia

Huntington's Disease
- 1 in 16,000
- Onset: 35 - 45 years old
- At first, clumsy and forgetful
- Progressive deterioration in muscle control, IQ.
- Brain atrophy - terminal in 10-20 years.
- Enlarged ventricles, cortical degeneration
- Dominant gene -> offspring have 50% change of acquiring it. Detection possible through gene mapping.

Tay Sachs Disease
- 1 in 3600 (common in eastern Europeans)
- 1 in 30 French Canadians are carriers
- Lack of enzyme that breaks down fatty acids
- Normal development at first, but then blind, deaf, unable to swallow
- Muscle atrophy, mental impairment
- Fatal by age 4

Chromosome disorders
- We can get XXX, X, XXY, XYY
- XYY tended to be incarcerated more, but not for violent crime. More likely to get caught.

Down Syndrome
- 1 extra chromosome on the 21st pair
- Nervous system abnormality
- Mild to moderate retardation
- Shorter life expectancy
- Physical appearance (Mongolism)
- Caused by the accumulation of Amyloid protein that strangles neurons (also occurs in Alzheimer's)
- Symptoms can be alleviated with intense cognitive stimulation
- Not hereditary - due to faulty meiotic division
- Incidence related to mother's (and dad's) age
  - 1 in 1000 normally
  - If mother is past 40, 6 in 1000

Q. **Professor Buss reports that h^2 for the personality trait of envy is -1.86. This suggests that...**

a. envy is mostly due to genes
b. envy is mostly due to environment
c. envy is not likely inherited
d. envy is the production of both genes and environment
e. Buss made an error

e. (←Tilt screen to see answer)

EVOLUTION

Biologically based mechanisms - receive input from environment, process info and respond to it
Evolution - change over time in the frequency of certain genes in a population
Natural selection - characteristics that increase likelihood of survival and ability to reproduce will become more common over time
Adaptations - allow organisms to meet environmental challenges to survival
Domain specific adaptations - allow organisms to solve a specific problem (finding a mate, choosing safe food, detecting lying). The human mind is not all purpose - it is a collection of modules.

Evolutionary personality theory - basic human personality traits are sculpted by natural selection i.e. how well they help you survive. There are very few basic personality traits and they are found in every culture.

Parental investment - the time, effort, energy & risk associated with caring for offspring

Polygyny
Means "many women". In polygynous mating systems, men mate as much as possible and women are discriminating of their mates. This occurs when women have high parental investment. The more polygynous a species is, the larger the men are than the women.

Monogamy - equal investment for the man and the woman *(birds)*

Polyandry - opposite of polygyny, quite rare *(fish/insects)*

Polygynandry (promiscuity)
Everyone has sex with everyone. *(bonobos)*

MATE PREFERENCES

Both genders value love, dependability and emotional stability. These preferences are consistent across cultures/races.

Men Prefer...
- Youth (reproductive potential)
- Physical attractiveness
- good health

Women Prefer...
- Older mates - earning potential, status and ambition
- mate with sign of high parental investment

ALTRUISM

Cooperation - helping someone for mutual benefit
Altruism - helping someone at personal cost

Kin selection theory
Argues altruism developed to increase survival of relatives. Higher relatedness between people result in higher rates of altruism.

Theory of reciprocal altruism
Argues that altruism is long term cooperation, and that it is practiced with the hope to be repaid in the future

These two theories are not incompatible, they explain different things.

AGGRESSION

- Competition for mates
- As brains evolved, animals created dominance hierarchies
- Based on social alliances, saves energy
- Higher-ups try to stop fighting in subordinates
- Aggression is built-in, and triggered by certain cues
- Murder rates are correlated with income inequality (not unemployment or total wealth)

EVOLUTIONARY FALLACIES

- **Genetic determinism** - genes have unavoidable effects that cannot be altered
- **Social Darwinism** - those at the top of the social latter are genetically the "best"
- Evolution has no "plan"; evolution doesn't define "laws of nature"
- Don't forget about the influence of culture and learning

DARWIN

- Theories are based on economics, not biology
- Behavior is changing to meet environmental needs *(functionalism)*
  - **Proximal causes** of behavior are immediate mechanisms to meet those needs
  - **Distal causes** of behavior and evolutionary processes to meet those needs

"What made an animal fight this time" is proximal question.
"How has the species we observe today acquired the particular behavior systems during evolution" is a distal question.

Change Without Natural Selection

- **Genetic drift** - there is more schizophrenia north of arctic circle. This is not because of adaption, but just because the gene moved there and was isolated. The same with happened Tay Sachs and eastern Europe.
- **Correlate of Structure** - Because one train is selected, other related traits are selected. Opposable thumb selection results in larger brain parts, shorter other fingers, etc.

AGGRESSION

Freud:
Eros vs Thanatos *(good vs bad)* inside your brain. You try to get rid of thanatos; hurt others so you don't hurt yourself. Viewed as crazy talk nowadays.

Lorenz:
Hydraulic model - Aggressive instinct builds up over time until it is "triggered" by an external stimulus. Very similar to Freud's theory - aggression is to prevent "buildup". Behavior is caused by "releasers" aka "sign stimuli".

Berkowitz
Weapons effect - when you see a weapon (or anything associated with aggression), you are more likely to be aggressive.

STATISTICS APPENDIX

Measures of central tendency

- **Mean** - average
- **Median** - the middle value of a sorted set of numbers
- **Mode** - most frequently occurring value

Normal distribution occurs when mean = median = mode for a data set. Produces a perfect "bell shape".

Variance - Degree of fluctuation of scores around the mean

Standard deviation - square root of variance

Z-score = (score in question - mean) / standard deviation

- Measures how many standard deviations from the mean you are
- In normally distributed data, **68%** of scores are between are within 1 standard deviation of mean (Z-score between 1 and -1)
- **95%** are within 2 standard deviations of mean
- **99.7%** are within 4 standard deviations of the mean

Statistical significance - scientific standard that it was unlikely a finding was due to chance alone. Must be 95% sure (within two standard deviations) that your results weren't due to chance.

Null hypothesis - assume differences are due to chance

YOU MADE IT!

HOW WAS IT? GREAT? GREATEST?
TALK TO US AT HELLO@WUCKEXAMS.COM