PSYC 1001

CHAPTER ONE

Psychology is the study of mind, brain and behaviour.

- How the human mind works?
- How are we different from everyone else in the world?
- How do we learn?
- What is peer pressure?

Five branches of Psychology:

- Neuroscience – trying to learn the mind by exploring the brain.
- Developmental – trying to look at the progression of growing up as a human. They start their exploration of their questions before they are born. e.g. How does the environment affect the person before they were born?
- Cognitive – Cognition is the way of learning and understanding the world, the way of perceiving, thinking, etc, How we store information? Etc.
- Social – learn about people base on how they interact with other people. Group dynamics. What is peer pressure? How do people choose to be their friends or partners?
- Clinical – examination of mental illness and exploration of psychological disorders and applications of those research to real world settings what they have learned.

Birthday of Psychology: 1879

Ancient Greece (470 BCE) – Socrates, Plato, Aristotle, Hippocrates, Galen

Aristotle – curious about the mind, believes the difference between the mind and the soul. “We can understand people by looking at the workings of the mind. Because we have a mind, we are human.” He is the first psychologist that defined emotional intelligence. He said, “Anyone can be angry, but to be angry at the right person, to the right degree, at the right time, for the right reason, that is difficult.” Emotions were called passions. It was frowned upon for a person if they follow their passions than.

China – Confucious (551 BCE), Multiple tests

Confucius - was interested about learning, personality, human development. Mostly well known for his quotes in life and decision making and how to deal with people. He created a multiple test. We can call him the first organizational psychologist.

Muslim scholars

Al-Kindi (801 CE) (lived in Iraq) – he came much later. He took the lessons of the Greeks and Roman to disseminated them to the Muslim world. Well-known on psychopathology, very interested in the mental illness, especially depression. The first psychotherapist.

Middle Ages (~5th 15 century)

- Scientific learning comes to a halt – the public has been directed to priests to believe in the Church doctrine, and that everyone question's answers in a holy book.

Why is this a blow?
Because people are demonized when they have hallucinations or mental health problems.

Renaissance (~14th-17th century)
Rebirth of knowledge – they went back to the writings of Plato and Aristotle
Focus on here and now and not afterlife – they have started asking question and expanding the knowledge. They want to find way to better their living conditions.

Mid-1800 Europe
Psychology is no longer a branch of speculation (philosophy). People have declared that Psychology is a different branch.

Schools of Thought – a unified way of thinking of a specific phenomena

Structuralism (Edward Titchener)

- Conscious experience can be broken down in smaller pieces
- Introspection – small steps in the thinking process
- Too subjection – no way to test people's accuracy on their inner world, and secondly, conscious experience does not stop for examination, and impossible to break down into chunks.
-

Functionalism (William James)

- We can conceptualize our mental world by looking at it as a stream of consciousness, but in order to understand it, we need to ask the question, "Why? What purpose does it serve?" What is the function of this train of thought. At the same time Charles Darwin also proposed the theory of Evolution. Why do people behave a certain way? Why do they adapt a certain way?

Gesalt Psychology (Max Wertheimer)

- The whole of personal experience is different from the sum of its individual elements. (The sum is more important). There is no one reality for all. People experience the world different. The brain creates a version of reality.
- Phenomenology – what seems to be to you a reality; another person can experience another reality.
- There is no right or wrong way to perceive the world.

Sometimes our brains lie to us about the world. There is one thing our brain is unable to perceive: it cannot accept a human face that is concave.

Behaviourism (John B Watson)

- Examine observable behaviour and not internal processes
- Reinforcement and punishment.
- There is no nature vs nurture, it is always nature AND nurture.
- We don't really know what people think about, so we can't trust them. So behaviour is measured

and uniform to people. Behaviour can be manipulated.

Freud and Psychoanalysis
- Famous for his psychoanalysis research.
- Unconscious is what determines behaviour and personality.
- Two motivations: Sex and aggression.

The Humanistic Perspective (Maslow, Rogers)
- Growth, free will and optimism, We can nurture people by believing that we can do better.

Cognitive
- How people process information – speed of processing, speed of time, memory capacity, etc.,

Biological
- Biochemical and bodily structures – how do hormones affect human behaviour, etc., why are we depressed?

Evolutionary
- Adaptive traits enhance reproductive success – we can learn about people by looking at the past. However we cannot replicate these reproductive behaviours back then.

Clinical Psychology
They conduct research and expand them and test that knowledge to help people in distress.
- Clinical psychologist help people in distress
- Apply theories/research findings to help clients

Three step process
- Psychopathology – Classify, research etiology, course of disorder
- Assess and make decision – diagnosis, evaluate outcome
- Intervention – treat and prevent.

CHAPTER TWO

Psychology is an empirical science
Scientific method: "A systematic procedure of observing and measuring phenomena to answer questions about what happens, when it happens, and what causes it and what causes it and why?"

- Theory

A model of interconnected ideas and concepts that explains what is observed and makes predictions about future events.

- Hypothesis

A prediction of what should be observed in the world if a theory is correct. Testable vs non-testable hypothesis.

- Conduct Research/Design Study

Collect data

- Analyze data and draw conclusions

- Report the findings

Experimental Research

- Independent variable: What is being manipulated

ex. Cell phone use

- Dependent variable: What is being measured

ex. Number of errors in driving

- Experimental Group:

Driving and cell phone use

- Control group

Driving and no cell phone use

- Other issues to consider

Extraneous variable
Random assignment

The Experiment

Advantages
Isolates the relationship between variables
Establish cause and effect

Disadvantages
Artificiality
Some variables we can't manipulate
Most occur in controlled (lab) settings

Descriptive/Correlations Studies

- Designed to identify "What foes with what" in nature, and NOT designed to identify casual relationships

Major advantage is that allows us to identify relationships among variables as they occur naturally.

- Naturalistic observations
- Case studies
- Surveys/questionnaires

Statistics and Research

- Descriptive statistic: organize and summarize
- Inferential statistics: interpret and draw conclusions

Descriptive statistics:
mean (important): arithmetic average of scores
median: score falling in the exact centre
mode: most frequently resulting score

Outlier – important biases in the research process. It is a score that is different from the rest we cannot explain.

Descriptive Statistics: Variability

Variability: by how much the scores vary from each other and from the mean
range: highest score-lowest score
standard deviations: numerical depiction of variability.

Same Mean; Differed SD

Descriptive Statistics: Correlation

Designed to identify "what foes with what" in nature, and NOT designed to identify casual relationships.

Correlations coefficient: Numerical index of the degree of the relationships
- 1 (perfect negative relationships)
0 (no relationship)
+ 1 (perfect positive relationship)

Correlations does not indicate causation
Directional problem
Third variable problem

Inferential Statistics: Interpreting Data and Drawing Conclusions

Hypothesis testing: do observed findings support the hypothesis. Are the findings real or due to chance?

Statistics significance: very small probability that the observed findings are due to the chance.
Very low = less than 5 chances in 100 (0.05 level)
Very very low = less than 1 chances in 100

Meta-Analysis
Replication: repeating a study hoping to duplicate results.
Meta-analysis: a study of many other studies

Important question: are there gender differences in IQ?

Ultimate goal: generalizability.

CHAPTER THREE

DUALISM AND MATERIALISM

Dualism (Rene Decartes) – French Mathematician and philosopher
Humans: Material bodies and immaterial minds

- Mental and material
- robots and the matrix
- Reincarnation

Humans are very similar to animals. Animals = beast machines. Humans share also properties with the beast machines when it comes to movement. He also said that humans are more advanced in the way they operate because we have a soul. He made a distinction between the mind and the body. The body will perish, the soul will survive forever.

A lot of religions share that same belief. Because people like to think that when they die, something will survive.

Our egoentric worldview cannot come to terms that we can just become nothing and leave nothing. So a lot of people like the idea, and attach themselves with the idea.

There is this duality in the brain now. What is concrete exists in the real world, and then there is the soul.

Reincarnation – Your soul gets recycled and come up with different creatures.

Materialism:
We don't adhere to dualism now.
The mind represents the workings of the brain.

- The only thing that exists is matter or energy
- The mind is what the brain does.
- Imaging techniques illustrates this.

Mind altering substances – work on sectors in the brain that work in the brain change perception, thoughts, emotions, etc.,

There is no such thing as the soul being separate from the body. We want to know about mind, we want to know the emotional, physiological,

THE NERVOUS SYSTEM

- Central nervous system – is comprised the central nervous system, and it is
- brain – responsibility of interpreting information, communicating, muscles, hormonal glands, regulating important organs, and functions.
- spinal cord – extension of the brain. It acts as a pathway in which information from the brain is relayed from the rest of the body.

Preipheral nervous ststem
Nerves outside the brain and spinal cord
Nerves: bundles of axons that transport
electrochemical impulses

Communication path between CN and extremities.

BRAIN – has body guards, protected from pathogens, infections, and viruses.
Protected by:
Meninges – are system of membranes in the brain that protect it, and to extent the spinal cord. If the meninges is compromised, the brain is in danger.
Celebrospinal fluid – this nutritious soup that flows through the ventricles of the brain and to the spinal cord. An important in the well-function of the brain, because it brings nutrients to brain cells, and it acts as a protector against infection, and clears out the brain and the spinal cord from neuronal waste. Which is dead neurons that have completed their function and needs to be removed from the brain.

SPINAL CORD – connects brain tot he rest of body. - extension of the brain
Levels of paralysis:
The higher the damage is, the more profound and severe the injury.

THE BRAIN
Start small:
Neuron – The basic unit of the brain. It is a brain cell, specializes and serves an important function, in regulating organs, behaviour, mood, synthesizing information, etc. Highest neuron count can be found on a new born baby, it has a 100x times more than an adult. But they are not specialized yet. Just numbers.
Estimate: 1 thousand billion neurons. Each of this neurons is surrounded by glia.
Glia – they thought they were useless. Glial cells have very specific functions.
Four important functions:

- they surround the neurons in order to keep it in place. Like bubblewrap.
- They supply oxygen and nutrients to the brain and to the neurons
- Insulate neurons; they provide insulation – so the signal will not be compromised
- they clear up waste

Three types
Sensory
Convert external stimuli into the internal stimuli (CNS) ex in the retina, they are these specialized cells when lights hits the retina, and that information is transmitted to an area to the brain that process infromation.

Interneurons – proxy neurons
They help other neurons form connections between them. (in the CNS)

Motor neurons
Transmit commands from the CNS to muscles, glands, and organs.

Neurons looks different, comes in many shapes and forms.

immediate pain – short axons
dull long pain – longer axons

The main component of the neurons are the same regardless of their shapes.

NEURON
Dendrite – branch-like tentacles – it means “tree” in greek. They receive information and signals from surrounding neurons. This is transmitted through the axon. An electrical impulse, called action potential. Then the information needs to be sent out through axon terminals. They receive information, maybe even drugs.
Axon - windows – sending information
Action potential - electrical signal that sends to another neuron. - electrical signal.
Neurons don’t touch – there is no physical connection between dendrites and axons. The magic happens in teeny tiny space called synaptic cleft.
Synapse: small gap (millionth inch gap) – synaptic cleft (lock and key). - where it is released - in that little gap a lot of things can happen that could inhibit or enhance communication

vesicles – produced the neurotransmitters in the neurons – mini factories

what happens to the leftovers – they are being reabsorbed. Reuptaking. The brain sends chemicals
MAOS – one purpose- they neutralize the left overs. They target the substances levels, they clean up serotonins.

THE NEURAL IMPULSE
Hodgkin & Huxkley (1952-) Giant Squid

Fluids inside and outside neuron
Electricallly charged particles
Neuron at

- the axon of it is a hundred times bigger than an axon of a neural brain. So it was much easier to examine the functioning of a neuron of a giant squid and use that knowledge to explore the brain. So what they came across is that this giant squid and the neuron and the axon of the animal outside of the axon, there a fluids are positively charged called ions. Then inside the ions are negative charge. These fluids determine if it would fire or not.

Resting potential – it is negative – measured to be 70 millivolts. When a neuron is stimulated (you need to fire), the balance changes, because there are openings in the brain (allowing the positive charge ions to go inside to send the signals) It changes the chemical composition of the neurons, which can results to electrical signals of the brain.

Action potential
- shift of the electrical charge in the neurons, it changes the chemical composition. A very important note, the firing operates on an all-or-nothing law. A neuron will fire, then rest, and if the chemicals continue to send signals, it will keep firing again.

Strong signals = faster firing, or quicker firing.

- Positively (+) charged sodium ions flow in
- Shift in electrical charge travels along the neurons
- All-or- none law (eg like a gun, either it fires or not)
- Type of signal: excitatory or inhibitory (fire or stop firing) – they are chemicals are sent. Neurotoxins block the firing, which would cause danger.

Alcohol is a depressant. It inhibits the communication that engages in self-regulatory.
Cocaine – excitatory, brings euphoria.

Resting potential – equilibrium. At the same time it is waiting for a signal. Nothing happens.

NEUROTRANSMITTERS IN THE BRAIN

Neurons communicate with each other chemical messengers – it is quite complex and it has profound effect.
Psychopharmacology – the study of science that examines and talks about how neurons that affect this processes in the brain and have different effects on the body or motives or moods.

Divided into two groups:

- Agonist – chemical substance that is produced by the brain or ingested and travels to the brain, and this chemical increases the effect of neurotransmitters. The agonist will enhance the affect of the firing of the neurons.
  - Making more (in the brain)
  - Faking some (eg cocaine)
  - Extending the effect of neurotransmitters in the synapse

This can happen in three different pathways.

- Pre-synaptic neurons and the post-synaptic neurons, and in the middle the snypatic cleft
- It affects the way they produce the neurons, the mini factories. they facilitate the binding, which means they would receive the signal, and ask them to fire faster
- They can fake their way into a post-synaptic neurons. How does it do that? Because for example cocaine has the same chemicals as dopamine.
- Reuptake – the longer the neurotransmitters it will stay in the gap, the more likely it is to be absorbed and bind. Two ways: 1. it can block the neuro-uptake. 2.) interfere with the mechanism of MAOs (the cleaner). However MAOs are not selective cleaners, so they could take everything in the gap. Inhibiting MAOs could have serious side effects.

- Antagonist – Chemical that slows down the effect of neurotransmitters – to be more dormant
  - Destroying them
  - Preventing the brain's ability to produce more – this is more dangerous to do – heroin prevents them to produce, even if they stop taking it, they are severe withdrawal
  - Preventing the binding of neurons by blocking receptor sites on the brain – it messes up the receptor sites.

PSYCHOPHARMACOLOGY
Antagonist – opposite action

- eg snakes, plants, insects
- Block receptors sites

    - Neurons can't communicate
- Alcohol (very popular antagonist) – its an inhibitor – it has a euphoric effects that compromise your ability to regulate your behaviour.
- There is a snake that has the most potent nuerotoxins on earth. It's very selective and in it is not treated in half an hour you die. Why? Because it can eat food.
- Most poisons have very effective venoms.
- There is a plant that also has neurotoxins, and the paste immobilizes you.

Agonist-mimics actions

- Mimics the action of neurotransmitter
    - Nicotine – enhances the acetone. Responsibility for arousal, memory, actions. The bad thing about smoking, it's because it has paint, gasoline, poison, car battery, spray.
- Cocaine – mimics the actions of dopamine, etc.,
    - Blocks reuptake of dopamine, serotonin, norepinephrine

FEYMAN TECHNIQUE

Feyman – nobel price physicist; he is also knowledgeable

Four Steps

- Identify what you want to study and learn – what concept do you want to grasp? Identify topics in terms of a question.
- Read whatever you can find on the subject – focus learning
- Close the book, pretend that you're teaching someone who has no idea of the subject – he distilled that information to someone who doesn't know about anything, simplying things for them.
- Go back and get unstuck, relearn things that you forget.
- Create examples, metaphors, analogies

The Organization of the Nervous System

Central nervous system (CNS)- brain and spinal cord

Peripheral nervous system (PNS)-nerves that lie outside the central nervous system.

- Somatic nervous system
    - voluntary muscles and sensory receptors – they carry information when something happens to you, such as putting your hand on a hot surface, and recoiling
- Autonomic nervous system
    - Controls automatic, involuntary functions – you keep breathing even when you are unconscious, your body temperature changes
    - Subdivided to two systems:
    - Sympathetic: GO (Fight or Flight) -
    - Parasympathetic : STOP- rest and digest system
    - These systems work in oppositions.

Sympathetic NS – the go system

Sympathetic NS – the go system
When it is stimulated – prepares the body for action

- Epinephrine and Norephinephrine (adrenaline and noradrenaline)
- Release prompts bodily changes
  - heart rate
  - lung capacity increases
  - pupils dilate – to see better
  - organs are modified to meet danger or flee
  - your body is pumping blood 2 to 3 times than normal; your extremities are pumped, so you could run farther and faster; there is more oxygen in your body
  - Capullaries – they shrink in GO systems; you are less likely to bleed to death when in adrenaline.
  - All functions of the body that the aren't important in the GO system, they shut down.

Assuming you finally fled from the danger:

Parasympathetic NS

- Controls organs under normal circumstances
- Antagonizes sympathetic NS
  - Restores the body to a normal state
  - restores equilibrium in the body – or else we will be exhausted and we will die.
    - decreases arousal, slows breathing and heart rate, lowers blood pressure etc.,

Breain Structures and their Function

The Brain

- Most information comes from
  - Disease
  - Head injuries
- Phineas Gage
  - Survive physical brain injury – he got into an accident in the railway, a pipe piercing through his cheek and through his skull
  - But, profound personality changes – he woke up and he could talk but he was different; the old Cage was friendly and hospitable, but the new Cage was irritable and hostile.
  - Brain damage to prefrontal cortex
  - Frontal lobe – emotional regulation, feelings
  - People with damage to prefrontal cortex – can't get along with others

Regions of the Brain
Three main regions

- Hindbrain – autonomatic functions, controling heart rate, vital functions, etc.
  - Vital functions (medulla, pons, cerebellum)
- Midbrain – sensory movements, voluntery movements
  - Sensory functions (dopaminergic projections, reticular activating system)
- Forebrain – largest and most complex – the seat of emotions
  - Emotion, complex thought
    - Thalamus (incoming sensory information)

    - Hypothalamus (regulates emotion, temperature, motivation and sexual behaviour)

        - Cerebral cortex (outer layer of the brain)
        - metacognition – we can think about thinking

Sex Difference and the Brain
What affects brain development?

- Environment?
- Biology?
- It is both, there is no versus.

Sexual dimorphism

- Sex differences in anatomical structures
- Males brain 9% larger on average
- Processing structures different
    - Women's brain more inter-connected – the different parts of the brain "talk" more to each other than than male brain
        - More neural fibres – more dense in the average female brain
        - Larger corpus callosum (bridge connecting two hemispheres)
- We cannot compare base on size

The Cerebral Cortex

- Outer wrinkly later
    - Two hemispheres and corpus callosum
    - Left: verbal processing, language, speech, reading, writing
    - Right: non-verbal processing: spatial, musical visual recognition

Some species don't have it

- Fish

Primates have it and humans are champions in size

- 80% of brain volume
- Broken down into 4 parts
    - Frontal lobe - movement, executive control system – seat of emotion, personality, motivation.
    - Occipital – vision – visual information - detecting depth and colour,
    - Parietal – somatosensory – every information that are sense other than visual infromation
    - Temporary auditory – processes auditory information

Homunculus
Sensory map of the brain

- Areas in the body that are close together, are close on the brain
- Size of the map doesn't represent size of organ in real world
    - E.g. hands have more sensory organs confused on the tongue and hands, but not arms. More senses include tongue and mouth
    - Diagram of a person corresponding to somatosensory cortex

Looking Inside the Brain
How else can we explore the brain?

- Lesions, tumors strokes injury,

Neuroscientists

- They don't like helmet laws

- They don't like helmet laws
    - **Brain injury and behavioural outcomes**
- Eg apraxia (can move, but no coordination) -
- Agnosia (not blindness, but can't recognize objects) – inability to recognize objects, but there is no damage to the visual nerves, but they cannot process information, they cannot name the objects
- Synesthesia
    - Cross-sensory experience
    - Test: try it yourself!

Brain Activity

- Brain produces electricity
- Can be measured by electrodes on scalp– EEG - electroencephalograph
- Evoked potential techniques
    - participant is given a stimulus and the researcher assess specific brain response
- Brain imagine techniques – map structure and function of brain
- Positron emission tomography (PET) – ingesting a radioactive substance, goes to the blood stream, and the substance would be found in the brain.
- Functional magnetic resonance imagine (fMRI) – we want to spot where it is busiest, and we can detect where activity is happening because blood carries oxygen to the activities of the brain

The Endocrine Systems

- Hormones-chemical messengers in the bloodstream
    - Released by endocrine glands
        - Pituitary (found in the brain) - "master gland", growth hormone – signal other glands to produce their own hormones
        - Thyroid-metabolic rate
        - Adrenal-salt and carbohydrate metabolism
        - pancreas - sugar metabolism – insulin.
        - gonads – sex hormones – ovaries and testes
    - Hormones and sexual behaviour
        - Testes, ovaries
        - Androgens (testorerone), estrogen (estradiol, progesterone)
        - Males – minimum level of androgens
        - Females – more complex story – the higher the testorerone, the higher the sexual drive.
        - Social aggression – being dominant, achieve status, manipulation, gather, social influence, physical aggression

Genes and Behaviour

- Behavioural genetics: the study of the influence of genetic factors on heavioural trates
- Genes – DNA – Chromosomes – Cell – Human body
- Chromosomes: strands of DNA carrying genetic information
    - Guman cells: 46 chromosomes
    - Chromosome: 1000s genes
- Genes:
    - Dominant – it will be manifested in the trait
    - Recessive – they will only manifest when the other trait is also recessive
    -

What is Heritabilility?

- Proportion of genetic variance OR proportion of phenotypic variance that is attributable to genetic variance. or accounted for by

- Heritability coefficient = *(r mz = r dz)x2*
- Environmentality.
- We are implying that what is left is environmentality. H + E = 1. What cannot be attributed heritability is attributed to the environment.

Misconception About Heritability

- Heritability CANNOT be applied to single individuals. We can only talk about heritability in a group of people.
- Heritability is NOT constant or imutmable
- Heritability is NOT a precise statistic

Nature-Nurture Debate Clarified

- No such debate at the individual level
- Influence of genes and of environmental is only relevant for the discussion of group-level variation

Evolution

- Evolutionary Theory – the foundation of modern biology; it has influence to psychology, physics, sociology, anthropology. Proposed by charles darwin.
- Evolutionary psychology
- Making and testing prediction and personality from evolutionary psychology

Natural Selection and Reproductive Success

Natural Selection

- Naturally occurring variation leads to differences in the ability to survive and reproduce (reproductive success)
  - The next generation contains more of the successful variant.
- Thus, successful variants are selected and unsuccessful variants are weeded out
- Over time, successful variants come to characterize entire species
- **Adaptations**: inherited solutions to survival and reproductive problems posed by hostile forces of nature. Hostile forces of nature – impedes survival

Sexual Selection

- Many mechanisms seemed to threaten survival
  - E.g. peacock's elaborate plumage
- Evolution by sexual selection as solution
  - These traits evolved because they contributed to an individual's mating success
  - **IntrAsexual competition**: members of the same sex compete with each other for sexual access to members of the other sex – male aggression is direct consequences of:
  - **IntrErsexual competition**: members of one sex choose a mate based on their preferences for particular qualities in that mate.
  - Beauty and physical attractiveness signals good genes.

CHAPTER FOUR

SENSATION AND PERCEPTION

- Sensation: stimulation of snese organs; the way our bodies through our senses, we receive energy from the environment. Essence of sensation: detecting energy levels: high low and quality. Sensing is elementary

- Perception: selection, organization and interpretation of sensory input. It is the brain's further propose to perceive information; computational capacity from our brains. The brain selects information, filter, interpret, organize so we can make sense of the world. It is an intelligent process, effortful. Essence of perception: construction; we construct information.
- Sensing visual stimulus ; brain perceives something differently. When we take things into our senses, we undergo a process called transduction. Transduction means that its turned into neuronal impulse energy, and gives us the sense of hearing, feeling, etc. We form internal interpretation of the world.

Psychophysics

- Psychophysics: the study of how physical stimuli are translated into pyschological experience
- Gustav Fechner: the concept of the threshold.
  - Absolute threshold: minimum intensity of stimulation that must occur before you experience a sensation. (minumum amount of energy to perceive that something is happening)
  - Eg quietest whisper you could hear half the time.
  - Difference threshold: smallest difference detectable; telling the difference in sensing things; it is proportionate to the original size of the stimulus.
    - Weber's law: size of JND proportional to the size of initial stimulus.

Signal Detection theory

- Important variable: human judgment; actual measurement of stimuli
  - False Alarm: you make the decision that you made something happen when nothing really happened; it is influenced because we are expecting something to happen
  - Hit: we are right on something (correct responses)
  - Miss: we don't hear anything
  - Correct rejection: when you don't do or expect something (correct responses)
- SDT: sensory processes + decision processes
  - Detection of stimuli
    - Noise of the system
    - Decision making process
  - Sensory adaptation: decline in sensitivity; our bodies habituate to temperature, smell, and other senses with repeated exposure.
  - Subliminal perception: existence vs. Practical effects
    - Myths in the mind
    - Priming and Subliminal perception
    - We cannot change someone's perception with subliminal perception. It taps into people's dreams and unconsciousness.
    - We can increase motivation through priming: we can enhance a person's positive mood or negative mood, we can make people more thirsty than they are. It does not produce a new motivation. We have to put in actual effort n things.

The Visual System

- Human eye is NOT a Camera. Seeing is an intelligent process. It includes a lot of processes that may seem unintelligent processes. Light passes through the cornea, the cornea is thick, and these

light rays are b re we are focusing. It projects an i the eye, because the retiners's special ability is to detect colour, dim lights, sharp edges. The retina includes: rods and

cones.
- Vision: most important source of knowledge
- Rodes and Cones
  - Rods: there are 12 million rods. They are responsible for detecting shadows, images, and low levels of light. It gives you the ability to detect a path at dusk.
  - Cones: there are 6 million cones. When you can see the colours and the light, because it picks up info in high stimulation
  - The cones and the rods are distributed differently in the retina. They are spread out among the retina. Their distribution depends on what we're looking at.

From The Eye to the Brain
- Light is transduced into neural impulses – rods & cones
  - Ganglion cells – a specialized cells that take this information and processes it and send it to the visual lobe of the brain (the talamus, the visual cortex).
  - Optic nerve – is made of all the axons that
  - Blind spot. - two blinds spots, one in each eye

Demonstration

Viewing the World in Color
- Color – deconstructing different wavelengths of electric energy, depending on their aptitude. Bees can detect ultraviolet rays. We don;t actually see colour in the world, but different levels of electromagnetic energy in the world. We pick up different energy in the world that picks up different wavelegnths.

Theories of Color
- Trichromatic Theory:
  - They are specialized to pick up three types of cones
    - Sensitive to red, green, or blue
- Opponent-Process Theory
  - They pick up information and send them to the ganglion cells, and the processing of the information is that they balance the visual cortex. How much light and dark information? Opponent addition and subtract. Three types of color receptors
    - Red-green, blue-yellow. And light dark.

Colour blindness is more frequent in males. The genes are found in the XY-chromosome, and it is recessive.

Visual Perception
- Gestalt principles of form perception; the ancestors have this bias that we do not like gaps;
  - Figure-ground - depending on where you focus, you will sometimes be different perception of an image.
  - Proximity – we group small things into a big image
  - Similarity – we are more likely to see similarities than difference

  - Continuity - our brain could feel the gaps when we see the image; we perceive thing to be one
  - Closure – our brains are filling in the gaps
  - Perception is subjective.

Hearing: The Auditory System

- Audition: the sense of sound perception
- Learning to detect those patterns are something the brain picks up at a critical period; the time frame that infants are exposed to sound.
- Stimulus – sound waves (vibration of molecules travelling in air) – displacement of air molecules. They enter the ear, computations, signal.
- Vibrations – sound
  - Amplitutde=loudness
  - Wavelength=pitch

The Ear

- Shaped and structured to
  - Capture sound eaves,
  - vibrate in sympathy with them, and
  - trasmit auditory information to the brain
  - Three parts : outer, middle & inner ear

Deafness:

Conductive deafness

- Damage to middle ear
- Hearing aids can help

Sensorineural deafness

- Damage to inner ear or auditory nerve
- Cochlear implants may help with damage to inner ear, but not auditory nerve.
- Hearing loss can be permanent if there is damage in the auditory nerve

Locating Sounds

- Loudness and sequence in which sounds reach the ear provide cues
  - May turn head to clarify information
  - Try at home: “Virtual Barber Shop” (requries headphones to be appreciated fully).

Taste and Smell

- Taste is sense through taste cells (helps decide what tastes good, and what tastes awful smell or components)
  - Receptor neurons on taste buds
  - Papillae – specialize in stimuli chemical substances that could be dissolved in the saliva.
  - Pathway: taste buds – neural impulse – thalamus – cortex
- Four primary taste qualities
  - Sweet, sour, salty, and bitter
  - Umami (fifth basic taste) – savory
- Flavour of food depends on odor, texture, temperature, and taste
- Individuals have taste sensitivities.
- ARE YOU A SUPERTASTER?

- Smell: Olfaction
- Odors trigger
  - Odors are
- Sensory information about odors is sent to the brain through the olfactory nerve

    - Pathway: olfactory cilia – neural impulse – olfactory nerve – olfactory bulb (brain)
    - Does not go through the the thalamus.
- Odor contributes to flavor of foods.
- In the beginning of a degenerative illness, the sense of smell is the first one to be compromised

Skin Sense: Touch

- Physical stimuli = mechanical, thermal, and chemical energy impinging on the skin
- Pathway: Sensory receptors – the spinal column – brainstem – cross to opposite side of brain – thalamus – somatosensory (parietal lobe)
- Temperature: free nerve endings in the skin
- Pain receptors: also free nerve endings
    - Two pathways: fast vs. Slow

MIDTERM

- Date: October 13, 2017
- Time: During class time
- Location: Class location
- Duration: 2 hours
- Format: 70 MC questions
- Content: Chapter 1,2,3,4 and ALL lecture material
- Bring pencil, eraser, and STUDENT ID

Chapter 1 review:

- Pyschology's birthday and birth place, which countries
- What is the difference between structuralism and functionalism
- What is the course tenant of behaviourism?
- What did Freud propose in his theory of psychoanalysis
- Who were the humanists and what did they say? Are they optimists, pessimists?
- What are the different specialities in psychology? What are the questions they develop?
- Take the practice tests.

Chapter 2 review:

- Research methods.
- What is the scientific method? What do we do? What do we test?
- What is a hypothesis that is not testable?
- What is a dependent variable and what is an independent variable?
- What is a true experiment? Advantages and disadvantages?
- What is compare and contrasts, true experiments, and correlational studies? Cast studies?
- Mean, mode, medium? Variablility?
- Correlation, coefficient? What do we use it for? Meta analysis? Studies of other studies?

Chapter 3 review:

- biological basis of behaviour
- what is the basic hardware of the nervous system? The neuron
- What are the two major types of celll in the nervous sysyem?
- How do neurons communicate with each other. Neurons dont touch, their communication happens in the synaptic cleft

happens in the synaptic cleft
- Neurotransmitters and their basic function. ACH, dopamine, endorphins, etc
- Division of the central nervous system; central, and peripheral system. Subdivided in 4 sections
- How can we study the brain? What is a CAT SCAN, MRI?
- Endocrine system? How are they different from neurotransmitters? How are they released? Where are they released from?
- Heredity ? What is a genotype, phenotype? What is the theory of evolution, natural selection and sexual selection. Darwin stuff
- Chapter 3 recap; practice test

Chapter 4: Review
- sense of smell is the only one that has the direct path to the brain
- stimulus for vision is electromagnetic energy
- focus less on understanding what is happening
- Visual system: light? How do we see colour?
- What are cones and rods?
- Blind spot experience
- how do we perceive things? Gestalt principles? Why do we fill in the gaps? WE need to experience the world in a continuous way
- auditory system
- gestatory system; stimulus and dissolved in the saliva
- Touch: different receptors that pick up pain, temperature, etc.,

CHAPTER FIVE

CONSCIOUSNESS

Definition
- Consiousness: awareness of ourselves and the environment – we cannot locate the consciousness in the brain – knowing that we have that an awareness for being aware.
  - meta coginition or meta awareness.
- Animals dont have the same consciousness than we do.
- Awareness of internal and external events is constantly changing
  - William James – the consciousness is like a river: this is a stream of thoughts (introspection: looking inside ourselves), we cannot put that into scientific explanation.
  - Sigmund Freud – psychoanalysis – proposed that consciousness in humans is limited. We are not aware of the motives and memories and strong drivers in our behaviours and subconscious.
- Altered state of consciousness: bizarre, disorganized or dreamlike state of consciousness – 25 hour cycle – bizarre way of interpreting the world, perceiving the world in a disorganized state- feeling like we're dreaming.
- Different patterns of electrical activity are associated with different states of consciousness

Variations in Conscious Experience
- How conscious are you right now?
- Controlled an
  - Automatic
  - Controlled: greater conscious effort, slow, takes a lot of mental energy

- Nonconscious: processes that occur in the body – not aware about the automatic process – basic processes that has to do with the function of the body
- Preconscious: outside of conscious awareness but can be brought into consciousness on demand – short term memory - priming the brain like asking a question
- Unconscious: experience, ideas and motives that are threatening, and removed from consciousness. Suppressed or not examined them in the consciousness.

Consciousness and Coma

- Coma – does not feel physical pain, cannot be woken up but they look like sleeping, cannot perform voluntary actions, if the symptom lasts for six hours, it is a medical coma. If the coma persists for a month, it is called a persistent vegetative state. If it lasts for more than six months it is called permanent vegetative state.
- Minimally conscious state.

Consciousness and Brain Activity

- EEG – monitors brain activity – measures electricity in the brain
- Brain waves
  - Amplitude (height)
  - Frequency (cycles per second)
    - Beta (13-24 cps) – active, intense intellectual focus
    - Alpha (8-12 cps) - relaxing
    - Theta (4-7 cps) – light sleep
    - Delta (<4 cps) – deep sleep, an hour and a half after they had fallen asleep.

Sleep: Natural Loss of Consciousness

- Sleep is a motivation – it is as important to eating
  - also a form of torture: sleep deprivation – we are very connected nowadays, we are constantly multitasking, so we get disruptions of sleep
  - Melatonin is released in spurts
  - 70% of people in Canada are constantly sleep-deprived
  - Recommended hours of sleep is 8-9.
  - Consequences: reduced reaction time, concentration, memory is impacted, hunger motivation is impacted, hormonal imbalances, it is linked to obesity, anxiety and depression, cardiovascular and hormonal disorders
- How many hours is enough?
- Stages
  - 1. theta waves (transition period from wakefulness)
  - 2. spindles and mixed EEG activity (K-complex) – burst of activities, irregular brain waves that doesn't disrupt brain thinking, they look like blips in the EEG readings. Shutting down some processes that are active in the morning; consolidation of memories
  - 3. delta waves – slower brain waves
  - 4. progressively more delta waves – 90 minutes

  - REM sleep – very high actively, rapid eye movement, very vivid and emotionally active, lasts for 10-15

Why Do We Sleep?

- Restores the worn out body, growth hormone – recuperates, regenerates
  - Hippocampus – memory consolidation

    - Hippocampus – memory consolidation
    - growth hormone is only released when we are sleeping
    - Rest and repair
- Preserves energy & keeps you out of trouble (adaptive) – we are vulnerable at night, more likely to be prey.
- Neurogenesis (creation of new neurons) – sleep, exercise, diet, crunchy food
- Sleeping cleans our brain – cerebrospinal fluid – those tiny little gaps in the neurons those roads widen when we sleep, clearing out the toxins with the fluid – the brain clears out the toxins

Sleep Disorders:

- Insomnia: recurring difficulty falling or staying asleep
    - worrying about sleep
- Sleep Apnea: intermittent breathing cessation, which causes oxygen blood levels to plummet, especially when they are moving around in bed
    - most common in middle aged, obese men
    - leads to disturbed sleep
- Narcolepsy: period, uncontrollable sleep attacks – sleeping around random times
    - possible genetic roots
- Side effects of sleeping pills (AMBIEN) – compulsion to wake up, go to the kitchen to eat or clean the house, and engaging into activity like an awoke person

Dreams

- Dreams: the product of an altered stater of consciousness in which images and fantasies are confused with reality.
- REM and non-REM dreams
    - different brains regions active
        - REM (motivations, emotion, rewards)
    - REM dreams – more bizarre, intense, emotional
    - Non-REM dreams – mundane, boring
- Dream interpretation – the royal road to the unconscious. Cannot be proven right or wrong, we can entertain ourselves with finding meanings of the dream, but it does not fall into the realm of psychology.
- Manifest Content – everything you wrote in your dream journal, the description of your dreams
- Latent Content – symbolism, interpretation, meaningfulness.

Dreambank.net – collected the dreams of the people for research

- rural areas – more dreams about aggression (americans are more aggressive than europeans)
- urban areas – feeling alone, isolation
- women – want to dream about romance
- men – want to have to sex with strangers

Hypnosis

- Social interaction during which a person, responding to suggestions, experience changes in memory, perception and/or voluntary action
- Hypnotic susceptibility: individual differences
    - 10% of pe
    - Linked to
- Most can learn to hypnotize but not most easily hypnotized

- Highly suggestible people are easily hypnotized
- Not correlated with IQ, but imaginativeness, and absorption in activities

Theories of Hypnosis

- Socio-cognitive theory of hypnosis – acting it out
- Dissociation theory of hypnosis – an actual state of unconsciousness
- The Stroop task and hypnosis – did not show the stroop interference
- Hypnosis for pain – dissociate them from pain by meditating.
  - Hypnotic analgesia

Meditation

- Meditation: practices that train attention to heighten awareness and bring mental processes under greater voluntary control
- Several benefits: mental health, emotional regulation, cardiovascular benefits, etc
- Yoga, Zen, Transcendental meditation (TM)
- More than a relaxation procedure, meditation is like a gym
  - Potential physiological benefits
    - Similar to effective relaxation procedures
- Focused attention vs. Open monitoring
- Mindfulness meditation and CBT

How do Drugs Affect Consciousness?

- Psychoactive drugs: mind altering substances that change the brain's neurochemistry by activating neurotransmitters systems. If ingested, would affect how we perceive or sense thw world. They work on neurotransmitters in the brain, they bind or block the receptor sites, etc.,
  - stimulants
  - depressants
  - narcotics/opiates
  - hallucigons
  - hallucinogen & depreessant

Stimulants

- Increases CNS activation and behaviour activity. Amply emotional and cognitive processes
  - agonists
  - caffeine, nicotine, cocaine, amphetamine, methamphetamine, MDMA (ecstasy) – they increase, heartache, increased restlessness, disruptive sleep patterns, increased body temperature, they produced feelings of euphoria, well-being, alertness, confidence, but also paranoia, hallucinations, and psychotic behaviour.

Cocaine (coca bush)

- very high abuse potential – consumption for euphoric and feelings of confidence – high increase

of dopamine for increased sensual feelings. Negative – heart attacks, lung collapse, sinus damage, impairs kidney and sexual functions,

Amphetamines (synthesized in the lab)

- weight loss, staying awake
- increase energy level, cognitive function

Methamphetamines (illicit drug)

-

- blocks the reuptake of dopamine for the continual sense of dopamine.
- It also impairs the production of dopamine in the brain
- it stays in the system is longer than cocaine (8-10 hours). With repeated use, it damages the structures in the brain.
- Impairs temper lobes.
- Impairs the function of the limbic system.

Depressants

- Decreased CNS activation and behaviour activity
  - alcohol, barbiturates, ketamine
- lower activation
- if they reduce activity in the brain, that inhibits reading and doing tasks, alcohol poisoning may occur.

Ketamine

- anaesthesia
- controlled and slow doses in
- anti-depression vaccine for PTSD
- same effects as any deppressents.

Alcohol: the most widely abused drug

- gender differences across cultures
  - high consumption of alcohol is seen as masculine
- expectations
  - would make you more friendly, relaxed
  - would make you feel sexy? Flirtatious?
  - The more you drink, the more our frontal lobes communicate with each other
  - decreases sexual functions
- physical effects

Opiates

- provide enormous reward value by increasing dopamine activation in the nucleus accumbens and binding with opiate receptors
  - pain relief – very effective
  - agonists and antagonists
  - relaxation, analgesia, and euphoria
  - morphine, heroin, opium, codeine
    - heroin, when it was first introduced, was advertised as non-addictive drug

Hallucinogens – distorts sense and perception

- Antagonists: decrease neural activity
  - LSD, psilocybin (magic mushrooms)
- Effects on consciousness
  - Euphoria, delusions. and hallucinations
  - Withdraw
    - anxiety, [illegible] regulation,
- MDMA/Ecstasy

- Stimulant and hallucinogen
- it is synthetic, cannot be found in nature
- very quickly: extreme friendliness, relaxation, confidence,
- severe dehydration, dampens the sensation to urinate.

Hallucinogen & Depressants

- Marijuana: the most widely used illegal drug n NA
  - Psychatcive ingredient: THC
- Class of receptors activated by naturally occurring THC substances
  - alter pain perception
- Increases relaxation, calm and increases appetite
  - Antagonist: decreases neural activity
  - Withdrawal symptoms: anxiety hyperactivity, increased arousal, decreased appetite. Can impact maturation.

Addiction has Psychological & Physical aspects

- Dopaminergic and serotonin pathways
- physical dependence
- psychological dependence
  - habit of taking the drug in the first place, the compulsion.
  - They used to think drug addicts are by criminals
- Context
  - Vietnam veterans.
    - 95% were heroin addicts to deal with trauma in combat.
  - Portugal has the highest opium addicts in the world, so they decriminalized the drug. Now they are the lowest drug use in the world.

CHAPTER 6 LEARNING

- BF Skinner
  - Learning: an enduring change in behaviour resulting from experience
  - Crucial for survival
    - what to eat
    - when it is safe to sleep
- Essence of Learning
  - How events are rleated
  - Conditioning: environmental stimuli and behavioural responss become connected
    - Classical/Pavlocian conditioning
    - Operant conditioning

- Pavlovian/Classical Conditioning (will be in the final exam)
  - Unconditioned Stimulus
  - Conditioned Stimulus
  - Unconditioned Response
  - Conditioned Response
  - Ask the question: Has learning taken place?

Acquisition, Extinction & Spontaneous Recovery

Acquisiton, Extinction & Spontaneous Recovery

- Acquistion
  - Stimuli has to occur together (contiguity)
  - Strongest conditioning: brief delay between CS and US
    - Music just before scary scene instead of during or after the scene
    - Th US needs to predict the CS
  - How long does the behaviour persist?
- Extinction
  - If the CS is presented without the US, eventually the CR extinguishes
  - Deconditioning them could reverse the conditioned response
- Spontaneous Recovery
  - CR re-emerges, but will be extinguished again if not followed by CR

Generalization, Discrmination & Second Order Conditioning

- Generalization
  - Stimuli that are similar but not identical to the CS produce the CR
    - Dog will salivate to sounds that are 1000 Hz, 900 Hz, 800 Hz...
  - Stimulus Discrimination
    - Differentiation between similar stimuli when only one is consistently associated with the UC
  - Second-Order Conditioning / higher order conditioning

Phobias and Addictions

- Phobia: an out of proportion fear to real thread
  - Fear conditioning
    - Adaptive: help animal avoid danger. Brain structure: Amygdala
  - Counter-conditioning
    - Systematic de-sensitization – anxiety hierarchy, “how anxious would you be if you be dropped in a bathtub with a shark?” and then building it down with less threatening scenario or anxiety-provoking.
    - Aversion therapy – after one incident, maybe it would not do it again.

Operant Conditoning

- Classical conditioning is a relatively passive process
- The person or the animal operates in the environment (instrumental conditioning)
- Most behaviour is instrumental
- Operate Conditioning: consequences of an action determine whether it will be repeated in the future.
- Edward Thorndike: Law of Effect – Punishment and reward
- BF Skinner – Principle of reinforcement.
  - Operant chamber
  - Emission of response
  - Reinforcement contingencies
  - Cumulative recorder

Shaping

- A process in OC: reinforcing behaviours that are increasingly similar to the desired behaviour.
  - Not useful only in animals
  - Teaching
  - First: wait [illegible] rewarding them. But this is not a realistic method. But take a complex behaviour and then we deconstruct the

behaviour into smaller chunks.

Reinforcement: Consequences that Strengthen Responses

- Primary Reinforcers
  - Satisfy biological needs
- Secondary reinforcers
  - conditioned reinforcement
  - positive reinforcement – a behaviour we want to increase
  - negative reinforcement – a behaviour we want to decrease/removing something bad
  - money is a the most powerful secondary reinforcer, and it is a socially constructed item.

Schedules of Reinforcement

- How often should a reinforcer be given?
  - Continuous reinforcement – we reinforce them every time they perform a certain type of behaviour.
  - Intermittent (partial) reinforcement – we don't reinforce every instances of behaviour, we only reinforce them after a set amount of actions, or time.
  - Ratio schedules
    - Fixed ratio schedule
      - Give food after pressing the lever 5 times
    - variable ration schedule
      - give food after pressing the lever 6 times, or 19 times, or 4 times.
  - Interval schedules
    - Fixed interval
      - Paid by the hour
    - Variable interval
      - Responder doesn't know when reinforcement will occur (commission based salary)

Punishment

- Positive
  - Getting an electric shock for pressing lever, which means they would press the lever less. You give something bad to the subject.
- Negative
  - Revoking driver's license for running a red light – removing something good for bad behaviour to stop occuring.
- Problems with punishment
  - anxiety, aggression

Self-Determination Theory

- Reinforcement punishenmt, makes the assumption that all behaviour to insentives, positve or negative.
- Inherent growth tendencies

  - Basic premise: humans are naturally active seek opportunities to learn and grow
  - there are certain behaviours that we feel rewarding.
    - Autonomy – feeling independent, control, strong motivator of behaviour
    - Competence – choosing to be good at something because we enjoy it, because we find it meaningful.
    - Relatedness – relating to others. Interacting with others in positive ways, connecting with others, and engaging with peers to feel like we are part of something bigger.

Type of motivation

- Intrinsic (inherently interesting, enjoyable)
- Extrinsic (rewards, or avoiding punishment)
  - Behaviour might be the same, but motivation different (e.g. volunteering).

The Candle Problem

- Problem: fix a lighted candle on a wall, so that wax won't drip onto the table
  - box of matches
  - box of thumbtacks
- Two groups
  - Control – take your time – no reward
  - Experimental – will be rewarded on the fastest time.
- Which group was faster?
  - Control condition
    - 3 1/2 minutes faster

The Over-Justification Effect

- When external incentives (e.g. money) decreased a person's intrinsic motivation to perform a task
  - Does this happen with all tasks? Are rewards ineffective?
- Second Study
  - Same instructions
  - Different layout.
- Results?
  - Experimental group much faster!
- Important points:
  - Incentives not always effective
  - Intrinsic motivations much more effective in maintaining behaviour

CHAPTER 7: HUMAN MEMORY

- HM
  - The most famous people in memory research
  - Brain surgery due to seizures
    - Temporal lobe and hippocampus had been removed
    - Seizures were gone, but the person lost ability to form new long term memories was lost
  - Didn't know:
    - Day of the week, year, his age
    - No loss in previous stored memories
  - He learned new motor skills though
    - But didn't know it.
- Memory
  - "The nervous system capacity to acquire and retain usable skills and knowledge."

  - However doesn't work like a digital camera
    - Distortions, incomplete and biased
  - Encoding
    - The role of attention, paying attention to it
  - Selective attention – selection of input
  - The cocktail party effect - the ability to pick up information that is relevant to us and tune out the inform

The Door Study

- Would you notice if the person you were talking to suddenly changed into another person?

- Attention and “Change Blindness”
  - Failure to notice large changes in the environment
- When does it occur?
  - When we don’t pay attention to our environment
  - Try it yourselves

Level of Processing

- Incoming information processed at different levels
- Structural (looks like) – weak memory trace – leading to short term retention
- Phonological (sounds like) – intermediate memory trace
- Semantic (means) – strong memory trace – leading to long term retention

Enriching Encoding

- Elaboration: linking stimulus to other information
- Thinking of examples – if they are your own, the higher chance of remembering them.
- Visual Imagery – creating images to represents words
  - The more relevant to you, the better
  - The more concrete the images, the stronger the encoding
- Examples:
  - The baby was sad when hearing her mother sing.
  - The baby was bawling her eyes out and crying while her mother was singing.

Memory Storage

- Information-processing theories
  - Sensory, short-term, long-term
  - Sensory memory: brief
  - vision, hearing, smell, taste, and touch.
- Sensory memories allow us to experience the world as a continuous stream, instead of discrete sensations.
- Short term memory (STM)
  - Limited capacity
  - 7 plus or minus 2 (memory span)
  - 20-30 seconds, then disappears, until you rehearse
- Rehearsal
  - Repetitively verbalizing or thinking about the information.
  - Chunking
    - grouping familiar stimuli for storage (chunking phone numbers)
    - example: UTPHDBCMASFUBAUWO or UT PHD UBC MA SFU BA UWO

Long Term Memory

- Permanent storage?

- Debate: Are STM and LTM really different?
  - Phonemic vs Semantic encoding
- LTM organization
  - Clustering and conceptual heirarchies – example: teaching children how to count
  - Schemas and scripts
    - Schemas
    - scripts organized what a person is expected to do in terms of step-wise process of actions.
    - Semantic networks – looks at memories finding common themes

False Memory

Spreading activation model of memory

- Mental elements are stored in memory along with association to other elements in memory

Most modern cognitive psychologists believe that false memories can occur effortlessly
Humans have a constructive memory

- i.e. memory influences in various ways what ia recalled

Research on mistakes of recognition on word lists help us understand dramatic false memories of, e.g., childhood abuse.
Web of interconnected knobs.

- Critical lure – missing words that all the other words converge too
- Deese Lists – the words presented

Memories are constructive, prone to errors, and have high confidence

Retrieval: Getting Information Out of Memory
Tip of the tongue phenomenon

- Failure in retrieval
- Retrieval cues

Recalling an event

- context cues

Reconstructing memories

- Misinformation effect
  - source monitoring, reality monitoring

Destination memory

- Source monitoring is unreliable because it forces you to go back to the last memory.
- Reality monitoring determines whether it happened in reality or it didn't.
- Destination memory is trying to find out where we find the source of information.

Recall and Recognition.

Forgetting
Why do we forget?

- Ineffective encoding - You did not pay attention
- Decay – time goes by and we haven't practice a certain type of information; normal forgetting that subjected to the passing of time, or when we start growing.
- Interference – difficulty remembering information that you learn the same time as other unrelated information.
- Retrieval failure – lacking the right type of clues
- Motivating forgetting (repression)
  - debate – repression as the defence mechanism.

Primary effect and latency effect.

Amensia: deficit in LTM – memory loss resulted by trauma, accident, illness, brain surgery, etc

- retrograde – y le that we've met, and personal i.....
- anterograde – inability to form new memories ; not permanent

anterograde – inability to form new memories ; not permanent

How to Improve Memory

- Practice
- elaborate the material – deep level processing
- Overlearn – for children—three principles – rehearsing, repeating, and renewing. Most effective when it is distributed. Opposition is cramming, not as effective
- Get adequate sleep – to help with better active memory
- Use vernal mnemonics – acronyms
- Use visual imagery

CHAPTER EIGHT: LANGUAGE AND THOUGHT

one of the abilities to allow our race to impart knowledge, to think in abstract thoughts, and the ability to communicate with each other. Our frontal lobe evolve to the extent that we can express our thoughts, forecast the future.

Darwin – human language is natural and instinct.

- every culture in the world has a language.
- Every human is able to speak, to comprehend language, to communicate language.
- This is so important that we have found and identify that there are several spots in the brain that are responsible for communicating language.

Broca's area – if there is damage, they cannot produce speech. They cannot process language. This a condition called Aphasia.
Wernicke's area – they cannot comprehend language, they cannot process the meaning of words, they cannot recognize language, and cannot interpret it.

The Analysis of a Sentence
The smallest unit of language is phonemes.

- Phonemes are sounds. There are a hundred phonemes.
- Morpheme – the smallest meaningful part of language. Every morpheme is a combination of phonemes.
- Words
- Phrase
- Sentence.
- Syntax – the rules of how we can properly communicate
- grammar – a set of rules that talk about how we should say things.

Language Development

- Babies distinguish the sounds of their native language
- First:
  - Sounds (crying, cooing, laughing)
  - After 6 months, they begin babbling
  - Babbling becomes more complex and starts to resemble language
  - First words: age 1
    - Over-regularization –
  - Metalinguistic awareness – we can objectify language, we can talk about talking, separate the thought from the object from the label you put on the subject.
  - People who speak more than language are the masters of metalinguistic awareness.

Bilignuialism, Triligualism etc

- Does learning two languages simultaneously case problems?
  - Combined vocabularies
- Bilingual children: higher scores on
  - Cognitive flexibility – you are able to be aware of the audience, the concept, in which language you are choosing to describe it.
  - Analytic reasoning – happens in the frontal lobe; enhancing your analytical skills.
  - Selective attention – constantly monitoring and suppressing the first or second language to communicate to a preferred language.
  - Metalinguistic awareness – two ways in describing one object.

Up until 7 years of age, if they are exposed to a different language, they will not develop an accent in their second language. But after 7, there will be an accent.

How Do We Acquire Language?

- Behaviourist
  - Learning of specific verbal responses
- Nativist
  - Chomsky – children are born with the ability to learn a new language
    - Learning the rules of language
    - Language acquisition Device (LAD)
- Interactionist
  - Biological maturation + cognitive development (more prefiecient in learning) + linguistic environment (children must be environment.
  - Critical period: 0 to 6 months. This is where the babbling start.

Problem Solving

- Active efforts to discover what must be done to achieve a goal that is not readily attainable.
  - Induce structure
  - Arrangements
  - Transformation
- Most people stumble because:
  - Irrelevant information
  - Functional fixedness (remember the Candle Problem?) - there is a specific purpose for one object but cannot see the object retooled some other way.
  - Mental set – used to solving problems a certain way, this is linear way of thing.

THE WORM PUZZLE ANSWER: 7.5

Culture, Cognitive Style and Problem Solving

Field Dependence – relying on the environmental visual filed to make a judgment (more likely to be distracted; more likely to synthesize information in the way that would give you more interaction; read emotions, sympathize easily)
Field Independence – relying on your own sensations to make a judgment. Focus on one task and one task only, and not be distracted by the environment.

Measures used to asse

- rod and frame
- embedded figures test (EFT)

- embedded figures test (EFT)

Field Dependence-Independence & life choices

Field dependence – education, social work, psychology; attentive to social cues, oriented towards others.
Field independence – math, engineering, natural science; detached, better at filtering information

Choices and Chances

- Dread risks
  - Can affect reasoning and decision making; two reasons: people's memories are highly constructive, and events that are highly emotional tend to impact people's decision making. The risk that people take base on events that are highly unlikely to happen, but they are publicized and illicit certain emotional reactions
- People don't reflect on probabilities
  - Prominence of events
  - Mental images
- Decision making and bounded rationality
  - Human decision making employs simplistic strategies and yields irrational results.
  - Example: playing the lottery
  - dangerous convictions formed through prior experiences that usually cannot be generalized.
- Reasoning vs decision making
  - deductive vs inductive reasoning – we as humans engage in reasoning that isn't based on facts; sometimes we do everything based on emotions. We tend to follow two paths:
    - deductive – we start with the general principle and funneling down to the specific (top-down reasoning)
    - inductive -
- Deductive Reasoning Tasks
  - Syllogism
    - two premises and one conclusion
    - example. All chimpanzees are primates. All primates are mammals. Therefore, all chimanzees are mammals.
    - Wrong way to approach it: all foods made with spinach are delicious. The cake is made with spinach. Thefore, the cake is delicious.
- Inductive Reasoning
  - Using examples to determine the rule
    - a new friend is late for a meeting
  - Inductive reasoning and the scientific method
    - inducing a general principle from specific instances
    - But sample needs to be representative
  - In everyday life...
    - We consider anecdotal evidence more than we should
    - Physicians claim:
      - people accept testimonials too easily.
        - Who wrote this review? Is there a connection?

CHAPTER NINE: INTELLIGENCE

How can we define intelligence?

- The human ability to use knowledge, to solve problems, to understand complex ideas, to learn quickly, and to adapt to the environment.
  - Range of intelligence
- How can we measure intelligence?
  - Scientific standpoint of intelligence
    - G (general intelligence; thinking about outcomes, predict) and S (specific intelligence; literary intelligence, mathematical intelligence, artistic intelligence, athletic intelligence)
- Psychological test: standardized measure of a sample of a person's behaviour
  - test norms – percentile scores, averages, and the range.
  - standardization group – group of people who took the same test as you

Key Concepts in Psychological Testing

- IQ tests: g (general mental ability) – IQ scores cannot be accrued from the way you learn.
- Aptitude tests: specific component of knowledge
- Achievement tests: mastery at specific subject – given to high school students
- Personality scales – measure motives, interests, values, and attitudes
- Test norms – percentile score – to compare people
- Standardization group

Measures of Variability

- Descriptive statistics
  - Mean – we can manipulate the mean.
  - mode
  - median
- Measures of variability
  - range – crudest form – idea of what is the spread of the scores.
  - standard deviation – the spread of all the scores around the mean. / on average, how much do people's scores vary from the mean?
    - Frequency distribution

Reliability and Validity

- Reliability – measuring the true level of the trait
  - Measure = "true" level of trait?
- Types of reliability
  - test-retest reliability: scores at T1 positively correlate with scores at T2. If there are high correlation with two test scores, it is reliable.

  - Internal consistency reliability: items within test positively correlate (a). looks in the insides of the exams. Are they measuring the same level of a trait?
- Correlation coefficient (r) – refers to the strength and the relationship between two variables, and the magnitude between.
- Validity – measures the nature of the construct we are aiming at. Does the test measure what it is supposed to measure?
  - Face validity: what test appears to measure
  - Predictive or criterion validity: test predicts criteria external to the test that it is expected to predict (some outcome or behaviour)
  - Content v[illegible]g measured?
  - Construct v[illegible]umes other types of validity; broadest type of validity)

- validity, broadest type of validity)
    - For a test to be reliable, it needs to be valid. But not necessarily the other way around.

The Evolution of Intelligence Testing

- Galton (1869) and "Hereditary Genius"
    - Nature vs Nurture
    - correlation and percentile test scores
- Alfred Binet and Theodore Simon (1905)
    - Binet-Simon Intelligence Scale – created to measure DEFICIT in intelligence, and not intellgience
    - Mental age – different performances
- Lewis Terman (1916)
    - Standord-Binet Intelligence Scale
    - Intelligence Quotient (IQ) = MA/CA x 100 – are you displaying the same capabilities of your own age.
    - Mental age and chronological age
- David Wechsler (1955)
    - Wechsler Adult Intelligence Scale -

What do IQ scores mean?

- Bell curve – the normal distribution – a frequency distribution that has special properties, mathematical properties. The distribution of scores follow a very specific pattern, and this pattern can be used to explain pheromone in real life. IQ follows the same pattern.

Reliability and Validity of IQ test

- Exceptionally reliable – correlation into the .90s
    - Qualified validity – valid indicators of academic / verbal intelligence, not intelligence in a truly general sense
    - Correlations:
    - .40s-.50s with school success - Validity of IQ test has been put into questions. IQ scores do not correlate with school success.
    - .60s-.80s with number of years in school - there is higher correlation in IQ scores with number of years they are in school.
- Predictive of occupation attainment, debate about protectiveness of performance. - just doing a good job isn't enough; teamwork, emotional intelligence, creativity could help boost you into a certain success

Perceptions of Intelligence

- Do beliefs about intelligence influence people's cognitive development?
    - Participants: 373 (12 year olds)
        - Equivalent achievement scores in math
        - Two conditions: fixed intelligence (you need to be born with it) vs expandable intelligence (can be made, can be expanded)
    - Result: Higher premium on learning – perception of how we can increase our intelligence becomes a self-fulfilling prophecy.
    - Students' low scores in math
        - Second study
        - Expandable vs. Fixed theory of intelligence
        - Expandable group reversed decline

Extremes of Intelligence: Intellectual Disability

- Diagnosis based on IQ and adaptive testing
  - IQ 2 or more SD below mean
  - Adaptive skill deficits
  - Origination before age 18
- 4 levels: mild, moderate, severe, profound