Psychology (week 1)

What is psychology?

- The scientific study of the mind and behaviour (it has 5 challenges)
    - -multiple determinants, (caused by many factors – genes, poverty, etc.)
    - -inter-relationships, (rarely independent, such as nurture and nature)
    - -different for each individual, (variations among people in their thinking, behavior, emotion, personality)
    - -influenced by others (reciprocal determinism)
    - -and cultural differences (places limits on generalization)
- Psychology has a multiple levels of analysis : rungs on a ladder of analysis; with lower level tied to the biological influences and higher levels tied with social influences:
    - •Social (highest)
    - •Behavioural
    - •Mental (thoughts feelings)
    - •Neurological / physiological (mood, emotions)
    - •Neurochemical
    - •Molecular (lowest)
- To fully understand psychology, we need to fully understand the multiple level of analysis as each level tells us different things

Naïve realism

- We rely on our common sense due to naïve realism (belief that we see the world precisely as it is) – and our common sense and intuitions are frequently mistaken. “seeing is believing”
- It can sometimes draw incorrect conclusions due to our tendencies toward naïve realism
- Our beliefs shape our perceptions of the world; we often do not realize it
- It may sometimes come in handy. It may be sometimes right

Psychology as Science

- Science is a systematic approach to evidence – consists a set of attitude and skills designed to prevent us from fooling ourselves
- It begins with empiricism – knowledge should initially be acquired through observation – and using stringent tests to determine the accuracy

Psychology as Scientific Theory

- Scientific theory – explanation for a large number of findings in the natural world
- Hypothesis – testable predictions derived from a scientific theory
    - Misconception 1 : theory explains one specific event
    - Misconception 2: theory is just an educated guess
        - Theories aren't just guesses.

Science as safeguard against bias

- Confirmation bias: tendency to seek out evidence that supports our hypothesis and deny, dismiss or distort evidence that contradicts them (cure : open minded skepticism)
- Belief perseverance: tendency to seek our initial beliefs even when evidence contradicts them (Cure: unbiased)
- Metaphysical claim: assertion about the world that is not testable (existence of god, soul, afterlife) – differs from scientific claims

Psychological Pseudoscience: Imposter of science

- Pseudoscience (an imposter of science) – set of claims that seems scientific but is not – lacks the safeguards against confirmation bias and belief perseverance.

Warning signs of pseudoscience

- **Adhoc immunizing hypothesis**: escape latch or loophole that defenders of a theory use to protect their theory from falsification
- **Lack of self-correction**: wrong claims never go away, falling into belief perseverance. Rarely updated in light of new data (cure : Willing to chance)
- **Overreliance on anecdotes**: relying on secondhand evidence (Cure: empirical observations)
- **Overreliance on anecdotal evidences**: relying on one or 2 individuals (difficult to verify)
    - Anecdotes are difficult to interpret as evidence
- Exaggerated claims
- Absence of connectivity to other research
- Lack of review by other scholars (peer review)

We are drawn to pseudoscience – our brains are predisposed to make order out of disorder and find sense in nonsense – helps us to simplify the bewildering world. It helps to buffer the overwhelming

information we don't have to process – cause us to perceive meaningful patterns even when there are none.

Antidote to pseudoscience: examine 3 common logical fallacies

- **Emotional reasoning fallacy** : the error of using our emotions as guides for evaluating the validity of a claim (affect heuristics)
- **Bandwagon Fallacy**: error of assuming that a claim is correct just because many people believe it
- **Not me fallacy** : error of believing that we're immune from errors in thinking that afflict other people
- **Bias blind spot** : people are unaware of their biases but keenly aware of them in others

Harms of pseudoscience

- Opportunity Cost (what we give up) – giving up treatment
- Direct Harm / indirect harm
- Inability to think scientifically as citizens

Scientific skepticism

- Approach of evaluating all claims with an open mind but insisting on persuasive evidence before accepting them

Critical thinking (scientific thinking)

- Set of skills for evaluating all claims in an open-minded and careful fashion
    - Ruling Out Rival Hypotheses
        - Whenever we evaluate a psychological claim, we should ask ourselves whether we've excluded other plausible explanations for it
    - Correlation VS causation
        - Correlation is not causation
        - Correlation-causation fallacy: error of assuming that because one thing is associated with another, it must cause the other effect
    - Falsifiability
        - The capable of being disproved – if a theory is not falsifiable, it cannot be tested
        - Does not mean that it must be false to be meaningful

        - It could be wrong if there were certain types of evidence against it
    - Replicability
        - A study's findings are able to be duplicated, ideally be independent investigators
        - Most replications are not exact duplications of the original research methods – it has some minor variations.
    - Extraordinary claims
        - Extraordinary claims require extraordinary evidence
        - Whenever we evaluate a psychological claim, we should ask ourselves whether this claim runs counter to many things we already know, and if it does, whether the evidence is an extraordinary as the claim
    - Occam's Razor (principle of parsimony)
        - Whenever we evaluate a psychological claim, we should ask ourselves whether the explanations can account for the data or whether simpler explanations can account for the data equally well
        - Parsimony = simplicity

Good Scientists never claim to prove their theories

Psychology (week 2)

An understanding of history gives us:

- Greater perspective and a deeper understanding
- Recognition of fads and fashions
- Ability to avoid repetition of mistakes
- A source of valuable ideas

Philosophy

- Psychology grew out of philosophy
- Persistent questions:
    - The mind-body problem
    - The origins of human knowledge
    - Nature vs. nurture
    - Relationship between humans and non-human animals
    - Free will vs determinism

- Early modern Philosophy
    - Rene Descartes (1596-1650)
        - French mathematician, physiologist, philosopher
        - Rationalism -the criterion of the truth is not sensory but intellectual and deductive
        - Knowledge is from thought and reflection
        - Challenged dogma by resolving to doubt everything
        - “Cogito ergo sum” or “I think, therefore I am”
        - Mind-body dualism –seat of soul in pineal gland
        - The mind-body problem
    - British Empiricism
        - Rejected rationalist doctrine of innate ideas (Descartes)
        - All knowledge is derived from experience, mainly sensory experience
            - tabula rasa
    - John Locke
        - The human mind begins as a “tabula rasa” and we learn through experience
        - Two sources of ideas from experience:
            - 1. Sensation and 2. Reflection
            - Simple knowledge builds Complex knowledge
    - David Hume
        - Organization of ideas according to laws of association:
            - Law of resemblance(similarity)
            - Law of contiguity(same time and place)
            - Law of cause and effect(form a connection as ‘habit’ of mind built up over time)
            - Bundle Theory –objects do not exist, just sensory properties
                - no such thing as “self”
            - opposite of Decartes (perception of thought is just only the perception of self)
                - only sensory information is real; mind only creates the perception of it
            - knowledge build is all from law of association

Empiricism VS Rationalism

- Rationalists (like Descartes) contend the way to knowledge is only through reason and thought; mind actively transforms sensory information
- Empiricists (like Locke) argue all knowledge is gained through experience; with emphasis on the method of using observation and sensory impressions to build knowledge
    - Laws of association (David Hume)
- Both rationalist & empirical approaches have their place.
    - The type of work favoured by empiricists is empirical work. By definition, an empirical project is one that requires observation at some point.
    - The type of work favoured by rationalists is theoretical work, a theoretical project being defined as one that does not require observation at any stage

19th century developments in physiology / medicine

- de-mystification' of the nervous system
    - Nerve function –speed of neural impulse
        - Muller (instantaneous)
        - Helmholtz (50-100 m/s)
    - Localisation of function
        - Gall, Flourens, Broca
- Franz Joseph Gall (1758-1828)(Germany)
    - Gall's Phrenology or Cranioscopy –became fashionable
    - Underlying assumptions:
        - Indentations and bumps on the outer contours of skull reflect contours of brain;
            - Brain can be divided into small number of functions
            - The bigger the indentations and bumps, the smarter you are
        - Mind's functions located in specific areas of the brain
- Paul Broca (1824-1880)(France)
    - Published clinical evidence:
    - injuries to specific areas in left cortical hemisphere of brain lead to specific loss of speech production— known as Broca'sarea
    - Later Wernicke's area shown to be associated with deficits in speech comprehension
    - Supported the localisation of function position

The beginnings of psychological measurement: Psychophysics

- Weber (1795 –1878; Germany)
    - Used the two-point threshold method to show sensitivity to touch differed across different body areas. Eg. tongue 1mm vs back 5cm
    - Used increases in weights to determine Just Noticeable Differences (JNDs); demonstrated judgements are relative
- Gustav Theodor Fechner (1801-1887) (Germany)
    - Fechner's law: S = k log R
        - S = psychological sensation
        - k = constant
        - log R = log of the physical stimulus intensity
    - "Elements of Psychophysics" influenced early psychologists such as Wundt and Ebbinghaus
- Charles Darwin's Theory of Evolution
    - Charles Darwin (1809-1882)
    - Humans have descended from animals by modification through principles of natural selection (principle that organisms that possess adaptations survive and reproduce at higher rate than do other organisms)
    - Change in religious and Cartesian thinking: no separation between man and animals
    - Examination of emotions in humans and animals; observed universality of emotional expressions
    - The impact of Evolutionary Theory
        - Study of animal behaviour as model for human behaviour—influence on behaviourism
        - Stimulated an interest in the measurement of individual differences
        - Precursor to the school of functionalism
        - Contemporary views on evolutionary psychology

The birth of Psychology

- Emergence of experimental psychology -> Structuralism & Functionalism -> early behaviorism -> Neobehaviorism -> cognitivism

William Wundt (Structuralism)

- Attempted to study the basic elements of psychological experience
- Seen as the founder of experimental psychology
    - "experimental introspection"
- Began the first journal of Psychology: Philosophical Studies (1881).
- Opened up first university based lab of psychology at University of Leipzig (1879)
- Used introspection – method by which trained observers carefully reflect and report on their mental representations
- Goal of Wundt's research was to understand consciousness
- He confined experiments to immediate experience
- Claimed that "the events of mental life are known through introspection"
- attempted to use introspection scientifically
    - Sought to investigate the immediate experiences of consciousness, including sensations, feelings, volitions, apperception, and ideas.
- Drawbacks
    - drawbacks - it is subjective
    - people have different perception
    - not scientifically acceptable
    - relying on subjective report on subjective data

Edward Titchener (Structuralism)

- Student of Wundt
- Englishman who completed PhD at Leipzig
- Moved to US to head new Dept of Psych at Cornell University
- Goal (like Wundt): to learn about the structure of the mind through analysing elementary conscious experience – Structuralism
- Adapted Wundt's methods, using "analytical introspection" to study the structures of the mind
- Elements of consciousness: sensation, images and affections (feelings) can be known by listing attributes
- Decline of structuralism partly due to criticisms of introspection as an experimental method
    - Highly trained introspectionists disagreed on subjective reports
    - Participants were able to solve mental problems with imageless thoughts

- Introspection could not provide all information needed for psychology.

William James

- Opened small psychology lab at Harvard, but not a research scientist
- Functionalism :"What for" (i.e. function) of mind, NOT "What is" (i.e. structures). What is the purpose of the behavior?
- They ask – Why questions (why do we forget things?); Structuralism asks What questions (what is conscious thought like?)
- Consciousness evolved because it has a function—to help us in the struggle for survival
- Writing the principle of Psychology - AIM: To examine the purpose and functions of the mind (the purpose of behavior)
    - A functionalism
    - Influenced by Darwin: behaviour can be understood in terms of its purpose without analysing its mechanisms
- Rejects structuralism of the introspection used to determine psychology

Ivan Pavlov (1849-1936)

- Pavlov influenced by Russian physiologist Sechenov who had worked with Wundt
- Studied function of conditioned reflexes
- Lead to the development of a theory of learning known as classical conditioning
- Classic example of pairing a bell (CS) and meat (UCS) to produce the conditioned response salivation

Edward Lee Thorndike (1874-1949)

- Performed systematic experiments on the learning process (Columbia University, USA)
- Studied S-R connections by observing the learned behaviour of cats in puzzle boxes
- Law of Effect
- Animal research –Darwin

Behaviorism

- John B. Watson
    - The rejection of introspection – it needs to be quantified
    - Emphasis on objectivity

    - Prediction and control
    - Use of animals
    - Environment was everything – dismisses inherited traits
    - The study of consciousness is a waste of time due to the inability to verify and quantify – based on mental experiences
    - Described relationship between environment(stimulus)and behaviour(response)
    - Made claims about the importance of education over inherited characteristics and instincts
    - Study of Little Albert and the white rat demonstrated the view of phobias as conditioned fear responses
- B.F. Skinner (a follower of Watson)
    - Return to radical behaviourism
    - Skinner similarly emphasized observation and control
    - Also argued that psychological studies should only focus on objective and measurable phenomena
    - **All behaviour is determined by its consequences**
    - emphasized that - we have no free will; we do things for rewards
    - we create internal states to rationalise what we're doing; but it doesn't really exist
    - - it must be observable and quantifiable
    - - stimulus and response
    - -the mind is a black box
    - - most researches are based on animals
    - - principle of reinforcement contingencies
    - -schedule of reinforcements
    - Watson & Skinner – no need to look "inside" of the organism to understand the principle – only focus on the outside (environment) – rewards and punishments
    - No need to worry of the "black-box"

Origins of experimental psychology: Summary

- Wundt started the emergence of experimental psychology
- Structuralism contrasted with functionalism

- Pavlov's and Thorndike's work on learning coincided with the beginnings of behaviourism as introduced by Watson
- Skinner's radical behaviourism emerged

The Decline of Behaviorism

- Psychologists increasingly challenged the view that cognitive events do not exist
- Thinking affects our behavior in powerful ways
- Neobehaviourism: Accept theoretical speculation about the existence of mediational variables (internal mental states), provided theoretical terms are operationally defined and lead to testable predictions
- Clark Hull (1884-1952): hunger 'drive'
- Edward Tolman(1886-1958): 'cognitive maps' – representation of the visual world
- **Gestalt Psychology**
    - 1910: Max Wertheimer observed a perceptual effect named the phi phenomenon (optical illusion of perceiving continuous motion between separate objects viewed rapidly in succession)
    - Contradicts Wundt and Titchener's molecular approach, the goal of which was to uncover the elements of consciousness
    - Gestalt psychology focuses on 'wholes' not parts or elements of experience, the "whole is more than the sum of the parts
    - Interested in how we organise our perception of the world –as humans we tend to "fill in the blanks
    - **Köhler** emphasized a "top-down" approach which aims to achieve closure and completion
        - Principles of organization
        - Figure / ground distinction
    - Insight learning in chimpanzees
    - **Forerunners to the cognitive revolution**
        - Sir Frederic Bartlett (1932) describes the role of schemas in "reconstructive memory"
        - Miller's (1956) demonstrates the limited capacity of short-term memory as the magical number 7 (±2)

        - Lev Vygotsky described the development of self in conversational practices
            - "Thought and language" banned until 1956, published in English 1962
            - Children learn through modelling, not only from stimulus response
        - Jean Piaget examined cognitive development
            - "Psychology of Intelligence" translated into English 195
            - The limitations throughout development
            - Children see the world differently than adults
    - **Further challenges to behaviourism**
        - Noam Chomsky's (1959) review of Skinner's Verbal Learning argued that Behaviourism cannot explain language learning
        - His approach has been described as Cartesian and Rationalist
        - Suggested that we are preprogrammed to learn grammatical rules
    - The cognitive revolution
        - The focus is on internal representations of the external world
        - View of human beings as active, information processors
            - Computational models: Thought or cognition IS the computer-like processing of information and symbols in rule governed ways
            - Connectionism (neural networks) –1980s:
                - 'neurally inspired'
                - parallel processing
    - Neuroimaging
        - Cognitive Psychology
            - how people learn, store, use information
            - school of psychology that proposes that thinking is central to understanding behavior
            - cannot base solely on rewards & rewards because our interpretation of them are the crucial determinants of our behaviour
            - encourage to open the black box
        - Cognitive Neuroscience
            - neural bases of cognition
            - examines the relation between brain functioning and thinking
        - Cognitive Science

- study of the mind / interdisciplinary
- view that science and philosophy can be combined

- **The rise of modern cognitive psychology: Summary**
  - Greater acceptance that cognitive events exist contributed to the decline of behaviorism
  - Experimental studies on cognitive abilities encouraged the emergence of mentalist psychology
  - Chomsky challenged the behaviorist interpretation of language learning
  - The cognitive revolution in the 1960s seen as the beginning of the information processing era

Schools	People	Goal	Method/concepts	Influences
Structuralism	.Wundt .Tichner	To study the structure of consciousness	Introspection	Chemistry, Physics
Functionalism	.William James	To study the function of consciousness. The purpose of consciousness	Writing	Darwin
Behaviorism	.Watson .Skinner	Predict and control – general principles of learning that explain all behaviors – focus is largely on observable behaviors	Animal Studies	Darwin
Cognitivism	.Jean Piaget .Kohler .Chomsky	Mentalism – role of mental processes on behavior	Neuroimaging Computer Science	Gestalt Psych
Psychoanalysis	Freud	Uncover the role of unconsciousness & early life experiences in behavior	Cathartic -Talk	

Early treatment of the mentally ill

- Possession by demons
    - Exorcision(e.g., trephining)
    - Witchhunts
- Early asylums still inhumane treatment (e.g., St. Mary of Bethelemor 'Bedlam' in London)
- Improvement in treatment in 18thcentury
    - Philippe Pinel
    - James Rush
    - Dorothy Dix
- Changing views of basis for mental illness

Precursors to Freud

- Mesmerism
    - Franz Anton Mesmer (1734-1815)
    - Viennese physician who developed a method of treatment using magnets
- Hypnotism
    - James Braid (1795-1860) "neuro-hypnology
    - Ability to be mesmerised lay with the subject
- Jean-Martin Charcot (1825-1893)
    - Study of hysteria as a disorder with a psychological basis
    - Use of hypnosis as treatment
- Pierre Janet (1868-1847)
    - Trauma produces hysteria, unpleasant memories "split off" from conscious and manifest as hysteric symptoms
    - Use hypnosis to bring dissociated memories to consciousness

Sigmund Freud (1856-1939)

- Founder of psychoanalysis: Emphasizes the role of unconscious processes
- Treatment of hysteria using hypnosis
    - Replaced by the method of free association & dream analysis developed in 1892

- Studies on Hysteria (1895) –Breuer and Freud
    - Hysteria caused by trauma that has been repressed and manifest in physical symptoms, need to make conscious to treat
    - Cathartic method ('talking cure')
- Seduction theory of hysteria (1896): neuroses are the result of sexual abuse in childhood
- Self-analysis of Freud's own dreams contributed to the publication of The Interpretation of Dreams (1900)
- Theory of personality
    - Id –pleasure principle
    - Ego –reality principle
    - Superego –morality
- Psychosexual stages of development
- Influence on behaviour aren't from the outside (environment) but from the unconscious drives – sexuality and aggression
- Some criticisms of Freud's work:
    - •Lack of falsifiability
    - •Dogmatic, non-experimental approach
    - •Definition of terms
    - •Too much emphasis on sex as motivation
- Neo-Freudians: New Directions
    - •Anna Freud and Melanie Klein applied psychoanalysis to children
    - •Development of attachment theory (Bowlby& Ainsworth)
    - •Karen Horney -emphasized cultural influences

Carl Jung (1875-1961)

- Disagreed with Freud's emphasis on sexual motivation
- Collective unconscious: repository for the experience of humanity
    - Archetypes: inherited predisposition
    - E.g., Anima(female); Animus(male)
- Introversion vs. Extroversion

The behaviourist challenge

- Opposed to psychoanalysis
- Both comprehensive systems
- Examine environment rather than explore the past
- Development of treatment techniques
- Behaviourism based on experiments

Humanistic alternatives

- 'third force' or humanistic psychology
    - an alternative to behaviourism and psychoanalysis
- Emphasis on human beings as unique individuals
- Focus on the positive, not the negative
- Assumes humans are free to choose (not determinism)
- Positive psychology

Carl Rogers (1902-1987)

- Human beings driven by a need be the best person they can be: self-actualization
- Goal of therapy is to foster an individual's potential for growth
- Client or person-centered therapy
    - Unconditional positive regard
    - Empathic understanding
    - Congruence
- Encouraged research by recording therapy sessions

Applications of Psychological Research

- Changes of fire engines from Red to lime-yellow
- Additional break lights (John Veovodsky)
- Advertising (John B. Watson) – faces on the left side of the magazines, text written in contrast on the right side
- SAT / ACT tests
- Using sequential lineups RATHER than simultaneous lineups
- Segregation of schools leads to negative impact on self-esteem