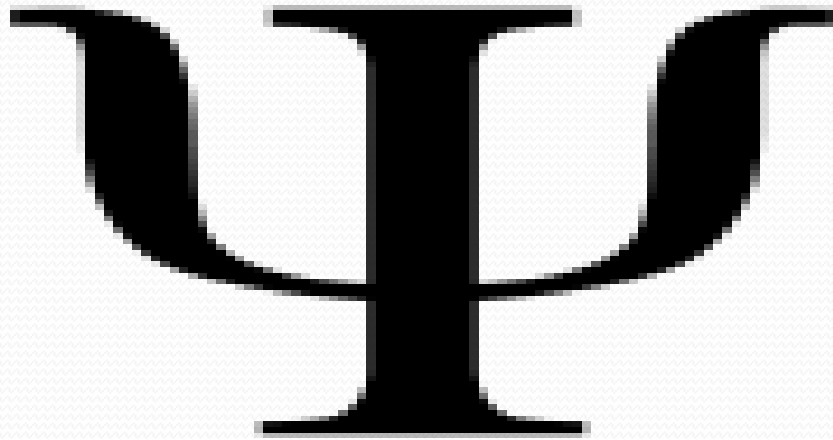


Psychology





Introduction to Psychology

Dr. Jaya A T

Assistant Professor

Department of Psychology

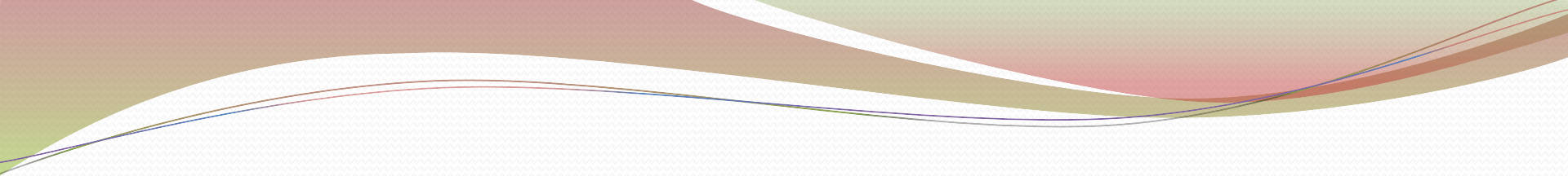
Prajyoti Niketan College,

Pudukad

- Psychology is the science of the mind and behavior. The word "psychology" comes from the Greek word psyche meaning "breathe, spirit, soul", and the Greek word logos meaning the study of something. For a psychologist, human behavior is used as evidence (or an indication) of how the mind functions. We are unable to observe the mind directly; however, the functioning of our minds influences virtually all our actions, feelings and thoughts. That is why human behavior is used as raw data for testing psychological theories on how the mind functions.

Definitions

- Greek Philosophers define Psychology as the study of mind.
- William James defined Psychology as the description and explanation of states of consciousness(1980).
- William Wundt defined Psychology as the science of consciousness.
- William McDougall(1949) defined Psychology as a science which aims to give us better understanding and control of the behavior of the organism as a whole.

- 
- J. B Watson (Father of Behaviorism) defined Psychology as the science of behavior(1913).
 - N.L Munn Psychology is the science of human and animal behavior and of the mental and physiological processes associated with the behavior(1976).

History of Psychology

- Pre-Scientific Psychology
 - India
 - China
 - Ancient Middle East – Hebrews

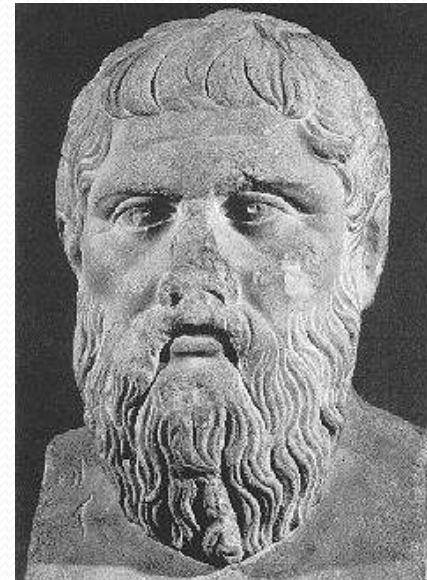
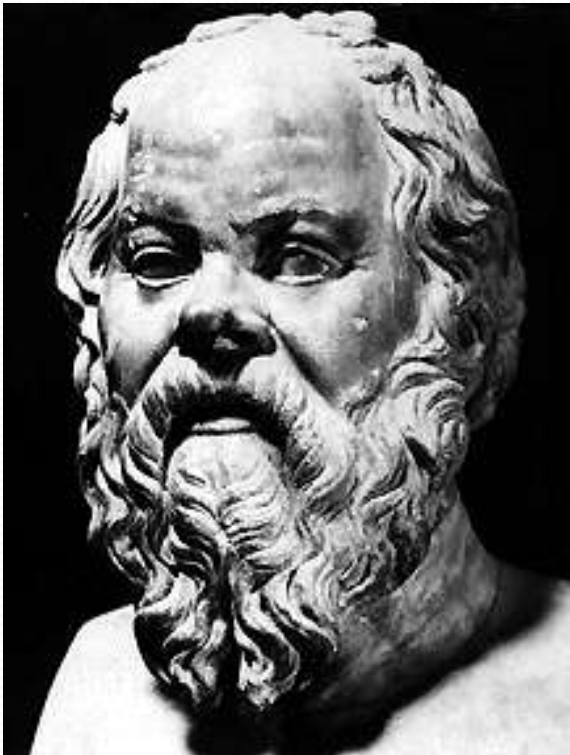
Pre-scientific Psychology

- Like most sciences, psychology has its roots in philosophy. **Buddha**, the spiritual leader whose teachings founded Buddhism, questioned how our sensations and preconceptions combine to form ideas. **Confucius**, the Chinese philosopher, stressed the power of ideas and an educated mind.
- **Socrates** and **Plato** of Ancient Greece concluded that the mind is separable from the body and continues after the body dies. In so much to say that knowledge is innate. **Aristotle** refuted, however, that knowledge is not pre-existing but grows from experience. Derived principles of knowledge all come from careful observation. Aristotle helped established the foundation for modern science, which officially began in 1600.

Confucius Scientific Psychology (551-479 B.C.)
In China, Confucius stressed the power of ideas
and the importance of an educated mind



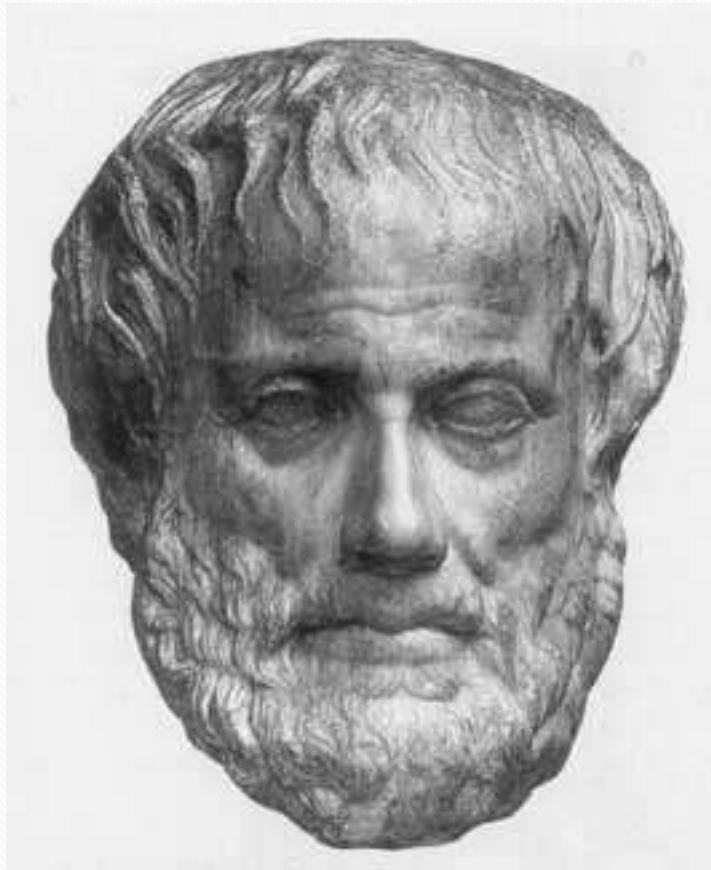
mind continued to exist after death, and ideas were *innate*.



and that knowledge (ideas)

grow from *experience*

Aristotle (384-322 B.C.)



HISTORY OF PSYCHOLOGY

- **The roots of western psychology can be traced to Greek philosophy. The word psychology itself is derived from the Greek words 'psyche' which means soul and 'logos' which means study. Psychology thus started as a part of philosophy and became an independent discipline much later.**
- **Plato and Aristotle were among the first philosophers who thought about the mind. Plato believed that body and mind are two separate entities and mind could exist even after death. But he was positive in that education can bring change to the basic nature of the mind. Aristotle, who was the disciple of Plato, followed the feet of his teacher and believed in the body-mind duality. But he thought that of each of these is the manifestation of the other. He was pessimistic about the role of education in changing the fundamental nature of humans.**

Rene Descartes—Cartesian Dualism

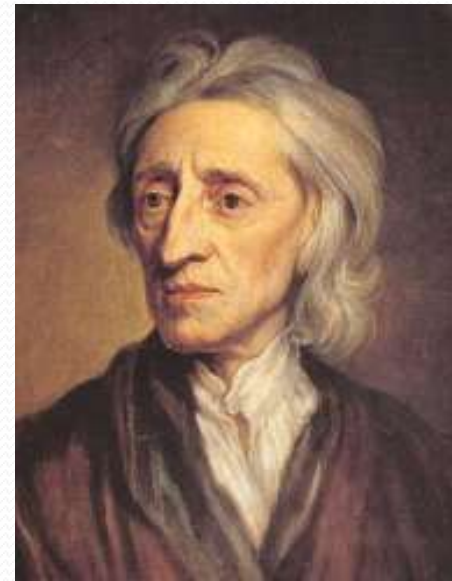
Descartes, like Plato, believed in soul (mind)-body separation, but wondered how the immaterial mind and physical body communicated.



Rene Descartes (1596-1650)

- **Rene Descartes, the French philosopher and mathematician, who originated the Cartesian system of coordinates or the coordinate geometry, also believed in the body-mind duality. But he was open enough to consider that there is an uninterrupted transaction between the body and the mind.**

- Prescientific Psychology
- John Locke (1632-1704)
- Locke held that the mind is a *tabula rasa* or blank sheet at birth and experience writes on it.



John Locke (1632-1704)

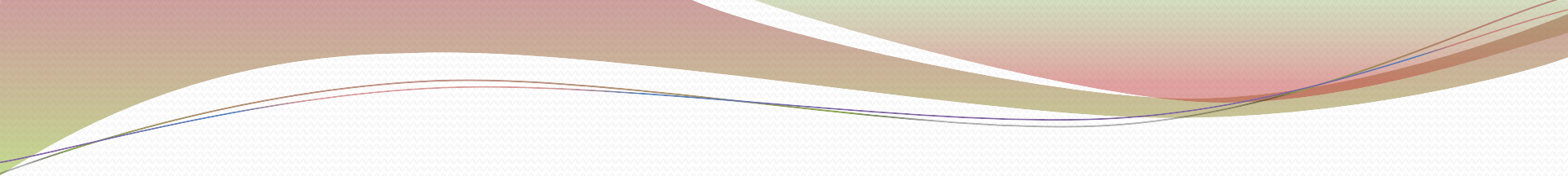
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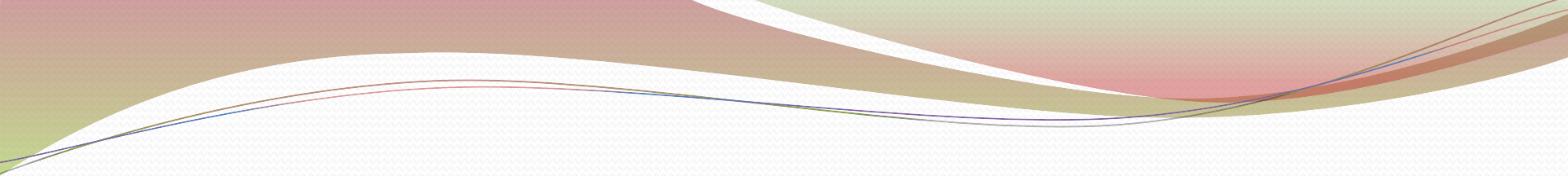
Scientific Psychology

- Scientific Psychology traces its roots to the older and more established fields of philosophy and biology
 - Philosophy – Uses reasoning and logical argument to discover the basic principles governing the world (including human behavior and mental processes)
 - Biology – the study of living organisms and life processes

Scientific Psychology

- In the twentieth century AD, German scientist E.H.Weber attempted a scientific approach in the study of the mind by his finding of the quantitative relation between stimulus intensity and the resultant sensory experience. This was later known as the Weber's law.
- Almost in the same period, G.T.Fechner, who is called the father of quantitative psychology, coined psycho-physics which is the quantitative study of external structures and sensory experience.

- 
- **Then came Darwin with his revolutionary ‘origin of species’ which influenced psychology and human thought.**
 - Darwin , he contributed to the prominence assumed by functional and genetic psychology, as opposed to analytical methods. His other main contributions were: (1) the doctrine of the evolution of instinct and the part played by intelligence in the process, (2) the evolution of the mind from the lowest animal to the highest men, and (3) the expression of emotions.

- 
- **In 1879, Wilhelm Wundt, a German scientist, established the world's first psychological lab at Leipzig, Germany. His aim was to prove that there is a physical activity for every mental activity. He suggested that psychologists should study sensation, perception, and emotions.**

- **In the first decade of the 20th Century AD, the Russian psychologist Ivan P. Pavlov made a path breaking finding when he was studying the digestion process in dogs. Before the experimental dog was given food, a bell was sounded. When this was repeated several times, the dog started salivating the very moment it heard the bell sound. Pavlov called this the conditioned reflex. This was one of the greatest findings that made radical changes in the field of psychology.**

HISTORY OF MODERN PSYCHOLOGY

- 1879-the first psychology laboratory was opened; Wilhelm Wundt opened it at the University of Leipzig in Germany
- 1883-first American psychology laboratory was opened by one of Wilhelm's student's; G. Stanley Hall opened it at Johns Hopkins University.
- 1886-first Doctorate in Psychology was given to a student of G. Stanley Hall, Joseph Jastrow at Johns Hopkins University.
- 1888-first Professor of Psychology was assigned to James McKeen Cattell, a student of Wilhelm Wundt who served Professor of Psychology at the U. Penn and Columbia.
- 1890-William James book entitled "The Principles of Psychology" was published

- 1892-G. Stanley Hall founded the American Psychological Association and served as its president. He later established two key journals in 1887 and 1917.
- 1896-Lightner Witmer opened a world's first psychological clinic to patients.
- 1900-'The Interpretation of Dreams' a theory of psychoanalysis was introduced by Sigmund Freud.
- 1901-Edward Bradford introduced Structuralism to the US with the Publication of 'Manual of Experimental Psychology.
- 1904-first woman President of the American Psychology Association was elected to be Mary Calkins.
- 1905-IQ tests developed by Alfred Binet and Theodore Simon.

- 1913-Behaviorism was introduced to the world by John B Watson publishing 'Psychology of Behaviour'.
- 1920-first African/American Doctorate of Psychology, Francis Cecil Sumner. Also a student of G Stanley Hall at Clerk University.
- 1925-Charles Frederick Menninger and his sons Karl Augustus and William Clair had opened the Menninger clinic in Topeka, Kansas.
- 1929-Electroencephalogram was invented by [Psychiatrist](#) Hans Berger.

- 1933-Nazis persecuted the scholars and researchers in psychology and [psychiatry](#).
- 1936-Walter Freeman's first lobotomy was performed in the U.S. at George Washington University in Washington
- 1938-Electroconvulsive (electric shocks) therapy began by the Italian Psychiatrist and Neuropathologist Ugo Certelli.
- 1946-U.S. President Harry Truman signed the National Mental Health Act.
- 1951-first drug to treat Depression was invented.

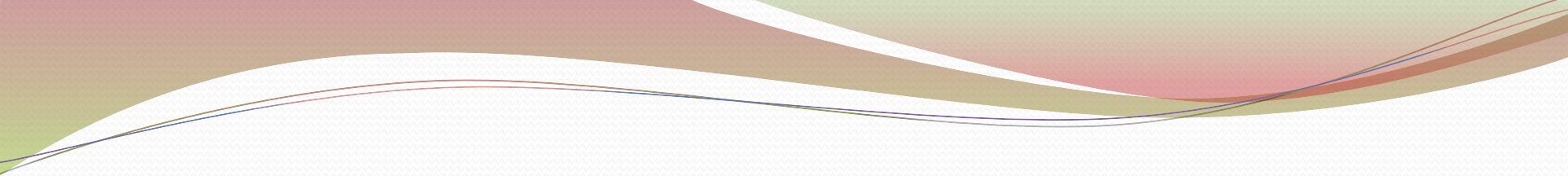
- 1960-FDA approved the drug Librium for treatment of Non-Psychotic Anxiety.
- 1963-Community Mental Health Centers Act was passed by the U.S. by president John F. Kennedy.
- 1964-National Medal of Science was given to Neal A. Miller.
- 1964-FDA approved lithium carbonate to treat patients with bipolar, mood disorders.
- 1984-the Insanity Defense Reform Act was passed

Psychological Science is Born

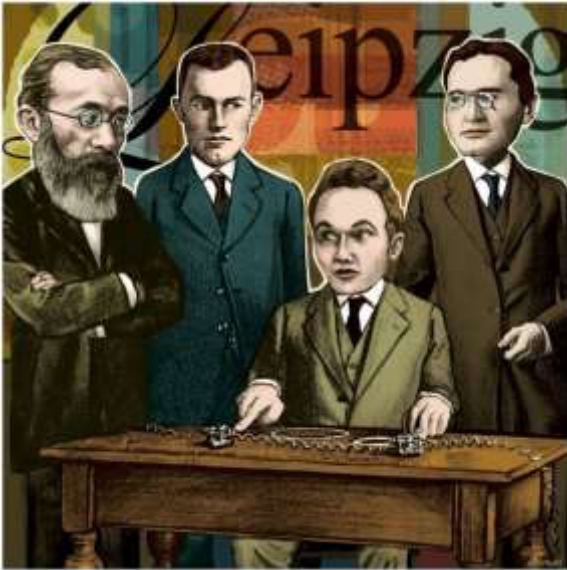
Schools of Psychology

Structuralism

- Wundt and Titchner studied the elements (atoms) of the mind by conducting experiments at Leipzig, Germany, in 1879.

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Wundt (1832-1920)



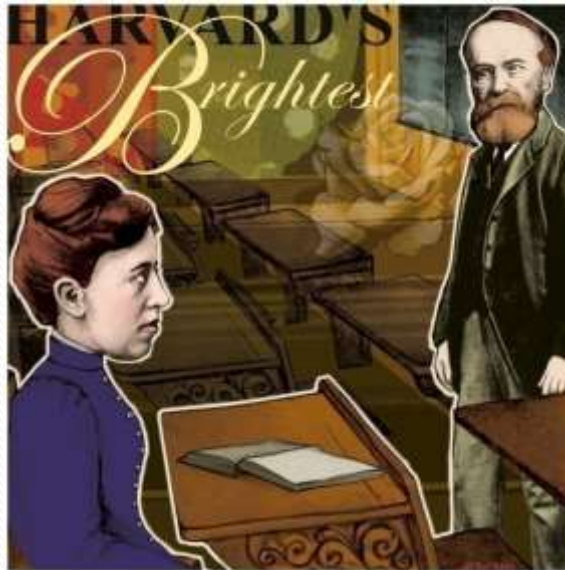
Titchner (1867-1927)



- 
- Proposed by German physician [Wilhelm Wundt](#)

Functionalism

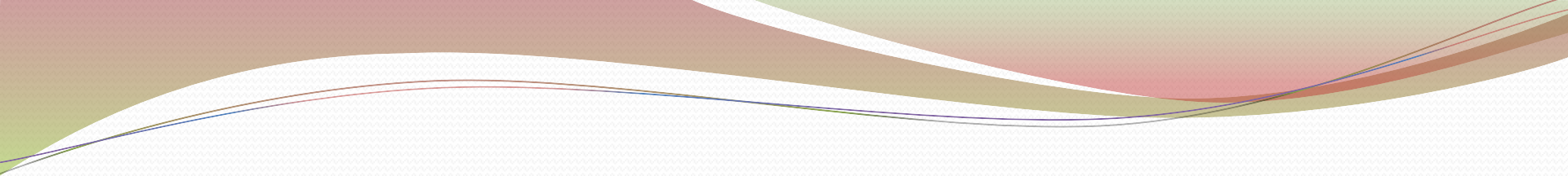
- Influenced by Darwin, William James established the school of functionalism, which opposed structuralism.
- James (1842-1910)



Functionalism

- Functionalism formed as a reaction to the theories of the structuralist school of thought and was heavily influenced by the work of the American philosopher, scientist, and psychologist [William James](#)

- In his book, *Principles of Psychology*, published in 1890, he laid the foundations for many of the questions that psychologists would explore for years to come.
- Other major functionalist thinkers included John Dewey and Harvey Carr.



Watson (1913) and later Skinner emphasized the study of overt behavior as the subject matter of scientific psychology

Watson (1878-1958)



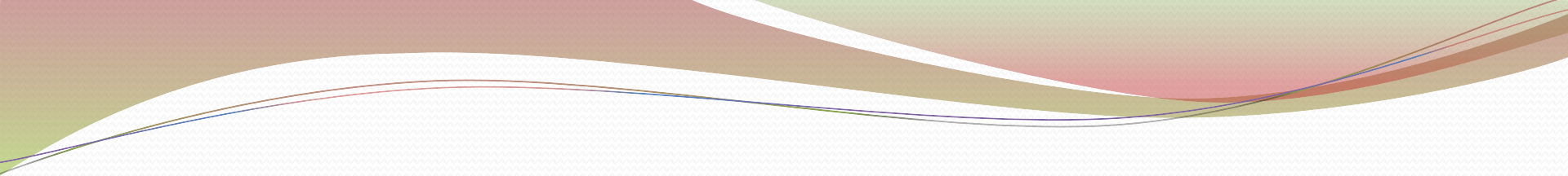
Skinner (1904-1990)



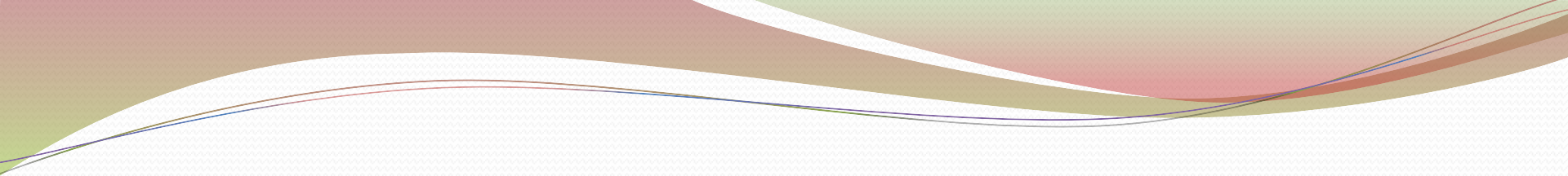
Behaviorism

- In the United States, [behaviorism](#) became the dominant school of thought during the 1950s. Behaviorism is a discipline that was established in the early 20th century by [John B. Watson](#), and embraced and extended by [Edward Thorndike](#), [Clark L. Hull](#), [Edward C. Tolman](#), and later [B.F. Skinner](#).

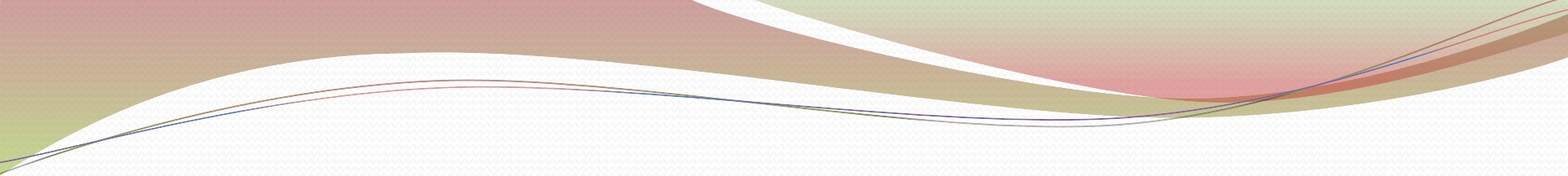


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- Theories of learning emphasized the ways in which people might be predisposed, or conditioned, by their environments to behave in certain ways.

- Classical conditioning was an early behaviorist model. It posited that behavioral tendencies are determined by immediate associations between various environmental stimuli .

- 
- Skinner emphasized the study of observable behavior.
 - He focused on behavior–environment relations and analyzed overt and covert behavior as a function of the organism interacting with its environment.
 -

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- Skinner's version of behaviorism emphasized operant conditioning.

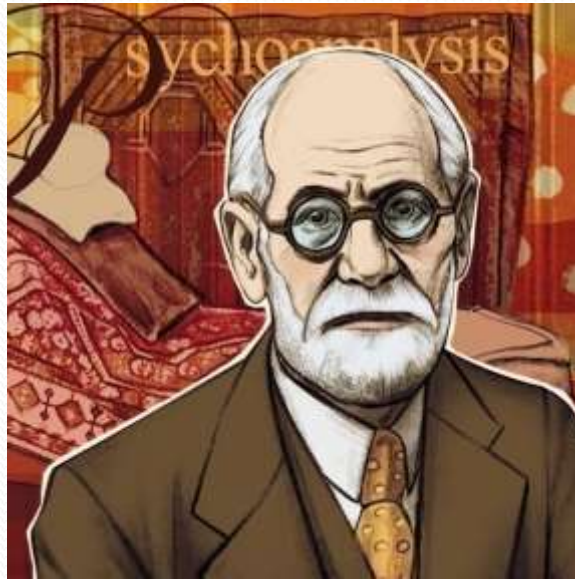
- 
- Linguist [Noam Chomsky](#)'s critique of the behaviorist model of [language acquisition](#) is widely regarded as a key factor in the decline of behaviorism's prominence

Gestalt Psychology

- [Wolfgang Kohler](#), [Max Wertheimer](#) and [Kurt Koffka](#) co-founded the school of [Gestalt psychology](#).
- This approach is based upon the idea that individuals experience things as unified wholes.
- This approach to psychology began in Germany and Austria during the late 19th century.

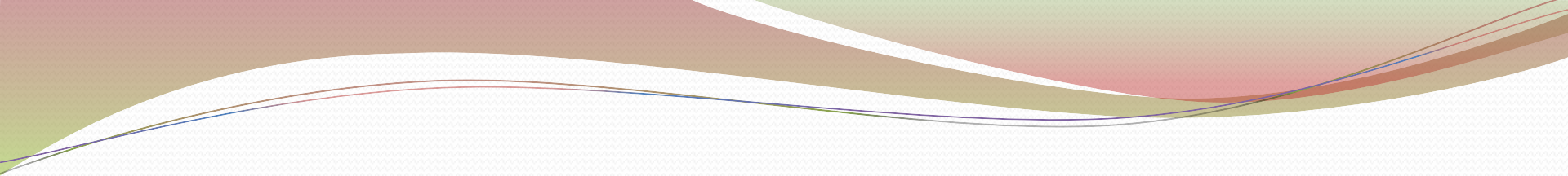
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- Gestalt position maintains that the whole of experience is important, and the whole is different than the sum of its parts.

Psychoanalysis



Freud (1856-1939)

- 
- Sigmund Freud and his followers emphasized the importance of the unconscious mind and its effects on human behavior.

- 
- From the 1890s until his death in 1939, the Austrian physician [Sigmund Freud](#) developed [psychoanalysis](#), a method of investigation of the mind and the way one thinks; a systematized set of theories about human behavior; and a form of [psychotherapy](#) to treat psychological or emotional distress, especially unconscious conflict.

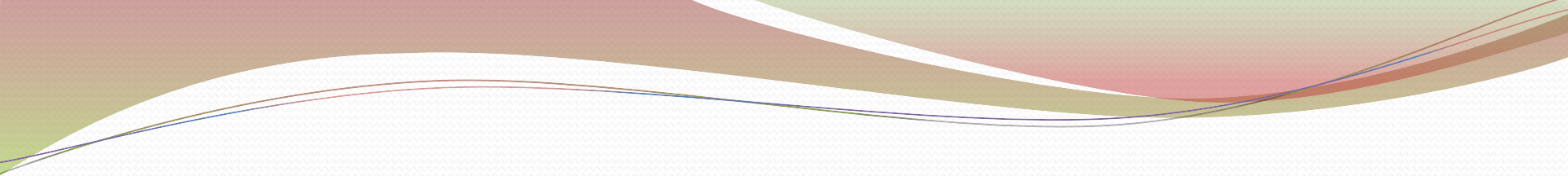
- Freud's psychoanalytic theory was largely based on interpretive methods, [introspection](#) and clinical observations. It became very well known, largely because it tackled subjects such as [sexuality](#), [repression](#), and the [unconscious mind](#) as general aspects of psychological development

- 
- . Clinically, Freud helped to pioneer the method of free association and a therapeutic interest in dream interpretation.

- Freud had a significant influence on Swiss psychiatrist Carl Jung, whose analytical psychology became an alternative form of depth psychology. Other well-known psychoanalytic scholars of the mid-20th century included psychoanalysts, psychologists, psychiatrists, and philosophers.

Modern perspectives of Psychology

- *Humanistic Approach*
- Humanistic psychology was developed in the 1950s in reaction to both behaviorism and psychoanalysis.

- 
- Humanism focused on fundamentally and uniquely human issues, such as individual free will, personal growth, self-actualization, self-identity, death, aloneness, freedom, and meaning. The humanistic approach was distinguished by its emphasis on subjective meaning,, and concern for positive growth rather than pathology.

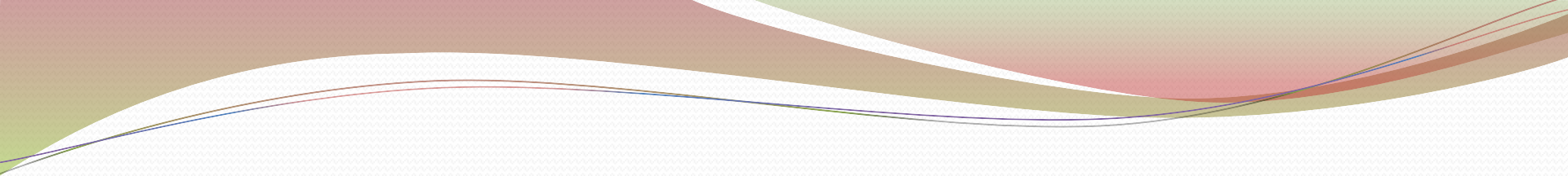
- 
- Abraham Maslow, who formulated a hierarchy of human needs, and Carl Rogers, who created and developed client-centered therapy.

Maslow (1908-1970)



Rogers (1902-1987)



- 
- Later, positive psychology opened up humanistic themes to scientific modes of exploration

Cognitive Approach

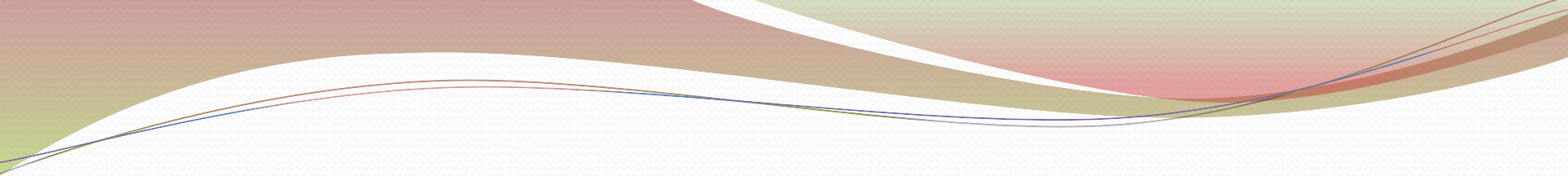
- Cognitive psychology studies mental processes including how people think, perceive, remember, and learn.
- As part of the larger field of cognitive science, this branch of psychology is related to other disciplines including neuroscience, philosophy, and linguistics.

Biological Approach

Searches for the causes of behavior in the functioning of genes, the brain and nervous system, and the endocrine system.

This approach makes four assumptions ;

- Psychological and social phenomena explain in terms of biochemical processes.
- Behavior determined by hereditary factors.

- 
- Analyzing complex behavior into smaller and specific units.
 - Modify behavior by altering biological structures and processes.

Behavioristic Approach

- Focuses on overt behaviors that can be objectively recorded and manipulated.
- Use ABC formula to understand psychological functioning;
- First identify the antecedent (A)
- Second measure the changes in observable behavior(B)
- Third, record the consequences (C)

Psychodynamic Approach

- This views behavior as driven or motivated by powerful mental forces and conflicts.
- Human actions stem from inherited instincts and biological drives.
-).

- 
- *Psychodynamic* because it proposes that the mind (*psyche*) is the source of behavioral energy(*dynamics*)

Evolutionary Approach

- It assumes that human mental abilities , like physical abilities, evolved over millions of years to serve particular adaptive purposes.

Sociocultural Approach

- This approach argues that, to predict individual behavior, it is necessary to take into account very broad influences, including individual's environment, social organization, community, cultural values, and family.

Three Major Forces in Modern Psychology

- **Freudian Psychoanalysis and the offshoots from it are considered the First Force in Psychology. This has been very dominant in the earlier part of the 20th century.**
- **second force in psychology called behaviorism.**

- 
- **Third force in psychology – Humanistic Psychology.**

GOALS OF PSYCHOLOGY

- **Describing what happens**

Psychologists identify & study relationships to understand something about the individual making the responses or about the underlying process that causes or relates responses and stimuli.

Description includes only the external stimuli or features; it stops short of making inferences about motives and emotions.

- 
- Differentiating between normal, healthy and unhealthy behaviors is the cornerstone of psychology.

Explaining what happens

- The attempt to explain behavior based on observation is actually rather difficult due to many factors

Predicting what will happen

- The third goal of psychology is to predict behavior. Psychologists try to determine if a person is likely to make healthy or unhealthy decisions when confronted with certain situations.
- Most of the time, they will use experiments to make their predictions

Controlling what will happen

- Controlling what will happen
- Once we know what happens, why it happens and what is likely to happen in the future, we can exert control over it.
- The ability to control is crucial to validating scientific explanations for behavior.

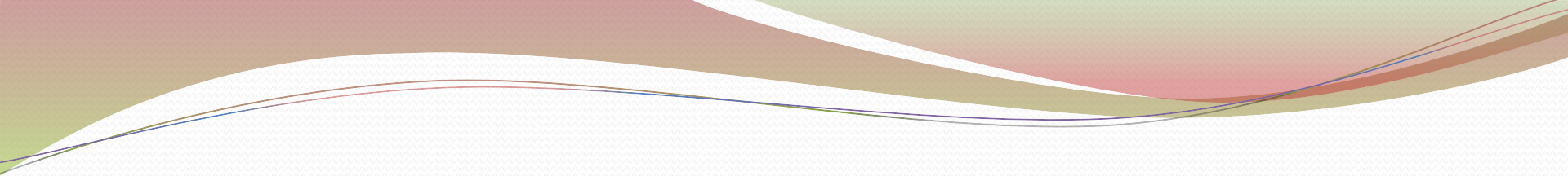
Improving quality of life

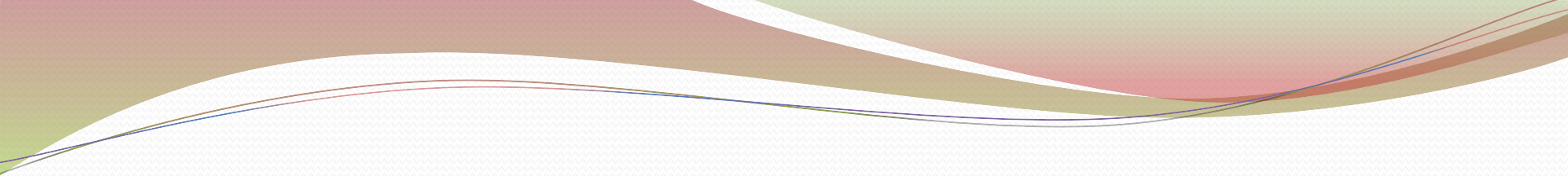
- Not only do psychologists attempt to control behavior, they want to do so in a positive manner, they want to improve a person's life, not make it worse. This is not always the case, but it should always be the intention.
- psychology attempts to voluntarily encourage individuals and groups to modify behavior for long-term healthy gain.

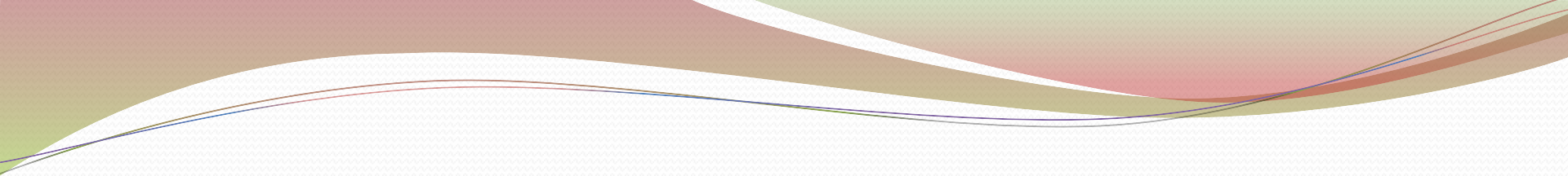
Subfields of psychology

Psychology encompasses a vast domain and includes many different approaches to the study of mental processes and behavior.

Biological psychology, (*Neuropsychology*, *Physiological psychology*, and *Cognitive neuroscience*)

- 
- Biological psychology or [behavioral neuroscience](#) is the study of the biological substrates of behavior and mental processes. There are different specialties within behavioral neuroscience.

- 
- For example, physiological psychologists use animal models, typically rats, to study the neural, genetic, and cellular mechanisms that underlie specific behaviors such as learning and memory and fear responses.↓

- 
- Cognitive neuroscientists investigate the neural correlates of psychological processes in humans using neural imaging tools, and
 - neuropsychologists conduct psychological assessments to determine, for instance, specific aspects and extent of cognitive deficit caused by brain damage or disease.

Clinical psychology and Counseling psychology

- Clinical psychology includes the study and application of psychology for the purpose of understanding, preventing, and relieving psychologically based distress or dysfunction and to promote subjective well-being and personal development.
- Central to its practice are psychological assessment and psychotherapy,

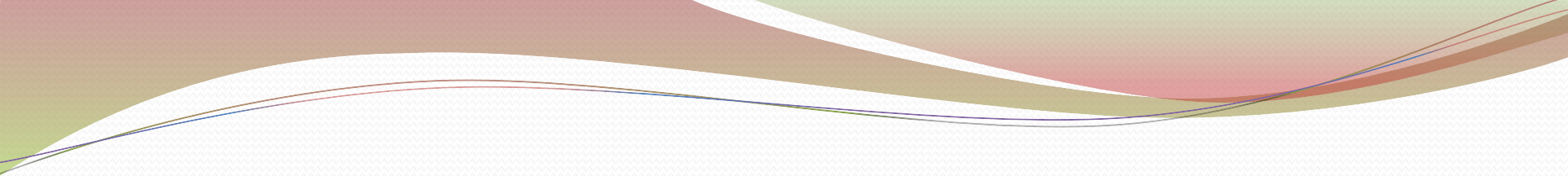
Cognitive psychology

- studies cognition, the mental processes underlying mental activity. Perception, attention, reasoning, thinking, problem solving, memory, learning, language, and emotion are areas of research.
- On a broader level, cognitive science is an interdisciplinary enterprise of cognitive psychologists, cognitive neuroscientists, researchers in artificial intelligence, linguists, human-computer interaction, computational neuroscience, logicians and social scientists. Computational models are sometimes used to simulate phenomena of interest.

- 
- Computational models provide a tool for studying the functional organization of the mind whereas neuroscience provides measures of brain activity.

Developmental psychology

- Mainly focusing on the development of the human mind through the life span, developmental psychology seeks to understand how people come to perceive, understand, and act within the world and how these processes change as they age. This may focus on cognitive, affective, moral, social, or neural development

- 
- **Developmental psychology** - this is the scientific study of systematic psychological changes that a person experiences over the course of his/her life span.



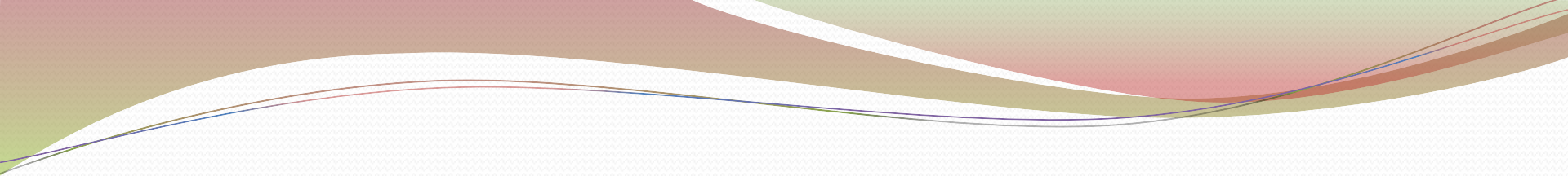
- Developmental psychology also looks and compares innate mental structures against learning through experience.

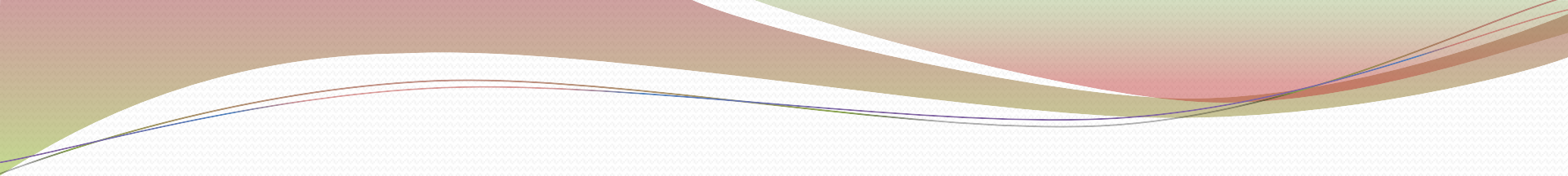
Educational psychology and School psychology

- Educational psychology is the study of how humans learn in educational settings, the effectiveness of educational interventions, the psychology of The work of child psychologists such as Lev Vygotsky, Jean Piaget, Bernard Luskin, and Jerome Bruner has been influential in creating teaching methods and educational practices.

Abnormal Psychology

- Abnormal psychology is the branch of psychology that looks at psychopathology and abnormal behavior.
- The term covers a broad range of disorders, from depression to obsession-compulsion to sexual deviation and many more.
- Counselors, clinical psychologists, and psychotherapists often work directly in this field.

- 
- The Diagnostic and Statistical Manual of Mental Disorders is used by clinicians and psychiatrists to diagnose psychiatric illnesses. Until May of 2013, the DSM-IV-TR was the most recent version of the manual. The DSM is published by the American Psychiatric Association and covers all categories of mental health disorders for both adults and children

- 
- The DSM-IV was originally published in 1994 and listed more than 250 mental disorders. An updated version, called the DSM-IV-TR, was published in..
 - The DSM-IV TR is based on five different dimensions. This multi-axial approach allows clinicians and psychiatrists to make a more comprehensive evaluation of a client's level of functioning, because mental illnesses often impact many different life areas.



- **Axis I: Clinical Syndromes**

This axis describes clinical symptoms that cause significant impairment. Disorders are grouped into different categories, including adjustment disorders, anxiety disorders, and pervasive developmental disorders.

Axis II: Personality and Mental Retardation

- This axis describes long-term problems that are overlooked in the presence of Axis I disorders. Personality disorders cause significant problems in how a patient relates to the world and include [antisocial personality disorder](#) and [histrionic personality disorder](#). Mental retardation is characterized by intellectual impairment and deficits in other areas such as self-care and interpersonal skills.

Axis III: Medical Conditions

- These include physical and medical conditions that may influence or worsen Axis 1 and Axis II disorders. Some examples may include HIV/AIDS and brain injuries.

Axis IV: Psychosocial and Environmental Problems

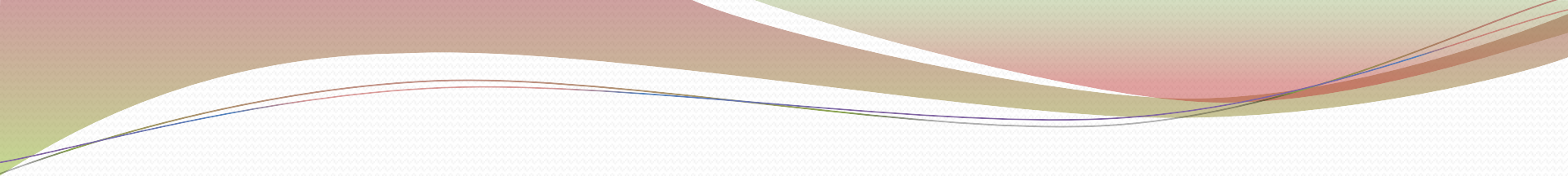
- Any social or environmental problems that may impact Axis I or Axis II disorders are accounted for in this assessment. These may include such things as unemployment, relocation, divorce, or the death of a loved one.

Axis V: Global Assessment of Functioning

- This axis allows the clinician to rate the client's overall level of functioning. Based on this assessment, clinicians can better understand how the other four axes are interacting and the effect on the individual's life.

Neuroscience and Biological Psychology

- Learn more about how the brain and nervous system impact our behavior, thoughts, and feelings.
- What is biopsychology? What do biopsychologists do? Learn the answers to these questions plus find more information on the brain, nervous system, and neurotransmitters.

- 
- **Neuropsychology** - studies the structure and function of the brain in relation to clear behaviors and psychological processes.
 - Neuropsychology is also involved in lesion studies in the brain, as well as recording electrical activity from cells and groups of cells in higher primates, including some human studies.

Evolutionary psychology

- Studies how human behavior has been affected by psychological adjustments during evolution
- An evolutionary psychologist believes that our human psychological traits are adaptations for survival in the everyday environment of our ancestors.

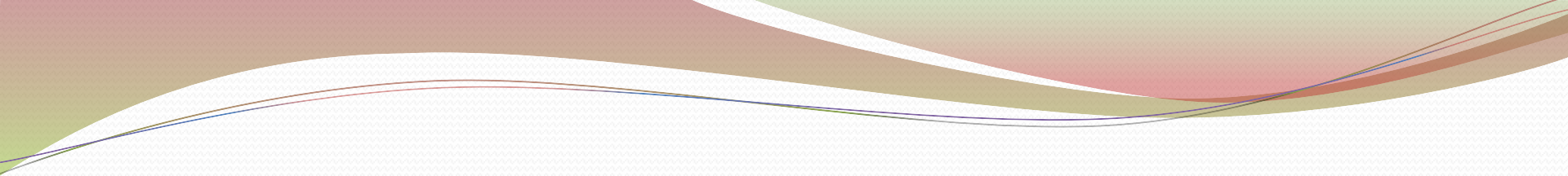
Health psychology

- It is also called behavioral medicine or medical psychology.
- This branch observes how behavior, biology and social context influence illness and health.
- The aim of the health psychologist is to improve the patient's overall health by analyzing disease in the context of biopsychosocial factors.
- Biopsychosocial refers to the biological, psychological, and social aspects in contrast to the strictly biomedical aspects of disease.

- 
- Health psychologists generally work alongside other medical professionals in clinical settings.

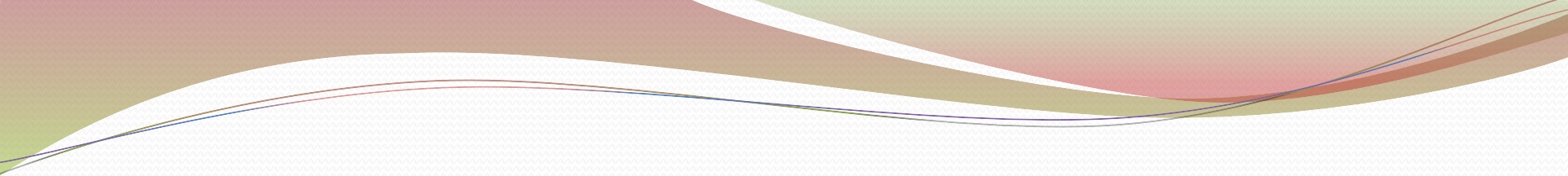
Occupational psychology

- It is also known as industrial-organizational psychology, I-O psychology, work psychology, organizational psychology, work and organizational psychology, occupational psychology, personnel psychology or talent assessment) –
-

- 
- studies the performance of people at work and in training, develops an understanding of how organizations function and how people and groups behave at work.
 - The occupational psychologist aims to increase effectiveness, efficiency, and satisfaction at work.

Social psychology -

- Social psychology uses scientific methods to understand and explain how feeling, behavior and thoughts of people are influenced by the actual, imagined or implied presence of other people.

- 
- A social psychologist will look at group behavior, social perception, non-verbal behavior, conformity, aggression, prejudice, and leadership.
 - Social perception and social interaction are seen as key to understanding social behavior.

Sports Psychology

- Sports psychology is the study of how psychology influences sports, athletic performance, exercise and physical activity. Learn more about this branch of psychology, its history and careers within this field.

Forensic psychology -

Involves applying psychology to criminal investigation and the law.

A forensic psychologist practices psychology as a science within the criminal justice system and civil courts

Forensic psychology involves understanding criminal law in the relevant jurisdictions in order to interact with judges, lawyers and other professionals of the legal system

A forensic psychologist needs to understand the rules, standards, and philosophy of his/her country's judicial system.

Comparative Psychology

- Comparative psychology is the branch of psychology concerned with the study of animal behavior. The study of animal behavior can lead to a deeper and broader understanding of human psychology.

Positive Psychology

- Positive psychology is a branch of psychology focused on understanding human well-being and happiness.

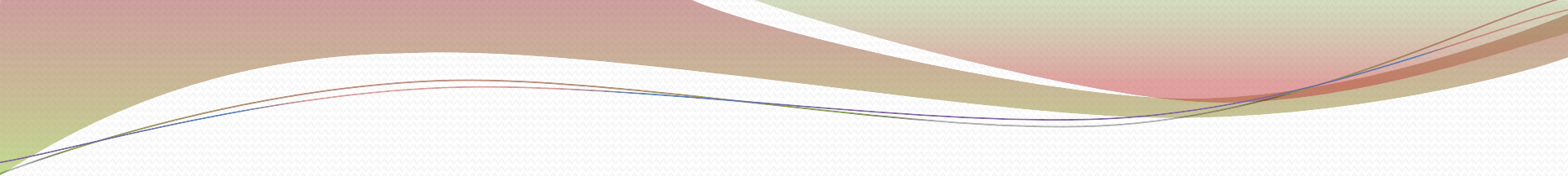
Environmental Psychology?

Whether we know it or not, every day we are affected in some way by the environments we live, work and play in. For example, some environments may make us feel secure or productive, while others may make us feel cramped or nervous.



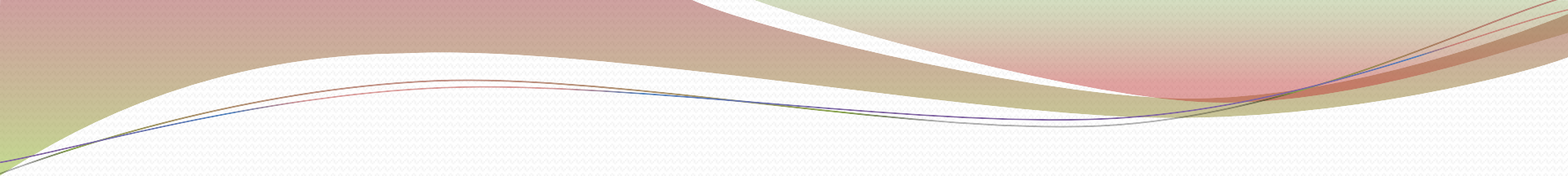
A few of the common environments that humans surround themselves with include:

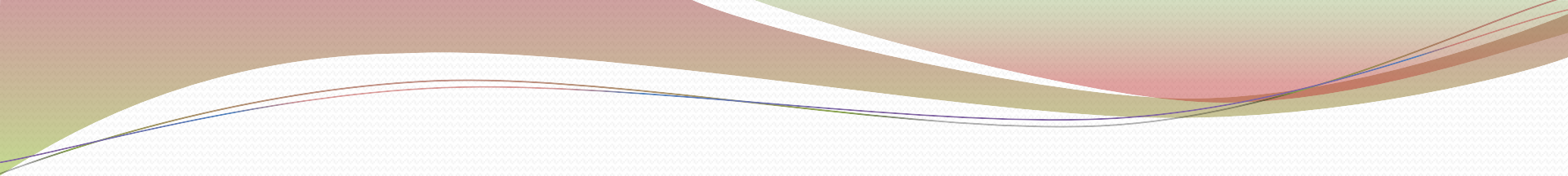
- Homes
- Workplaces
- Schools
- Stores
- Cultural centers

- 
- Towns
 - Cities
 - Natural settings
 - Environmental psychology is a field of psychology that focuses on the study of how humans are affected by their environments, or surroundings.

Military psychology

- Military psychology is the research, design and application of psychological theories and empirical data towards understanding, predicting and countering behaviours either in friendly or enemy forces or civilian population that may be undesirable, threatening or potentially dangerous to the conduct of military operations.

- 
- Military psychology then specializes in looking at this unique combination of stresses that plagues the military and war settings. These stresses include post traumatic stress disorder(PTSD), guilt, family difficulties with the veteran's spouse, nightmares and flashbacks, and many more.

- 
- Military psychology is applied towards counselling and treatment of stress and fatigue of military personnel or military families as well as treatment of psychological trauma suffered as a result of military operations.

Pseudo psychology

- Pseudo psychology is the psychology that is aligned towards the scientific orientation. It is also called pseudoscientific psychology that involves the study of human behavior in an unscientific point of view.



ATTENTION

DR, JAYA A T

ASST. PROFESSOR

DEPARTMENT OF PSYCHOLOGY

PRAJYOTI NIKETAN COLLEGE, PUDUKAD

ATTENTION AND PERCEPTION

- Attention is a central process and perception is not possible without attentional processes. That means attention precedes perception. Attentional processes serve various functions in the organization of our perceptions and other cognitive functions.

The background is a solid teal color. In the four corners, there are decorative white line-art patterns resembling circuit traces or neural network connections. These patterns consist of straight lines of varying lengths and angles, ending in small white circles.

The various functions of attention are :

1. Alerting function
2. Selective function
3. Limited capacity channel
4. Vigilance




• Alerting function:

- Carefully observe a cat poised at the mouse hole. If you look at the cat carefully in such a situation, you will observe that the ears of the cat are directed towards the mouse hole (to receive the slightest sound of movement inside the hole), eyes are converged and focused on the hole (to get visual image of the mouse as it tries to come out), the four leg muscles are in a state of high alert (to pounce at the mouse as it comes out). There is a complete physiological and mental preparedness to catch the prey. This is an example of alertness, what we call an alerting function of attention

- Attention refers to a state of focused awareness with readiness to respond (e.g., if asked some question). Distraction occurs when some interference (e.g. loud noise) prevents the individual to continue with the ongoing task.

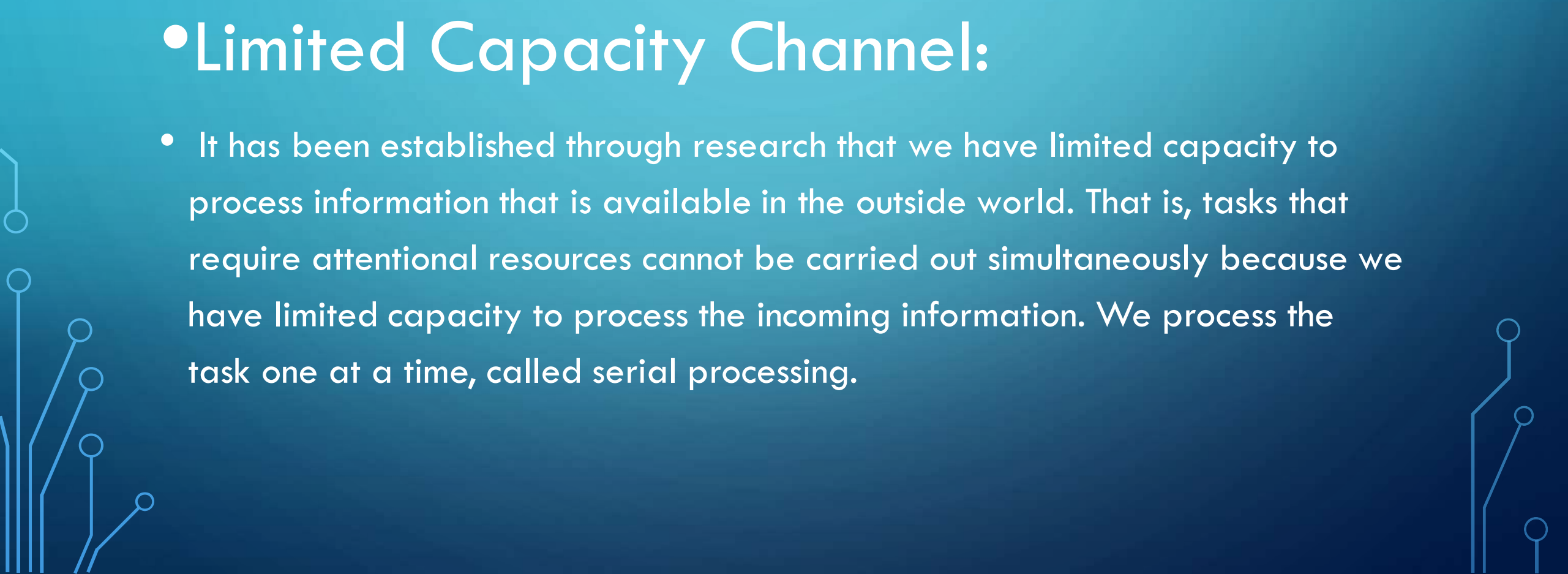


• Selective function:

- The most important function of attention is selectivity. Selectivity refers to a process by which attention is focused on stimulus or stimuli of ongoing interest and other stimuli are ignored. Selective attention acts as a filter, that allows some information in and the other (unwanted) out. The best example of selective attention is that of "tea-party effect" in selective listening (generally referred to as cocktail –party effect)
- 
- 
- 





• Limited Capacity Channel:

- It has been established through research that we have limited capacity to process information that is available in the outside world. That is, tasks that require attentional resources cannot be carried out simultaneously because we have limited capacity to process the incoming information. We process the task one at a time, called serial processing.
- 

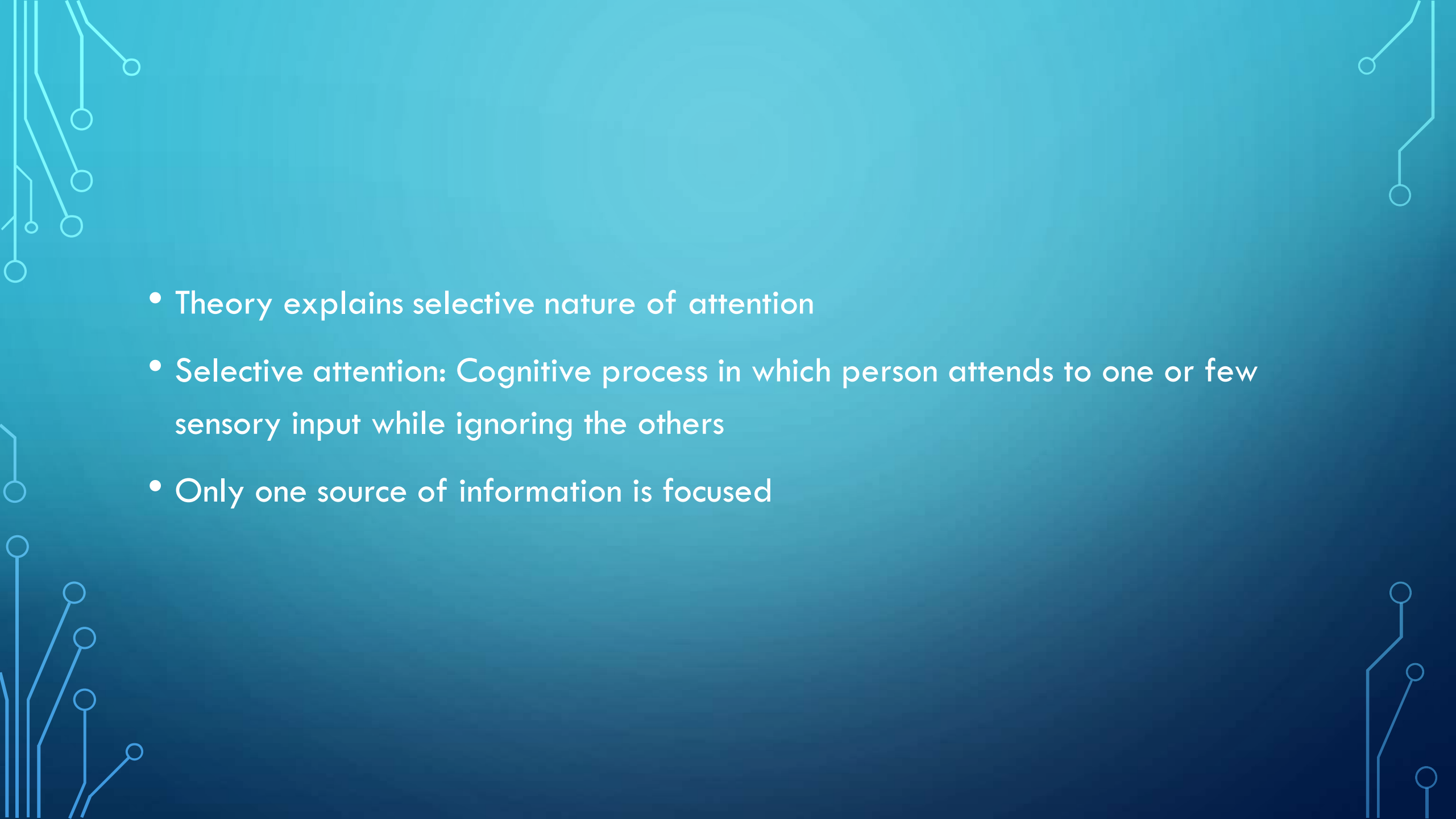


•Vigilance Function:

- Maintaining attention on a task continuously, for some time, like looking at the radar screen, is called vigilance or sustained attention. It has been found that attending to a task for long is taxing, particularly if the task is monotonous and it leads to decrease in performance
- 
- 

THEORIES OF ATTENTION

- Bottleneck theory/information processing approach
 - By Donald Broadbent
 - Individuals have a limited amount of attentional resources that they can use at one time
 - Informations or stimuli are filtered somehow.
 - Only the most relevant is perceived


- 
- Theory explains selective nature of attention
 - Selective attention: Cognitive process in which person attends to one or few sensory input while ignoring the others
 - Only one source of information is focused

PERCEPTION

- Sensation is the process of receiving the sensory information
- Perception is the interpretation of senses
- For the purpose of scientific investigation we consider the sensory system to include

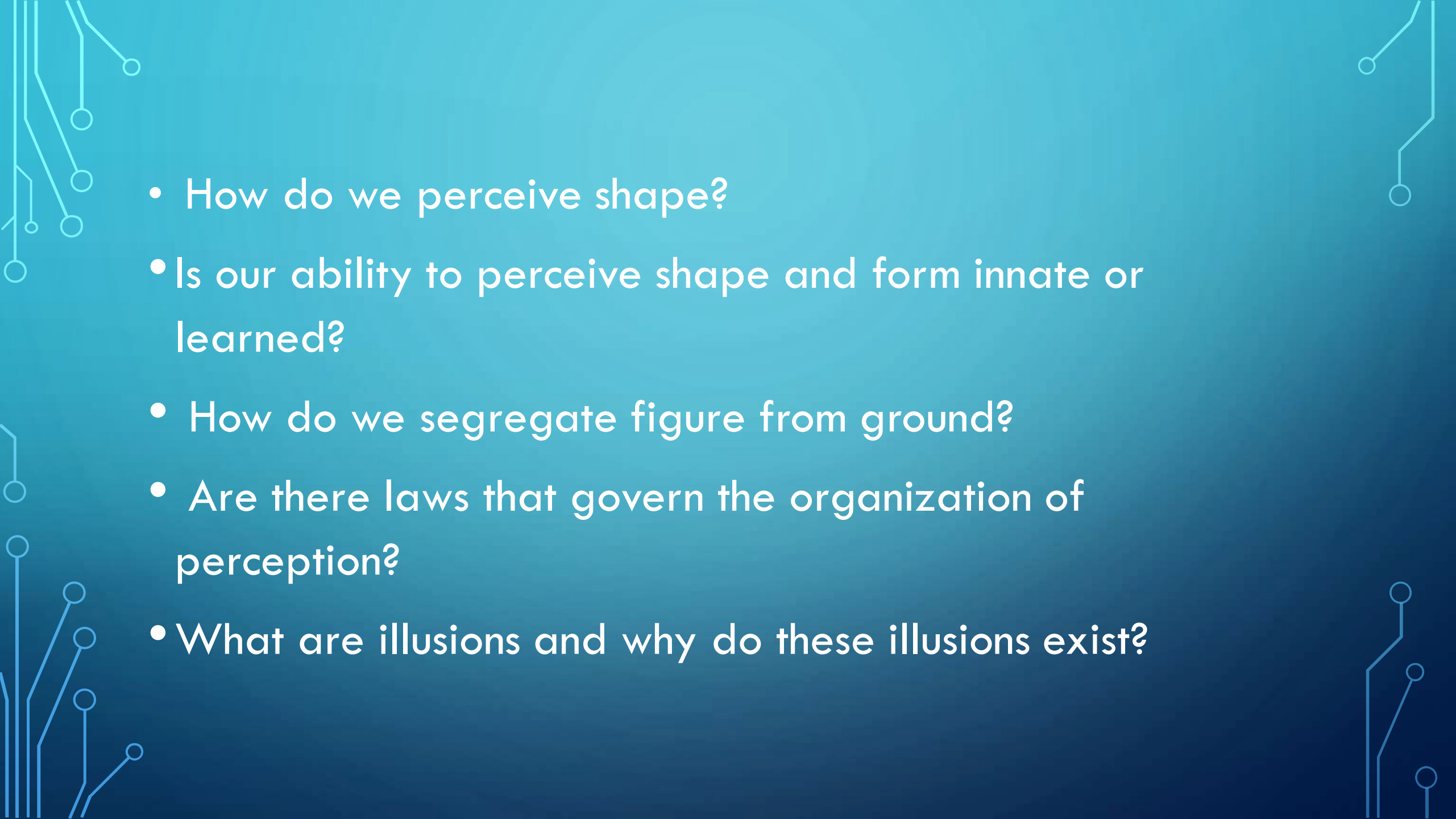






RECEPTION OF STIMULATION BY SENSORY
ORGANS, TRANSDUCTION, TRANSMISSION
OF NEURAL IMPULSES THROUGH AFFERENT
NEURONS, AND REACHING THE APPROPRIATE
AREA IN THE CEREBRAL CORTEX (E.G., VISUAL
STIMULATION REACHING OCCIPITAL LOBE IN
THE CEREBRAL CORTEX).

- Our sensory system gathers information from the external and internal world. Further, by taking into account past experience, knowledge, memory, motivation, cultural background, beliefs, and attitudes, etc. from internal system, the brain makes sense out of the signals that it receives from different sense organs.
- Thus, how we receive information from the external world and with the help of internal system we construct a world of reality. This is what we call perception.

- 
- The slide features a dark teal background with decorative white circuit-like lines in the corners. These lines consist of straight segments connected by right-angle turns, ending in small circles, resembling a stylized PCB or neural network diagram.
- How do we perceive shape?
 - Is our ability to perceive shape and form innate or learned?
 - How do we segregate figure from ground?
 - Are there laws that govern the organization of perception?
 - What are illusions and why do these illusions exist?

PERCEPTION OF SHAPE /FORM

- The terms “shape” and “form” are often used interchangeably.
- Shape or form is defined as areas of visual field that are set off from the rest of the field by visible contour. Werner in 1935 demonstrated how contours are perceived and their role in the perception of shape or form. To perceive a shape, its contours must be sharp enough to mark off region that is called shape.

- To perceive a shape, its contours must be sharp enough to mark off region that is called shape.

- The distinction between figure and background is presented below.
- 1. The figure has a shape, while the ground is relatively shapeless.
- 2. The ground seems to extend behind the figure.
- 3. The figure has some of the characteristics of a thing, whereas the background appears like unformed material.
- 4. The figure usually tends to appear in front, the ground behind.
- 5. The figure is more impressive, meaningful, and better remembered

DETERMINANTS OF FIGURE-GROUND PERCEPTION

- The Gestalt psychologists in Germany, principally
- Kohler, Koffka, and Wertheimer, proposed that the brain has the innate capacity for organizing perceptions

LAWS OF ORGANIZATION

- Laws of Perceptual Organization
- (i) **Good Form (Law of Pragnanz):** This law states that perceptual organization will always be as “good” as the prevailing conditions allow. The simplest organization requiring the least cognitive effort will always emerge. Pragnanz means that we perceive the simplest organization that fits the stimulus pattern

- (ii) Proximity: All the stimuli that occur together in space or time will be organized together. In Figure 5.3 you can observe three groups of two vertical lines. You will find it difficult to see six individual lines.

- (iii) Similarity: Other things being equal, elements which are similar in structure or have common characteristics will be grouped together.

- (iv) Closure: An incomplete figure will be seen as a complete one. We have the tendency to fill the gaps and perceive it as a complete figure

PERCEPTION OF SPACE

- Perception of space also refers to the perception of size and distance. The problem emerges from the fact that the image of the three dimensional world is projected on the two dimensional retina. This raises the question:
- From the two dimensional image, how do we perceive the three dimensional world?
- Or in other words how do we perceive depth and distance?

- **Distance:** This refers to the absolute spatial extent (D) between the observer and the object. See Figure 5.8 a. Corresponding to the physical distance (D) there is a perceived distance (D') sometimes referred to as apparent distance also

- we perceive depth and distance with the help of various cues available to us. These cues may be divided into three categories
 - i. Non- Visual Cues
 - ii. Binocular Cues
 - iii. Monocular Cues.

NON-VISUAL CUES

- **Accommodation and Convergence are the two non-visual cues.**
- These cues are called 'non-visual' because they do not emanate from the retinal image, as is the case with other cues.



- The image of the external objects is focused on the retina with the help of lens in the eye. The lens is adjusted by the Ciliary muscles to focus far and near objects on the retina. The ciliary muscle changes the convexity of the lens so that the image of the object is clearly focused and this process is called accommodation.

- **Convergence:** When you read the letters of this printed line, you converge your eyes (with the help of six intraocular muscles located outside each eye) to bring the image in both eyes to fall on the fovea of each eye for fusion and clear vision.

- The extent of convergence achieved is signaled to the brain and this provides a cue to distance. For example, if the object is nearer the angle of convergence will be large and as the object goes farther away the angle of convergence decreases. For objects at a far away distance the eyes are more or less parallel.

MONOCULAR CUES

- Monocular Cues are also called pictorial cues because they include the kind of depth information found in the photographs and paintings. These cues are extensively used by the artists in their paintings.

- 
- Interposition
 - Aerial perspective
 - Linear perspective
 - Lights and Shadows
 - Familiar size
 - Texture-Density Gradient
 - Motion parallax
 - shadow
- 



- **Interposition:** When an object (A) partially blocks another object (B), the object blocked is perceived farther away than the object blocking it
- **Aerial perspective:** When you look at buildings in the city, buildings close by look clearer and their boundaries (contours) are well defined in comparison to distant ones, which look gray and hazy. The buildings, trees, and other objects that look hazy are perceived far away in comparison to those which look clear.

- (c) Linear Perspective: When parallel lines recede into the distance, as rail road tracks, they converge towards a point in your retinal image
- (d) Lights and Shadows : We are often aware of the source and direction of light. It is generally from above, as sunlight. The shadows cast by one object on another can indicate which object is farther away.

- **Familiar size:** When we look at an object which is away from us we can interpret the distance from the retinal image by taking into account the familiar size.

- **Texture gradient/Texture-Density Gradient** : This texture gradient is a cue to distance. The objects lying on a surface that look fine and smooth in texture are perceived at greater distance than those objects on a rough surface.

Binocular Cues

BINOCULAR CUES

- Binocular cues, unlike the two cues discussed above, emanate from the retinal image itself. These cues are:
 - a. Double images
 - b. Binocular disparity

- **Double images:** You have already learnt that when we fixate our eyes on an object in space, fusion takes place and we see one object. However, when we fixate on an object, all other objects nearer or farther than the fixation point fall on the non-corresponding points and produce double images.

- **Binocular Disparity:** Objects that are nearer and farther than the fixation point project their retinal images on the non-corresponding or disparate areas of the two retinas. Greater the distance from the fixation point, greater will be the binocular disparity. That is, disparity increases as the distance of the object from the fixation point increases.

- **Depth:** It is the Relative spatial extent between two objects as viewed by the observer. For example, the relative extent between the two trees as viewed by the observer Corresponding to the physical depth is the perceived depth, the depth perceived by the individual.
- **Size:** the object has a physical size (S) that is out there. The individual perceives this, it is called perceived size (S').



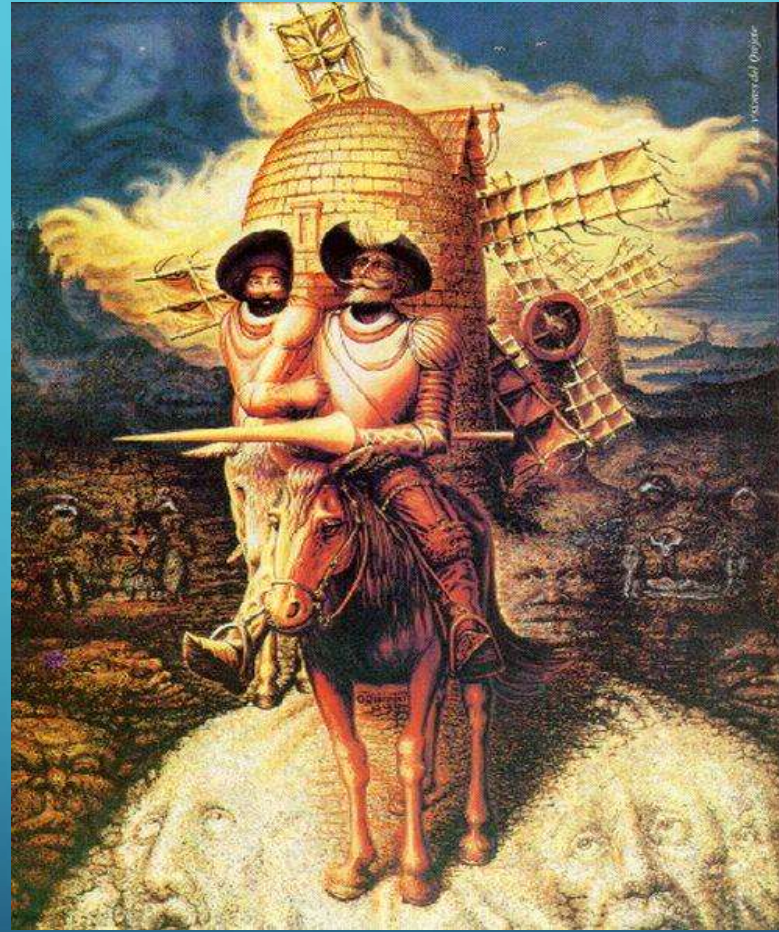
YOUNG LADY VS OLD LADY OPTICAL ILLUSION

THIS IS DEFINITELY ONE OF THE MOST AMAZING **OPTICAL ILLUSIONS** OF ALL TIMES! WHAT DO YOU SEE AT FIRST GLANCE - AN OLD LADY OR A YOUNG LADY? THEY ARE BOTH THERE! MOUTH OF THE OLD WOMAN IS NECKLACE OF YOUNG WOMAN AND NOSE OF THE OLD LADY IS CHIN OF THE YOUNG LADY



YOUNG VS OLD FACE ILLUSION

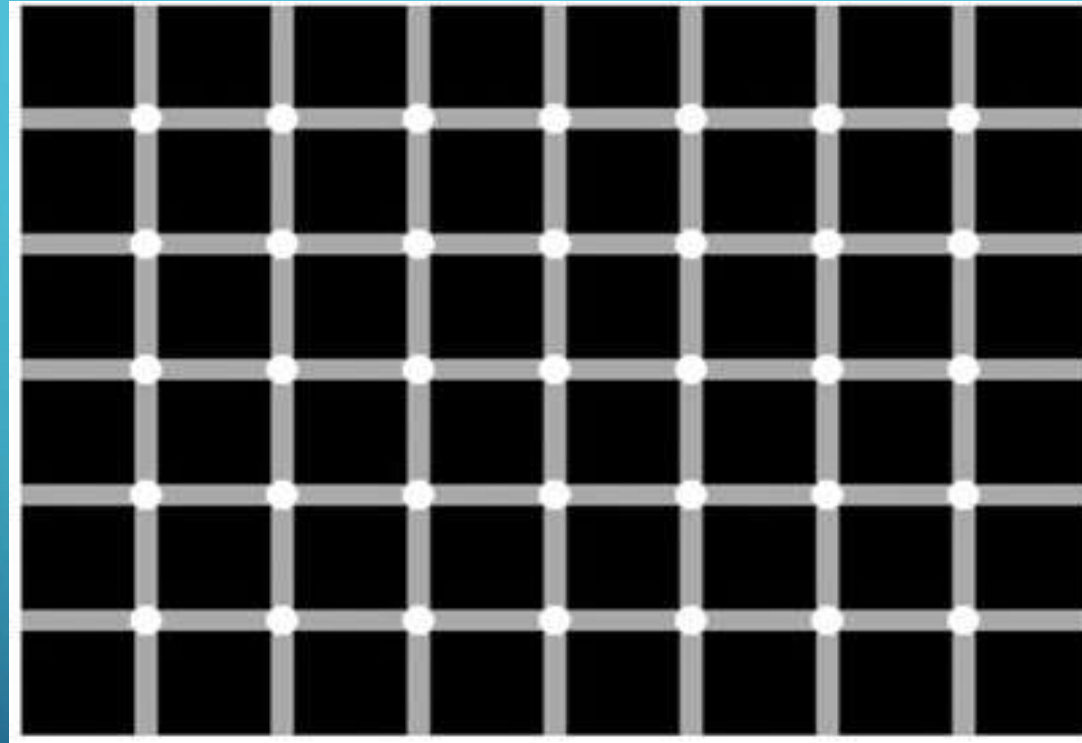




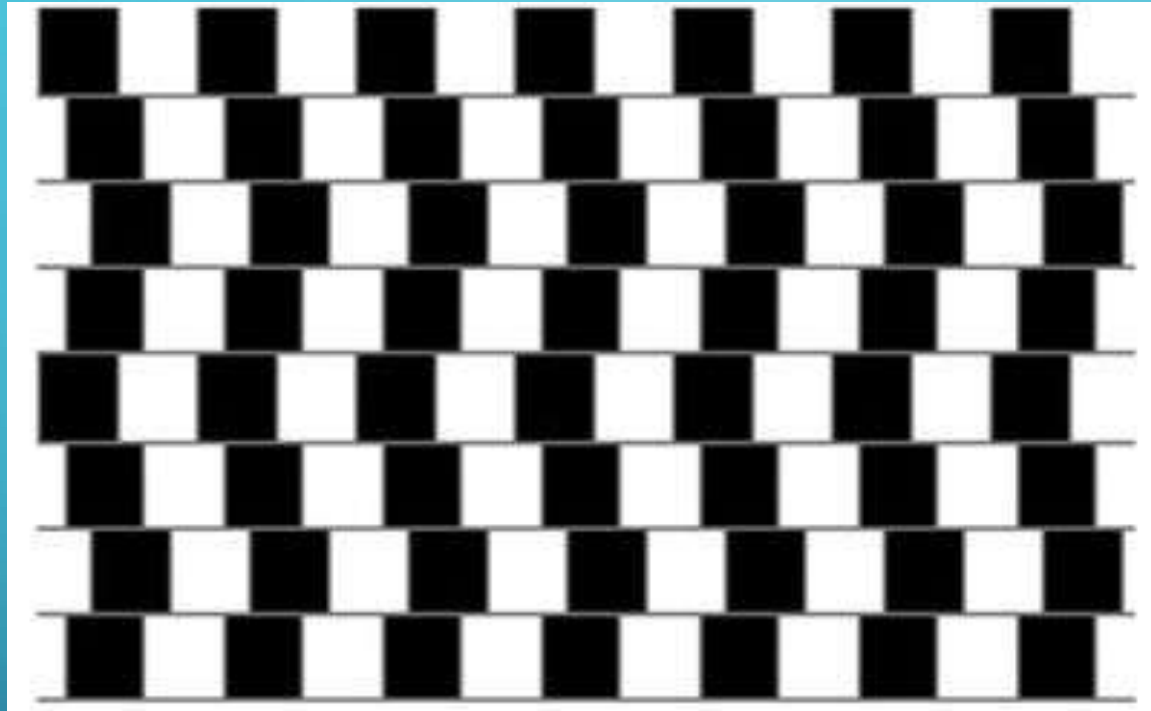
IS THE LADDER GOING UP OR DOWN

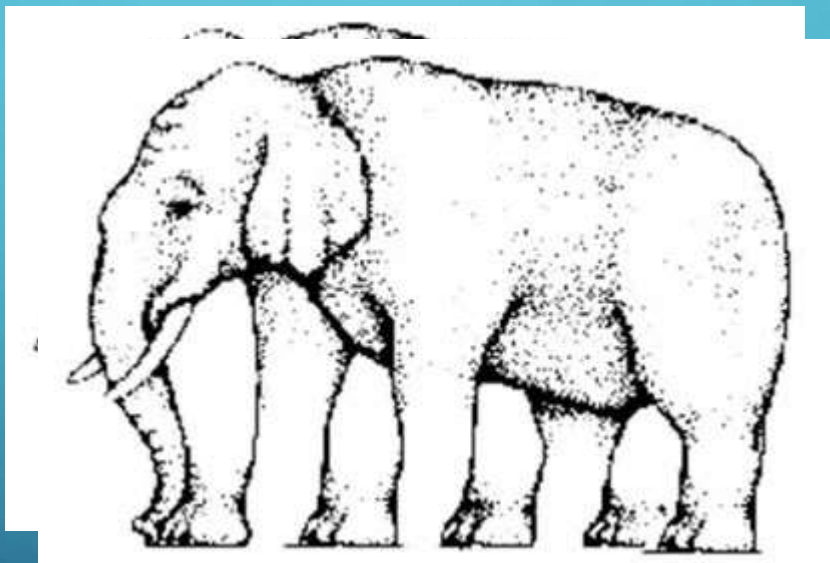


ARE THE DOTS IN BETWEEN THE SQUARES WHITE, BLACK OR GREY?



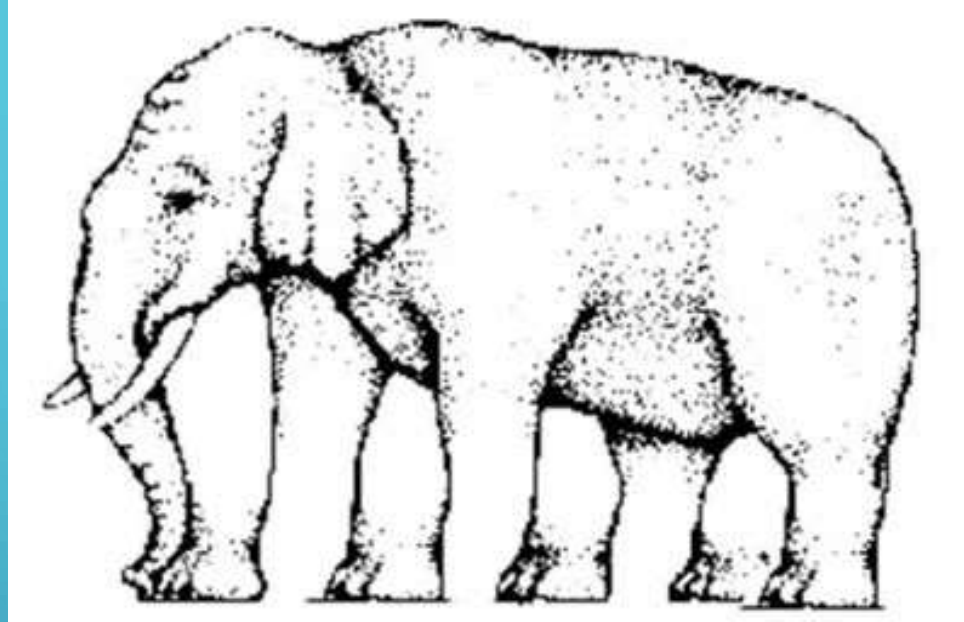
ARE THE LINES PARALLEL OR CROOKED?



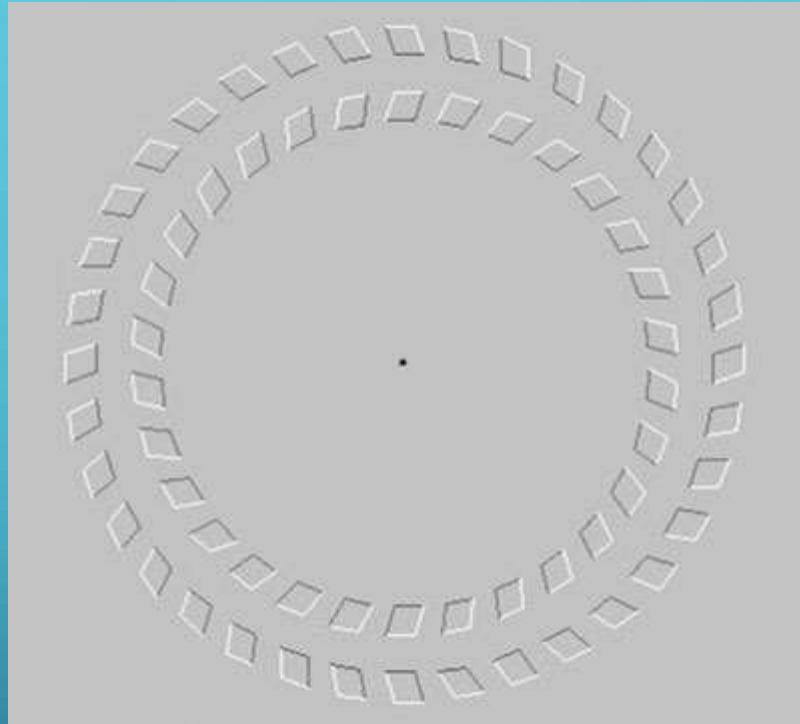




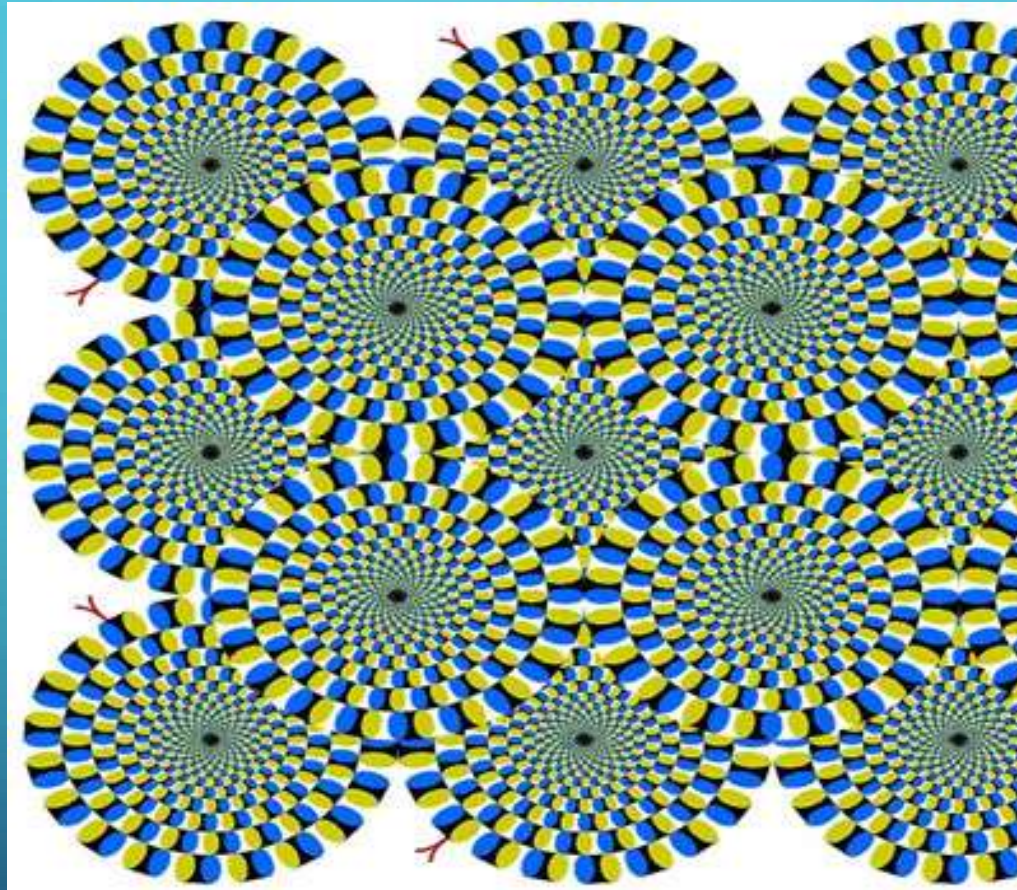
HOW MANY LEGS ELEPHANT HAVE?



FOCUS ON THE DOT IN THE MIDDLE AND THEN MOVE YOUR HEAD BACKWARDS AND FORWARDS.



IS THIS PICTURE STILL OR MOVING?



THIS IS A REAL AMAZING ILLUSION! FOCUS ON THE 4 DOTS IN THE MIDDLE OF THE PICTURE FOR 30 SECONDS. THEN LOOK AT A BLANK WALL AND SEE WHAT YOU SEE OR MORE IMPORTANTLY - WHO DO YOU SEE? MAYBE BLINK YOUR EYES A FEW TIMES TO FIND OUT.



SUBLIMINAL PERCEPTION

- The term **subliminal** is derived from the terms sub (below) and limen (threshold), and it refers to **perception** so subtle it cannot reach conscious awareness.

- A subliminal message, also called a hidden message, is one that's designed to pass below the normal limits of perception.
- They're inaudible to the conscious mind, but audible to the unconscious, or deeper, mind.

- Subliminal messages in advertising rely on that concept, and is the practice of using words or images (stimuli) that consumers don't consciously detect.
- It often involves words being flashed on a screen so briefly, we don't detect them. We're talking .003 seconds brief.
- Subliminal messaging in advertising was first introduced as a concept by James Vickery, and later reiterated by Vance Packard in his 1952 book *The Hidden Persuaders*.

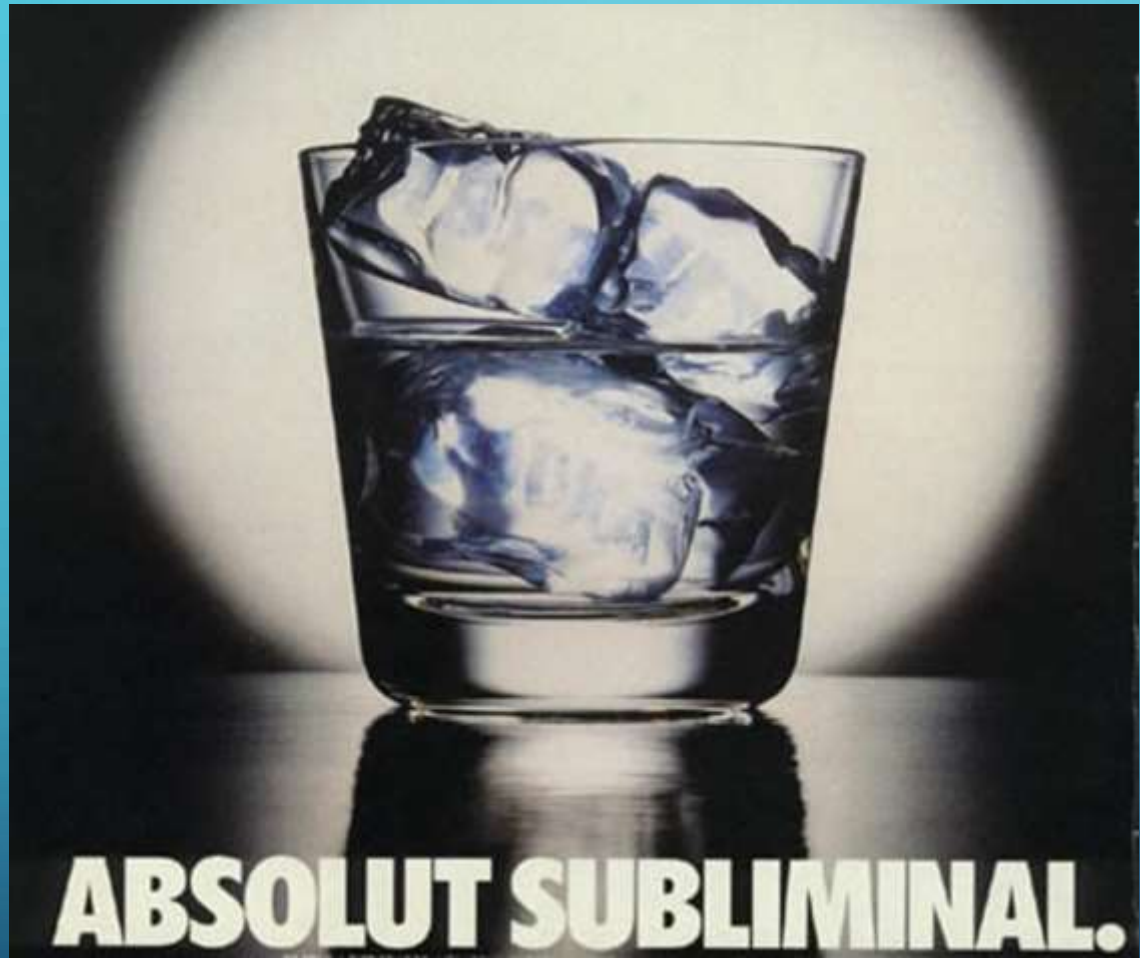
- The concept of subliminal perception is of considerable interest because it suggests that peoples' thoughts, feelings and actions are influenced by stimuli that are perceived without any awareness of perceiving.





*This image is hosted on
ebaumsworld.com*

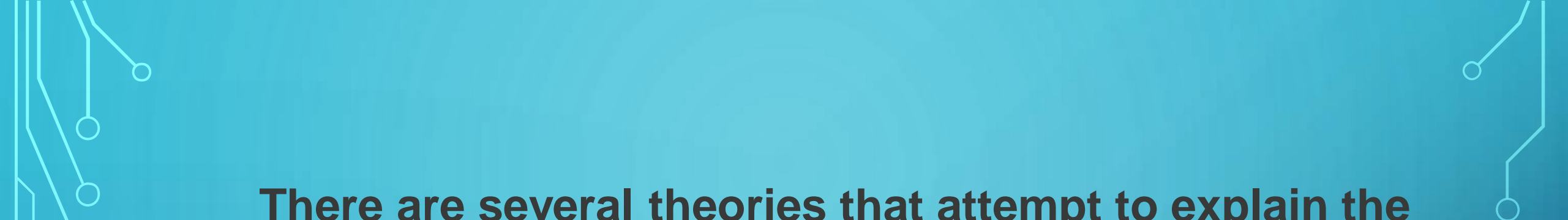




ABSOLUT SUBLIMINAL.

A photograph of a movie theater interior. The screen is illuminated with a white background and displays the text "DRINK COCA-COLA" on the top line and "EAT POPCORN" on the bottom line. The audience is visible in the foreground as dark silhouettes against the bright screen. The theater walls are dark, and the overall lighting is dim, typical of a cinema.

DRINK COCA-COLA
EAT POPCORN

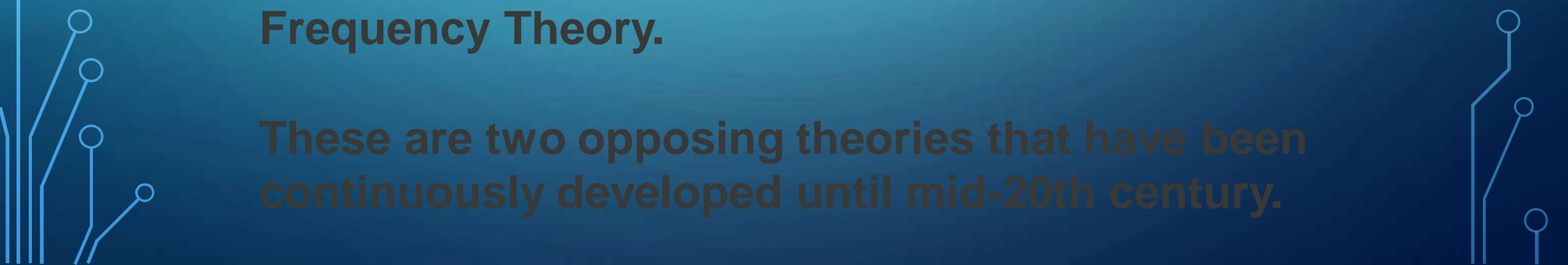



There are several theories that attempt to explain the perceptual processing of sound sensation. However, the most

referred to hearing theories are the Place Theory and the

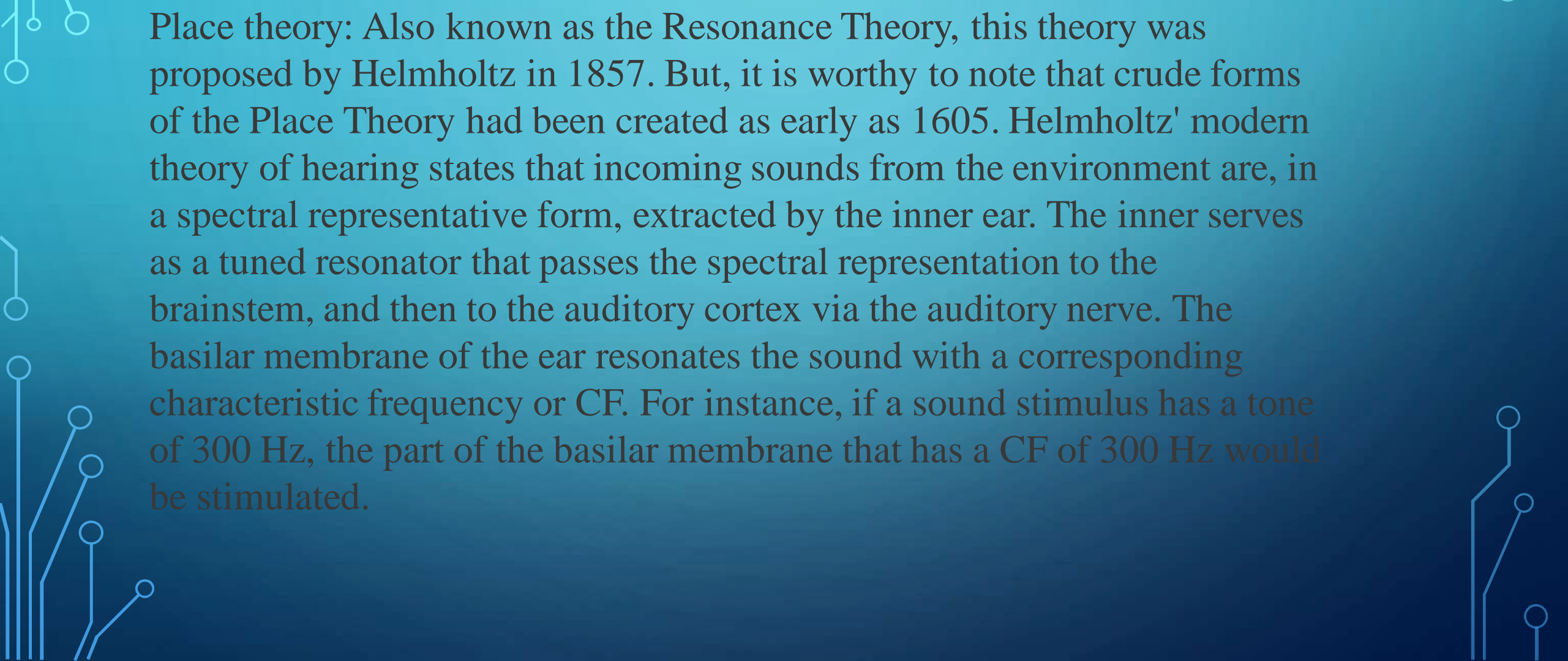
Frequency Theory.

These are two opposing theories that have been continuously developed until mid-20th century.








Place theory: Also known as the Resonance Theory, this theory was proposed by Helmholtz in 1857. But, it is worthy to note that crude forms of the Place Theory had been created as early as 1605. Helmholtz' modern theory of hearing states that incoming sounds from the environment are, in a spectral representative form, extracted by the inner ear. The inner ear serves as a tuned resonator that passes the spectral representation to the brainstem, and then to the auditory cortex via the auditory nerve. The basilar membrane of the ear resonates the sound with a corresponding characteristic frequency or CF. For instance, if a sound stimulus has a tone of 300 Hz, the part of the basilar membrane that has a CF of 300 Hz would be stimulated.



- Critics of the Place Theory of hearing argued that most often than not, characteristic frequencies are hard to determine below 120 Hz.



• **Frequency Theory**

- Rinne (1865) and Rutherford (1880) proposed the early forms of the Frequency theory of hearing. Their theories were known as telephone theories due to the similarity between the waveform of speech sound in a telephone line and the incoming sound signal to the human brain. The theory gives an assumption that the firing rate of the auditory nerve has a wide range of 20 to 20,000 times per second. This assumption is important in relation to the theory's suggestion that the incoming sound waveform has a time domain representation that is associated with the manner or rate at which the auditory nerve fires. The said time domain representation, as well as the frequency analysis, is theorized to be processed in the brain, rather than in the inner ear.
- 
- 
- 

- The studies done in the late 20th century have proven the Frequency Theory incorrect in its assumption of the firing rate of the auditory nerve. Today, it is widely accepted that individual nerve fibers, including that of the auditory nerve, can only fire at a range of 300 to 500 times per second. Neural groups can only fire with frequencies up to 5000 Hz.
- Most psychologists agree that hearing sound stimuli at low frequencies is accounted to the frequency theory, whereas those at high frequencies are attributed to the place principle. Sound stimuli in mid frequencies are believed to be rightfully accounted to both hearing theories.

Auditory Perception

Dr, Jaya A T

Asst. Professor

Department of Psychology

Prajyoti Niketan college, pudukad

- Sound waves are usually generated by a vibrating object like a light.
- Sound waves have certain characteristic like
 - 1.amplitude,
 - 2.wavelength, and their purity affect the psychological qualities of
- loudness, pitch, timbre respectively.

- Wavelength of sound are described in terms of their frequency, which is measured in cycles per second, or hertz (Hz).
- Sounds of higher frequency are perceived as louder.
- Human can hear sounds ranging in frequency from 20 Hz to 20,000 Hz.

Theories of auditory perception

- Theories explain how sound waves are physiologically translated into the perception of pitch, loudness, timbre.

Place theory

- Hermann Von Helmholtz in 1863.
- specific sound frequencies vibrate specific portions of the basilar membrane, producing distinct pitches.
- The perception of pitch depends on the vibration of different portions or places, along the basilar membrane.
- .

- Hair cells on the basilar membrane at a different location respond independently.
- Different set of hair cells are vibrated by different sound frequencies.
- The brain then detects the frequency of a tone according to which area along the basilar membrane is most active

Frequency theory

- Rutherford in 1886.
- perception of speech depends on the rate, or frequency, at which the centre basilar membrane vibrates.
- The whole basilar membrane vibrates in response to sounds.
- A particular sound frequency, for example; 3,000 Hz, causes the basilar membrane to vibrate at a rate of 3000 times per second.
- The brain detects the frequency of a sound by the rate at which the auditory nerve fibre fire.

- But later research proved that neurones are hard pressed to fire at a maximum rate of thousand impulses per second.
- So in the case of 4000 Hz neuron cannot generate 4000 impulses per second.

Volley theory

- Wever and Bray (1937)
- group of hair cells operate according to the volley principle.
- The volley principle holds that groups of auditory nerve fibers fire neural impulses in rapid succession, creating volleys of impulses. These volleys exceed the 1000-per-second
- limit. Studies suggest that auditory nerves can team up like this to generate volleys of up to 5000 impulses per second (Zwisiocski,1981).
- Recent research found that pitch perception depends on both place and frequency coding of vibrations along basilar membrane (Goldstein,1996). Sounds under 1000 Hz appear to be translated into pitch through frequency coding. For sounds between 1000 and 5000 Hz, pitch perception seems to depend on a combination of frequency and place coding. Sounds over 5,000 Hz seem to be handled through place coding only.

- Recent research
- Perception depends on both place and frequency coding of vibrations along basilar membrane (Goldstein, 1996).
- Sounds under 1000 Hz appear to be translated into pitch through frequency coding.
- For sounds between 1000 and 5000 Hz, pitch perception seems to depend on a combination of frequency and place coding.
- Sounds over 5,000 Hz seem to be handled through place coding only.

Visual perception

- The retina contains millions of receptor cells that are sensitive to light.
- Cones & Rods
- Colour perception depends on complex blends of three properties of light.
 - **Wavelength** is most closely related to **hue or colour**,
 - **amplitude to brightness**, and
 - **purity to saturation**.

Trichromatic theory of colour vision

Hermann Von Helmholtz, 1852

- tri means three and
- chroma means colourHermann Von Hin elmholtz 1852.
- human eye has three types of receptors with differing sensitivities to different light wavelengths.
- Specialised receptors sensitive to the specific wavelengths associated with the red, green, and blue.
- other colours just the mixing of these three primary colours.
- normal colour vision is based on activity of three receptors.

- Most people who are colour blind are dichromats; that is they make do with only two colour channels.
- Colour blindness is a deficiency in distinguishing among colours.
- Three types of dichromats, and each type is insensitive to a different colour (red, green, and blue, although the latter is rare) (Gouras, 1991).
- The **three** deficiencies seen among dichromats support the idea that there are three channels for colour vision as proposed by trichromatic theory.

Opponent process theory of colour vision

- Ewald Hering (1878).
- colour perception depends on receptors that make and stick responses to three pairs of colours.
- The three pairs of opponent colours are
 - red versus green,
 - yellow versus blue,
 - black versus white.

- Activation of one member of the pair inhibits its activity in the other.
- No two members of the bear activity same time.
- This theory could explain why don't we experience
- colour bluish yellow,
- reddish green etc.
- There are ganglion cells in the retina that are excited by green and inhibited by red.
- Other ganglion cells in the retina work just in the opposite way as predicted in opponent process theory.

Granit's theory of color vision

Arthur Granit (1947)

- The perception of color relies on the activation of three types of cells:
- (a) scotopic dominators, which are retinal rods most sensitive to wavelengths of 500 nm;
- (b) photopic dominators, which are retinal cones most sensitive to wavelengths of 560 nm; and
- (c) photopic modulators, other cones sensitive to very narrow frequency ranges and respond to both light adapted and dark adapted eye.

Hartridge's polychromatic theory

Hartridge in 1950 s

- There are seven receptors in our retina. These are divided into 3 units
- First unit is **tricolour unit** consists of receptors for **orange, green and blue**
- Second unit is **dicolour unit** consists of receptors for **yellow and blue**
- Third unit is also **dicolour unit** and consists of receptors for **red and green**



• Thank You

ILLUSION

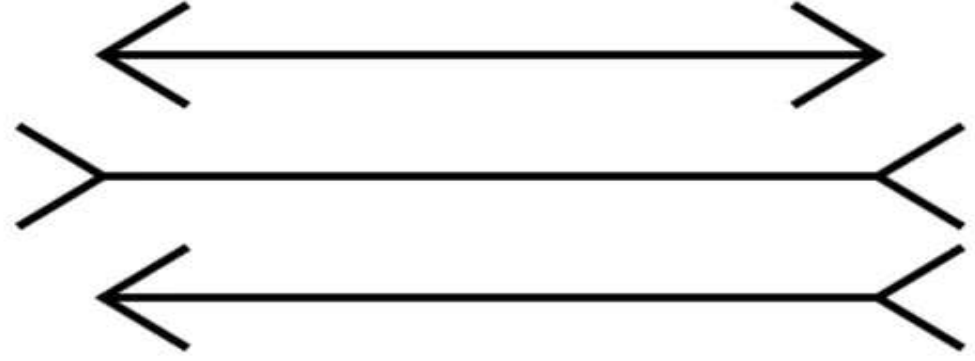
Dr. Jaya A T
Assistant Professor
Dept of Psychology
Prajyoti Niketan College, Pudukad



Illusion

- In the three-dimensional world, this principle allows us to perceive a tall person as tall whether they are standing next to us or off in the distance. When we apply this same principle to two-dimensional objects





Illusion

'geometrical-optical illusions'.

One explanation for how the Vertical-Horizontal Illusion works is the 'misapplied size constancy scaling' hypothesis which is also used to try and explain the Müller-Lyer Illusion.

- The Muller-Lyer illusion is a well-known optical illusion in which two lines of the same length appear to be of different lengths. The illusion was first created by a German psychologist named Franz Carl Muller-Lyer in 1889.



- For most people, the line with the fins of the arrow protruding outward (the center line) appears to be the longest, while the line with the arrow fins pointing inwards appears shorter. While your eyes might tell you that line in the middle is the longest, the shafts of both lines are exactly the same length, as shown in the bottom half of the image.



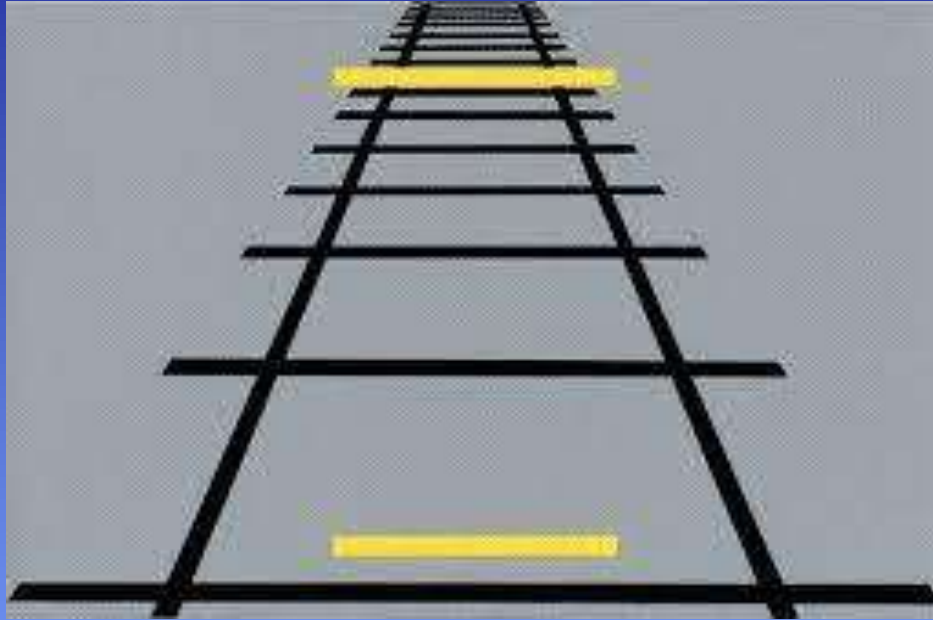
- The Depth Cue Explanation
- Depth plays an important role in our ability to judge distance. One explanation of the Muller-Lyer illusion is that our brains perceive the depths of the two shafts based upon depth cues. When the fins are pointing in toward the shaft of the line, we perceive it as sloping away much like the corner of a building. This depth cue leads us to see that line as further away and therefore shorter.

- The Conflicting Cues Explanation
- R. H. Day suggests that the Muller-Lyer illusion occurs because of conflicting cues.
- Our ability to perceive the length of the lines depends on the actual length of the line itself and the overall length of the figure.
- Since the total length of one figure is longer than the length of the lines themselves, it causes the line with the outward-facing fins to be seen as longer.

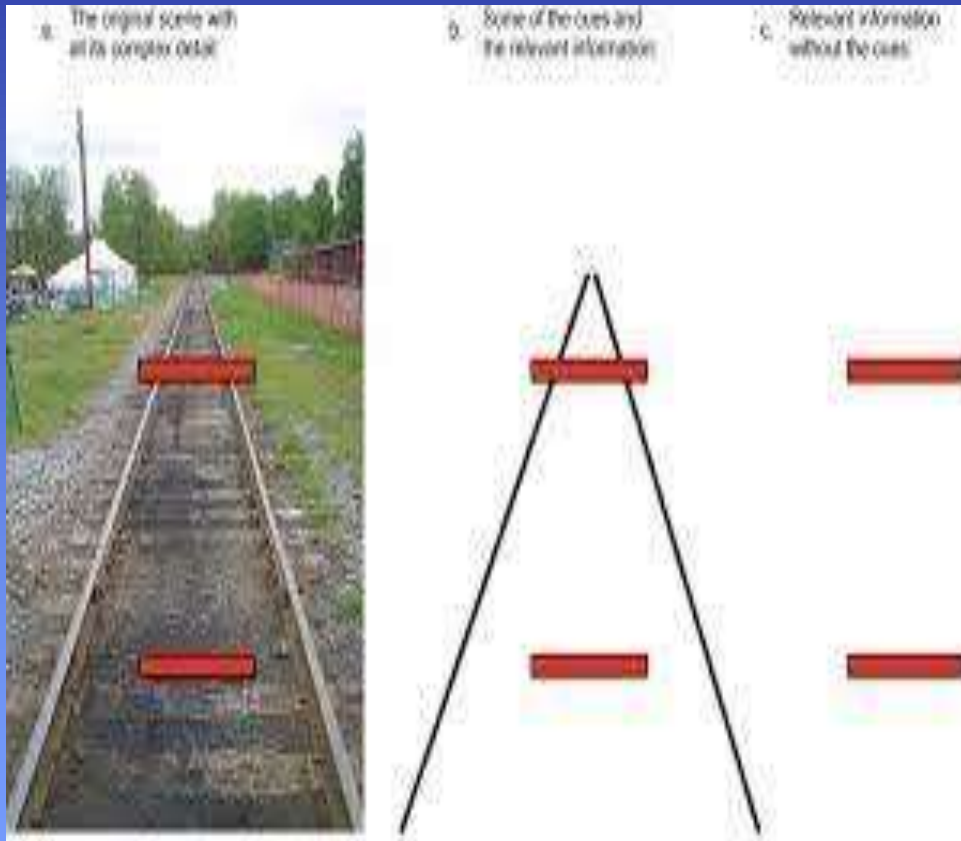


- Ponzo illusion is a geometrical-optical illusion that was first demonstrated by the Italian psychologist Mario Ponzo in 1911. He suggested that the human mind judges an object's size based on its background. He showed this by drawing two identical lines across a pair of converging lines, similar to railway tracks.





پہلے
چلو



moon illusion

- The Moon illusion is an optical illusion which causes the Moon to appear larger near the horizon than it does higher up in the sky.



moon illusion



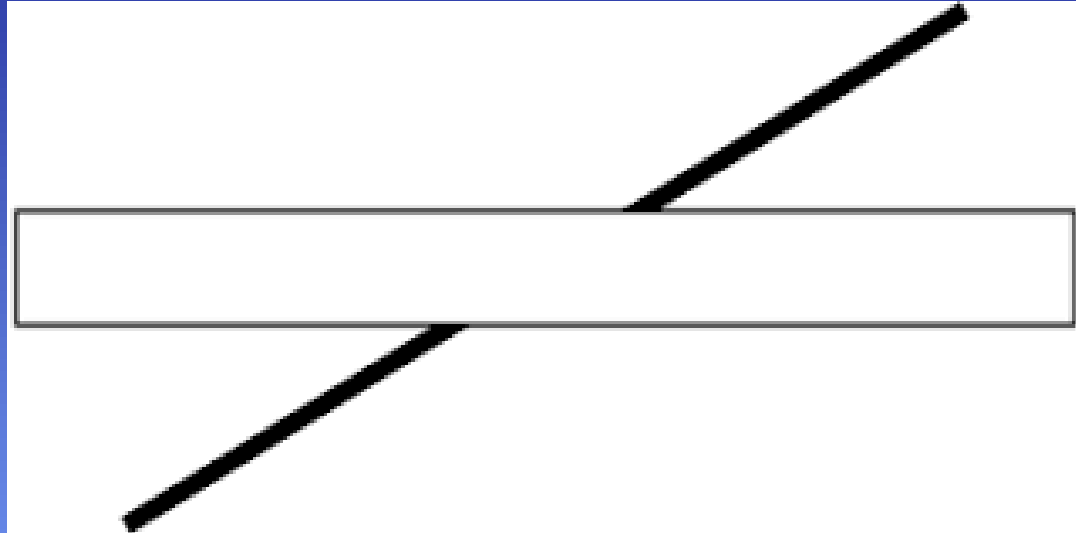
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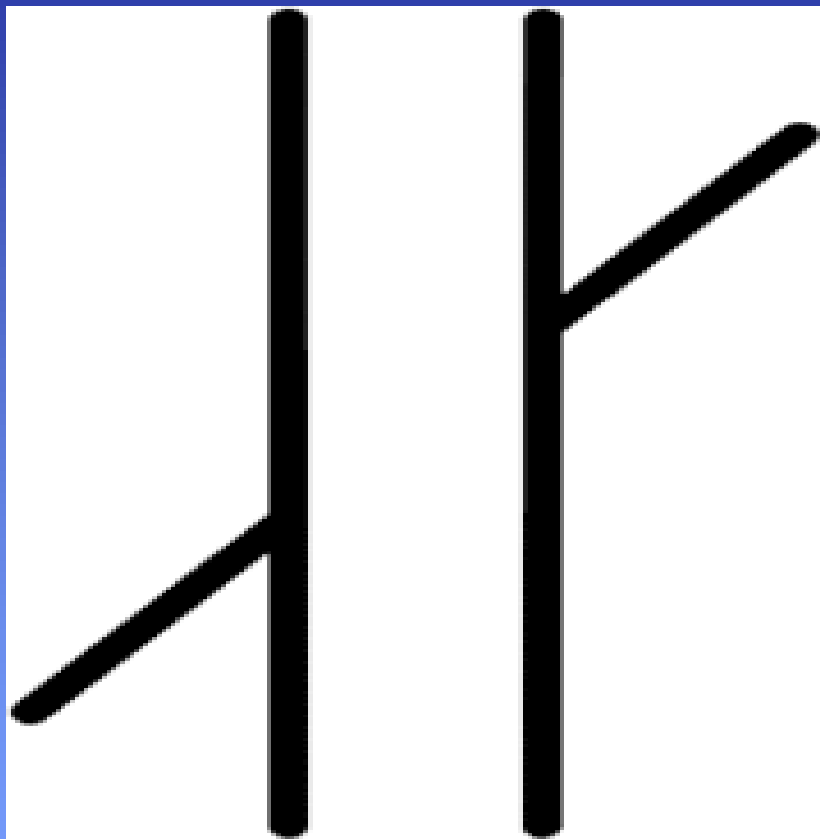
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Poggendorff illusion

- The Poggendorff illusion is a geometrical-optical illusion that involves the misperception of the position of one segment of a transverse line that has been interrupted by the contour of an intervening structure.





Apparent Motion

Phi Phenomenon: When lights flash at a certain speed they tend to present illusions of motion. Neon signs use this principle to create motion perception.



One light jumping from one point to another: Illusion of motion.

Chapter 5-Consciousness

What is Consciousness?

Chapter 5-Consciousness
Dr Nice Mary Francis P
Asst Professor
Department of Psychology
Prajyoti Niketan College,Pudukad



How would YOU define consciousness?

- Consciousness is a state of awareness and responsiveness
- Events in the environment
- Your own mental processes and inner awareness
 - Example: Your knowledge of your feelings, thoughts, and memories.

The Nature of Consciousness

- What is consciousness?
 - Your awareness of external events
 - your awareness of internal sensations
 - your awareness of yourself as a unique being having experiences
 - your awareness of your thoughts about these experiences
- The critical element in consciousness is awareness!

Is consciousness a black or white state?

- No, Consciousness is a spectrum that ranges from low to high levels of awareness.



LOW

Unconscious

Awake

HIGH



Very Alert

Some Early Definitions

- **Consciousness:** All the sensations, perceptions, memories, and feelings you are aware of in any instant
 - **Waking Consciousness:** Normal, clear, organized, alert awareness
- **Altered State of Consciousness (ASC):** Awareness that is distinctly different in quality or pattern from waking consciousness
- **Consciousness is NOT** an all-or-nothing phenomenon—it exists on a continuum

History of Consciousness

- 1. Psychology began as a science of consciousness.
- 2. Behaviorists argued about alienating consciousness from psychology.
- 3. However, after 1960, mental concepts (consciousness) started reentering psychology

Feeling Sleepy?

How many hours do you sleep a night?



What do you know about sleep?

True or false?

1. Teens who fall asleep in class have are just lazy.

False! Teens need at least 8.5 – 9.25 hours of sleep each night, compared to an average of seven to nine hours each night for most adults.
2. Health problems such as obesity, diabetes, hypertension, and depression are unrelated to the amount and quality of a person's sleep.

False!
3. The older you get, the fewer hours of sleep you need.

False!
4. During sleep, your brain is very active.

True!
5. If you wake up in the middle of the night, it is best to lie in bed, count sheep, or toss and turn until you eventually fall back asleep.

False!

Biological Rhythms

Biological rhythms are controlled by internal “biological clocks.”

1. Annual cycles: On an annual cycle, geese migrate, grizzly bears hibernate, and humans experience seasonal variations in appetite, sleep, and mood.

Seasonal Affective Disorder (SAD) is a mood disorder people experience during dark winter months. Biological rhythms are controlled by internal “biological clocks.”

Did you know?

Did you know that we spend about $\frac{1}{3}$ of our lives asleep. If you live to be 75 years old you will have slept about 25 years!

An average 20 year old student has spent about 6 years asleep!

Measuring Sleep Changes

- Electroencephalograph (EEG): Brain-wave machine; amplifies and records *electrical* activity in the brain
- Beta Waves: Small fast waves associated with alertness and being awake
- Alpha Waves: Larger, slower waves associated with relaxation and just before falling asleep
- Delta waves: Very large and slow waves associated with a move to deeper sleep and a further loss of consciousness.

Researchers have established what happens during sleep, but not why we sleep.

One theory is that we sleep because we are tired. In other words, sleep has a restorative function, like rebooting a computer.



Is it important to
maintain a regular bed
and wake time?

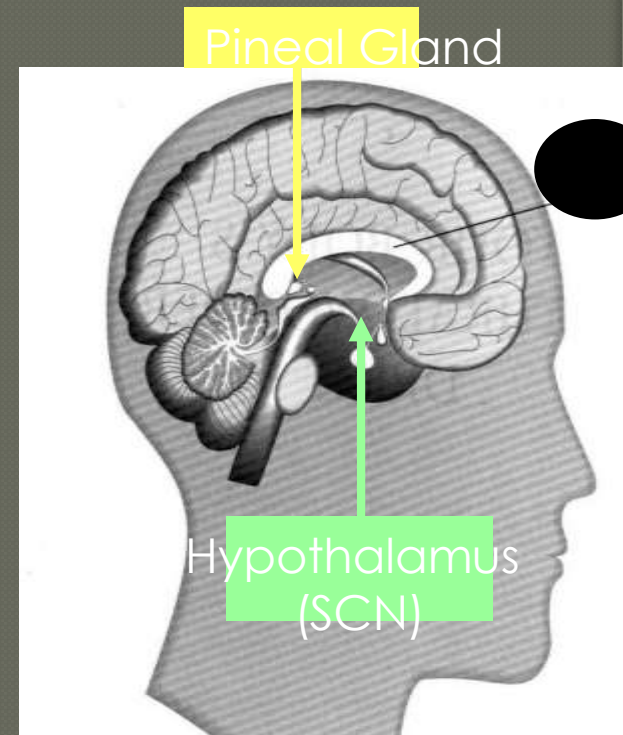




- Humans and other animals have an internal biological clock called the *circadian rhythms*
- These patterns vary over approximately a 24-hour cycle and occur even in the absence of normal cues about whether it is day or night
- Responsible for body functions including:
 - Hormone levels
 - Sleep and wakefulness
 - Blood pressure
 - Body temperature

The Brain's Control of Circadian Rhythms

- Generated by the suprachiasmatic nucleus (SCN)
 - Regulates the pineal gland's secretion of the hormone – *melatonin*
 - Increases in *melatonin* produce drowsiness



Can your clock get out of whack?

- Yes, problems can occur if someone works through the night and sleeps during the day
- Also experienced with jet lag
 - We are awake when our circadian rhythm cries “SLEEP!”
 - To speed up resetting your biological clock after a long flight – spend time outdoors
 - Bright lights help reset our biological clocks

Morning People versus Evening People

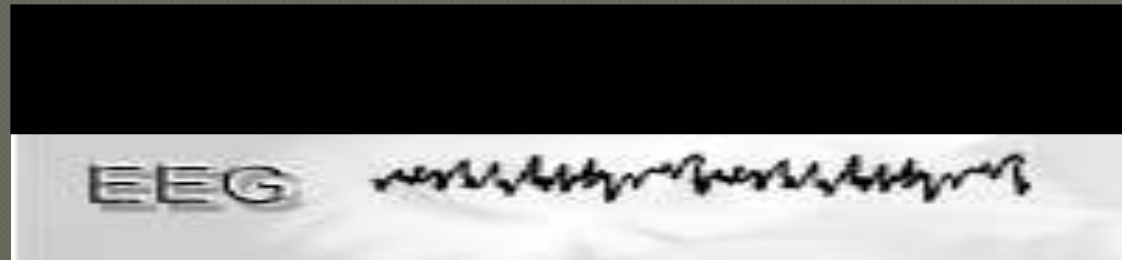
- Morning people awaken early and full of energy – doing their best work before noon
 - Most people over 65 are morning people
- Evening people take longer to warm up in the morning – doing their best work in the afternoon or evening
 - Most young people are evening people

Isn't sleep all the same?

- No, the use of the EEG shows variations in brain waves which determine different stages of sleep.
- There are 5 Stages of sleep
 - (4) Non REM and (1) REM
- During an 8 hour period, people typically progress through all 5 full cycles,
 - Each cycle lasts about 90 minutes

Non REM Sleep

- When awake, brain waves show a high frequency, low amplitude pattern



- **NREM** (non-rapid eye movement) sleep involves increasing bodily relaxation
 - Slower EEG activity occurs
 - The heart rate and respiration are slower during NREM

Non-REM Stages of Sleep

- NREM brain waves are of low amplitude and are fast, with mixed frequencies
 - Brain activity changes with each stage
- People become more difficult to awaken as they progress through the four stages of NREM sleep.

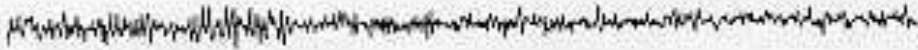
Stages of Sleep

- Stage 1: Small, irregular waves produced in light sleep (people may or may not say they were asleep)
 - Hypnic Jerk: Reflex muscle twitch throughout body that may occur in Stage 1
- Stage 2: Deeper sleep; sleep spindles (bursts of distinctive brain-wave activity) appear
- Stage 3: Deeper sleep; Delta waves appear; very large and slow
- Stage 4: Deepest level of normal sleep; almost purely Delta waves

States of Sleep

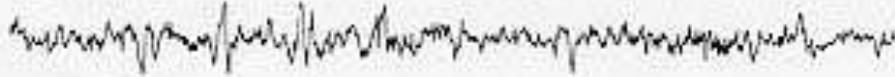
- Rapid Eye Movements (REM): Associated with dreaming; sleep is very light.
 - Body is very still during REM sleep.
 - Lack of muscle paralysis during REM sleep is called *REM Behavioral Disorder*.
- Non-REM (NREM) Sleep: Occurs during stages 1, 2, 3, and 4; no rapid eye movement occurs.
 - Seems to help us recover from daily fatigue.

Awake



← Awake

Stage 1 sleep



— Neural activity unsynchronized

Stage 2 sleep



— Start of longer, slower brain activity
(beginning to synchronize)

Stage 3 sleep



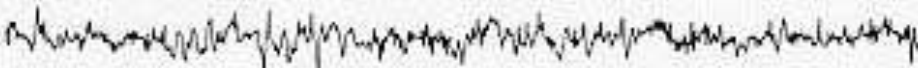
— Neural activity more synchronized
(delta waves)

Stage 4 sleep



— Neural activity highly synchronized
(delta waves)

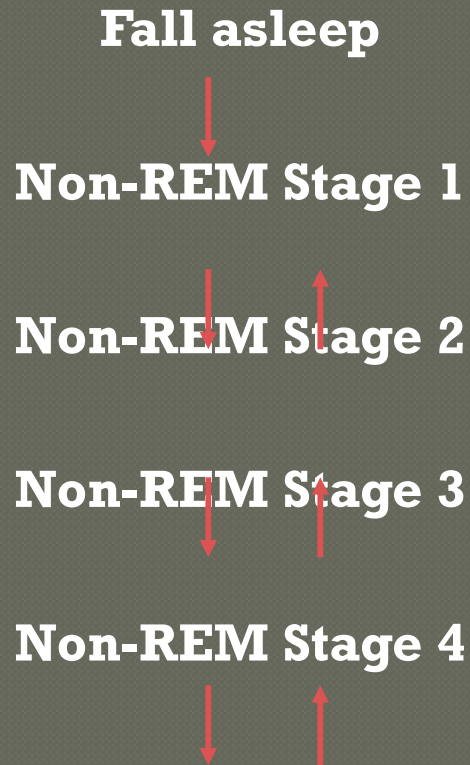
REM sleep



— Neural activity unsynchronized

Non-REM Sleep

◆ Sleepers take about 30 to 40 minutes to go through the four stages of NREM sleep



- Rapid eye movement (REM)

- This stage of sleep is characterized by high-frequency, low-amplitude brain wave activity

- Occurs only after people go through first 4 stages of NREM



- REM is difficult to distinguish from being awake on the basis of physiological measures
- During REM sleep breathing and heart rate increase
 - The same rate as if we were awake



Function of REM Sleep

- Memory storage- REM Helps consolidate memories
- Brain areas that are active during the learning of the task become active again during sleep
- Performance on tasks usually improves if you test someone a day after they've learned the task
 - As long as they get at least 6 hours of sleep

-
- ◉ REM dreams tend to be longer, more vivid, and involve more detail and movement.
 - However, dreaming occurs during all sleep stages.
 - ◉ Paralysis of muscles occurs so we cannot act out our dreams.

What Happens When We Don't Get Enough Sleep?



Do YOU Get Enough Sleep?

Sleep Deprivation Quiz



Sleep Deprivation

- The longer people go without sleep—the sleepier they get and the worse their performance becomes
- A fatigued, sleep deprived person may experience:
 - Impaired concentration diminished productivity
 - Tendency to make mistakes
 - Irritability
 - A depressed immune system
 - Greater vulnerability to accidents

Sleep Deprivation

- Research on total sleep deprivation with humans is not possible
- However, rats totally deprived of sleep die
 - lose inability to regulate body temperature
 - lose weight

Chapter 5-Sleep Disorders

CLASS OBJECTIVES-

What are Sleep Disorders?

Narcolepsy

Insomnia

Sleep apnea

Night terrors

Sleep walking

The EEG is used to help diagnose sleep disorders



Sleep disorders quiz... True or False?

- Approximately 70 million people in the United States are affected by a sleep problem. **True**
- If you regularly doze off unintentionally during the day, you may need more than just a good night's sleep.
- If you snore loudly and **True** persistently at night and are sleepy during the day, you may have a sleep disorder.
- Narcolepsy is a sleep disorder marked by "sleep attacks."
- **True** The primary cause of insomnia is worry.

True

Sleep Disturbances

- **Insomnia: Difficulty in getting to sleep or staying asleep, or waking early**
 - **Temporary Insomnia: Brief period of sleeplessness caused by worry, stress, and excitement.**
 - Avoid fighting it and read a book, for example, until you're struggling to stay awake.
 - **Chronic Insomnia: Exists if sleeping troubles last for more than three weeks.**
 - Adopt regular schedule; go to bed at the same time each night, for example.

- *Insomnia* involves problems in going to sleep or maintaining sleep.
- 10% of the population experience insomnia at sometime and is often associated with anxiety or depression.
- People with insomnia may actually sleep as much as norm, but quality of sleep tends to be poor and don't feel rested (Dement, 1999).

Parasomnias include
abnormal disturbances
during sleep

These include nightmares, night
terrors, sleep walking and sleep
talking

More Sleep Disturbances

- Sleepwalking (Somnambulism): Occurs in NREM sleep during Stages 3 and 4
- Sleepwalking: Speaking while asleep; occurs in NREM sleep



Sleepwalking

- Sleep Disorder characterized by walking or other activity while seemingly still asleep.
- Sleepwalking is common in children 6-12 years old. It may occur at any age and it appears to run in families.
- Sleepwalking affects approximately 1% to 17% of children and is more frequently seen in boys.
 - The incidence of sleepwalking decreases with age.

Sleepwalking

- Sleepwalkers are NOT acting out a dream-brainwave activity of sleepwalkers indicate that they are in stage 4 sleep.
- There is no danger in waking a sleepwalker. most likely you cannot because they are so deeply asleep.

Nightmares vs. Night terrors

- **Nightmares: Bad dreams**
 - Occur during REM sleep
 - May occur once or twice a month; brief and easily (unfortunately) remembered
 - Imagery Rehearsal: Mentally rehearse the changed dream before you go to sleep again; may help to eliminate nightmares
- **Night Terrors: Total panic and hallucinations may occur**
 - Occurs during Stage 4 sleep
 - Most common in childhood; may occur in adults

Night Terrors

- Night Terrors is a sleep disorder in which a person experiences symptoms of a panic attack
- The child can usually be seen sitting upright in state of sheer panic.
 - Scream, breathe rapidly appear awake- yet person is not fully conscious
- This disorder is most common in children between ages 3-8 and disappears as the child grows older.

Sleep Disorders

- Sleep apnea causes airflow into the lungs stop for at least 15 seconds.
 - The sleeper stops breathing, chokes, then awakens briefly. Rather than choking awake, some choke and die (Skatrud & Pappard, 2004).
- People with this disorder can have as many as 100 episodes per night.



Consequences of Sleep Apnea

- People with sleep apnea get poor-quality sleep and feel extremely sleepy during the day.
- The person may have:
 - Memory loss
 - Suffer from severe headaches or work-related accidents.
- Sleep apnea may also lead to high blood pressure, heart disease, heart attack, and stroke.

Sleep Disorders are
divided into two major
diagnostic categories:

Dyssomnias and Parasomnias

Approximately two-thirds of adult
suffer from sleep problems, and
about 25% of children under the
age of 5 have sleep disturbance

What is Narcolepsy?



Sleep Disorders

- People who experience sudden, uncontrollable episodes of sleep have Narcolepsy.
- Main symptoms:
 - Fall asleep suddenly and unexpectedly
 - Excessive daytime sleepiness and
 - Abnormal REM sleep.



Who's effected by this sleep disorder?

- This disorder is fairly common, 33% of the population experience symptoms of sleep apnea.
- Middle-aged, overweight men are at risk, but even children can have this disorder.



Can it be treated?

- Several effective therapies have been developed, including minor surgery or the use of a machine that affects airway pressure.





I just CAN'T sleep!!

Insomnia is the most common
dyssomnia effecting as many as one in
ten people each year!

Dreams

- REM Rebound: Extra rapid eye movement sleep following REM sleep deprivation
- Psychodynamic (Freudian) Theory: Emphasizes internal conflicts, motives, and unconscious forces
- Wish Fulfillment: Freudian belief that many dreams are expressions of unconscious desires
- Manifest content vs. Latent content
- Dream Symbols: Images that have a deeper symbolic meaning
- Activation-Synthesis Hypothesis: Dream content may be affected by motor commands in the brain (that occur during sleep) that are not carried out

**Dreams as wish fulfillment
(Freud)**



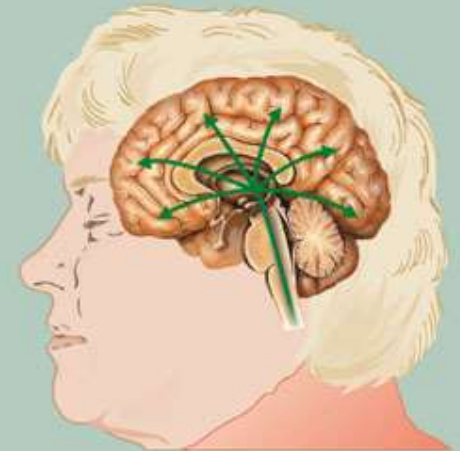
The day residue shapes dreams that satisfy unconscious needs.

**The problem-solving view
(Cartwright)**



We think through major problems in our lives.

**Activation-synthesis model
(Hobson & McCarley)**



A story is created to make sense of neural activation.



Figure 5.14 Three theories of dreaming

Hypnosis

- Altered state of consciousness characterized by intensely narrowed attention and increased openness to suggestion
 - Mesmer: Believed he could cure diseases by passing magnets over body; true “animal magnetism” (“mesmerize” means to hypnotize)
 - Must cooperate to become hypnotized
- Hypnotic Susceptibility: How easily a person can be hypnotized—this is a stable, measurable trait

Hypnosis: Altered State of Consciousness or Role Playing?

- **Hypnosis** = a systematic procedure that increases suggestibility
- **Theories of hypnosis**
 - Role Playing (Barber & Spanos)
 - people act out the “role” of hypnotized subjects and do what they think hypnotized people should do
 - Altered State of Consciousness (Hilgard)
 - people dissociate by splitting awareness into two separate simultaneous streams of awareness
- **Hypnotic susceptibility:** individual differences
- **Effects produced through hypnosis:**
 - Anesthesia
 - Sensory distortions and hallucinations
 - Disinhibition
 - Posthypnotic suggestions and amnesia

Hypnosis Can's and Cannot's

- Hypnosis CAN
 - Help people relax
 - Reduce pain
 - Get people to make better progress in therapy
- Hypnosis CANNOT
 - Produce acts of superhuman strength
 - Produce age regression
 - Force you to do things against your will

Stage Hypnosis

- Simulation of hypnotic effects.
- Tricks of the Trade:
 - Waking Suggestibility: People on stage do not want to spoil the act, so they will follow any instruction.
 - Selection of Responsive Subjects: Any “volunteer” who does not get hypnotized in the stage group and does not follow instructions is “voted off.”
 - The Hypnosis Label Disinhibits: On stage, once you are “in a hypnotic trance,” your responsibility for actions is removed; you can do whatever you want!

More Stage Hypnosis “Tricks of the Trade”

- Hypnotist as Director: Once they are in a trance, the “volunteers” are suddenly the show’s stars, and they will act like it. The hypnotists only need to direct them.
- Stage Hypnotists Use Tricks: Stage hypnosis is 50% deception and 50% taking advantage of the situation

Meditation

- **Meditation** = practices that train attention to heighten awareness and bring mental processes under greater voluntary control
- **Yoga, Zen, transcendental meditation (TM)**
 - Potential physiological benefits
 - Similar to effective relaxation procedures

-
- WHAT ARE PSYCHOACTIVE DRUG.....
 - □ A chemical substance that alters sensory perceptions , moods, thinking and behavior.
 - Impacts on neurotransmitter function.
 - □ Neurotransmitter are the chemical signals that affect how happy , thirsty , anxious , scared , or tired you are. Eg., dopamine , GABA , noradrenalin etc.
 - □ There are four general types of psychoactive drugs 1. Stimulants 2. Depressant 3. Narcotics 4. Hallucinogens

-
- **STIMULANTS** □ Range from nicotine and caffeine to cocaine and crystal meth. □ Block the reuptake or reabsorption of neurotransmitter e.g. ., serotonin and dopamine which can lead to increased energy , panic and anxiety

-
- **DEPRESSANTS** □ Increases the production of neurotransmitter GABA (gamma – Aminobutyric acid). □ Which decreases reaction in brain. □ Affects cognition impairing memory. □
Depressants like benzodiazepines help GABA neurotransmitter bind to receptors that receive the chemical signals , leading to reduced nervous system activity and inducing sleep

◉ NARCOTICS

- ◉ Administered as painkillers.
- ◉ Used recreationally to create a sense of euphoria .
- ◉ They stimulate your endorphins , which are neurotransmitter that naturally reduces pain .
- ◉ e.g., morphine , heroine and codeine etc

-
- **HALLUCINOGENS** □ They trick the brain into seeing or hearing things that aren't there actually . □ Warps a persons sense of time and space. □ These altered states of consciousness can lead to paranoia and anxiety . □ Eg., includes LSD (Lysergic acid diethylamide) , mescaline and ecstasy

Psychoactive drugs

- **Narcotics (opiates)** – pain relieving
- **Sedatives** – sleep inducing
- **Stimulants** – increase CNS activity
- **Hallucinogens** – distort sensory and perceptual experience
- **Cannabis** – produce mild, relaxed euphoria
- **Alcohol** – produces relaxed euphoria, decreases in inhibitions
- **MDMA** – produces a warm, friendly euphoria



Table 5.3 Psychoactive Drugs: Tolerance, Dependence, Potential for Fatal Overdose, and Health Risks

Drugs	Tolerance	Risk of Physical Dependence	Risk of Psychological Dependence	Fatal Overdose Potential	Health Risks
Narcotics (opiates)	Rapid	High	High	High	Infectious diseases, accidents, immune suppression
Sedatives	Rapid	High	High	High	Accidents
Stimulants	Rapid	Moderate	High	Moderate to high	Sleep problems, malnutrition, nasal damage, hypertension, respiratory disease, stroke, liver disease, heart attack
Hallucinogens	Gradual	None	Very low	Very low	Accidents
Cannabis	Gradual	None	Low to moderate	Very low	Accidents, lung cancer, respiratory disease, pulmonary disease, perhaps head and neck cancer
Alcohol	Gradual	Moderate	Moderate	Low to high	Accidents, liver disease, malnutrition, brain damage, neurological disorders, heart disease, stroke, hypertension, ulcers, cancer, birth defects

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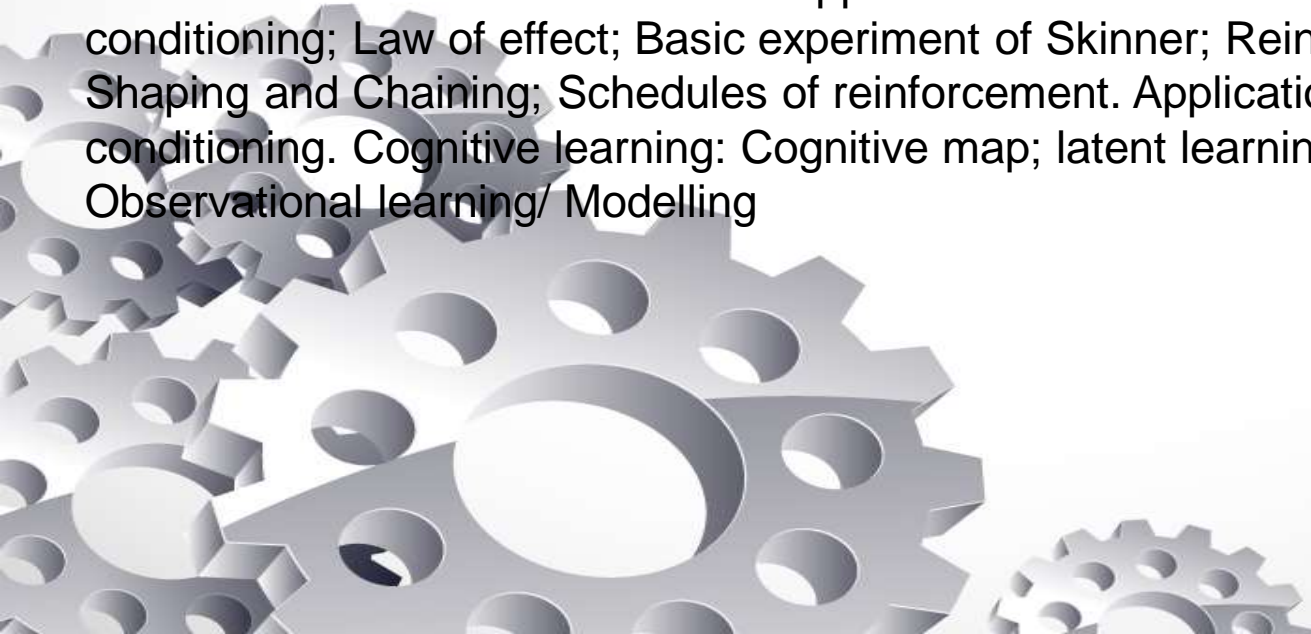
Table 5.3 Psychoactive Drugs: Tolerance, Dependence, Potential for Fatal Overdose, and Health Risks

Learning



Dr Nice Mary Francis P
Asst Professor
Department of Psychology
Prajyoti Niketan College, Pudukad

Concept of learning, Nature of learning, learning curve. Types of Learning; Associative learning (Classical and operant conditioning) and Cognitive learning. Classical conditioning: Basic experiment and basic terms; Principles of Classical conditioning Acquisition, Higher order conditioning, Extinction, spontaneous recovery, Generalization and Discrimination. Applications of classical conditioning. Operant conditioning; Law of effect; Basic experiment of Skinner; Reinforcement, Punishment, Shaping and Chaining; Schedules of reinforcement. Applications of operant conditioning. Cognitive learning: Cognitive map; latent learning; sign learning. Observational learning/ Modelling





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Concept of Learning - Definition

R S Feldman - **Learning** is defined as a relatively permanent change in behavior brought about by experience.

Behaviour - is any activity of the organism that can be either directly or indirectly observed,

The change in behaviour may come from nature and nurture

Nature - Maturation -

Nurture - Learning

Behavior changes that are due to maturation or to temporary conditions (such as fatigue or drug-induced states) are not included.



PASSER M.W,AND SMITH R.E

LEARNING IS A PROCESS BY WHICH EXPERIENCE PRODUCES A RELATIVELY ENDURING CHANGE IN AN ORGANISM'S BEHAVIOUR AND CAPABILITIES.

WEITEN.W-LEARNING REFERS TO a relatively durable change in behaviour or knowledge that is due to experience.



Aspects of definition

- 1) The term learning does not apply to temporary changes in behaviour
- 2) It does not refer to changes resulting from maturation
- 3) Learning can result from vicarious as well as from direct experiences
- 4) The changes produced by learning are not always positive in nature .

Nature of learning



- Learning is a process.
- It involves all the experiences from birth to death: produce change in behavior.
- Learning makes change in behavior either +ve or –ve.
- Learning prepares an individual for adjustment and adaptation.
- All learning is purposeful and goal oriented.
- The scope of learning is too wide.
- Learning is universal and is continuous.
- Learning does not include those changes that occurs as part of maturity, drugs etc.

Kinds of learning

According to Atkinson and Hilgard

Learning basically are of 4 types:

- 1) Habituation
- 2) Classical conditioning
- 3) Operant conditioning
- 4) Complex learning



Associative Learning



The formation of simple associations between various stimuli and responses

It includes:-

1. Classical conditioning
2. Operant conditioning



Classical Conditioning

Ivan Pavlov

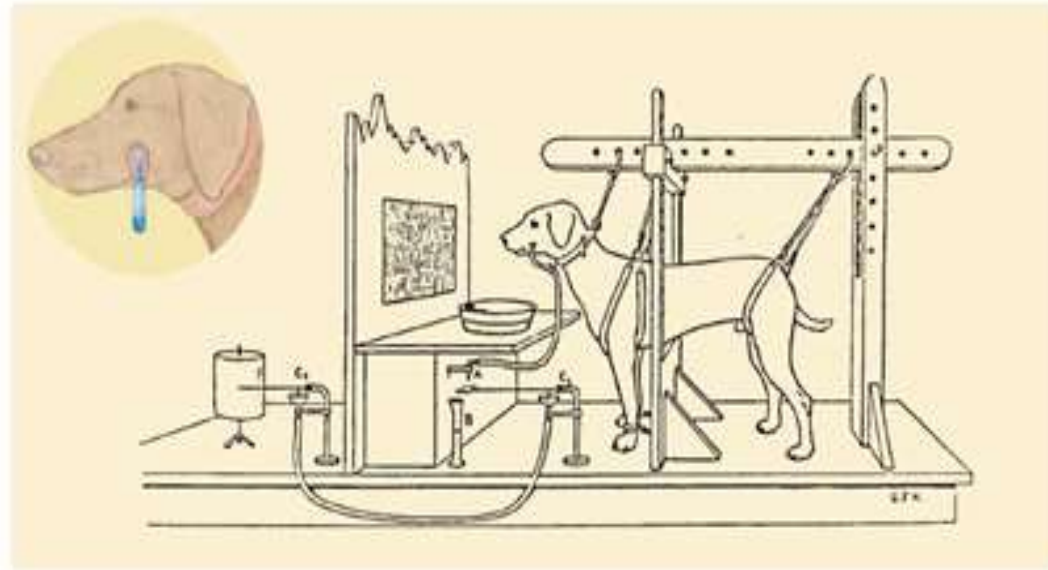
Pavlov's experiment



Ivan Pavlov, a Russian physiologist

Received the Nobel Prize for his research on digestion in 1904

Classical Conditioning Apparatus





Elements of Classical Conditioning

Neutral Stimulus (NS) - a stimulus that has no effect on the desired response prior to conditioning.

Unconditioned Stimulus (UCS) - a naturally occurring stimulus that leads to an involuntary and unlearned response.

Unconditioned Response (UCR) - an involuntary and unlearned response to a naturally occurring or unconditioned stimulus.

Conditioned Stimulus (CS) - a previously neutral stimulus that becomes able to produce a conditioned response, after pairing with an unconditioned stimulus.

Conditioned Response (CR) - a learned response to a conditioned stimulus



The Classical Conditioning Procedure

Involves 3 stages

1. Before Conditioning

NS → No response
response

UCS → UCR
Salivation

Example

Bell → No

Food →

1. During Conditioning

NS - UCS → UCR

Example

Bell - Food

Before Conditioning

Neutral Stimulus
(NS) Metronome



No Salivation



During Conditioning

Neutral Stimulus
(NS) Metronome



Unconditioned Stimulus
(UCS) Food



Unconditioned Response
(UCR) Salivation



After Conditioning

Conditioned Stimulus
(CS) Metronome



Conditioned Response
(CR) Salivation



Classical Conditioning - Definition



A kind of learning in which previously neutral stimulus (NS) comes to elicit a response through its association with a stimulus (UCS) that naturally brings about that response



Principles of Classical Conditioning

1. Acquisition
2. Extinction
3. Spontaneous Recovery
4. Reconditioning
5. Stimulus Generalization
6. Stimulus Descrmination
7. Higher Order Conditioning

1. Acquisition



Acquisition is a gradual process in which **conditioned stimulus (CS)** gradually acquires the capacity to elicit a **conditioned response (CR)** as a result of repeated pairing with an **unconditioned stimulus (UCS)**



Factors affecting acquisition

i. Temporal (time related) arrangement of the CS-UCS pairing

The extent to which a conditioned stimulus precedes or follows the presentation of an unconditioned stimulus

3 Temporal arrangements

1. Forward conditioning- delay conditioning & trace conditioning

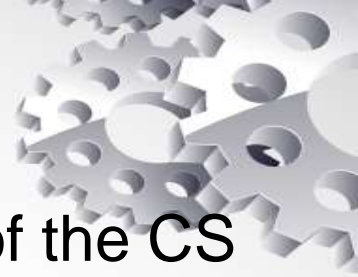
2. Simultaneous conditioning

1. Forward conditioning

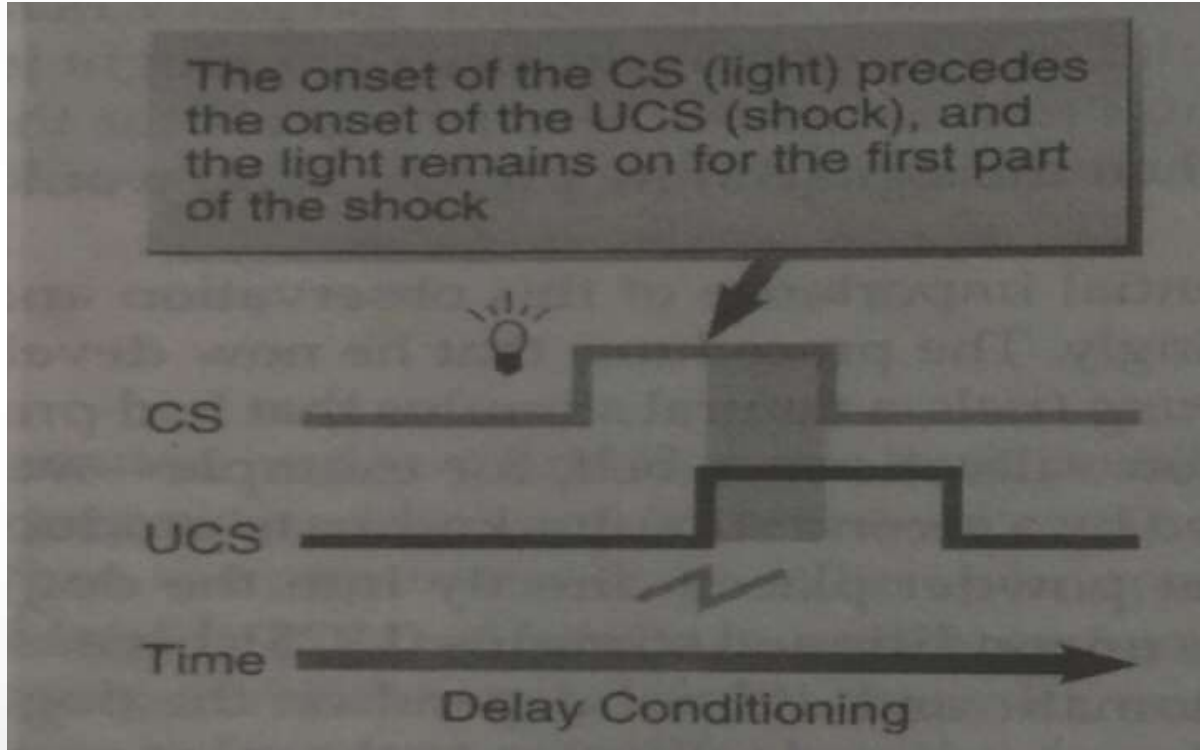
- A type of conditioning in which the presentation of the CS precedes. The presentation of UCS - 2 Types

A. Delay conditioning

- A form of forward conditioning the onset of the UCS begins while CS is still presenting. There is an overlapping between CS and UCS.
- Generally produces the most rapid rate of learning



Delay Conditioning

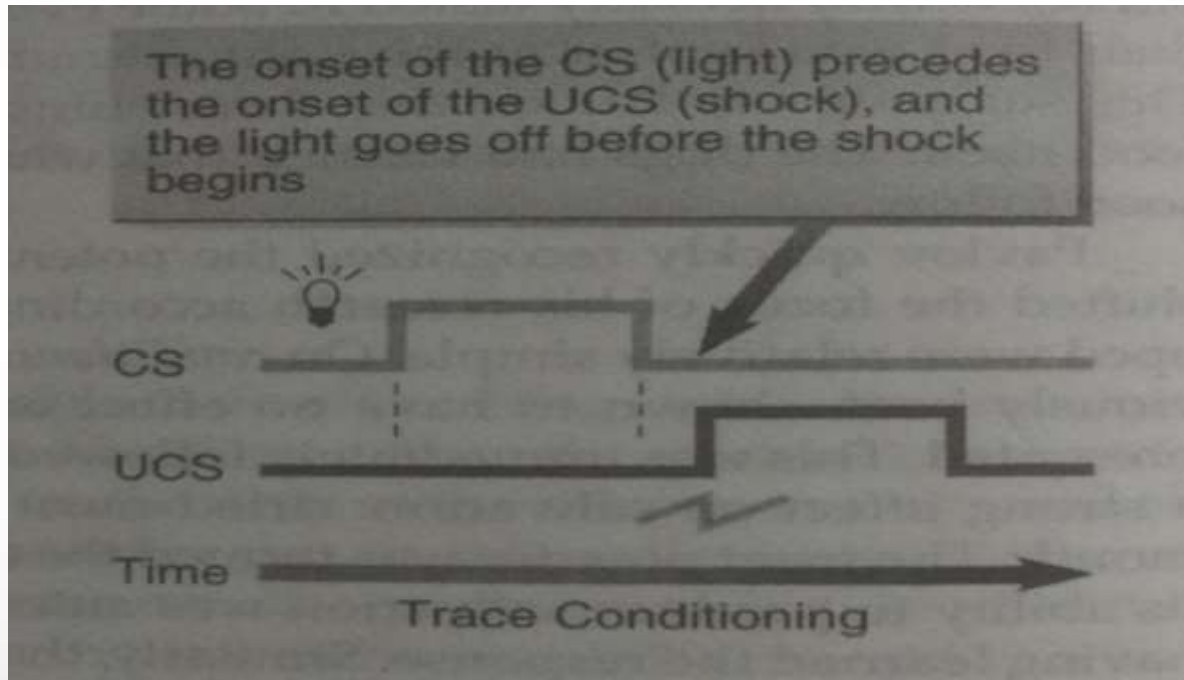




B. Trace conditioning

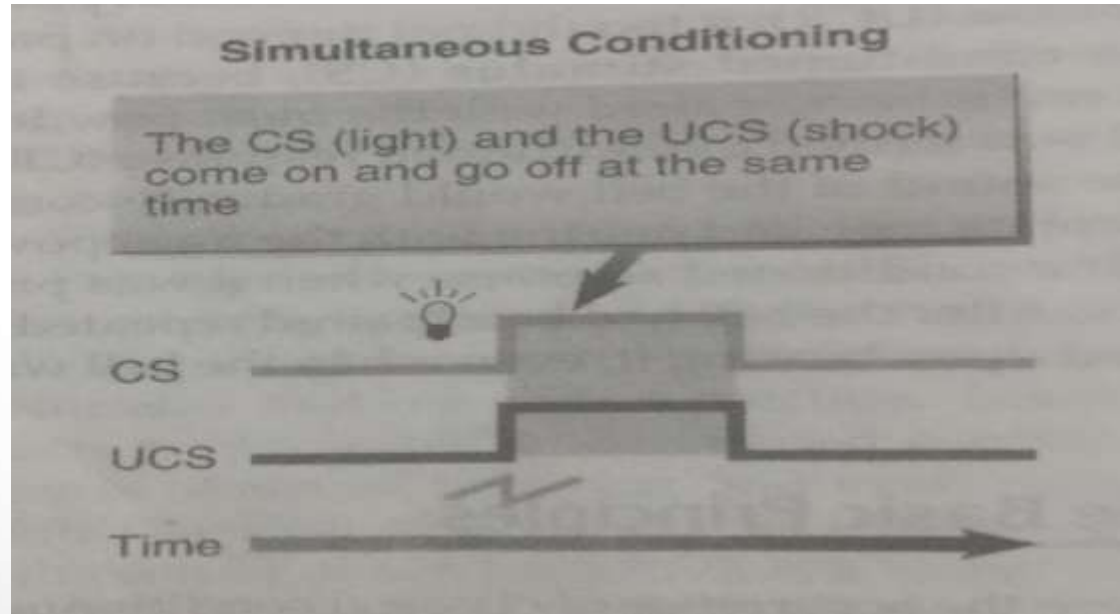
- A form of forward conditioning in which the onset of the CS precedes the onset of the UCS
- The presentation of the CS and the UCS does not overlap

Trace Conditioning



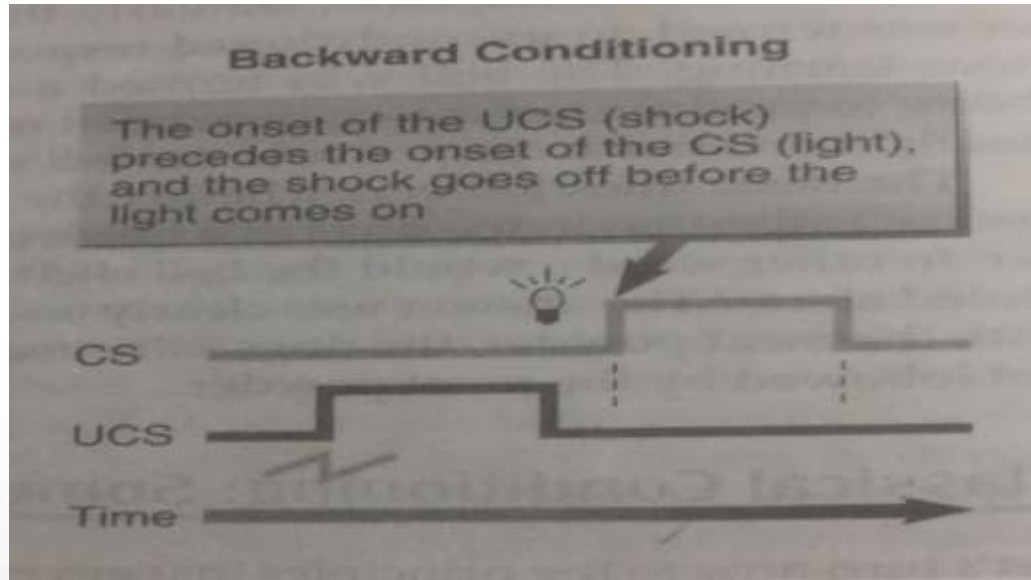
2. Simultaneous Conditioning

- A form of conditioning in which the **CS** and the **UCS** begin and end at the same time



3. Backward Conditioning

- A form of conditioning in which the presentation of the UCS precedes the presentation of CS





II. Intensity of CS and UCS

- Conditioning is faster when the intensity of either the CS or UCS increases

III. Time interval between presentation of the CS and UCS

- Extremely short intervals less than 0.2 sec- rarely producing conditioning
- Optimal CS- UCS interval seems to be between 0.2 and 2 sec
- Longer intervals make it difficult for recognizing CS as a signal



2. Extinction

The conditioned stimulus (CS) gradually loses its ability to evoke conditioned response (CR), when it is no longer followed by unconditioned stimulus (UCS)

3. Spontaneous Discovery

The reappearance of previously extinguished response after a period of time during which conditioned stimulus (CS) has been absent

Graphical Representation of Acquisition, Extinction, Spontaneous Recovery





4. Reconditioning

- ★ Rapid recovery of conditioned response (CR) to CS - UCS pairing following extinction.
- ★ Reconditioning takes much less time than the original conditioning, extinction must not have erased the association between the conditioned stimulus and the conditioned response



5. Stimulus generalization

The tendency of stimuli similar to a conditioned stimulus to evoke conditioned response

E.g. a person who reacts with anxiety to the sound of a dentist's drill might react with some slight anxiety to a similar-sounding machine, such as an electric coffee grinder



6. Stimulus discrimination

The process by which an organism learns to respond to certain stimuli. But not to others.

E.g. the sound of the coffee grinder might produce a little anxiety in the dental-drill-hating person, after a few uses that sound will no longer produce anxiety because it isn't associated with dental pain.

1. Higher Order Conditioning/ Second order Conditioning



Classical conditioning in which a conditioned stimulus (Tone) that has been established during earlier conditioning is then paired repeatedly with a neutral stimulus (Red light)

Phase I: NS(bell) \rightarrow CS (bell) + UCS (food) \rightarrow UCR(salivation)

Phase II: NS (light) + CS (bell) \rightarrow UCR (salivation)

Higher order conditioning



Applications of Classical Conditioning



Classical conditioning principles have been applied in

1. Classical conditioning and phobias
2. Classical conditioning and drug overdose
3. Psychoneuroimmunology
4. Biological preparedness
5. Conditioned taste-aversion

1. Classical conditioning and Phobias



Phobias are intense, irrational fears of objects or situations. Classical conditioning often plays a role in the development of phobias (Bouton, Mineka, & Barlow, 2001).

Classically conditioned fears can be extremely long-lasting, especially when they are based on experiences with strong unconditioned stimuli.

Treatment of Phobia



Classical conditioning has also been used to treat phobias

- **Joseph Wolpe (1958)** was a pioneer in this effort showed that irrational fears could be relieved through systematic desensitization, a procedure that associates a new response, such as relaxation, with a feared stimulus.

It includes 3 steps

1. Relaxation technique

Systematic Desensitisation



A hierarchy of fearful situations is created - each step being more fear-provoking than the last



Client is taught deep relaxation techniques



The client learns to associate the relaxation with the least fearful scenario



Once that's achieved the client is encouraged to systematically make step by step progress through the hierarchy



Flooding



- **Flooding:** involves immediately exposing client to a stimulus that causes undesirable response to show that stimulus isn't dangerous.
- Flooding can lead to extinction of fear.

- This technique was developed by [Levis & Stampf in 1967](#)
- The technique used to treat phobias and anxiety disorders including PTSD
- Faster method but less efficient and more traumatic

2. Classical conditioning and drug overdose

• Drug Tolerance -- Drug Overdose

- drug users become increasingly less responsive to the effects of the drug
- tolerance is specific to specific environments (e.g. bedroom)
- familiar environment becomes associated with a compensatory response (Physiology)
- taking drug in unfamiliar environment leads to lack of tolerance → drug overdose



When a person uses drugs repeatedly in a particular context, the stimuli in that environment become conditioned stimuli and elicit conditioned response

Experiment conducted by Siegal (1983) using 2 group of rats

Result - Environmental differences are quite subtle , a fact that emphasizes the powerful effects produced by conditioning

3. Classical conditioning and Immune system



A prolonged elevated level of **immune activation (UCR)** was demonstrated after repeated exposure to an oral stimulus e.g. **Saccharin flavoured water (CS)** without receiving the injection of a **substance (UCS)** known to raise the level of **certain antibodies in their system**. Experiment conducted by Alvarez-Borda and her colleagues (1995) - experiment conducted in 2 groups of rats



Results - Classical conditioning exert powerful effects on the immune system - in the absence of original substance that produced it

Implications - This discovery may offer tremendous hope to people whose health is compromised because of depressed immune system. E.g. persons who are HIV Positive or have

4. Biological Preparedness



- people and animals are naturally inclined to form associations between certain stimuli and responses.
- This concept plays a very important role in the concept of classical conditioning process.
- Biological preparedness helps in understanding the role of different phobias, which tend to form without difficulty.
- Fear can be developed of things that may pose a threat to our survival, such as snakes, spiders, and heights.

5. Conditioned Taste Aversion



- Biological constraint on learning in which an organism learns in one trial to avoid a food whose ingestion is followed by illness (Garcia and Koelling (1966))
- People (and animals) are innately predisposed to form associations between tastes and illness.
- It is most likely due to the evolution of survival mechanisms. Species that readily form such associations between food and illness are more likely to avoid those



Operant Conditioning

B.F Skinner

Thorndike's Puzzle Box



Edward L. Thorndike (1898) - Learning was an association between stimuli in the situation and a response that an animal learned to make: a stimulus–response (S–R) connection.

Learning of these S–R connections occurred gradually and automatically in a mechanistic way as the animal experienced the consequences of its actions through trial and error.

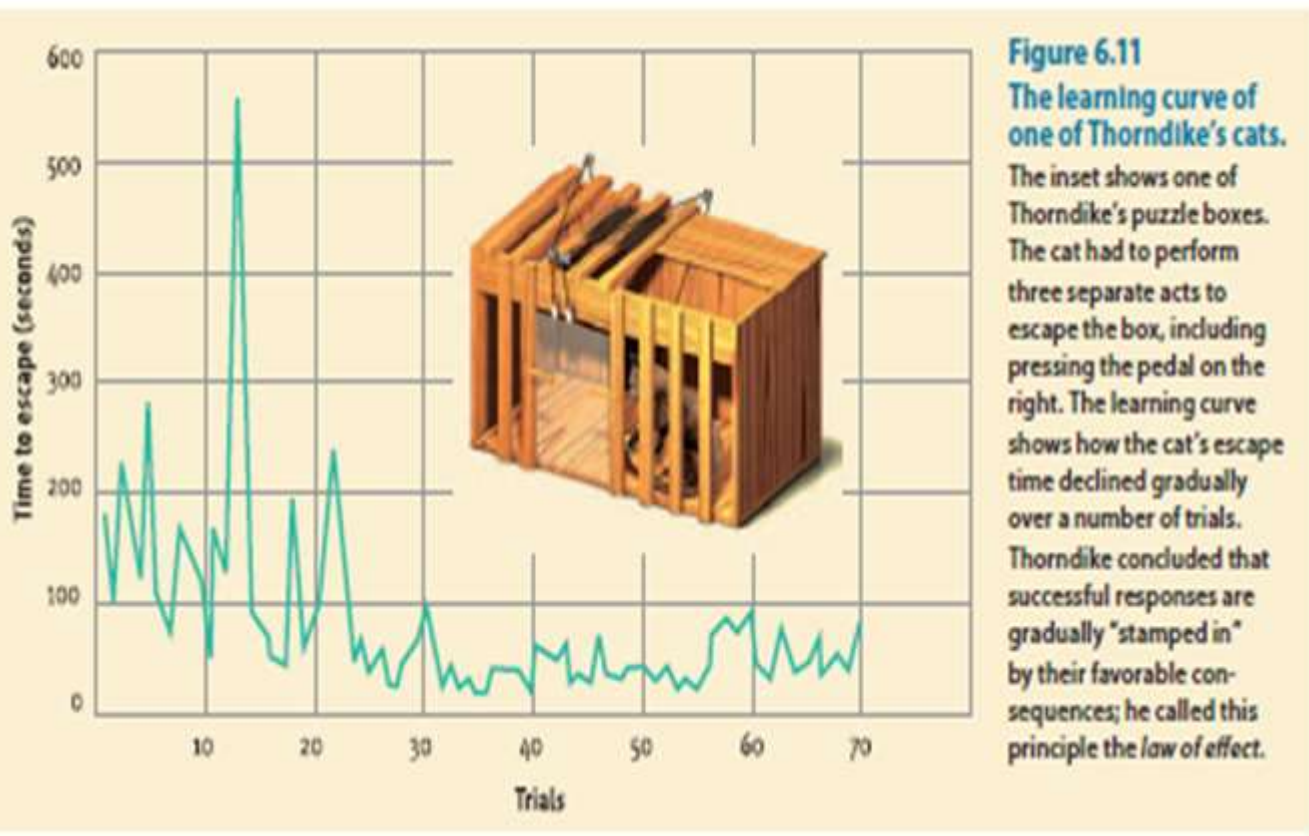
Thorndike referred to this relationship between behavior and its consequences as the **law of effect**.



Law of Effect

A basic law of learning that states that the power of a stimulus to evoke a response is strengthened when the response is followed by a reward and weakened when it is not followed by a reward.

The learning curve of Thorndike's cat

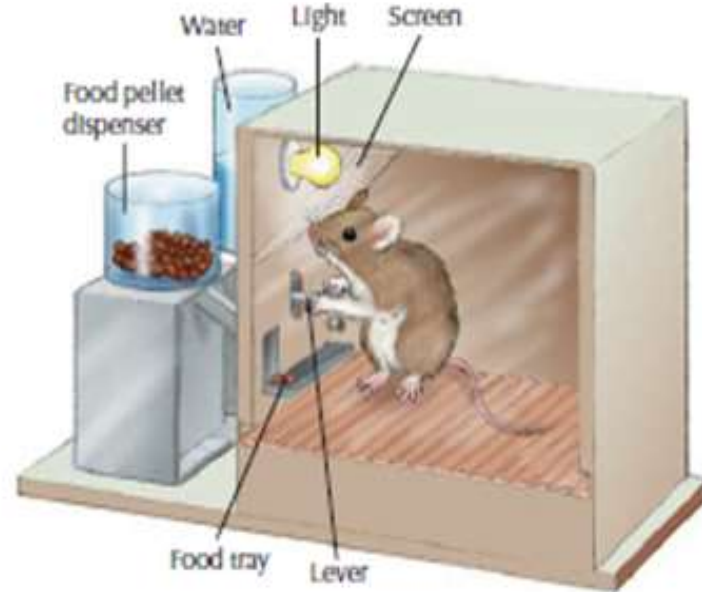


From the Puzzle Box to the Skinner Box

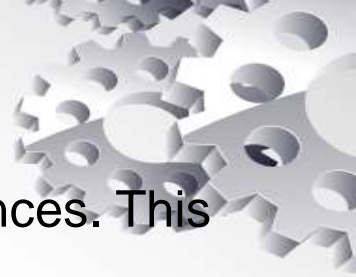
Thorndike's law of effect became the cornerstone of Skinner's theory of operant conditioning

Skinner Box/
Operant Chamber

B.F Skinner developed operant conditioning in 1938



Operant Conditioning/ Instrumental Conditioning



The organism operates in the environment to generate consequences. This consequences are rewarding and the animal is repeated it then response - reinforcement is strong

An **operant** is any behavior that is emitted by an organism and can be characterized in terms of the observable effects it has on the environment.

Literally, operant means affecting the environment, or operating on it.

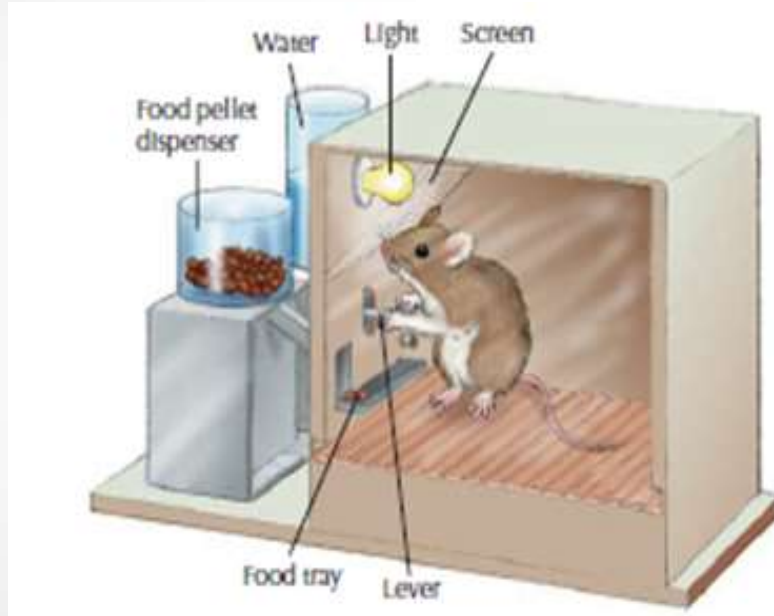
Operant Method A process through which organism learn to repeat behaviors that yield positive outcomes or permit them to avoid or escape from negative outcome

Terminology and Procedures



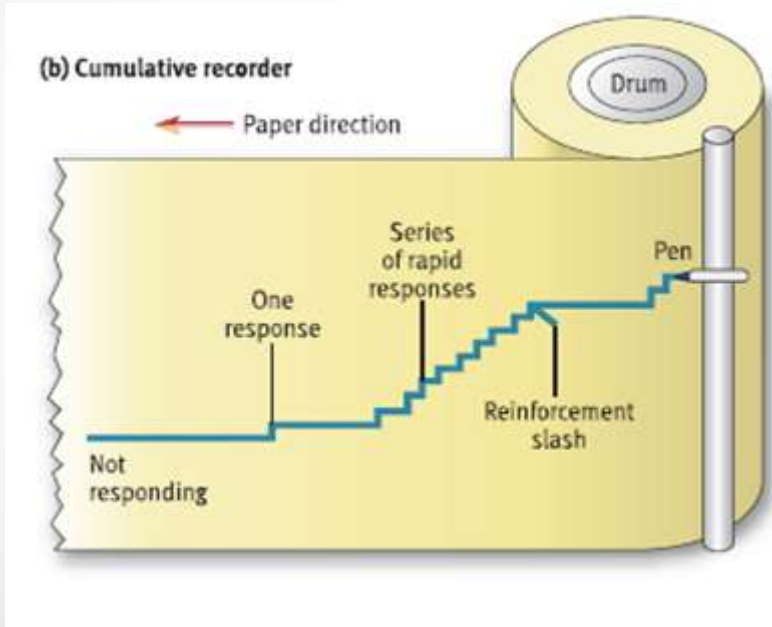
1. Skinner Box
2. Cumulative recorder
3. Reinforcement contingencies

Skinner Box / Operant Chamber



An operant chamber, or Skinner box, is a small enclosure in which an animal can make a specific response that is recorded while the consequences of the response are systematically controlled

Cumulative Recorder



- Skinner box is monitored continuously by a device known as a **cumulative recorder**
- The cumulative recorder creates a graphic record of responding and reinforcement in a Skinner box as a function of time



Reinforcement contingency

- ❑ The Skinner box permits the experimenter to control the reinforcement contingencies that are in effect for the animal.
- ❑ Reinforcement contingencies are the circumstances or rules that determine whether responses lead to the presentation of reinforcers / A consistent relationship

Four Kinds of Operant Conditioning



1. Primary Reward Conditioning
2. Escape Conditioning
3. Avoidance Conditioning
4. Secondary Conditioning



1. **Primary Reward Conditioning:** Learned response is instrumental in obtaining a biologically significant reward such as drink or water
2. **Escape Conditioning:** Organism learns a response i.e. instrumental in getting out of some place it prefers not be
3. **Avoidance Conditioning:** A Kind of learning in which response is instrumental in avoiding a painful situation
4. **Secondary Reward Conditioning:** A kind of learning in

Techniques of Instrumental Conditioning



3 Major Techniques

1. Reinforcement
2. Omission of Reinforcement
3. Punishment

1. Reinforcement



Reinforcers: Any stimulus that, when made contingent on a response, increases the probability of that response (Anything which strengthens the behaviours. E.g. food)

Reinforcement: The procedures that strengthens or increases the probability that the behaviour will be repeated

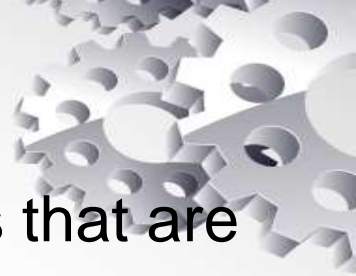
Reinforcement - 2 Types



Positive reinforcement: A behavior is followed by the presentation of an appetitive stimulus, increasing the probability of that behavior (Strengthening the behaviour by giving something pleasurable).


Positive reinforcement includes:-

Positive Reinforcer: If a consequence of some action



Primary reinforcers: Primary reinforcers are events that are inherently reinforcing because they satisfy biological needs. Direct gratification of biological needs.e.g. Food

Secondary reinforcers: Secondary,or conditioned, reinforcers are events that acquire reinforcing qualities by being associated with primary reinforcers. Indirect gratification of biological needs. Eg. Money, Price



Negative reinforcement: A behavior is followed by the removal of an aversive stimulus, increasing the probability of that behavior (Strengthening the behaviour by removing something painful).

Negative reinforcement includes:-

Negative Reinforcers: Stimuli that strengthens responses that permit an organism to avoid or escape from their presence. E.g. Electric Shock



Escape Conditioning

An organism learns to make a response that brings about an end to an aversive situation.

E.g. taking aspirin to escape from the headache

Avoidance Conditioning

It occurs when an organism responds to a signal of an impending unpleasant event in a way that permits its evasion.

E.g. Apply sunscreen lotion before getting sunburn



Partial Reinforcement

Behavior taking place when the response is reinforced only
fraction of time it occurs

Schedules of Reinforcement



- Rules determining when and how reinforcements will be delivered
- The frequency and timing of reinforcement
- It can be time based (interval schedule) or event based (ratio schedule)
- Each schedule of reinforcement produces a characteristic pattern of responding
- It influence rate of learning



Intermittent reinforcement makes a response more resistant to extinction than continuous reinforcement does (Falls, 1998)

Learning occurs rapidly in **continuous reinforcement schedule** but in **partial reinforcement schedule** the expectation of animals take place

Types of Reinforcement Schedules



2 Types

1. **Ratio Schedule** (Based upon the no.of Responses)

- a. Fixed Ratio Schedule
- b. Variable Ratio schedule

1. **Interval Schedule** (Based upon the Time)

- a. Fixed interval Schedule
- b. Variable interval schedule



Ratio Schedule

- Based upon the number of responses (Number of responses by reinforcement) - 2 types - Fixed and Variable Ratio Schedule
- Reinforcers can be delivered after a certain number of responses
- There can be an irregular, or variable, pattern of



Fixed Ratio Schedule

A schedule of reinforcement in which a reinforcer is delivered for the first response made after a fixed number of responses. (reinforcement given after a fixed no.of responses)

E.g. Fixed amount is paid for each item produced

Variable Ratio Schedule

A schedule of reinforcement in which a reinforcer is delivered for the first response made after a variable number of responses whose average is predetermined. (Reinforcement given after the variable number of responses)



Interval Schedule

- Based upon the time- 2 types- Fixed & Variable Interval schedule
- Reinforcers can be delivered after the first response following a specified interval of time
- There can be Constant, or fixed, pattern of reinforcement



Fixed Interval Schedule

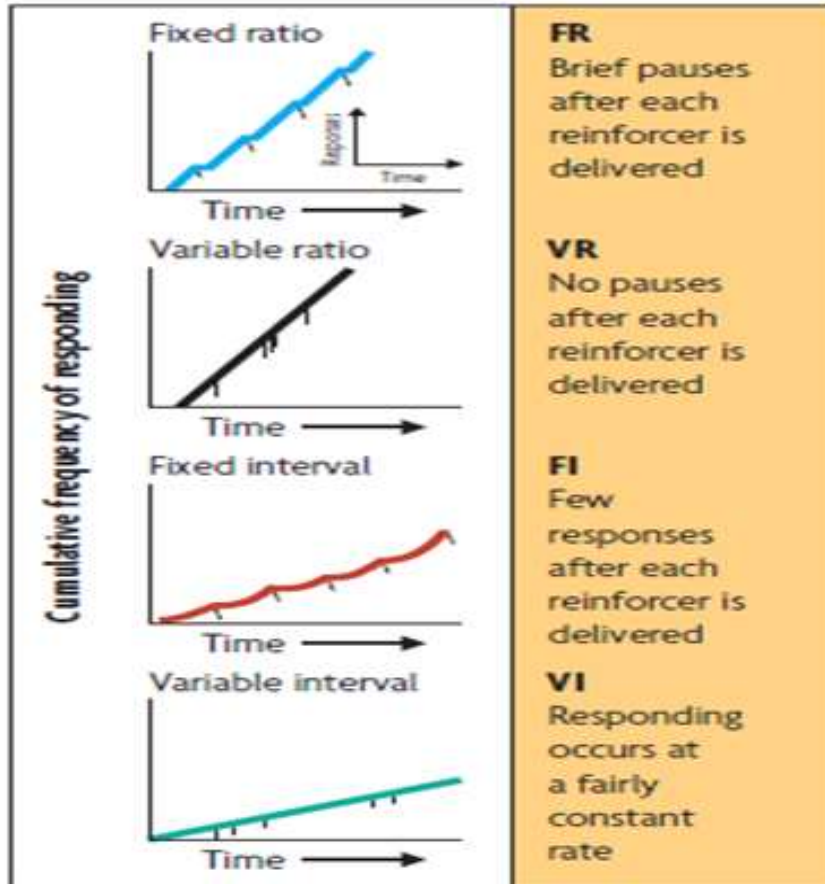
A schedule of reinforcement in which a reinforcer is delivered for the first response made after a fixed period of time.
(Reinforcement given in a fixed time interval)

E.g. Studying for exam

Variable Interval Schedule

A schedule of reinforcement in which a reinforcer is delivered for the first response made after a variable period of time whose average is predetermined. (Reinforcement given in a variable time interval).

Reinforcement Schedules & Their Effects



2. Omission of Reinforcement



Weakening of a response through the removal of something pleasurable (positive reinforcement)



3. Punishment

- Punishment is actually the opposite of reinforcement
- Weakening of a response by giving something unpleasant or painful stimulus

“It refers unpleasant or painful stimuli that decrease the probability that the preceding behaviour occur again”

- The aversive stimuli are called “punishers”



Types of punishment - 2 Types

1. Positive punishment - Punishment by application

Application of undesirable stimulus (aversive)- weakens responses that precede occurrence of stimulus - organism learn to suppress responses that lead to unpleasant consequences. E.g. spanking, scolding

1. Negative punishment - Punishment by removal

The loss or postponement of a desirable stimulus - weakens responses that lead to loss or postponement of stimulus - organism learn to suppress responses that lead

Applications of Operant Conditioning



1. Shaping
2. Behavior Modification
3. Chaining

1. Shaping



- The reinforcement of simple steps in behavior through *successive approximations* (actions remotely resembling target behavior) that lead to a desired, more complex behavior
- Based on the principle that a little can eventually go a long way
- Organism receives a reinforcement for each small step toward a final goal- the target behavior
- Shaping helps organisms to acquire, or construct, new and more complex forms of behavior from simpler behavior



2. Behavior Modification

- The use of learning techniques to modify or change undesirable behavior and increase desirable behavior.
- Operant conditioning principles such as reinforcement and the process of shaping have been used to change undesirable behavior and create desirable responses in animals and humans—particularly in school children.
- Token economies, Time-out, Applied behavior analysis,



3. Chaining

- A procedure that establishes a sequence of responses, which lead to a reward following the final response in the chain
- There is a sequence of responses (chain of responses) but only final response will be reward
- chaining helps organisms to acquire, or construct, new and more complex forms of behavior



Cognitive Learning

Edward C Tolman

Cognitive Learning



- Cognitive learning is the learning through experience and not through any reinforcement of specific responses or by the pairing of stimulus
- This type of learning gives importance to the perception and knowledge or cognitive process
- It involves the formation of new associations and perceiving new relationships among events

Types of Cognitive Learning



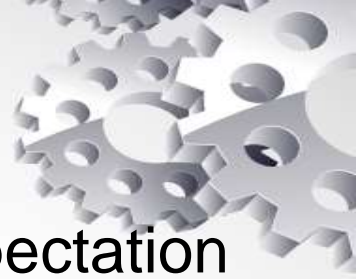
1. Latent learning
2. Sign learning
3. Observational learning
4. Insight learning
5. Place learning

Latent Learning



- Latent learning refers to any learning that is not evidenced by behavior at the time of learning
- This learning goes under low levels of drive or in the absence of reinforcement.
- Experiments on latent learning was done by **Edward C Tolman**
- The experiments on latent learning support the concept of the **Cognitive map**

Sign Learning



- **Sign learning** may be defined as an acquired expectation that one stimulus will be followed by another in a particular context
- Sign learning involves the learning of signs of what leads to what
- **Edward C Tolman** proposed sign learning
- He said that a running through a complex maze may be developing a kind of map or cognitive structure of the



Sign Learning

- Tolman said that sign learning is an acquired expectation.
What is acquired is an expectation rather than a chained sequence of responses
- The rat appears to have learned the location of the goal rather than the chain of specific stimulus-response connections
- Because what is learned is a set of expectations or the

Observational Learning




- The concept of observational learning is introduced by **Albert Bandura**
- The acquisition of new information, concepts or forms of behavior through exposure to others and the consequences they experiences
- Bobo doll experiment conducted by Bandura, Ross &

Steps in Observational Learning



1. Attention
2. Retention
3. Reproduction (Production Process)
4. Motivation

- 
- ❖ **Attention:** Paying attention and perceiving the most critical features of another person's behavior
 - ❖ **Retention:** Remembering the behaviors. Retain the memory and we should recall when it is needed. It must form representation of our memory
 - ❖ **Reproduction (production Process):** Reproducing the action. Our action should be converted into appropriate model. It depends on 2 processes:-
 - ❖ **Physical Ability:** Our physical conditions are



Thank You...