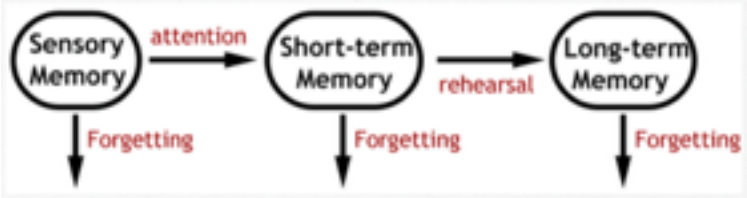
Cognition

Memory
- Definition: Can be defined as the internal record of some previous event or experience
- Memory is also called representation, which refers to the fact that memory is a psychological version of the original sound, thought, object or concept

Multi-store model of memory
Atkinson and Shiffrin (1968)
- developed a model of memory, known as the stage model, which has three separate stages: sensory memory, short term memory and long-term memory
- Each memory stage is characterised by 3 different types:
• Capacity: how much information can be stored?
• Duration: how long can the information be stored
• Function: What is done with the stored information



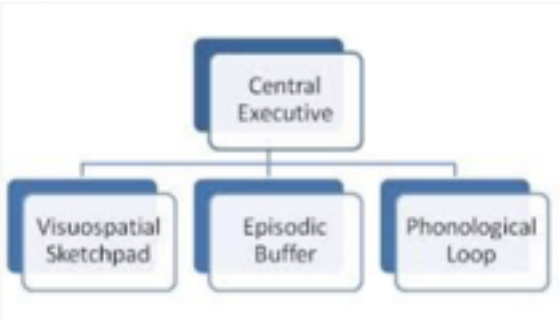
Sensory Memory
- Sensory memory refers to memory retained for a very brief period of time usually 5 seconds
- information is encoded rapidly
- registers the different senses
- iconic memory is visual and echoic is auditory

- Most information is lost quickly but information considered important is attended to and passed into short-term memory
- Encoding: refers to the conversion of sensory info into a form that can be processed by the brain
- Storage: refers to the retention of information
- Human information storage is via a network of neurons, information must be stored in a form that is accessible later, humans form associations between neural networks to aid retrieval later, retrieval is the recovery of information stored in the brain (process)

Short-term memory
- Short term memory: a place where currently used information is stored for about 20-30 seconds
- It is also called the "working memory" as it is a system for decision-making, problem solving and the direction of flow of information

STM- Capacity
- Limited capacity
- Miller (1956) proposed the amount of unrelated material that could be stored in the working memory was between 5-9 items, the capacity of working memory appears greatest for digits and lower for letters and words, the longer the words the shorter the working memory span

Baddeley and Hitch (1974)
- Two slave systems: for short-term maintenance of info and one central executive responsible for organising information and coordinating the slave systems
- Slave systems are the articulatory or phonological loop (rehearses silently) and visuospatial sketchpad (visual images-mental maps)
- The executive- directs attention to relevant information and suppresses irrelevant information
- Baddeley (2000) added 4th component= episodic buffer which links across the domains to form integrated units such as a memory of a story or movie, it links long term memory



<u>How to improve Short-term memory</u>

1) Effects of Rehearsal
- rehearsal is the process that enables information to be held in STM for a longer period and transfer material into long term memory
- Two types: maintenance rehearsal and elaborative rehearsal

• maintenance rehearsal: out loud or in your head rehearsal such as repeating a telephone number
• Elaborative rehearsal: relating meaning to remember

2) Chunking
- Chunking: process of recoding single items by grouping them on the basis of similarity or combining into a pattern
- Can increase the capacity of short term memory
- e.g mobile number we chunk them into 3 groups to remember them

Long-term memory
- Long-term memory: A relatively permanent store of information with an unlimited capacity
- Long term memory refers to storage of greater then 30 seconds to forever

- Information is transferred from short term memory to long term emory
- There are a number of types of long term memories distinguished according to the types of memory they hold

<u>Types of Long term memory</u>
- Procedural memory:

• LTM which stores information on how tasks are performed; the knowing 'how' of memory
• e.g riding a bike, brushing teeth
• Implicit memory because it is not a conscious memory process

- Declarative memory:

• LTM that stores information; knowing 'what'
• It is the explicit memory as it requires conscious effort for retrieval

1. Semantic
- Encyclopaedia, facts and information

2. Episodic
- Autobiography, events in your life

Recall, recognition and relearning
- Research has shown that the amount of information that we can retrieve from our memories depends on the sort of questions we ask
- The three ways: recall, recognise and relearn
- Recall: retrieve information from memory without prompts or cues
- Recognition: identify information from alternatives (people find this easier)
- Relearning: this method involves a person relearning information he or she has previously learned- if the information is learned more quickly the second time around it is assumed that some information must be retained

Forgetting and Remembering
- Forgetting: inability to use information that has been previously stored

<u>Theories of forgetting</u>
- Retrieval failure:
- Inappropriate cues used when locating previously stored information
- Cues= internal, external, general, specific, dependent on context or physiological cues

- Interference:
- Interference: competition for recall with other similar information
- Retroactive interference: new information interferes with old
- Proactive interference: information previously learned interferes with new learning

- Motivated forgetting:
- Some advantage to not remembering it, such as material that is painful, embarrassing, threatening, or unpleasant is blocked from consciousness (repression) it is not deliberate
- Term came from work of Sigmund Freud

- Decay:
- Decay: Memory traces fade overtime as a result of disuse
- 'If you don't use it, you lose it'

<u>Organic cause of forgetting</u>
- Anterograde Amnesia:
- the disruption of memory from experiences after the onset of amnesia
- causes: disease, accidents, brain surgery, drug use
- e.g sometimes experienced following consumption of very large amount of alcohol- alcoholic blackout

- Retrograde Amnesia (retro= before)
- A disruption of memory of experiences occurring before amnesic event
- causes: brain injury such as collision or blow to the head

Enhancing memory

- Context cues
- State cues
- Mnemonics

- The use of improved organisation of memory
- paying closer attention to the material remembered
- having experience with the information to be remembered
- using the information to be remembered rehearsing the material to be remembered as it is transferred from STM to LTM

Context cues

- Context cues: additional information about the circumstances around an individual that is encoded when other (effortful) encoding takes place
- context cue would be noticed if a person visited the classroom where they spent grade six

State cues

- state cues: information about the physiological or emotional state of a person that is encoded when other encoding takes place
- e.g if an adolescent is really angry and frustrated with her parents, her emotional and psychological state is likely to trigger recall of other times when she was angry and frustrated with them

Mnemonics

- Mnemonics: A collective name for methods or tricks that help people remember information
- Roy G Biv

Learning

- Learning is defined as a relatively permanent change, often behaviour that occurs as a result of experience
- How does learning occur?
- There are many different theories one is known as the stimulus-response approach (we learn by responding to the environmental stimuli
- Example of these theories are: classical conditioning and operant conditioning
- More recent theories describe learning as humans making sense of the world and problem solving: this has shifted to cognitive processes rather than changes in observation behaviours as a result of environmental stimuli e.g observational learning

Classical Conditioning

- Initially shown in animals
- It is learning caused by pairing, or association of two stimuli or the learning of 'conditional' behaviour
- An association forms between two stimuli, one of which is not normally associated with the desired response, such that the appearance of that stimulus alone results in the desired response of behaviour
- Stimulus: Event which may trigger a response
- It is the pairing and consequent association of stimuli that is essential for learning to occur

Pavlov

- Ivan Pavlov (1849-1936) studied the digestive systems of dogs, he noted that salivation, usually considered a reflex action, could occur before food was given to them
- He wanted to know what triggered the anticipatory salivation that occurred to many stimuli associated with food such as the sight of the bowl, he has a way of measuring this
- Pavlov set out to test the association between stimuli and response systematically

Pavlovs process:

- Selected stimulus not associated with food or salivation (bell)
- The bell was a neutral stimulus (NS) as it has no relevant response
- The bell was rung, closely followed by food. The food was considered and unconditioned stimulus (UCS) as it will lead to a reflexive response
- Unconditioned response (UCR) was salivation at the presentation of food
- After several pairings, the presentation of the bell alone produced the response of salivation, this is when conditioning has occurred
- Now the neutral stimulus (NS) produces a conditioned response (CR) to the conditioned stimulus (CS)
- The salivation at the sound of the bell was thus considered to be conditional response on its pairing with the conditioned stimulus (the bell)
- This experiment, modifying a reflex behaviour, showed how learning can take place

Before conditioning	During conditioning	After conditioning
NS (bell) = no response UCS (food) = salivation (reflex)	NS + UCS = unconditioned response UCR	CS (bell) -> CR -> CR salivate at the sound of bell

Classical conditioning in the real world

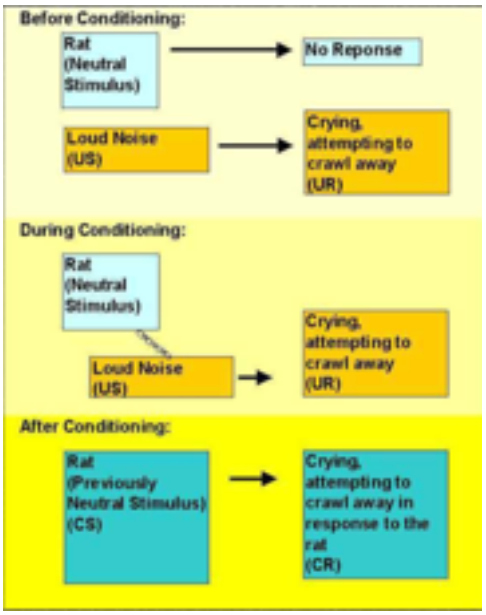
- Advertises often use classical conditioning in an attempt to lead consumers to associate a product or service with a particular object or event
- e.g soft drink advertisements which show young, attractive people having fun use a neutral object (soft drink) and try to create positive associations with it. The intention is that consumers will learn to associate the product with good times and consequently buy the product
- e.g CS being used by advertisers to influence out attitudes to products is the use of well-known sporting identities to endorse products by wearing brand-name logos on their sport gear (intention is that the manufacturers want consumers to learn to associate their product with the skills and success of the athlete enduring the product)

Classical conditioning and attitude formation

- Attitudes are formed, we are not born with them
- Attitudes are formed over a long period of time through the process of learning
- Apply the theory of classical conditional to ageism, sexism and racism
- Acquisition: is the process of pairing the neutral stimulus with the unconditioned stimulus to eventually produce the conditioned response
- Extinction: Is the process where the conditioned stimulus is repeatedly presented without the unconditioned stimulus then the conditioned response is weakened until it does not occur at all

Little Albert

- John Watson (1878-1958)
- Experiment to show how emotions are learned
- Watson used classical conditioning to induce a fear response in infant Albert
- Albert- 11 month old baby
- Said to be placid child who rarely cried



- Placed on a rug with white rat (NS), showed no fear of rat
- Later trials, Watson made a loud sound behind Alberts back (UCS)
- Loud noise made Albert cry, feared the loud noise (UCR)
- After several pairings, Albert became distressed when presented with rat- crying (CR), turning away
- Albert associated the rat with a loud noise (Rat became conditioned stimulus)
- Later Albert generalised the fear of the stimuli that were similar to the conditional stimulus (e.g a beard or fur coat)

Operant conditioning

- Operant conditioning: is a form of learning which has its origins in classical conditioning and American animal psychology
- E.L Thorndike (1874-1949) proposed that animals learn responses through experiencing consequences of which are rewarding and drop other responses that are punishing: Law of effect
- Classical conditioning focuses on changing voluntary behaviours through their antecedents (stimulus), operant conditioning is learning which is explained through consequences

- Reinforcement and punishment are associated with operant conditioning
- J.B Watson (1878-1958) and B.F Skinner are called behaviourists their work has applications today
- Skinner conducted the Skinner box (conditioning chamber) experiment in 1930's
- Skinner (1904-1990) was able to shape the rat's behaviour so that the rat would produce a response that would gain a satisfactory outcome
- Developed the notion of 'operant conditioning': The process to increase the likelihood of a behaviour that has a desirable consequence, and decrease the likelihood of producing a behaviour that has undesirable consequences

Skinner Box
- Hungry rat was placed in the conditioning chamber
- At first, no food pellets released (in order to establish a baseline record or control)
- The rat randomly touched various parts of the walls and floor until eventually pressing the lever by accident. After the food dispenser was connected, this action caused the pellet of food to drop into the dish below the lever
- In each successive trial, the rat discontinued most of the random behaviours, and the rate of lever pressing increases
- Eventually the rat was pressing the lever as quickly as it could finish eating each food pellet
- Even after the food dispenser was disconnected, the lever pressing would continue for some time
- The lever pressing would continue indefinitely if occasionally pellets were delivered (Partially reinforced)

How operant conditioning occurs
- Skinner believed an operant (response) could be strengthened if its consequences proved beneficial or rewarding, such as receiving food for pressing lever

Comparing operant and classical conditioning

Classical Conditioning	Operant Conditioning
Pavlov	Skinner
Observable stimulus leads to response	No observable stimulus to lead to response (non-reflex response)
Reinforcement comes before the response in early trials pairing UCS and NS	Reinforcement comes after response, as reward

Observational Learning
- Observational learning: Occurs when the learner learns a new behaviour or modifies an existing one as a result of watching another person and copying that person's actions
• Can also occur when observing the consequences faced by that person
- Observation learning: sometimes called modelling or imitation and this theory was developed by Albert Bandura (1925)
- Reciprocal determinism is that not only does environment cause behaviour and learning but behaviour can change the environment
- Learning occurs when we observe and imitate the behaviour of others

Bandura's Theory
- Bandura considered that children watch other people and copy their behaviour, in this way children can learn complex social behaviours
- Bandura found that children who watched a film of an adult hitting the Bobo doll changed their behaviour when left alone with it, imitating many of the behaviours of the adult

Observational learning in the real world
- Applications of observational learning are found in research on children's aggressive behaviour in playgrounds and the effects of television viewing on children's behaviour

- Observational learning is effective when trying to learn a skill such as how to throw a javelin or drive a car- which is difficult to learn through theory
- It can teach us what not to do- how to avoid potential dangerous situations
- Explanation for aggression in children

Application of social learning theory and Observational learning
- Lisa Simpson is said to have been responsible for large numbers of girls taking up saxophone lessons

Behaviour Modification
- Behaviour modification: the systematic and deliberate use of reinforcement and punishment in an attempt to modify unwanted behaviours
- Behaviour modification is the application of classical and operant conditioning techniques to human behaviour and learning

- Behaviour modification is also called behaviour therapy because it is used to treat psychological problems, such as fears or phobias
- Useful in the treatment of maladaptive habits like overheating, antisocial behaviour, smoking and excessive drinking

A typical modification program
- Based on answers to the following questions:
• What behaviours are desired or undesired?
• Are these behaviours observable and measurable? (the answer must be yes)
• What reinforces these behaviours?
• When are the reinforcements applied?
• What are the consequences of these reinforcements?
• How can the reinforcement pattern be improved?

Types of behaviour modification
- Token economies
- Systematic desensitisation
- CBT
- Positive and negative reinforcement including rewards and punishment

Token economies
- Token economies: When a desired response is reinforced with symbolic reinforcers which can later be exchanged for a variety of tangible reinforcers
- More effective than simple reinforcement schemes because in reinforcement, the person can get full i.e a chocolate square is full whereas an accumulation of counters etc leads to a secondary reinforcer such as a DVD so you can never get full

Token economies in the real world
- Classrooms (stickers)
- prisons
- psychiatric institutions (get reward for taking medicine etc)
- fly buys
- frequent flyer points
- casino tokens (poker chips) (accumulate them and then trade in for money)

Criticism of token economies
- If used in places like hospitals and prisons it is difficult to maintain improvement of behaviour once left the institution
- Tokens need to be reinforced with social reinforcer and is often not successful
- Alcoholics anonymous does work where a behavioural contract is agreed upon standard of behaviour
- Similar schemes are also seen in frequent flyer loyalty programs, casino chips and fly buys where they can be used later/ exchanged for gifts etc

Systematic desensitisation
- Systematic desensitisation: A classic conditioning procedure used to replace the fear response with an incompatible relaxation response to a frightening object or situation

- Uses classical conditioning techniques to replace fear response with a relaxation response
- Exposed to least scary aspect of their feared event e.g photo of spider, practise relaxing until comfortable to proceed
- Presented with next level e.g dead spider in a jar until they tolerate appearance of spider (graded exposure)
- Be in presence of spider

Contribution to society
- It can help with fears, phobias etc

Cognitive behaviour therapy (CBT)
- CBT is a technique used by psychologists based on cognitions (thoughts) influence feelings and behaviours and that subsequent behaviours and emotions influence thoughts
- CBT- the therapist helps identify unhelpful thoughts, feelings and emotions
- Has both a cognitive component and a behavioural component
- Behaviour therapy: therapist helps to change behaviour modification, relaxation and other behavioural change techniques
- Cognitive therapy: based on the theory that distressing emotions and behaviours are the result of maladaptive thinking, it replaces dysfunctional thoughts with ones that can be managed which is an important component of CBT

- CBT: treat depressive disorders, anxiety disorders (highly recommended and successful), PTSD which uses trauma-focused CBT, obsessive compulsive disorder (highly successful), adjustment disorder, substance use disorders, childhood behavioural disorders and childhood anxiety disorders
- Also treat shyness, smoking cessation, obesity and all manner of activities where changing a person's thinking can lead to changes in behaviour

- CBT: cost effective as the benefits outweigh the costs relative to other treatments
- Used by many psychologists, psychiatrists and counsellors
- Used with limited success in treating schizophrenia which is a mental illness characterised by distorted thinking and emotions by reducing some symptoms and it can assist family members to avoid the patient relapsing and having another episode- it helps in conjunction with medication

CBT and depression
- Depression: in situations that could end positively or negatively, people are more likely to think a situation will end negatively
- CBT: will help replace negative thoughts with positive ones and reinforce positive actions

• Successful in reducing relapse after the treatment for depression and anxiety

Treating depression with CBT
1) helps identify and change negative thinking associated with depressed feelings
2) helps to focus on the positive things
3) helps to manage your problems
- CBT: regular appointments with psychologist, weekly then less frequent, maybe start off with 8 weeks and review the progress, usually 1 hour appointment and might give patient some homework

<u>Positive and Negative reinforcement</u>
- Reinforcement: the process of making a behaviour more likely to be repeated in the future because it is followed by a pleasant consequence for the learner
- Reinforcer: the stimulus that strengthens a response (i.e a pleasant consequence often referred to as reward)

<u>Positive and negative reinforcement and punishment</u>
- Reinforcement: is a consequence that causes a behaviour to occur more frequently
- Positive reinforcement: When a behaviour is followed by a pleasant reward
- Negative reinforcement: When a behaviour is followed by the removal of a unpleasant outcomes such as a cessation of a loud noise

Postive reinforcement
- When you receive a good grade on a test after several hours of studying, making it more likely you will invest a similar amount of time in preparation for the next test
- In the workplace, employees are offered a bonus for meeting productivity targets

Negative reinforcement
- Your parents may nag at you to clean your room or make your bed, and when you complete the chore the nagging stops
- When you take a panadol to relieve a headache, because taking the tablet removes the aversive headache stimulus and increases the likelihood that you will take the panadol next time you experience one

<u>Positive and negative reinforcement and punishment</u>
- Punishment: is a consequence that causes a behaviour to occur less frequently
- Positive punishment: is the addition of an aversive consequence (loud noise)
- Negative punishment: Is the removal of a pleasant stimulus- take a toy away

<u>Factors affecting the effectiveness of reinforcement and punishment</u>
- There are several factors that need to be considered when delivering punishment or reinforcement in order to maximise its effectiveness
• Order of presentation: important for consequence to follow behaviour
• Timing: Consequence to be presented immediately after the behaviour is demonstrated
• Appropriateness of the punisher: A reinforce must be considered desirable and pleasant by the learner, and a punisher must be considered undesirable and unpleasant

Four principles of operant conditioning
1) Immediacy: If the reinforcer is given immediately it has the maximum effectiveness
2) Principle of deprivation (nothing)/satiation (having too much): Desirability that the consequence (reward) diminishes overtime because the person has the lesser desire for the reward

3) Contingency: Reinforcement should occur consistently after the response, a future event that is possible but cannot be predicted with certainty
4) Principle of Size: If the size, or amount of the consequence is large enough to be worth the effort, then the consequence will be more effective upon the behaviour

Behaviour in the real world

- Police initiative is to lower the rate of drivers speeding
- So those who speed are punished with monetary fines
- Those who do not speed are 'rewarded' by not receiving a fine
- It is hoped with a combination of reinforcement and punishment, drivers will adjust their habits and obey speed limits