Unit 4 psych – learning

learningrelatively permanent change in behaviour that occurs as a result of experience. It is an ongoing process that continues throughout the lifespan, enabling us to adapt and cope in an ever-changing world

- can occur intentionally or unintentionally (taking piano lessons or hearing/watching someone else play)
- can be active or passive (reciting times tables or hearing about australias performance in the olympics)behaviour not dependant on learningreflexes, fixed-action patterns and maturation ONUNIT 4 PSYCH – LEARNING SPECIFICALLY FOR YOUFOR ONLY$13. 90/PAGEOrder Nowreflex actionsautomatic involuntary behaviour that does not require prior experience and occurs in the same way each time
- we are born with a large number of reflexes but most of these disappear or are incorporated as parts of other behaviours within several months after birth
- reflexes allow people to deal with specific stimuli that are important for their protection or survival through rigid automatic responses
- example: blinking eyes when wind blows in your facefixed-action patternsan innate (inborn) predisposition to behave in a certain way in response to a specific environment stimulus that is observable within a particular species or subgroup of a species
- occurs when members of a species produce an identical response to the same specific environmental stimuli
- this type of behaviour is also referred to as species-specific behaviour and instinctive behaviour
- behaviour that is inherited by every individual member of a species or, if the behaviour is sex-specific, by all members of one sex of the species

- different to reflexes as they usually consist of a single or simple response, whereas a FAP is more complex, usually consisting of a sequence of responses

- example: mother finch builds a nest, lays eggs, searches for food and returning it to the nest to feed her youngmaturationdevelopmental process leading towards maturity, based on the orderly sequence of changes that occurs to the nervous system and other bodily structures controlled by genetic inheritance

- responses that depend on maturation generally appear ay predictable times in development (unless there is undue interference from an environmental factor)

- example: a baby being able to sit up and then later on being able to crawl; automatic behaviour, timing depends on genesneural processesneurons are soft, flexible living cells that can change size, shape, function and connections with other neurons and patterns of connections

- influenced by the interaction of biological processes that are genetically determined and by experiences in everyday life

- as we learn, neurotransmitters are released and our brain modifies its neural pathways and neural connections within and between pathways, thereby literally changing its structure and function by 'rewiring itself'

- existing connections between neurons can reorganise and new pathways can form and strengthen during the learning process, thus making communication across a connection and along a pathway easier the next timedevelopment of neural pathwaysas with memory formation, when learning occurs, physical changes take place in the brain at the neuronal level

- the most prominent of these changes is the synapse, which is where neurotransmission occurs and the axon terminals of presynaptic neurons and the dendrites of postsynaptic neurons interconnect in forming neural pathways through different areas of the brain

- learning changes the strength of connections between neurons at the synapses within the neural pathways that also become our memory of an experience

- learning can cause new synapses to form

- most psychologists believe that the ability of the brain to 'rewire' itself by modifying existing neural connections and pathways, or by forming new ones, provides the biological basis or 'foundation' of learningrole of synapseslearning involves the establishment and strengthening of neural connections at the synapse

- learning results in the creation of cell assemblies, or interconnected groups of neurons that form networks or pathways

- neurons in a network send messages to other neurons within the network, but messages from one network may also organise into bigger networks

- the same neurons may be involved in different learning or in producing different patterns of behaviour, depending on which combination of neurons is active

- when neurotransmitter is repeatedly sent across the synaptic gap, the presynaptic neuron and the postsynaptic neuron are repeatedly activated at the same time

- this changes the chemistry of the synapse which strengthens the connection between the neurons at the synapse

- when the synaptic connection between neurons is strengthened, this makes

them more likely to fire together again and to transmit their signals more forcibly in the future

- the synaptic changes that take place in a neural pathway during learning are believed to have long-term potentiation

- postsynaptic neurons become more and more responsive to the presynaptic neurons as a consequence of repeated stimulation

- ltp is a crucial neural mechanism that makes learning possible in humans, as well as in all animals with nervous systems

- ltp is necessary for learningplasticity and effects of experience on the brain-the brain is capable of learning because of its flexibility in being able to adjust to changes in environmental input

- experience associated with learning causes changes at the synapse, including the establishment and strengthening of connections between neurons that form neural pathways within the brain

- plasticity is the ability of the brains neural structure or function to be changed by experience throughout the lifespan

- the brains plasticity is a feature that persists from embryonic development through to and including old age

- lifelong plasticity accounts for many of the learning experiences we have throughout life, such as learning our native language as a child, learning to play a musical instrument as an adolescent, learning to text message as an adult, learning to use a computer in old age, and so on

- we perform with increasing skill as our brain incorporates the learning within its structure; the neural activity underlying this process occurs in a systematic way and not haphazardly

- the brain of a developing individual is even more plastic than that of an

adult, particularly at specific times in development when it seems that the brain is more responsive to certain types of experiences, which is why infants learn a new language more quickly than adults do, and infants also recover more quickly from brain damage that do adults do to greater plasticity of their braindevelopmental plasticity- occurs as brain development proceeds according to its maturational blueprint

- refers to changes in the brains neural structure in response to experience during its growth and development
- this type of plasticity is predetermined and therefore influenced by the genes we inherit, but it is also subject to influence by experience
- infant brain forms far more synaptic connections than it will ever use
- the process of forming new synapses is called synaptogenesisadaptive plasticity- most apparent in recovery from trauma due to brain injury
- refers to changes occurring in the brains neural structure to enable adjustment to experience, to compensate for lost function and/or to maximise remaining functions in the event of brain damage
- typically quicker and more substantial and extensive in the earlier years, particularly in infancy and early childhood
- enables the brain to compensate for damage by reorganising its structurereroutingan undamaged neuron that has lost a connection with an active neuron may seek a new active neuron and connect with it insteadsproutingis the growth of new bushier nerve fibres with more branches to make new connectionssensitive perioda period in development when an organism is more responsive to certain environmental stimuli or experiences. Sensitive periods are sometimes described as 'windows of opportunity for learning because they are the optimal or best possible times

for the relevant learning to occur

- sensitive periods indicate that brain development goes through specific periods during which some synaptic connections are most easily made and some neural pathways are most easily formed, assuming there is exposure to the appropriate environmental stimulusexperience-expectant learningtakes place when the brain encounters the experience that is expected, ideally in a sensitive period because this is the best time for it to occurexperience-dependant learningrefers to learning that depends on exposure to specific experience at any time during an individuals developmentcritical perioda specific period in development during which an organism is most vulnerable to the deprivation or absence of certain environmental stimuli or experiences

- critical periods have identifiable start and end times, thereby tending to begin and end suddenly, rather than gradually (if at all) as do sensitive periodshippocampusthe role of the hippocampus is a medial temporal lobe structure that is crucial for long term memory formation

- forms and encodes new declarative explicit memories (semantic and episodic) but not directly in forming or retrieval implicit procedural memoriesamygdalaa small structure located next to an interconnected with the hippocampus in the medical temporal lobe

- plays a crucial role in processing and regulating emotional reactions, particularly strong emotions a= such as fear and anger

- important for the learning and memory of fear responses involving implicit memory

- the amygdala attaches significance to previously 'neutral' events that become associated with fearventral tegmental area (VTA)a group of neurons

located close to the midline on the floor of the midbrain

- the origin of the dopaminergic cell bodies of the mesocorticolimbic dopamine system and is widely implicated in the drug and natural reward circuitry of the brain

- It is important in cognition, motivation, orgasm,[2] drug addiction, intense emotions relating to love, and several psychiatric disorders

- The VTA contains neurons that project to numerous areas of the brain, from the prefrontal cortex (PFC) to the caudal brainstem and several regions in between