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01 - 1. Learning Theory

1. Learning Theory

1. Learning Theory

The psychological construct of learning refers to the development of a relatively lasting change in behaviour as the result of a single or repeated experience. Non associative learning: These are simple forms of learning demonstrated in lower animals where only single events are used in learning paradigm - no pairing

or ‘operation’ on the environment is required.

Habituation is a non-associative learning in which repeated stimulation leads to a reduction in response over time as the organism ‘learns’ the stimulus.

Sensitization is an increase in response to a stimulus as a function of repeated presentations of that stimulus. Similar to habituation, repetition of exposure is required to elicit the learning effect, but the response rates go

up, not down (i.e. opposite to the effect seen in habituation).

Pseudoconditioning (cross-sensitization): The emergence of a response to a previously neutral stimulus simply as a result of exposures to a different but powerful stimulus. Associative learning: Here learning occurs through the association of two events.

Classic conditioning: learning takes place through repeated temporal association of two events. The

learning organism is passive, respondent (i.e. shows an innate, reflexive response such as salivation) but not instrumental (i.e. does not actively operate on its environment).

Operant conditioning: learning results from consequences of one’s actions – operations. The learning organism actively operates (instrumental) on the environment.

Social learning theory: combines both classic and operant models of learning, and includes cognitive processes and social interaction to be relevant in human learning. Classical conditioning is produced by repeatedly pairing a neutral conditioned stimulus (CS e.g. bell) with an unconditioned stimulus (UCS e.g. food) that naturally evokes an unconditioned response (UCR e.g. salivation). Eventually the neutral stimulus alone eventually evokes the desired response (salivation – now called conditioned response, CR). It is a relatively rapid process and depends upon the nature of the unconditioned stimulus. Pavlov first demonstrated this paradigm in dogs. The development of the association between the CS and the UCR resulting in a CR is called acquisition. For animals this takes around 3 and 15 pairings; if sufficient emotional involvement is

present acquisition can occur with even one pairing. Type of conditioning Pairing procedure Delayed or forward conditioning. CS (bell) presented before UCS (food); the CS+ UCS pairing continued till UCR (saliva) appears Backward conditioning. UCS (food) presented before CS (bell) – not useful in animals; used in advertising Simultaneous conditioning. UCS + CS presented together – often the case of learning in

 real life situations. Trace conditioning. CS presented and removed before UCS presented – conditioning depends on memory trace.

A delay of less than 0.5ms is proposed to be the optimum for trace conditioning. Temporal contiguity (time between stimulus and response) is important for conditioning according to Pavlov. But Rescorla showed that predictability is more important than temporal contiguity in humans i.e. if one can predict painful tooth extraction on hearing the dentist's drill, then the noise gets conditioned to elicit fear response better than two unconnected, unpredictable events having temporal contiguity. Note that for classical conditioning it is not necessary that the organism understands an association in cognitive terms but such awareness facilitates the learning. Higher-order conditioning refers to the use of an already conditioned stimulus CS1 as UCS for the next level of conditioning and eliciting a CR for another stimulus CS2. In this way second order and subsequently higher order conditioning are possible. Animals do not respond higher than 4th order usually. Pavlovs' experiments were conducted using human subjects by Watson & Rayner. Watson produced 'phobia' in an infant called Little Albert. By exposing him to loud frightening noise whenever he was shown a white rat, eventually Albert became fearful of the white rat, even when he heard no loud noise. A similar fear response was seen when any furry white object was shown to Albert. This 'spread' of associative learning from one stimulus to other is called stimulus generalisation. Discrimination is a process diametrically opposite to generalization; in many situations associative learning can be very selective. In such cases, learned responses are made only to specific stimuli and not to other similar stimuli e.g. a child may be afraid of dogs but not all four-legged animals. Extinction: reduction/disappearance of a learned response when the UCS – CS pairing (or the reinforcer in operant conditioning; see below) is not available anymore. Faster extinction may mean weaker learning. Extinction does not mean loss of learning, but only a suppression of behavioural response. Spontaneous recovery refers to regaining a previously extinguished learned response after a period of time. Counter conditioning is a form of classical conditioning where a previously conditioned response is replaced by a new response that may be more desirable. Utilised in behavioural therapy - systematic desensitisation, aversion therapy. Latent inhibition: A delay in learning the association between UCS and CS is seen if previous exposure to an isolated presentation of CS is present. An organism learns an appropriate behaviour after many trials because the right behaviour is followed by appropriate (desirable) consequence. This forms the basis of the concept of operant conditioning; this

 phenomenon is termed the law of effect and is often demonstrated using trial-and-error learning experiments originally described by Thorndike. A conditioning that leads to increase in the frequency of behaviour following learning is called reinforcement. A conditioning that leads to decrease in the frequency of behaviour following learning is called punishment. Both reinforcement and punishment can be positive (i.e. something is given) or negative (something is taken away). Positive Reinforcer Food for pressing a lever (given) Negative Reinforcer Ceasing of electric shock on pressing a lever (taken away) Positive Punishment Points on your driving license

for speeding (given) Negative Punishment A monetary fine from a parking ticket (taken away) Primary Reinforcer Stimulus affecting biological needs (such as food) Secondary Reinforcer Stimulus reinforcing behaviour associated with primary reinforcers (money, praise) Both positive and negative reinforcement increase the desired response. The use of a “star chart,” with a variable interval schedule so that about 2 or 3 stars are administered per day depending on the good behaviour, and none for bad behaviour. This part would be positive reinforcement by giving something additional to increased the desired response In a patient with OCD, compulsions provide short-term relief of obsessional anxiety via negative reinforcement. When carrying out compulsive rituals, anxiety is reduced acutely. This provides a reinforcement to engage in the compulsions repeatedly - the termination of the aversive anxiety cued by obsessions, increases the compulsive behaviour that removed the anxiety, without addressing the core of obsessions. Reinforcement Schedules A reinforcement schedule refers to how and when behaviour is reinforced on the basis of the number of responses. Reinforcement Schedule Explanation/Example Continuous (aka contingency reinforcement) Reinforcement every time the positive response occurs - e.g. food pellet every time a rat presses a lever in an experiment Partial Only some of the positive responses result in positive reinforcement – the reinforcement is determined by number of responses (ratio) or time (interval) Fixed Interval Reward occurs after a specific period of time regardless of number of responses e.g. a monthly salary irrespective of your level of performance! Variable Interval Reward occurs after a variable (unpredictable) period of time, regardless

 of the number of responses e.g. an angler catching a fish - the first may be after 10 minutes, the next after 45, then 5 minutes etc. Fixed Ratio Reward occurs after a specific number of responses e.g. after completing 20 MCQs, you give yourself a coffee (or chocolate) break. Variable Ratio Reward occurs after a random number of responses e.g. gambling slot machines. Your first win of £20 on a gamble may occur after 3 tries; then the next win may not occur even if you play 30 times, while the third win may follow in quick succession after the second. Important points to note: In fixed schedules, a pause in response is seen after reinforcement as the organism knows the reinforcement will not be happening for some reasonable time or attempts hereafter. The pause for fixed interval schedule is greater than the pause for fixed ratio schedule. When we interpret an operation to be under control (as in fixed schedules) we learn more quickly. Variable schedules generate a constant rate of response as the chance of obtaining a reward stays the same at any time and for any instance of behaviour. In general, partial schedules are more resistant to extinction than continuous schedule though they take longer to learn. Variable ratios are the most resistant to extinction. This may explain why gambling is such a difficult habit to eradicate. Another important determinant of operant conditioning is contingency - learning the probability of an event. Premack’s principle (a.k.a. Grandma’s rule): high-frequency behaviour can be used to reinforce lowfrequency behaviour e.g. “eat your greens and you can have dessert”. An existing high-frequency behaviour (eating dessert) is used to reward low-frequency behaviour (eating greens). Avoidance learning: an operant conditioning where an organism learns to avoid certain responses or situations. Avoidance is a powerful reinforcer and often difficult to extinguish. A special form of avoidance is escape conditioning seen in agoraphobia where places in which panic occurs are avoided / escaped from leading to a housebound state eventually. Aversive conditioning: This is an operant conditioning where punishment is used to reduce the frequency of target behaviour e.g. the use of disulfiram (noxious stimuli) to reduce the frequency of drinking alcohol. Covert reinforcement: In covert reinforcement schedules, the reinforcer is an imagined pleasant event rather than any material pleasure e.g. imagining

MRCPsych graduation event to reinforce the behaviour of practicing MCQs. Covert sensitization: The reinforcer is the imagination of unpleasant consequences to reduce the frequency of an undesired behaviour e.g. an alcoholic may be deterred from continuing to spend on alcohol by imagining his wife leaving him, being unable to support himself and ending up broke and homeless.

© SPMM Course Flooding: An operant conditioning technique where exposure to feared stimulus takes place for a substantial amount of time so the accompanying anxiety response fades away while the stimulus is continuously present e.g. a man with a phobia of heights standing on top of the Burj Khalifa or the Shard. This will lead to the extinction of fear. When a similar technique is attempted with imagined not actual exposure then this is called implosion. Shaping (a.k.a. successive approximation): This is a form of operant conditioning where a desirable behaviour pattern is learnt by the successive reinforcement of behaviours closer to the desired one. Note that shaping is used when the target behaviour is yet to appear (i.e. it is novel and does not exist already). Dog runs towards a wheel but doesn't jump Runs and makes a jump close to the wheel Runs, jumps through the wheel Runs, jumps through the wheel on fire Circus on show Gets a bone Gets a bone Gets a bone Gets a bone Behaviour is shaped

Chaining: This refers to reinforcing a series of related behaviours, each of which provides the cue for the next to obtain a reinforcer. Chaining is used when the target behaviour is already notable in some form but not in the fully formed sequence. An example is teaching a child to write his name. The shape of individual alphabets is first taught using reinforcers and forward chaining can be used to link each alphabet in the correct order, finally reinforcing the completed name. Backward chaining starts at the end e.g. when making cupcakes, the child is first taught how to sprinkle over a fnished cupcake, the next time icing the cake and sprinkleing, the next time placing the prepared cake mixture into cupcake wrappers then icing then sprinkling etc. Incubation: An emotional response increases in strength if brief but repeated exposure of the stimulus is present. Rumination of anxiety-provoking stimuli can serve to increase the anxiety via incubation. This is a powerful mechanism that maintains phobic anxiety and PTSD. Stimulus preparedness (Seligman) explains why snake and spider phobia are commoner than 'shoe phobia' or 'watch phobia'. In evolutionary terms, the stimuli that were threatening to hunter-gatherer men has been hard wired into our system, reflexively eliciting responses immediately – and phobia develops more readily for such 'prepared stimuli'. Learned helplessness (Seligman): initially put forward as a behavioural model for depression. When confronted with aversive stimuli from which escape is impossible, an animal stops making attempts to escape. This was shown experimentally with a dog on an electrified floor unable to escape. After a while, the dog stopped trying, as if accepting its fate. This paradigm is frequently invoked to explain the dependence seen in victims of domestic abuse. Reciprocal inhibition (Wolpe): If stimulus with desired response and stimulus with the undesired response are presented together repeatedly, then the incompatibility leads to a reduction in frequency of the undesired response. This is evident when your dog barks at your friend; try hugging her in front of

© SPMM Course your dog every time the dog barks and slowly the dog will stop barking at your friend. This is used in relaxation therapy for anxiety and in systematic desensitisation. Cueing (a.k.a. prompting): specific cues can be used to elicit specific behaviours – e.g. in a classroom a teacher puts her finger on her lips to reduce chatter and elicit the response of silence. The process of unlearning such cue associations is called fading. Bandura's social learning theory: Bandura believed that not all learning occurred due to direct reinforcement, and proposed that people could

learn simply by observing the behaviour of others and the outcomes. According to behaviourists, learning is defined as a relatively permanent change in behaviour but social learning theorists differentiate actual performance from learning a potential behaviour. Social learning theorists emphasize the role of cognition in learning; awareness and expectations rather than the actual experience of reinforcements or punishments are sufficient to have a major effect on the behaviours that people exhibit. Cognitive processing during social learning:

1. Attention to observed behaviour is the basic element in learning.
2. Visual image and semantic encoding of observed behaviour memory
3. Memory permanence via retention and rehearsal
4. Motor copying of the behaviour and imitative reproduction
5. Motivation to act. Reciprocal causation: Bandura proposed that behaviour can influence both the environment and the individual and each of these three variables, the person, the behaviour, and the environment can have an influence on each other. The most commonly discussed experiment illustrating Bandura's theory is the Bobo Doll experiment. Children watching a model showing aggression against a bobo doll learnt to display the aggression without any reinforcement schedules. Cognitive learning (Tolman): reinforcement may be necessary for a performance of learned response but not necessary for the learning itself to occur (latent learning). He inferred that rats can make cognitive maps of mazes – called place learning - which consists of cognitive expectations as to what comes next. Insight learning (Kohler) is diametrically opposite to associative learning and views learning as purely cognitive and not based on S-R mechanism - a sudden idea occurs and the solution is learnt. Hierarchy of learning: Gagne's hierarchy of learning (see the attached table) describes that simple or basic learning steps are prerequisites for later complex learning. This pattern of learning can also be seen during human development and in the hierarchy of evolution. Stages Gagne's learning hierarchy Classical conditioning (signal learning) Operant conditioning Chaining Verbal association Discrimination learning Concept learning Rule learning Problem solving

02 - 2. Basic principles of visual and auditory pe

2. Basic principles of visual and auditory perception

When perceiving an object it needs to be differentiated from its background. Determinants of figure vs. ground differentiation include

1. Contour – surroundedness
2. Size
3. Orientation
4. Symmetry This is also influenced by perceptual set (see below). Reversal of figure-ground perception frequently occurs so that sometimes, the ground is perceived as figure and vice versa e.g. try googling for images of Rubin’s vase illusion. This indicates that same stimuli can produce more than one perception. Figure-ground differentiation is also crucial for perceiving auditory stimuli e.g. when we are at a crowded party we are still able to filter our friend’s voice and have a conversation amidst all noisy background (cocktail party phenomenon). Shadowing is an experimental extension of this effect where two different messages are given to the right and the left ear and the subject is asked to follow one and suppress the other. These experiments are called dichotic listening tests (see below for further information in ‘attention’ section). The principle of Gestalt: Gestalt means shape or form; it also refers to the global whole of an object. Gestalt law of perceptual organisation includes

According to Gestalt laws, global processing occurs before local processing of components. The whole is different from the sum of its parts. This is true at least for 2 dimensional objects though ecological validity is lower for 3D objects. •Objects close to each other are perceived as one figure Proximity Proximity •Incompletely closed figures are perceived as fully closed Closure Closure •Continuous items are perceived as one object. Continuity Continuity •Similar items are grouped together based on colour or shape etc. Similarity Similarity •Things moving together are perceived as one object. Common fate Common fate

© SPMM Course Depth perception depends on pictorial and non-pictorial primary cues. The non-pictorial cues are generally binocular cues and include a. Retinal image disparity b. Stereopsis c. Accommodation (monocular) d. Convergence

Pictorial cues (secondary) include largely monocular elements such as a. Size b. Brightness c. Superimposition d. Texture e. Linear perspective (rails converge at distance, wide apart when closer) f. Aerial perspective (colour – blue mountains means a distant sight) g. Motion parallax (closer it is faster it seems)

Visual cliff is an apparatus used to test an infant's perception of depth. A pane of thick glass covers a shallow drop and a deep drop. The underlying surfaces of both deep and shallow sides are covered with the same chequered pattern. Children of six months and older will not venture to the 'deep side' and this is taken as an indication that the child can perceive depth. Perceptual constancy is defined as the ability to perceive objects to be the same and unchanging in character despite varied inputs. It consists of

1. Size constancy
2. Shape constancy e.g. a door is always a door no matter which angle it is showing to the viewer
3. Location constancy – movement of the head gets nullified somehow so we do not perceive objects around us getting relocated as we move our head!
4. Brightness, hue and colour constancy

Autokinesis refers to the phenomenon that if light is shown from a small, dim, and fixed light source for an extended period of time in a dark room, it will appear as if the light source is moving. This visual illusion can explain UFO sightings and can also affect pilots. The phi phenomenon is a perceptual illusion described by Wertheimer. This refers to the phenomenon in which a false perception of motion is produced by a succession of still images shown with fixed time interval rapidly. Theories of perception: Bottom-up theory: Gestalt is an example of a bottom-up theory. According to bottom up theories, perception is purely data driven and directly starts with the optic array. Piecing together of basic elements of the data gives rise to more complex systems. This makes the original elements sub-systems of the 'emergent system'. But perception is not just seeing, it is 'seeing as'.

© SPMM Course Top-down theory: Gregory's constructivist theory is an example of a top-down theory. According to this theory, retinal images are sketchy and cannot explain the complex and fully formed perceptions that we experience. Perception is best defined as a process of using information known already to formulate and test a hypothesis. It is driven from the 'top down' – i.e. from higher cortical areas. Illusions such as Muller Lyer (i.e. when you compare >----< and □□ , despite the horizontal line being of same length in both instances, the first one may appear to be longer) support top-down processing. A perceptual set is defined as the readiness to perceive selected features as an object. This is related to the level of motivation e.g. hunger, emotional state, values, beliefs, context and expectations (e.g. UFOs are sighted only by those who believes in them and 'expects' them). Illusions and hallucinations Illusion is defined as any perceptual situation in which a physical object is perceived but appears different from what it really is e.g. a white wall appears yellow if a yellow light is shone on it. A hallucination is an experience in which

an object (e.g. sound or light) is perceived in the absence of any corresponding object in the real world. A hallucination is often indistinguishable from genuine perception.

Human visual perception The development of human visual perception is an illustration of a constitutional-environmental interaction. Most of the time during development, complex visual stimuli such has human faces are preferred. Innate visual processes such as visual scanning, tracking, fixating, figure-ground discrimination are present from birth. Learnt visual processes include size constancy, shape constancy, depth perception, shape discrimination. From birth we have the ability to discriminate brightness and carry out eye tracking, visual acuity is significantly impaired and focusing is fixed at 20cm. At 2-4 months – depth perception is apparent (as evidenced by visual cliff experiments). By 4 months – accommodation and colour vision seems to be present in most children. By 6 months – 6:6 acuity is achieved.

03 - 3. Information processing and attention

3. Information processing and attention

© SPMM Course 3. Information processing and attention Focused or selective attention refers to the mechanism by which certain information is registered while others are rejected. Capacity or divided attention refers to the upper limit of the amount of processing that can be performed on incoming information at any one time. Many studies of attention have used auditory tasks. Dichotic listening refers to feeding one message into the left ear and a different message simultaneously into the right ear. Participants have to repeat one of the messages aloud. This process is called Shadowing (first used by Cherry). This is a method to study selective attention. Divided attention can be tested using a dual-task technique whereby the individual is asked to attend and respond to both or all incoming messages. Cocktail party effect: It is a concept related to selective attention. It is a term used in early attention research 'to describe the ability of people to be able to switch their attention rapidly to a nonprocessed message'. The cocktail party effect shows that certain types of stimuli can elicit switching between messages e.g. the physical location of the speaker, the pitch of the voice or the use of familiar stimuli such as the listener's name. (Lunch-queue effect) Broadbent's early selection filter theory: o Our ability to process information is capacity limited. o A temporary buffer system receives all information and passes it to a selective filter. o The selection is based on physical characteristics of the information – one source is selected and others are rejected. o Processing two different pieces of information will take longer and will be less efficient as switching takes a substantial period of time.

 Triesman's attenuation theory: o Treisman (1964) proposed that physical characteristics and semantic relevance (meaning) are used to select one message for full processing while other messages are given partial processing. Deutsch-Norman late selection filter model: o This model rejects Broadbent and suggests that filtering occurs only later, after all inputs are analysed at a higher level. This is also called the pertinence model. Pigeon-holing: o Later Broadbent revised the early selection filter theory and stated that apart from filtering, pigeon-holing can also take place. STM Selective Filter short term memory sight sound smell Selected stimulus Selected stimulus Senses

© SPMM Course o Pigeonholing is similar to filtering but selection is not based on physical characters; it is based on categorization. o E.g. if one is asked to attend to the names of animal (a category) from many stimuli, this will take place irrespective of physical characters such as volume, pitch etc. Automaticity o Automatic processing: Does not require conscious attention Unaffected by capacity limits Difficult to modify E.g. driving a car or listening to the radio o Controlled processing: Requires attention Heavy demands Slow and capacity limited E.g. reading this notes! Closed loop control: when we first learn a task it is under conscious attention system. When we become skilled at it, open loop control takes over. Open loop is controlled by automatic motor processes. It is fast and allows conscious attention to be diverted to other activities. Stroop test and letter cancellation tasks can test selective attention. A hierarchical model of attention: Sohlberg and Mateer proposed a clinically useful model of evaluating attention in a hierarchical fashion based on the sequential recovery of attentional ability in patients with brain damage. Five different kinds of activities of growing difficulty are described in the model connecting with the activities that patients could do as they recover gradually. This model has been clinically useful in terms of rehabilitation of brain-damaged patients. Studies of attention in schizophrenia suggest that there is an underlying attentional abnormality for those with a genetic predisposition for psychosis. The overall reaction time is much slower in patients with schizophrenia and their relatives; sustained attention, distraction, verbal memory and controlled processing are also affected. Focused attention The ability to perceive individual items of information (respond discretely to the specific modality of stimuli). Sustained attention The ability to maintain a consistent behavioral response during continuous and repetitive activity. Also called as vigilance or concentration Selective attention The ability to avoid distractions from internal or external cues and maintain a behavioural or cognitive set in the face of competing stimuli. Alternating attention The ability of mental flexibility that allows individuals to shift their focus of attention and move between tasks having different cognitive requirements. Divided attention This is the highest level of attention and it refers to the ability to respond simultaneously to multiple tasks or multiple task demands. It is much more difficult to achieve within same modality (e.g. visual) as it is between different modalities (visual and auditory)

04 - 4. Memory

4. Memory

© SPMM Course 4. Memory In all cognitive operations involving memory 3 different processes are thought to occur. Encoding - It leads to the formation of initial memory traces and receives information from the outside. Storage - Retention of information and maintenance Retrieval - Accessing and recovering information from memory stores William James divided memory to primary (short term) and secondary memory (long term). In fact 3 forms of memory are now recognised.

1. Sensory memory: This is modality specific, has a large capacity but gets disrupted by the inflow of new information in the same modality. Each sense has its own sensory memory e.g. iconic (visual) lasting 0.5 seconds, echoic (auditory) lasting 2 seconds etc. No processing is involved in sensory memory. If attention is paid to the sensory memories during perception, sensory memory gets consolidated or ‘moves’ into the short-term memory system.
2. Short term memory: The capacity of STM according to Miller is 7+/- 2 items. This is evident while testing digit span (but see below for chunking). Unaided, STM lasts 15 to 30 seconds. By maintenance rehearsal, this duration can be increased further up to indefinite periods. If maintenance rehearsals are prevented, then by 15 seconds the original material is completely forgotten. Brown Paterson task involves introducing distraction (such as counting a three digit number backwards) immediately after the digit span test in order to prevent rehearsal. STM uses acoustic coding (mostly) or visual coding. Recall of information is effortless and usually error-free. Information is held in STM by the process of rehearsal. Loss of information from STM occurs mainly through displacement (newly acquired items entering STM displaces existing material) and decay (older materials have a weaker trace strength than the recently acquired items). In order for memory to move from temporary to long-term storage, elaborative encoding (Daniel Schacter) must take place. NOTE: The term working memory is increasingly used to describe a large part of what was called as STM in the past. Working memory allows cognitive processes to be performed on data that is briefly stored in short-term memory.
3. Long term memory: This has unlimited capacity and lasts for an indefinite duration. The coding is largely semantic, though visual and acoustic coding can occur to some extent. According to Atkinson & Shiffrin, STM and LTM are regarded as structural components. Rehearsal is supposed to be the transient control process that can aid maintenance of STM and transfer to LTM. Other control processes include encoding, retrieval strategies and decision to STM LTM Encoding Acoustic Semantic Retrieval Error-free Error-prone Capacity 7+/-2 chunks Unlimited

© SPMM Course remember. Rehearsal may be maintenance/rote rehearsal or elaborative rehearsal where encoding is semantically elaborated or changed. It is proposed that rehearsal can take place at 3 levels of processing. Shallow processing where surface features are only rehearsed, phonemic processing where sound features are rehearsed or semantic processing where deeper encoding and meaning related associations are made. Higher level of processing depends on time available and nature of the material processed. [The terms often used in psychology are short term memory (corresponds to immediate memory in clinical psychiatry) and long term memory (recent memory and remote memory in psychiatry). STM (immediate memory) is tested by the recall of digits immediately after their presentation (Digit span).] Other classifications: Recent memory is the ability to remember what has been experienced within the past few minutes (recall of items after five minutes), hours (recall of last meal), days (recall of recent news items). Remote memory is the ability to remember events in the distant past (weeks to years). This can be tested by inquiring about important dates in their lives such as date of birth, date of marriage, how many siblings they have etc. Tulving elaborated multistore model (LTM) to have two forms - declarative (explicit – includes semantic and episodic memory) and non-declarative (implicit) memory. Procedural or Implicit memory: This cannot be consciously inspected. This is not affected by an organic amnesia of hippocampal origin. It is made of procedural memory for skills and habits, priming, classical conditioning and nonassociative learning. Episodic memory is autobiographical, self-focused, spatio-temporal memory. Semantic memory includes factual knowledge of the world. It is proposed to be made of multiple episodic memory components. Priming is a form of learning that occurs without conscious recall of the episode of learning; performance demonstrates that the information is learnt but conscious episodic recall is absent. Baddley & Hitch proposed a working memory model. Working memory is proposed to have central executive and 2 arms – phonological loop and visuospatial sketchpad. The central executive is capacity limited but modality free, similar to attention system. The phonological loop consists of auditory rehearsal loops while visuospatial scratch pad consists of pattern recognition and movement perception components. It is proposed that dyslexia may be related to erratic phonological loop. The 4th component of WM is sometimes called episodic buffer. This is a multimodal store that integrates info from the slave systems onto LTM. This buffer is important for chunking. Working memory is important for various processes including executive functions, decision-making, error detection and correction, new learning (anterograde memory formation) and judgement. Serial position effect: While memorising and recollecting a list of words both primacy and recency effects are seen. Regardless of the length of a list, the initial words (primacy) and last few words

© SPMM Course (recency) are remembered better than those at the middle of the list. Primacy is supposed to be due to LTM as consolidation has occurred in the sufficient time between learning the first word and testing recall. Recency effect is due to STM wherein last heard words are freshly retained. In those with organic anterograde amnesia, recency is better preserved than primacy. Here the problem is in transferring to LTM from STM and/or retrieval from LTM. In retrograde amnesia, the physical establishment of LTM memory (called consolidation) fails. Retrieval: Modes of retrieval (i.e. moving from LTM STM) are through Recognition (solving MCQs) Recall (actively searching and reproducing), Reintegration/reconstruction (recollection of past experiences based on certain cues). An eyewitness testimony is a reconstructive memory, which is a mode of retrieval from long-term memory. However, reconstructive memory of events as in eyewitness testimony is affected by the type of questioning asked to elicit the memory. Forgetting: Hermann Ebbinghaus plotted the forgetting curve by plotting the proportion of words retained in memory

against time. The curve shows a sharp drop over the first nine hours and particularly during the first hour. After nine hours, the rate of forgetting slows and declines little thereafter, even after the lapse of 31 days. The main findings from his and other studies are; Forgetting is maximum in the first few hours, and the rate of forgetting gets less with time. Forgetting is never complete, and some information is retained over longer periods of time, even for life. Recalling the material during the test period increases the probability of remembering items or events. Continuous motor skills, such as cycling and swimming, show no forgetting at all. But discrete motors skills such as typing are lost more quickly. Problems with encoding (registration), retention or retrieval, can all result in forgetting. Decay theory states that neural engrams breakdown with time. This means that disuse with time is the cause of forgetting, but no evidence exists that neurological decay occurs. Also what happens before and after learning is more important than the mere passage of time in forgetting. FLASHBULB MEMORIES

Distinctly vivid long-lasting memories of a personal circumstance surrounding a person's discovery of shocking events. These are not as accurate or permanent as photographic memories but forgetting curve for the flashbulb memories is far less affected by time than other types of memories. These memories are often associated with important historical or autobiographical events. Such events could include, for example, the 9/11 or 7/7 etc.

© SPMM Course Displacement theory states that due to capacity limitation new info replaces old information. Retrieval failure theory states that due to lack of proper cues to recall we forget things. According to encoding specificity principle, anything we encode during learning can be a cue/tag for later retrieval. Recall improves if same cues are available when recalling, but this holds true only for recall, not recognition. Hence, some times recall is better than recognition! Such cues can be the context (place, external state) specific or emotion/ inner state specific. According to interference theory forgetting occurs due to interference. When newly learnt material interferes with recall of old material, this is called retroactive interference. Proactive interference refers to the interference of new learning from older learnt material. There is a low ecological validity for interference model as most experiments were conducted with memorizing word lists, a skill that is rarely required in daily life. Strategies to improve encoding include – order and sorting info, chunking, mnemonics, using imageries, adding importance and salience to the info and using primacyrecency effects. Retrieval can be helped by cueing and reinstatement of learning context. Chunking is a method of increasing the capacity of short-term memory by combining units or information (usually numbers) into chunks. By doing so, impressive feats of memory can result. For example the numbers 1,5,2,3,5.2,5,8,5,3,7,8 would normally overload our short-term memory but if they are arranged into chunks 152, 352, 585, 378, they become a lot more manageable. The more similar the retrieval situation is to the encoding situation, the better retrieval. This is called encoding specificity principle. Amnesia refers to a marked impairment in episodic memory, although other types of memory such as working memory, semantic memory and procedural memory may remain relatively intact. Anterograde Amnesia: The loss of the ability to form or retain new episodic memories after an injury/lesion/event Lack memory for events taking place in immediate future after an event Classic cases often involve hippocampal damage The subject cannot learn anything new. Nothing can be moved from STM to LTM.

RIBOT'S GRADIENT

Theodule Ribot first suggested that recent memories might be more vulnerable to brain damage than remote memories in 1881. After damage to the hippocampal memory system, patients tend to lose more of their recent than of their remote memories. This pattern, unique to organic amnesia, is called the Ribot gradient. This may be related to the dependence of retrieval on hippocampal systems, while consolidation gradually ‘pushes’ stored memories to the neocortex, making them independent of the hippocampal system.

© SPMM Course Retrograde Amnesia: The loss of episodic memories that were stored before brain damage had occurred. Lack memory for immediately preceding events. Follows head injury The subject never consolidates the information that is already in STM (retrieval failure i.e. fails to move from LTM to STM).

Transient global amnesia is caused by transient cerebral ischemia causing a temporary lack of blood supply to the regions of the brain concerned with memory functions. The main features include sudden onset of severe anterograde amnesia with a retrograde amnesia for the preceding days or weeks. Sometimes amnesic episodes may occur in patients who have had no brain injury but suffered a traumatic or emotionally disturbing life event (hysterical or psychogenic amnesia). There are two types-Global and situation specific. Fugue state is a type of psychogenic global amnesia in which there is a sudden loss of all autobiographical memories, knowledge of self and personal identity. Usually, there is a period of wandering, and there is an amnesic gap upon recovery. It usually last a matter of hours or days. Memory recovery is complete after few hours or days. In most cases, the fugue states will clear over a few days and the amnesia is mainly transient. If not, the patient usually adopts a new name and identity and begins a new life. As in organic amnesia, fugue patients will normally retain their procedural and semantic memories. The patient may have episodic memory loss that is usually only retrograde memory loss and no anterograde impairment. Situation specific amnesia: Offenders, as well as victims of crimes commonly, claim amnesia regarding the offence. In 25-45% of homicides, 8% of other violent crimes and a small percentage of non-violent crimes, offenders claim amnesia (Kopelman 2002a). Amnesia for an offence is associated with alcohol or substance misuse and acute psychosis, but purely psychological amnesia is often limited to crimes of passion. In people with PTSD anterograde memory dysfunction has been demonstrated with some reduction in hippocampal volume on MRI (Bremmer 1999) attributed to effects of glucocorticoids (Markowitsch 1996) Amnesic syndromes: Various disorders can give rise to amnesic syndromes (e.g. hypoxia, herpes encephalitis) and the features would include

1. Immediate memory is unimpaired.
2. Anterograde amnesia- inability to acquire new information (impaired delayed recall)
3. Retrograde amnesia of variable extent and severity-The degree depends on the extent of brain damage
4. Preserved global intellectual abilities
5. Preserved implicit memory

© SPMM Course Korsakoff’s syndrome: It is a form of an amnesic syndrome caused by thiamine deficiency. The patient may have severe anterograde amnesia and extensive retrograde memory loss. This retrograde memory loss includes autobiographical memory loss with relative sparing of the most distant memories. Working memory and procedural memory are unimpaired. Bedside

tests: Three words learning task (e.g. apple, table, penny) is a test of anterograde memory and learning, useful to investigate Korsakoff's syndrome. Post-traumatic amnesia: The time between the injury and recovery of normal continuous memory, seen in head injury patients. The longer the PTA, the more severe the brain damage and poorer the prognosis for the recovery. PTA Retrograde amnesia is also possible after head injury – tested with recent autobiographical questions (what did you eat for dinner yesterday?). In most cases, the amnesic gap is short and (< 1 min). It is not a good indicator of prognosis. Memory loss following ECT: The impairment is usually temporary. There may be both anterograde and retrograde amnesia, both of which reduce rapidly in most patients. A third of patients report persistent memory loss following ECT (Rose et al. 2003). Memory impairment is less pronounced with unilateral ECT. Tests of memory: Digit span is the commonest test of auditory, verbal working memory. Both forward and backward digit span are tested in routine clinical practice. The average range of digit forwards is 6+/-1 and for reverse digit span is 5+/-1 Three words learning task (e.g. apple, table, penny) is a test of anterograde memory and learning. Name and address recall task (7 items) is the commonest test of recent (verbal) memory. Here the subject is asked to recall as many items, without prompts, in five or ten minutes Rey-Osterrieth complex figure test is one of non-verbal memory test. Here the subject is first asked to copy a complex geometric figure and then to draw from memory after an interval of 30 minutes. The recall is impaired in patients with dementia and amnesic syndrome. Wechsler memory tests: Here the subject is asked to read a short story from the Wechsler memory scale containing 25 elements and both immediate and delayed recall after an interval of 30 minutes is tested.

Infantile amnesia: The average age of the earliest retrieved memory is 3.5 years. There is a total lack of memories for events occurring during the first few years of life, and there is a variable degree of amnesia for events that occurred in the first 2 to 5 years. This is termed infantile amnesia. Emotion and retrieval: Retrieval is reconstructing past experiences and is influenced by a number of variables including emotion. Current mood affects what is attended, encoded and retrieved. The mood-congruent effect refers to the ability to more easily recall information if it is congruent with the current mood e.g. in a depressed mood, negative thoughts and circumstances are more readily retrieved. Mood-state dependent retrieval refers to the phenomenon wherein retrieval of information is easier if the emotional state at the time is the same as the emotional state at the time of encoding.

© SPMM Course Elaboration: Material that is fully elaborated produces stronger memory trace as it is believed that consolidation is linked to the depth with which the data is processed. Schemas are mechanisms for elaborating and for reconstructing memory at test. They are organized sets of facts. During recall, distortion can occur in order to ensure the information fit the schemas or to fit cultural stereotypes. This then impacts the recall of the information. Inference is a method where known, easily accessible information is used to piece together the retrieved information, resulting in a biased recall. Brain imaging and neuropsychological studies provide strong evidence that a. The brain areas mediating performances in STM are principally the pre-frontal lobes b. The phonological STM system is mediated by the left hemisphere regions of Broca's' area and prefrontal cortex. c. The visuospatial STM system is mediated by the parietal and prefrontal areas of the right hemisphere. d. The brain areas responsible for LTM includes the regions of the limbic system especially the hippocampus and the entorhinal cortex of the medial temporal lobe

05 - 5. Thought & language

5. Thought & language

There are several different theories that consider how language can affect thoughts and behaviour.

Sapir-Whorf Hypothesis Grammatical structure of mother tongue influences how we perceive the world e.g. a language that does not have a word for a specific colour makes that colour less likely to be remembered - this has largely been disputed as very little experimental data has been produced in support. Behavioural economics People are more likely to believe events that are verbally described more vividly (e.g. availability heuristics) Prospect theory People make different economic choices based on how something is framed Cognitive distortions Challenging our 'internal dialogue' can change our cognitive distortions (as in CBT) Counting Some cultures do not have numbers above 10, or even 2 - instead using the word 'many' to describe any number above the highest. This indicates a conceptual difference in how some people would interpret 100 vs. 1000 vs. 1 million. Neuro-linguistic programming A theory that language patterns can affect behaviour, such as influences a consumer in a sale setting.

Concepts, prototypes and cores Constituents of thoughts are defined as concepts and are important to psychological processes such as learning, memory and decision-making. There are several theories of concepts – one of which is the prototype theory.

Let us consider a lexical concept termed X. This concept may not yet have a defined structure but many constituent features of X are well defined. In this case we can conceptualize that something will fall under the concept X, if sufficient number of constituent features are satisfied. In other word, we obtain a prototype of a concept using the linguistic components, thus acquire further knowledge of the world around us. Consider the concept of FRUITS – most fruits are rounded. Now consider the properties of apple and banana. Apple Banana Edible Edible Red Yellow Sweet Sweet Crunchy Soft Rounded Elongated

 Using this model, apples would be judged to be more typical of fruits than bananas as the idea of an APPLE shares more of its constituents with the idea of a FRUIT. Deductive and Inductive reasoning: Reasoning is broadly divided into deductive and inductive reasoning. Deductive reasoning starts with a theory with which we form a hypothesis and collect observations to confirm or dispute our hypothesis. This is often known as top-down reasoning. THEORY HYPOTHESIS OBSERVATION CONFIRMATION Inductive reasoning starts with observations and formulate tentative hypotheses that are then explored and a theory is formed. This is known as bottom-up reasoning. OBSERVATIONS PATTERN HYPOTHESIS THEORY Inductive reasoning

is open-ended and exploratory in comparison to the narrow nature of deductive reasoning. Problem-solving: Two methods of information processing have been described in problem-solving. Algorithmic method involves step-by-step search which guarantees solution but it is timeconsuming and more useful in simpler and smaller magnitude problems. Heuristic method uses rules of thumb; more likely solutions are tried before others – hence solution is not guaranteed but it is more quick and ‘dirty’! Means-end analysis is a type of heuristics in which the solution is sought from working backwards and may include reduction and breaking down of a complex problem into easily solvable steps. Heuristics in decision-making:

1. Availability heuristics: the decision is based on readily available information without systematic search.
2. Representativeness bias: fitting a problem into one of the well-known categories and solve it in a similar fashion.
3. Gambler’s fallacy: an outcome is due as it has not happened for some time. A gambler thinks that more he loses, the more chances that he wins later.
4. Base rate fallacy: tend to ignore the relative frequency of occurrence of events but stick to stereotypes. Consider that a very good student fails an exam, the probability of which is not negligible. Someone has earlier said that this student could fail only if the examiner gets annoyed by his handwriting and does not read his answer fully. One believes this has happened even though the probability of such an event is ridiculously small, as the primary event of that student failing has now occurred.
5. Sunk cost bias or entrapment: no choice than to continue to a decision, as one believes withdrawal would not justify the cost incurred.

06 - 6. Personality

6. Personality

© SPMM Course 6. Personality

Theories of personality consider the following different dimensions:

1. Personality as an enduring and consistent feature (dispositional) vs. differing with and influenced by situations (situationalism)
2. Personality traits are shared and comparable (nomothetic) vs. traits are unique to individuals and not comparable (idiographic)

Various theories of personality differ in the degree to which they embrace situationalism (vs. dispositionalism) and the notion of idiography (uniqueness).

(Adapted from Gross Psychology 9e Page 731) Allport's theory: Allport analysed 18000 adjectives used as 'trait labels'. A trait refers to an enduring disposition viewed as a continuous dimension. He described three types of traits:

1. Cardinal traits: influential, core traits
2. Central traits: 5 – 10 traits, less general
3. Secondary traits: least important, least consistent traits that only close friends can notice.

Cattell's approach: Cattell selected 4500 traits from Allport's work, and further reduced them to 171 elements before factor analyzing them to identify 16 dimensions. Surface traits are correlated to one another but not important for understanding one's personality and Source traits that are basic building blocks of the 16 PF questionnaire devised by Cattell. Cattell undertook oblique factor analysis to identify these source traits. Cattell's factors are a larger number of less powerful somewhat correlated (not fully independent) factors arising out of first order analysis – called traits. Cattell maintained that a •Unique features •Variable and situational •Unique features (idiographic) •Consistent and enduring •Variable and situational •Shared features •Shared features (nomothetic) •Consistent/enduring (dispositional) Eysenck's factors Cattell's traits Eysenck's factors Cattell's traits Psychoanalytic theories Psychoanalytic theories Situationlism Humanistic school Situationlism Humanistic school Kelly's personal construct theory Kelly's personal construct theory

© SPMM Course fundamental discontinuity exists between normal and abnormal personalities (categorical). During his work Catell identified 3 types of data that reveal qualities of one's personality: 1. Q-data: obtained from questionnaires 2. L-data: Obtained from lifetime records (e.g. report cards, friend's accounts etc.) and 3. Tdata: test based data (e.g. Thematic Apperception Test

etc.). Eysenck’s approach: Eysenck used second order analysis (orthogonal factor analysis) that identified small number of powerful independent factors. This method yielded 3 dimensional traits. These are neuroticism (vs. stability), psychoticism and extraversion (vs. introversion). Eysenck’s personality questionnaire contains a lie scale. Biologically, extraversion is related to arousal and ascending reticular activating system; neuroticism may be related to sympathetic system reactivity. Introverts are said to be easily aroused. Hence they are also more easily conditionable than extraverts; this may explain why introverts stay indoors more often. Extraverts have low arousal state; hence they are not easily conditionable. Eysenck maintained that no fundamental discontinuity exists between normal and abnormal personalities (dimensional view). Cloninger’s psychobiological model of personality includes four dimensions of temperament (each 50 to 60 % heritable), which manifest early in life and 3 components of character, which are shaped by environment. The temperamental dimensions include Novelty-seeking (includes frustration avoidance, impulsive decision-making) Harm-avoidance (pessimistic worry about the future, passive avoidant behaviour, fear of uncertainty); Reward-dependence (sentimentality, social attachment, and dependence on praise and approval) Persistence (high perseverance and tolerance of frustration) The character dimensions are self-directedness, cooperativeness, and self-transcendence. DSM identifies 3 clusters of personality disorders. In general Cluster A personalities are associated with low reward-dependence. Cluster B personality with high novelty-seeking and Cluster C personalities with high harm-avoidance traits. Rotter’s locus of control theory is a single trait theory – where external and internal loci are used to measure personality attributes. Note that both Cattell’s and Eysenck’s are multitrait theories. Big Five Traits– McCrae & Costa 1992:

1. Openness
2. Conscientiousness
3. Extraversion
4. Agreeableness
5. Neuroticism (OCEAN) The Big-Five concept has provided a unified framework for trait research. NEO decreases with age; AC increases with age.

© SPMM Course Kelly’s personal construct theory: Kelly proposed an idiographic theory of personality influenced by the humanistic school. According to him one’s personality can be deciphered only when observations regarding interpersonal relationships are made and hypotheses are formulated and tested. For this purpose, Kelly used a repertory grid. Initially a list of important people is generated (called elements). 2 elements are chosen and contrasted with the third one to see what themes emerge – called constructs. Such constructs are applied to elements down the list till all are exhausted and sufficiently descriptive. Such constructs and elements can also be used for measuring formal thought disturbances (Bannister grid). Humanistic or phenomenological school of personality focuses on the individuals’ view of the world rather than their unconscious impulses. In contrast to trait-based approaches that view personality as relatively enduring and shared, the humanistic school emphasises on the uniqueness of an individual’s personality and the capacity for growth in an optimistic manner. Therapeutic models such as Roger’s Client Centred Therapy originated from humanistic school. Interactionism: A major issue with trait theories (nomothetic approaches) is the poor correlation between one’s traits and observed behaviour. This led to a raise in the prominence of the so-called situationalism that contends that all are apparently enduring behavioural patterns are in fact a result of environmental demands on an individual. A middle path is the concept of interactionism (Magnusson and Endler, 1977), which proposes that

personality and the environment interact with each other to produce the observed behaviour. Typology: Early personality theorists such as Sheldon and Kretschmer used body shape based physical types to describe associated personality traits. Kretschmer related body types to personality variations and dispositions to major psychoses (1921). Asthenic – thin body; aloof individuals; correlated with schizophrenia Pyknic – plump individuals; childish with swings in mood; correlated with manic-depression Athletic – well-built individuals with a steady temperament. Based on the study of thousands of nude photographs of first year college students, Sheldon proposed three body types (1954). Endomorphic - plump and round people who are relaxed and outgoing. Mesomorphic - strong and muscular people who are energetic and assertive. Ectomorphic - tall and thin people who are fearful and restrained; associated with schizophrenia Friedman & Rosenman introduced Type A / Type B personality classification. Type A persons show impatience, excessive time consciousness, insecurity, high competitiveness, hostility and aggression and are incapable of relaxation. They may be high achievers and workaholics. Type B persons are relaxed, and easy-going; creative, often self-analyze and evade stress but cope poorly when under stress. Type A was first described as a risk factor for coronary disease but MRFIT study later concluded that there is no difference between Type A and Type B in regard to coronary proneness. This classification has poor

07 - Measuring personality traits

Measuring personality traits:

© SPMM Course psychometric construct and content validity. The hostility component of Type A is the only significant risk factor for CHD association. Measuring personality traits: Projective tests are individually administered tests to obtain information about emotional functioning. They are based on the principle that ambiguous unstructured open-ended situations stimulate projection of an individual’s internal emotional world onto the stimulus (environment). Murray was a major proponent of projective tests. But the first projective test introduced was Rorschach’s inkblots. Thematic Apperception Test (Murray), Draw-a-person test, sentence completion tests are other examples. Projective tests do not have much place in contemporary practice. Classification of projective tests:

1. Association inducing: verbalizing response pertaining to a stimuli e.g. Rorschach.
2. Completion tests: completing unfinished stimulus e.g. sentence completion test
3. Choice or ordering: rank order or categorise stimuli.
4. Construction: develop or construct story or narration e.g. TAT.
5. Self-expression: create something without stimulus e.g. Draw a man (Goodenough), House Tree Person (Buck). Rorschach is the most commonly used, consists of 10 inkblots, sequentially presented and asked to describe. Has two phases – free association and inquiry phase – both are analyzed later. Can be scored using Exner’s system. Needs extensive training to be used. Thematic Apperception Test (Murray) TAT has 20-30 pictures and one blank card and the subject has to make a story from each depicted picture; not all cards are used. Stimuli somewhat more structured. Jung introduced Word Association Test (WAT). In WAT and sentence completion tests, time pressure is usually applied. Minnesota multiphasic personality inventory (MMPI) is a popular inventory for measuring personality. It has 10 scales with clinical labels. It is NOT a projective test. Self-report inventory Most researched personality inventory Developed by Hathaway & McKinley 567 statements included Empirically derived 10 clinical scales are used to score responses
6. Hypochondriasis
7. Depression
8. Hysteria
9. Psychopathic deviance
10. Masculinity-femininity.

11. Paranoia.
12. Psychasthenia.

© SPMM Course 8. Schizophrenia. 9. Hypomania. 10. Social introversion

 Also contains lie scale (validity component) The Q-sort technique developed from client-centered therapy involves a person sorting cards with selfdescriptive statements(e.g. ‘I don’t trust my own emotions’, ‘I like to be around friends’) on them into ordered piles under the headings ‘self’ and ‘ideal’. A numerical discrepancy score between ideal and real self can be thus computed. The International Personality Disorder Examination (IPDE): Psychometric trait instrument for the clinical assessment of personality disorders (for those > 5 years age). IPDE comprises both a pencil-and-paper self-report screening questionnaire (77 true/false), and semi-structured diagnostic interview rated by trained clinician. Compatible with both ICD 10 and DSM IV. Allows for a definite, probable, or negative diagnosis with respect to each personality disorder Translated into several foreign languages Ratings can be based either on the patient's answers or informant responses. Allows a "past personality disorder" diagnosis prior to the past 12 months Allows a "late onset" diagnosis when the diagnostic criteria have only been met after age 25 years.

08 - 7. Motivation needs and drives

7. Motivation: needs and drives

Motivation refers to the process involved in initiation, direction and energisation of behaviour. It can have various dimensions including internal vs. external, innate vs. learned, conscious vs. unconscious and mechanistic vs. cognitive. Maslow identified deficiency needs called D motives and growth needs (or ‘being’) needs called B motives. He proposed a hierarchy of human needs with phylogenic and ontogenic evolution through the hierarchy. The needs become less biological as one ascends through the hierarchy. The higher needs come into focus only when the lower needs are satisfied at least to some extent. Once an individual has moved upwards to the next level, needs in the lower level will no longer be prioritized. If a lower set of needs is no longer being met, the individual will temporarily re-prioritize those needs by focusing attention on the unfulfilled needs, but will not permanently regress to the lower level. Some authors place aesthetic needs and cognitive needs (need to know & understand) in between esteem needs and actualisation. Transcendence can be placed above self-actualisation. The need for self-actualisations is "the desire to become more and more what one is, to become everything that one is capable of becoming." According to Maslow, the following characters are seen in self-actualizing people: Spontaneous in their ideas and actions. Creative. Interested in solving problems. Appreciate life. Have a system of internalized independent morality. Able to view all things in an objective manner. Law of Effect related to learning theories can also be considered as a theory of motivation. A satisfying effect strengthens behaviour; a dissatisfying effect weakens behaviour. So behaviour is contingent on the consequences (the basis of behaviourism) (Thorndike, 1911).

 Drive-Reduction Theory (Hull): According to this, the physiological aim of drive reduction is homeostasis- the tendency for organisms to keep physiological systems (e.g. temperature) at equilibrium. Any imbalance in homeostasis creates a need – a biological requirement for well-being. The brain responds to such needs by creating a psychological state called drive – a feeling of arousal that prompts action to reduce drive. According to Hull, primary drives stem from biological needs; secondary drives are psychological and learned from primary drives (e.g. self-esteem, power etc.) Similarly Murray (1938) divided needs into primary or

vasculogenic needs that are physiological (e.g. air, water, food, sex) and secondary needs that are acquired or learned through experiences e.g. money etc. Yerkes-Dodson Law: An inverted U-shaped curve relates the level of arousal with the performance of an act. Optimum arousal (moderate) is required for best performance; too low or too high arousal proves to be a hindrance e.g. sexual performance. But it is demonstrated that the relationship is not as simple as proposed as task difficulty varies highly. So, difficult or intellectually demanding tasks may require a lower level of arousal (to facilitate concentration). But tasks demanding stamina or persistence may be performed better with higher levels of arousal (to increase motivation). Because of task differences, the shape of the curve can be highly variable. Curiosity is an intrinsic motivator – it is stimulated when something in our environment attracts our attention. There are two types of curiosity that can stimulate intrinsic motivation – sensory curiosity (change in tone of voice or level of contrast e.g. typing bold letters) or cognitive curiosity (learner believes it may be useful to modify existing cognitive structures e.g. improving knowledge in statistical models in order to improve understanding of baseball batting averages). The optimal discrepancy is the strongest curiosity when information appears different from what we know but is not so dissimilar as to be considered strange or irrelevant. Cognitive consistency theory focuses on the cognitive balance that is created when inconsistencies result in tension, which motivates our brains/body to respond. The theory suggests people see imbalances and correct them through the motivation to make things consistent.

1. People expect consistency.
2. Inconsistencies create a state of dissonance
3. Dissonance drives us to restore consistency.

Need for achievement (nAch) refers to the individual’s desire for significant accomplishment and mastering skills to a high standard. First used by Henry Murray, it is associated with a range of actions. Need for achievement motivates an individual to succeed in competition. People high in nAch are characterised by a tendency to seek challenges and a high degree of independence. nAch is a personality trait measured in the Thematic Apperception Test (TAT). Sources of high nAch include:

1. Parents who encouraged independence in childhood
2. Praise and rewards for success

© SPMM Course 3. Association of achievement with positive feelings 4. Association of achievement with one's own competence and effort, not luck 5. A desire to be effective or challenged 6. Intrapersonal strength 7. Desirability 8. Feasibility 9. Goal Setting abilities

09 - 8. Emotions

8. Emotions

Ekman identified 6 primary human emotions – surprise, fear, sadness, anger, happiness and disgust. These are universal, innate and ready-wired responses, also seen in primates to some extent. An emotion has 3 components – 1. Subjective ‘cortical’ experience 2. Physiological ‘visceral’ changes 3. Associated behavioural (‘skeletal’) changes. James-Lange theory of emotions: Perception of a stimulus leads to bodily (skeletal and visceral) changes. The peripheral responses send feedback to the cortex via thalamus leading to the perception of the emotion. A modification is a facial feedback hypothesis, according to which different facial movements elicit different emotional perceptions. But wide repertoires of bodily changes are not available to explain the widely variant emotions perceived. Also, emotional perception occurs faster than that could be explained by a feedback theory. Studies on peripheral features of emotions have shown that anger is associated with the maximum rise in temperature, while fear and disgust are associated with a drop in temperature. The increase in heart rate produced by sadness is usually greater than that produced by happiness.

Cannon-Bard theory: On the perception of a stimulus, thalamus coordinates signals to cortex leading to a conscious experience and simultaneously sends signals to hypothalamus leading to physiological changes. The thalamus is considered to be cardinal in the emotional appraisal. Schachter-Singer labelling theory: On the perception of a stimulus, both physiological changes and a conscious experience of general arousal take place simultaneously. This generic arousal is then interpreted to either positive or negative and labelled appropriately according to the situational cues. This is also called jukebox theory or two-factor theory. If an appropriate label is not found, by default, negative appreciation of arousal occurs (e.g. ‘dysphoria’ when experiencing boredom). Lazarus cognitive appraisal theory states that appraisal precedes affective reaction – hence affective primacy cannot be supported. Cognitive appraisal refers to the immediate, intuitive, personal evaluations of a situation that gives an idea of how the individual subjectively experiences their environment. Roseman and Scherer propose eight cognitive appraisal dimensions to distinguish emotional understanding, rather than the traditional two (pleasantness and arousal). A third group of theorists suggest that each emotion is categorised by a unique pattern of cognitive appraisals.

10 - 9. Stress physiological and psychological asp

9. Stress: physiological and psychological aspects

Stress is an organism’s response to a challenge in the environment or stimulus. The response, deemed fight-or-flight, is via the activation of the sympathetic nervous system. Though the sympathetic nervous system activation is short-lived (as the parasympathetic system calms down the physiological response), prolonged stress can have systemic effects (e.g. cardiac dysfunction). The neuroendocrine system plays an important role in regulating response to stress. (see the chapter on Neuroscience for further details.) In psychological terms, stress is the feeling of pressure – positive stress or ‘eustress’ is a small amount of stress that improves motivation and ability but large amounts of negative stress (‘distress’) can be detrimental to mental health. As well as the external environment, stress can also be caused by internal cognitions, which can be addressed in CBT for anxiety. Stress can be classified into four categories: Crises/catastrophes Completely out of the control of the individual e.g. natural disasters, war – can lead to post-traumatic stress disorder Major life events Going to university, marriage, birth of a child, the death of a loved one (NB not all life events produce detrimental stress; the context of occurrence is important). Daily hassles or microstressors Meeting deadlines, making decisions, irritating colleagues. Ambient stressors Low-grade environmental e.g. pollution, traffic, noise

Stressors can result in various levels of conflicts. Approach-approach conflict: choosing between two equally attractive options e.g. which restaurant to have dinner Avoidance-avoidance: choose between two unattractive options Approach-avoidance conflict – attractive and unattractive traits e.g. going to university but incurring significant debt Stress Vulnerability model (Zubin and Spring, 1977) proposes individuals have strengths and vulnerabilities for dealing with stress. On the diagram shown here, person a has low vulnerability and thus can deal with a high deal of stress without much negative consequences, whereas person c has high vulnerability and therefore even moderately low stress can cause them to become mentally unwell. This model applies to a wide variety of psychiatric disorders including psychosis. Causes of increasing vulnerability include genetic factors, childhood loss and trauma. This is a simplistic model and more

11 - The Stress Vulnerability Model

The Stress Vulnerability Model

© SPMM Course sophisticated models exist. Medications, psychological interventions and training to improve coping skills can build resilience and reduce vulnerability. The Stress Vulnerability Model

Coping process: Lazarus (1999) developed the most popular model of coping – the cognitive-mediation model which explains why different individuals respond differently to the same types of stressors, and why the same individual may respond differently to a similar stressor at different times. This model proposes three stages in the coping process. Three stages: Primary appraisal Evaluation of stressor Secondary appraisal Evaluation of resources and options to manage the stressful situation Coping stage Choose and use strategy to cope with stressor

Coping strategies may be divided into either problem-focused coping, where an individual attempts to change the stressful situation or the relationship between oneself and the stressful context, or emotionfocused coping, in which the individual alters his or her appraisal or emotional reaction to the stressful situation. Locus of control refers to the extent to which individuals believe that they control events affecting them. It is one of the four core dimensions affecting self-evaluation, the others being neuroticism, self-efficacy and self-esteem. Locus of control concept is aligned with the framework of the social-learning theory of personality (Rotter 1954). According to the locus of control, outcomes of an individual's actions can be attributable to the 4 features shown in the box. SEROTOIN TRANSPORTER & LIFE EVENTS

In an interesting study of environmentgene interaction, Caspi et al (2003) noted that individuals with one or two copies of the short allele of the 5-HT T promoter polymorphism exhibited more depressive symptoms, diagnosable depression, and suicidality in relation to stressful life events than individuals homozygous for the long allele.

© SPMM Course Learned resourcefulness is a concept that is related to Seligman's concept of learned helplessness. It refers to the conscious appreciation of the acquired repertoire of behaviour and skills that aids a person to selfregulate internal events (emotions, cognitions), which would

otherwise interfere with ability to execute target behaviour. Psychological resilience: individual’s ability to appropriately adapt to stress and adversity. Factors developing and sustaining resilience: communication and problem-solving skills, ability to manage strong feelings/impulses, ability to make and execute plans, confidence in own ability. Both learned resourcefulness and helplessness can explain how stressors are appraised in their context.

ABILITY (Internal & stable) EFFORT (Internal unstable) TASK DIFFICULTY (External stable) LUCK (External unstable)

12 - 10. States and levels of awareness

10. States and levels of awareness

© SPMM Course 10. States and levels of awareness Consciousness is defined loosely as human awareness of stimuli. There are many theories of consciousness, e.g. Sigmund Freud’s Topographical model of the mind. The topographical model was elaborated in The Interpretation of Dreams in 1900. Here, the mind is divided into three systems: the conscious system, the preconscious system, and the unconscious system. The conscious system Receives and process information from the outside world. Its contents are communicated via speech and behaviour. Attention cathexis refers to the investment of psychic energy on a particular idea or feeling to process it consciously. Cathexis is ‘stable’ in the conscious mind. Operates secondary process thinking mainly. The unconscious system: Contains the contents of censored or repressed wishes. Characterized by primary-process thinking, and is governed by the pleasure principle. Shift of cathexis happens very often and quickly Evident via parapraxes (Freudian slips) and dreams. The preconscious system: As and when needed service Interfaces with both unconscious and conscious - contents of unconscious become conscious by ‘squeezing’ through the preconscious Maintains the ‘repressive barrier’ to censor unacceptable wishes and desires (not the repressed contents). Problems with a topographic theory: When someone employs defense mechanisms such as displacement, repression etc., he or she is not aware of the process of this defense. Hence, these cannot be represented by preconscious as Freud originally proposed – as preconscious is available to the conscious ‘as and when’ needed. Further, an ‘unconscious need for punishment’ was frequently noted among Freud’s patients – topographical theory fails to explain this. The role of the unconscious mind in decision-making is still greatly debated. Unconscious cognition is processing of memory, thought, learning and perception without awareness. Freud believed the unconscious stored memories and desires that influenced an individual's thought process. Freud believed the unconscious could be accessed through dream analysis and random association. Carl Jung categorised the unconscious into personal unconscious (holding individual memories/experiences) and collective unconscious (holding memories/experiences of a species passed down through generations). Arousal: physiological and psychological state of being awake/reactive to stimuli. Activation of the reticular activating system in the brain stem, along with the autonomic nervous system leads to an ‘alert

© SPMM Course state' – raised blood pressure and heart rate, alertness and readiness to respond. Arousal regulates consciousness and attention, important for fight-or-flight response and sexual activity. Arousal is also crucial for the appraisal of emotion (see notes for emotion theory) and motivation (see notes for motivation). Alertness is a state of heightened awareness of environmental stimuli resulting in ability to act promptly to danger. Biorhythms: Chronobiology refers to the study of biological rhythms. Various biological processes of the human body repeat themselves in a cyclical fashion indicating the presence of a biorhythm. Processes repeating approximately every 24 h are considered to have a daily rhythm (circadian e.g. sleep-wake cycle); those with cycles lasting less than a day are called ultradian (e.g. daily arousal levels, phased brain activity patterns during sleep) while those lasting more than a day are called infradian (e.g. menstrual cycles last 28-30 days). Infradian rhythms may also occur as a result of seasonal changes in animals e.g. migration cycles in birds and hibernation in some mammals - these are called circannual rhythms. Biorhythms are driven mostly by endogenous factors but are entrained by external time cues (called 'zeitgebers' or time givers). For example, light is an important zeitgeber without which the sleep-wake circadian cycle may indeed be a 25h cycle instead of the entrained 24h cycle that we have. Social zeitgebers are external social cues that function to entrain biological rhythms, e.g. the need to go to work by 8AM, etc. Life events that disrupt social zeitgebers can increase one's vulnerability to depression/manic episodes. The suprachiasmatic nucleus is an internal pacemaker located in the anterior hypothalamus that regulates many biorhythms. More details on this neuroendocrine system are given in the Neuroscience section along with details regarding sleep structure and parasomnias. Sleep deprivation: Most cognitive processes cope surprisingly well despite sleep deprivation. In early stages, sleep deprived individuals show reduced arousal and perform poorly on monotonous tasks, but optimally on interesting tasks, indicating that the motivation to perform is more affected than one's performance capacity. With further deprivation, 2-3 second periods of micro-sleep (wherein the individual is unresponsive) are noted. The individual also complains of 'hat phenomenon' a feeling that "something is gripping one's forehead and temples". Further deprivation results in delusional ideations, paranoia, loss of sense of identity and difficulty in social interaction including disorganized speech; this syndrome is termed sleep-deprivation psychosis. Upon deprivation, sleep debt accumulates over time, some of which is 'paid back' when an individual resumes sleep after the period of deprivation. REM sleep deprivation has profound effects on concentration and other psychological functions. REM phases of sleep recover better than NREM sleep, a phenomenon known as REM rebound. Hypnosis: the state of consciousness involving focused attention and reduced peripheral awareness. There are two theories about what occurs – altered state: hypnosis is an altered state of mind with a level of awareness different from normal; non-state: hypnosis is a form of imaginative role-enactment.

© SPMM Course Normally preceded by 'hypnotic induction', non-state theory suggests the client becomes more focused, heightens expectation.

The term suggestion (instruction or suggestion of subject into the hypnotic state) was not used in the initial description of hypnotism, but suggestion now forms part of the language associated with hypnosis. Some state that 'suggestion' is communication directed at the conscious mind whereas others believe it is communication with the unconscious. Braid defined hypnotism as focused (conscious) attention upon a dominant idea (or suggestion). Other hypnotists (e.g. Erickson) who believed that responses are mediated through an 'unconscious mind', employed indirect

suggestions such as metaphors.

Meditation is defined the practice of training one’s mind or inducing a mode of consciousness for the benefit or as an end itself. It often involves self-regulation and clearing the mind. It can help reduce blood pressure, help with anxiety and depression. Mindfulness-based therapy is about increasing awareness of emotions/cognitions in order to address them. Trance is a state of consciousness other than normal waking consciousness. It can be associated with hypnosis meditation, prayer and illicit substances. It denotes any state of awareness or consciousness other than normal waking consciousness.

13 - 11. Intelligence

11. Intelligence

The two-factor theory of intelligence was postulated by Spearman. Spearman carried out a factor analysis of the result of children’s performance on a number of tests and concluded that all tests measured both a common factor of general intelligence (g) and a specific factor (s). He believed that individual differences were due to differences in g. Triarchic theory of intelligence: Sternberg's Triarchic Theory of (Successful) Intelligence contends that intelligent behaviour arises from a balance between analytical, creative and practical abilities, and that these abilities function collectively to allow individuals to achieve success in particular sociocultural contexts (Sternberg, 1999). Analytical abilities enable the individual to evaluate, analyze, compare and contrast information. Creative abilities generate invention, discovery, and other creative endeavours. Practical abilities tie everything together by allowing individuals to apply what they have learned in the appropriate setting. To be successful in life, the individual must make the best use of his or her analytical, creative and practical strengths while at the same time compensating for weaknesses in any of these areas. Three sets of components are essential for this process:

1. Knowledge-acquisition components: used in obtaining new information.
2. Meta-components: executive processes used in problem-solving and decision-making.
3. Performance components: processes that actually carry out the actions that the meta-components dictate. Flynn effect: An interesting feature of IQ measurements is the observation that IQ scores increased from one generation to the next for all of the countries in which generational cohorts have been studied to date (Flynn, 1994). This is called Flynn phenomenon. In general, countries have seen generational increases between 5 and 25 points. The largest gains appear to occur on tests that measure fluid intelligence (problem solving: These tests on average have shown an increase of about 15 points or one standard deviation per generation e.g. Raven’s progressive matrices) rather than crystallized intelligence (verbal and math skills: These tests on average have shown an increase of about 9 points per generation e.g. Weschler’s tests). Salient features of Flynn effect:
4. Non-verbal IQ has risen more rapidly than has verbal IQ.
5. Performance gains are smallest on the most culturally specific tests, and largest on the most abstract tests.
6. Performance gains, as they occur over time, are roughly constant for all age groups.
7. Problem-solving abilities have seen the biggest performance gains.

© SPMM Course What causes Flynn phenomenon? Artifacts (i.e. IQ tests do not actually measure the construct of intelligence but measure something that has a link to intelligence that can change with generations) Test sophistication (e.g. improvement in test taking strategies across time) Actual intelligence increases (e.g., due to improved nutrition, improvement in early childhood education). Regression towards the mean (repeated resampling tends to reveal the true mean value) Paradoxes of the Flynn Effect: There are several observations that highlight the baffling nature of the Flynn Effect. The factor paradox: Prior factor analysis research suggests that a single factor, 'general intelligence' or 'g,' underlies IQ. The Flynn Effect does not affect all sections of the intelligence tests to the same degree. Hence if we're getting smarter every generation, some parts not all of our intelligence is getting smarter, and this is difficult to explain. The interaction paradox: As Flynn Effect suggests, a difference of some 18 points in the average IQ over two generations exist. In that case, it ought to be highly visible when the elderly interact with the young! This is not the case though. The mental retardation paradox: If Flynn effect was true then in 1900, average IQ was 75, just above mental retardation range; this assumption predicts a very high frequency of persons with mental retardation. But no such phenomenon has been noted. The identical twins paradox: Twins raised apart tend to have very similar IQ scores, but the Flynn Effect suggests that intelligence as measured by IQ is more subjected to environmental effects than genes. Commonly used tests for measuring IQ Stanford-Binet Scale is the first formal IQ test introduced before 1st World War in 1905 (used for ages 2 to 18). Wechsler Adult Intelligence Scale (WAIS-Revised version) is for individuals aged older than 16. Wechsler Intelligence Scale for Children (WISC-Revised) is for those aged 6 to 16. Wechsler Preschool and Primary Scale of Intelligence (WPPSI) is for children aged 4 to 6.

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part of these notes should be used as prescribing information