PSYCH 101
Personal Notes

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Module 1: Memory

How has the understanding of memory evolved? (1A)

Forgetting curve - Ebbinghaus

The "forgetting curve" is a visual model to show the decline of memory retention over time.

Behaviourist perspective

The "behaviourist" perspective focused only on things that could be observed directly in their investigations, ignoring the mind completely.

Cognitive perspective

The "cognitive" perspective was the belief that the brain and mind functioned like the hardware and software of a computer respectively.

In particular, they conceptualised memory to have the main processes of

1. encoding;
2. storage; and
3. retrieval.

Errors in memory (1B)

Note that each time a memory is used, it must be reconstructed in your mind.

This makes it prone to "drift" from the original memory.

Omission

The "omission" of a memory involves the loss of details during the reconstruction of it.

Substitution

The "substitution" of a memory involves the changing of details of the memory in subtle ways during the reconstruction of it.

Insertion

The "insertion" of a memory involves the adding of details of the memory that never actually happened during the reconstruction of it.

Confabulation

"Confabulation" is a type of memory error in which gaps in a memory are unconsciously filled with fabricated, misinterpreted or distorted information.

Source amnesia

"Source amnesia" is the recollection of information from someone else's experience, but mistakenly believing the experience was your own.

Leading question

A "leading question" is a question that subtly prompts the respondent to answer in a particular way

Two car study - Loftus & Palmer (1974)

The "two car study" was a classic psychology study that examined the malleability of eyewitness testimony

Methodology:

1. Participants watched a video depicting two cars in an accident.
2. After the video, one group was asked "how fast were the cars going when they contacted each other?"
3. The other group was asked "how fast were the cars going when they smashed each other?"
4. The researchers found the first group remembered the cars going ~7 mph slower than the second group.
5. Moreover, after a week, the participants were asked whether they saw any broken glass in the video.
6. 32% of the participants from the "smashed" group recollected there being some, whereas only 14% of the participants from the "contacted" group did, even though there were no broken glass to begin with.

PROCESSES OF MEMORY

ENCODING (IC)

"Encoding" is the process in which various types of information are converted into neuronal impulses.

PASSIVE ENCODING

$_1$ We say encoding is "passive" if no effort is invested in remembering the information.
- eg watching TV, reading a book

$_2$ Since passive encoding is shallow, most of the information will be lost or remembered inaccurately.

ACTIVE ENCODING

$_1$ On the other hand, we say encoding is "active" if effort is expended to process the information for later use.
- eg taking notes, studying

$_2$ Since active encoding requires deeper levels of processing, it is more likely that the recollection of the memory later on will be far more superior.

STRUCTURAL ENCODING

"Structural encoding" is the process where the word is encoded via the physical structure of it.

PHONEMIC ENCODING

"Phonemic encoding" is the process where the word is encoded via the sound structure (ie phonetics) of it.

SEMANTIC ENCODING

"Semantic encoding" is the process where the word is encoded via the meaning of it.

WORD STRUCTURE STUDY – TULVING & CRAIK (1975)

$_1$ The "word structure" study examined how some forms of active encoding can lead to deeper processing and better memory reconstruction than others.

$_2$ Methodology:
1. the researchers asked participants something about the structure of each word in a list of 60 words.
2. One group was asked structural encoding questions;
3. One group was asked phonetic encoding questions; and
4. One group was asked semantic encoding questions.
5. Afterwards, the researchers recorded how many words the participants could "pick out" from a list of 180 words, 120 of which were similar "distracting" words and the other 60 from the original list.
6. They found that
   - the structural group could pick ~20% of the words;
   - the phonetic group could pick ~50% of the words; and
   - the semantic group could pick ~80% of the words.

ENRICHMENT TECHNIQUES

"Enrichment techniques" are techniques that can be used to process information even deeper, ultimately leading to better memory recall.

ELABORATION

"Elaboration" is a form of semantic encoding that aids the recall of new information by connecting it to existing information.
- eg using metaphors/analogies when explaining a novel concept.

SELF-REFERENT ENCODING

ntic

"Self-referent encoding" is a form of sema encoding that aids the recall of new information by connecting it to oneself

DUAL ENCODING

"Dual encoding" is a form of semantic encoding that aids recall of information by producing redundant (more than one) codes / pointers.

METHOD OF LOCI

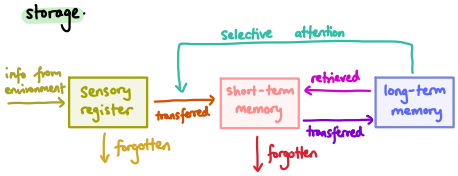
The "method of loci" is a memory technique that works by constructing dual codes via associating information with familiar spatial locations.

STORAGE (1D)

The "storage" of memory describes the process by which information is maintained in memory.

THREE-BOX MODEL

The "Three-Box model" is a method to visualise the "stores" of memory storage.



SENSORY MEMORY

1. "Sensory memory" refers to the collection of "sensory registers", who hold information from each of the sensory organs.
   eg eyes, ears etc
2. Note that only raw sensory information is stored in sensory memory.
3. Sensory registers typically maintain information for brief periods of time (≤ 1s).

DURATION OF VISUAL REGISTER STUDY - SPERLING (1960)

1. One of Sperling's most notable studies involved measuring the duration of the visual register.
2. Methodology:
   1. Participants were shown three rows of three letters for 1/20 of a second.
   2. This was followed by one of three tones (low, medium or high).
   3. If a low tone was played, the participant were to refer to the bottom row of letters, and similarly for if the medium or high tone was played.
   4. When the tone played immediately after the array disappeared, participants could confidently recall the cued row of letters.
   5. This result was observed even when there was a 1/4 second delay between the array disappearing and the tone.
   6. However, as the interval continued to increase, accuracy dropped off; eventually, after the interval was ~1/2 seconds long, participants could no longer report any of the letters.
3. Researchers concluded that information is held in the visual register for ~0.25-0.5 seconds.

EIDITIC / PHOTOGRAPHIC MEMORY

A person is said to have "eiditic memory" or "photographic memory" if they can retain information in their visual register for a little longer than usual (1+ seconds).

DECAY

"Decay" describes forgetting that occurs simply from the mere passage of time.

SHORT-TERM MEMORY

Some information may be transferred into our short-term memory for further processing, especially if it is the focus of our attention.

INCULCATION

"Inculcation" is the process of repeating something multiple times to remember it better.

DURATION OF SHORT-TERM MEMORY IS LIMITED TO 20s - PETERSON & PETERSON (1959)

1. A classic study by Lloyd & Margaret Peterson helped to determine the duration of short-term memory.
2. Methodology:
   1. Participants received an auditory cue that contained three letters followed by three numbers.
   2. Then, they started to count backwards by threes beginning with the numbers in the cue, to prevent them from practising the target information (the letters).
   3. Once the interval was complete, the participants stopped counting and tried to recall the letters in the cue.
   4. The proportion of participants who were able to recall the letters dropped exponentially as the interval length increased.
      (By 18 seconds, the proportion was practically 0.)

HOW MUCH INFO CAN SHORT-TERM MEMORY HOLD? - MILLER (1956)

1. In a now legendary study, Miller exposed how much information we can retain in our short-term memories.
2. Methodology:
   1. Participants were exposed to lists of words.
   2. Then, without any cues, the participants tried to recall as many of the words as possible.
   3. Results showed they could recall 7 ± 2 words on the list.

CHUNKING

"Chunking" is the process of combining bits of information to create fewer but more meaningful chunks of information.

THEORY OF WORKING MEMORY - BADDELEY (1970s)

1. Baddeley's Theory of Working Memory expands on the Short Term Memory (STM) model by incorporating conscious processing of info into the model.
2. In particular, its components are
   1. a "central executive", which monitors:
   2. the "visuo-spatial sketch pad", in charge of visual semantics;
   3. the "episodic buffer", in charge of episodic long term memory; and
   4. the "phonological loop", in charge of language.

LONG-TERM MEMORY

1. Some of the information from the Short-term Memory might be transferred to Long-Term memory, particular if it has received a deep level of processing.
2. It is contentious whether Long-term Memory can store information permanently, barring brain damage.
3. However, most researchers agree the capacity of Long-Term Memory is unlimited.

INACCESSIBLE INFORMATION

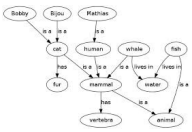
We say information in the Long-term Memory is "inaccessible" if it is still stored, but cannot be retrieved.

UNAVAILABLE INFORMATION

We say information is "unavailable" if it used to be present in Long-term Memory, but has since been lost.

SEMANTIC NETWORK

In Long-Term memory, information seems to be organised in "semantic networks"; ie information networks according to semantic meaning.



SPREADING ACTIVATION

"Spreading activation" describes the process where the priming/activation of a neuron increases the likelihood that connected/"adjacent" neurons will fire in the network.

PROSPECTIVE MEMORY

"Prospective memory" is a subclass of long-term memory which revolves around the performing of actions in the future.

eg picking up groceries on the way home.

RETROSPECTIVE MEMORY

1. "Retrospective memory" is a subclass of long-term memory which revolves around the memory of the past.
2. "Declarative" retrospective memories (or "explicit" retrospective memories) are memories that can be talked about and transferred from one mind to another.
3. Moreover, declarative retrospective memories can be subdivided further into
   ① "episodic" memories, or memories of past events/episodes; and
   ② "semantic" memories, or memories of facts.
4. On the other hand, "non-declarative" retrospective memories (or "implicit" retrospective memories) cannot be transferred simply by talking about it.
5. Non-declarative retrospective memories can be sub-divided into
   ① "procedural" memories (or "muscle" memories); and
   ② "conditioned" responses (see reading 1).

RETRIEVAL (IE)

"Retrieval" is the process by which information is retrieved from memory.

RECALL

"Recall" is the form of retrieval that requires the respondent to retrieve the information without any cues to help them.

eg short-answer questions

RECOGNITION

"Recognition" is the form of retrieval that requires the respondent to recognise the target information in the presence of distractor information.

eg MCQs

INTERFERENCE

"Interference" is the failure to retrieve target information due to similar pieces of information interfering with each other.

PROACTIVE INTERFERENCE

"Proactive" interference occurs when existing information interferes with our ability to store new information.

RETROACTIVE INTERFERENCE

"Retroactive" interference occurs when new information interferes with our ability to retrieve old information.

THE MEMORY OF CHILDREN - GARVEN, WOOD, MALPASS & SHAW (1998)

1. In 1998, a group of researchers constructed a study to investigate the interrogation techniques used by law enforcement officers to solicit false allegations from young children.

2. Methodology:
   1. Children were visited in their classroom by a man who read them a story, gave them stickers & cupcakes, and then left.
   2. Then, one group were simply asked questions of the things the man did and did not do.
   3. The other group were asked leading questions in combination with interrogating techniques; for example, the researchers
      1. repeated questions when no accusation was made;
         eg are you sure Manny didn't bump the teacher?
      2. prefacing a question by indicating other children had made an accusation;
         eg other children saw Manny bump the teacher
      3. rewarding children for making an accusation;
         eg you are a brave boy!
      4. acting disappointed when children did not make an accusation; and
         eg good boys tell the truth.
      5. "imagination inflation".
         eg imagine Manny had bumped the teacher; did he use his right or left shoulder?
   4. The researchers found that using interrogation techniques increased the likelihood that children would answer yes to misleading questions drastically.

3. The researchers concluded children are a lot more susceptible than adults to techniques that inadvertently create false memories.

Reading 1: Conditioning and Learning

KEY
H : heading
P : paragraph
S : study
(abstract = H0 (do not count learning objects))

CLASSICAL / PAVLOVIAN CONDITIONING (H1 P1)

"Classical conditioning", or "Pavlovian conditioning", occurs when neutral stimuli are associated with psychologically significant events. (H1 P4)
- eg associating the action of "eating fish" (stimulus) with getting sick (event)

The effect was studied by Russian physiologist Ivan Pavlov around the turn of the 20th century. (H1 P3)

PAVLOV'S DOG (H1 P2)

"Pavlov's dog" was a famous experiment that helped give rise to the classical conditioning theory.

Methodology:
① Pavlov rang a bell, and gave a dog some food; and
② Pavlov repeated action ① multiple times.
③ Eventually, the dog treated the bell as a signal for food, and began salivating in anticipation for the treat.

Note: this result has been reproduced in the lab using
① a wide range of signals; and
- eg tones, light, tastes etc

② paired with many different events.
- eg drugs, shocks, illness etc

CLASSICAL CONDITIONING IN HUMANS (H1 P3 (1))

Psychologists often attribute classical conditioning as the cause for many human phenomena.
- eg¹ associating a drug someone has taken with the environment they have taken it;
- eg² associating a stimulus (eg a big beach towel) with an emotional event (eg burst of happiness).

BENEFITS OF CLASSICAL CONDITIONING (H1 P3 (2))

Whilst classical conditioning may seem too "simplistic" or "old-fashioned", it is still studied today because
① It is a straightforward test of associative learning that can be used to study other, more complex behaviours; and
② Because classical conditioning is always occurring in our lives, its effects have important implications for understanding normal and disordered behaviour in humans;
③ There are many factors that affects the strength of classical conditioning, which warrants research and theory; and
(S: Rescorla & Wagner, 1972; Pearce & Bouton, 2001) (H3 P5)
④ Behavioural neuroscientists have also linked classical conditioning to the study of many of the basic brain processes involved in learning.
(S: Fanselow & Poulos, 2005; Thompson & Steinmetz, 2009) (H3 P5)

UNCONDITIONED STIMULUS (US) AND RESPONSE (UR) (H1 P5)

We say a stimulus and its associated response are "unconditioned" if the stimulus automatically triggers the response without any kind of "teaching" or "training".

In this case, we denote the unconditioned stimulus as "US" and the respective unconditioned response as "UR".
eg Pavlov's dog (after "training")
- US = food
- UR = makes the dog drool

CONDITIONED STIMULUS (CS) AND RESPONSE (CR) (H1 P6)

On the other hand, we say a stimulus and its corresponding response is "conditioned" if the stimulus must be paired with something that does have importance to elicit the response.

Note that the stimulus must not have any importance to the organism in question in the absence of the thing of importance.

In this case, we denote the conditioned stimulus as "CS", and the conditioned response as "CR".
eg Pavlov's dog (before training)
- before training, bell means nothing to dog
- but after training, bell causes dog to salivate
- so CR = salivation, CS = bell

Note that the unconditioned and conditioned responses (ie UR and CR) are often the same.
eg¹ US = eating of fast food
CS = seeing fast food logo
* UR = SR = salivating.
eg² US = waking up early
CS = alarm clock ringing
UR = CR = natural sense of grumpiness

CLASSICAL CONDITIONING HAS MANY BEHAVIOURAL EFFECTS (H2 P1)

1. Usually, CSs do not elicit only one reflex; they usually trigger a whole system of responses.
2. For instance, in the presence of a CS, an organism will respond to ready its body for the upcoming food (the US). (CS: Timberlake, 2001).
3. The organism might
   1. start salivating;
   2. elicit the secretion of gastric acids, pancreatic enzymes and insulin to prepare the body for digestion;
   3. elicit approach behaviour and a state of excitement; and
   4. even cause them to overeat (ie eat more even if they are full.)

TASTE AVERSION CONDITIONING (H2 P3)

"Taste aversion learning" is the phenomenon where a taste (CS) is paired with sickness (US), and causes the organism to reject and dislike that taste in the future.

eg a person who gets sick after too much tequila might acquire a profound dislike of the taste/odor of it.

FEAR CONDITIONING (H2 P4)

1. "Fear conditioning" is the phenomenon where a CS is associated with an aversive US (eg pain), which eventually elicits fear/anxiety in the organism when the CS is applied.

   eg if an experimenter sounds a tone just before applying a mild shock to a rat's feet, the tone will elicit fear/anxiety after one or two pairings.
2. Note that fear conditioning creates many anxiety disorders in humans, including phobias and panic disorders. (CS: Mineka & Zinbarg, 2006)

CONDITIONED COMPENSATORY RESPONSES (H2 P5)

1. A "conditioned compensatory response" is a CR that opposes/weakens the strength of the UR, rather than strengthening it. (CS: Siegel, 1989)

   eg someone addicted to morphine can increase their pain sensitivity when told that "the drug is coming.
2. Notably, conditioned compensatory responses have many implications for drug use: for example,
   1. they tell us a drug user's "tolerance" will be highest in the presence of cues associated with the drug; and
      - cues elicit compensatory responses that weaken the drug's effect
      - so, overdoses are usually not due to a dosage increase, but rather by taking the drug in an unfamiliar place. (CS: Siegel, Hanson, Kreek & McCully, 1982)
   2. they may also cause discomfort, thus motivating the drug user to continue usage of the drug to reduce them. (H2 P6)
      - eg heightened pain sensitivity, decreased body temperature

CLASSICAL CUES MOTIVATE ONGOING OPERANT BEHAVIOUR (H2 P7)

Another effect of classical cues is that they can motivate ongoing operant behaviour.

eg if a rat learnt pressing a lever will give it a drug, in the presence of cues that signal "the drug is coming soon", the rat will work harder to press the lever.

*see next page for definition of operant behaviour

THE LEARNING PROCESS (H3)

BLOCKING (H3 P1)

1. "Blocking" describes the phenomenon where the association of some CS A with an US blocks / inhibits the association of a novel CS B with that same US.
   - eg A rat learns to associate the ringing of a bell (CS A) with the presentation of food (US). Then, a light is added, and the light turning on (CS B) and the bell ringing are both paired with the US. But the rat fails to "learn" the association between the light turning on and the food presentation, since the previous association of the bell ringing with the food presentation "blocks" the new association.
2. Blocking occurs because since CS A already predicts the US, it is not "surprising" that the US occurs with CS B.
3. Note that blocking and other related effects indicate that the learning process tends to take in the most valid predictors of significant events, and ignore the less useful ones. (H3 P3)

PREDICTION ERROR (H3 P2)

1. A "prediction error" is a discrepancy between what is expected to occur and what actually occurs in a conditioning trial (ie how "surprising" the CR was in response to the CS).
2. Note that a non-zero prediction error is required for learning, as otherwise the outcome will be "given" and so no new connections need to be formed.

PREPAREDNESS (H3 P4)

1. "Preparedness" is the idea that an organism's evolutionary history makes it easy to learn a particular association.
   - eg Rats & humans are naturally inclined to associate an illness with a flavour, rather than with a light / tone. This is because if we get sick, it most likely stems from a food-related cause; hence, we will more greatly ensure we avoid that food in the future to avoid getting sick.

ERASING CLASSICAL LEARNING (H4)

EXTINCTION (H4 P1)

1. "Extinction" is the phenomenon where there is a decrease in the strength of a learned behaviour, resulting in the eventual "extinguishing" of the response.
2. This is accomplished by presenting the CS repeatedly without the US.
3. Extinction is especially important for psychologists, as it can help eliminate maladaptive and unwanted behaviours.
   - eg a person with arachnophobia is repeatedly shown pictures of spiders (CS) in neutral conditions, which eventually causes the association of spiders with fear (CR) to extinguish.

SPONTANEOUS RECOVERY (H4 P2)

1. "Spontaneous recovery" is the phenomenon where following a lapse in exposure to the CS after extinction has occurred, sometimes re-exposure to the CS can evoke the CR again.
   - eg A student associates the smell of chalkboards (CS) with the agony of detention (CR). However, after years from encountering chalkboards, a sudden whiff of one can trigger the agony of detention again.
2. The existence of spontaneous recovery tells us that extinction does not necessarily destroy the original learning. (S: Bouton, 2004)

CONTEXT (H4 P3 (1))

1. "Context" refers to the stimuli that are in the background whenever learning occurs.

RENEWAL EFFECT (H4 P3 (2))

1. The "renewal effect" is the phenomenon where if the CS is tested in a new context (ie different room/location), the CR can return even if extinction has already occurred.
2. These effects have been interpreted to suggest extinction inhibits (rather than erases) the learned behaviour, and this inhibition is mainly expressed in the context in which it is learned.
3. Note that this does not imply extinction is a bad treatment for behaviour disorders; indeed, clinicians can increase its effectiveness by implementing basic research on learning to help defeat the relapse effects. (H4 P4)

(S: Craske et al., 2008)

INSTRUMENTAL/OPERANT CONDITIONING (H1 P7(1))

"Instrumental conditioning", or "operant conditioning", occurs when a behaviour is associated with the occurence of a psychologically significant event.

This theory was first studied by Edward Thorndike, and later extended by B.F. Skinner.

eg mother tells child "don't make a fuss when we're in the supermarket, and you'll get a treat on the way out".

SKINNER BOX (H1 P7(2))

The "Skinner box" experiment is one of the most best-known examples of operant conditioning at play.

In a nutshell, a rat in a lab "learns" to press a lever in a cage to receive food.

OPERANT BEHAVIOUR (H1 P7(3))

"Operant behaviour" is any behaviour that is done voluntarily to achieve some set of consequences (ie a "learned" behaviour.)

- eg Skinner's box rat flicking the lever to receive food pellets.

THORNDIKE'S LAW OF EFFECT (H1 P9(1))

Thorndike's "law of effect" states that when a behaviour has a positive/satisfying effect or consequence, it is more likely to be repeated in the future; and when a behaviour has a negative/painful/annoying effect or consequence, it is less likely to be repeated in the future.

REINFORCERS (H1 P8)

A "reinforcer" is any consequence of a behaviour that strengthens the behaviour and/or increases the likelihood it will be performed again.

eg Skinner's box rat
- food pellets are reinforcers
- because they strengthen the rat's desire to engage with the environment in this particular manner (ie flicking the lever.)

"Positive reinforcement" is the strengthening of a behaviour by adding a desirable stimulus.

eg receiving a gold star for exellent work

"Negative reinforcement" is the strengthening of a behaviour by removing an aversive stimulus.

eg studying hard so parents will not nag you

PUNISHERS (H1 P9(2))

A "punisher" is any stimulus that decreases the strength of an operant behaviour, and/or decreases the likelihood it will be performed again.

"Positive punishment" is the weakening of a behaviour by adding an aversive stimulus.

eg yelling at a naughty child

"Negative punishment" is the weakening of a behaviour by removing a desirable stimulus.

eg taking a naughty child's favourite toy away.

MOST FACTORS THAT AFFECT THE STRENGTH OF CLASSICAL CONDITIONING ALSO AFFECTS THE STRENGTH OF OPERANT CONDITIONING (H5 P1)

Note that most of the things that affect the strength of classical conditioning also affects the strength of operant conditioning.

- eg reinforcers/punishers, extinction

INSTRUMENTAL RESPONSES COME UNDER STIMULUS CONTROL (H6)

STIMULUS CONTROL (H6 P1)

"Stimulus control" occurs when an operant behaviour is controlled by a stimulus that precedes it.

eg You only wait for the green arrow, not just the green light, before turning.

In this case, we say that the operant behaviour is "under" stimulus control.

Stimulus-control techniques are widely used in the laboratory to study perception and other cognitive processes in animals. (H6 P3)

DISCRIMINATIVE STIMULUS (H6 P2)

A "discriminative stimulus" is a stimulus that signals whether the response will be reinforced.

Note that a discriminative stimulus usually does not elicit the response directly (which is what a "classical" CS does), but instead "sets the occasion" for the operant response.

eg a canvas put in front of an artist does not elicit painting behaviour, but rather "sets the occasion" for painting to occur.

CATEGORISATION (H6 P4)

"Categorisation" is the sorting of different items into classes or categories.

Stimulus control techniques have also been used to study how animals can learn how to categorise different sets of stimuli.

eg birds in a Skinner box can learn how to peck at different buttons depending on the pictures of flowers, cars, chairs or people shown. (S: Wasserman, 1995)

OPERANT CONDITIONING INVOLVES CHOICE (H7 P1)

1. Note that operant conditioning always requires choosing one behaviour over others.
   - eg rat chooses to press the lever instead of sleeping, etc
2. Moreover, the alternative behaviours are each associated with their own reinforcers.
3. Then, the tendency for an organism to perform a particular action depends on both the reinforcers "earned" for it, and the reinforcers "earned" for its alternatives.

QUANTITATIVE LAW OF EFFECT (H7 P2)

1. The "quantitative law of effect" revolves around the notion that the effects of reinforcing one behaviour depend crucially on how much reinforcement is earned for the behaviour's alternatives.
   (S: Herrnstein, 1970)
   - eg If a pigeon learns that pecking one light will reward two food pellets, whereas the other light only rewards one, the pigeon will peck the first light.
     But what if getting to the first light takes more work?
3. In general, a given reinforcer will be less reinforcing if there are many alternative reinforcers in the environment.
   - eg sex/alcohol/drugs are less effective reinforcers if in the presence of family/work achievement/love.

COGNITION IN INSTRUMENTAL LEARNING (H8 P1)

Modern research have shown that reinforcers can also make animals learn about the specific consequences of each behaviour, and will perform said behaviour depending on how much they currently want/value its consequence.

REINFORCER DEVALUATION EFFECT (H8 P2 (1))

The "reinforcer devaluation effect" describes the finding that an animal will stop performing an instrumental response that once led to a reinforcer if the reinforcer is made aversive or undesirable.
(S: Colwill & Rescorla, 1986)

GOAL-DIRECTED BEHAVIOUR (H8 P2 (2))

We say a behaviour is "goal-directed" if it is influenced by the current value of its associated goal.
(S: Dickinson & Balleine, 1994)

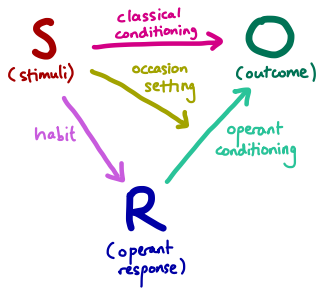
HABIT (H8 P3)

1. A "habit" is any instrumental behaviour that occurs automatically in the presence of a stimulus, with the animal's knowledge of the reinforcer's value not being able to influence the behaviour anymore.
2. Note that an animal might still persistently perform a habit even if the action is paired with an aversive/negative response (eg sickness.) (S: Holland, 2004)

PUTTING CLASSICAL & INSTRUMENTAL CONDITIONING TOGETHER (H9)

THE SOR MODEL (H9 P2)

The "SOR model" is a method we can use to visualise the connections between classical and operant learning. (H9 P3)



Firstly, the organism will have to learn to associate the response and outcome (ie R-O); this is typically done via operant/instrumental conditioning. (H9 P4)

Secondly, the organism will have to learn to associate the stimulus with the outcome (ie S-O); this is typically done via classical/Pavlovian conditioning. (H9 P5)

Thirdly, the organism will have to learn to associate the stimulus and the response (ie S-R); this is typically achieved via habit formation. (H9 P6)

Lastly, the organism will have to learn the association between the stimulus and the response-outcome connection (ie S-(R-O)); this typically occurs when the stimulus "sets the occasion" for the response-reinforcer link. (H9 P7)

OBSERVATIONAL LEARNING (H10 P1)

"Observational learning" is the process where organisms learn by observing the behaviour of others.

eg children watching children playing the game.

SOCIAL LEARNING THEORY (H10 P2)

"Social learning theory" revolves around the notion that individuals can learn novel responses via observation of key others' behaviours.

(S: Bandura, 1977).

SOCIAL MODELS (H10 P3)

"Social models" are authorities that are the "targets" for observation and who model behaviours.

Note that observational learning hinges on the presence of social models.

PROCESS OF OBSERVATIONAL LEARNING (H10 P4)

In his paper, Bandura highlights four major parts of observational learning:

1. attention;
   - one must pay attention to learn
2. retention;
   - one must retain the observed knowledge to learn
3. initiation (execution); and
   - one must be able to execute/initiate the learned behaviour
4. motivation.
   - one must be motivated to engage in observational learning

BOBO'S DOLL EXPERIMENT (H10 P6)

The "Bobo's doll" experiment was one of the more notable experiments designed to explore observational learning.

(S: Bandura, Ross & Ross, 1961)

Methodology:

1. Children were to observe an adult social model interact with a clown "Bobo" doll.
2. For one group, the adult was aggressive towards the doll; and
3. for the other group, the adult was neutral towards the doll.
4. Afterwards, the children were given a chance to interact with the doll themselves.
5. The children that were exposed to the adult behaving aggressively towards the doll were more likely to behave aggressively towards the doll themselves, compared to the other group.

The researchers concluded the observations of the adult's social model's behaviour gave the children in the aggressive group a justification to act aggressively towards the doll themselves.

VICARIOUS REINFORCEMENT (H10 P7)

"Vicarious reinforcement" refers to the learning that occurs when subjects observe the reinforcement or punishment of another person.

Note that vicarious reinforcement does play a role in observational learning.

eg In an adaptation of the Bobo doll study, children in the aggressive group were shown to exhibit less aggressive behaviour if they witnessed the adult model getting punished for their adult aggression. (S: Bandura, Ross & Ross, 1961)

Module 2: Stats and Research Designs

SAMPLING (2A)

POPULATION

The "population" refers to the complete set of data.

SAMPLE

A "sample" is a subset of scores drawn from the population.

MEASUREMENT

"Measurement" is the act of assigning numbers to observations.

eg assign 20 to someone's age, assign 1 to represent whether they are male or not.

CONSTANT

We say a set of observations are "constant" if they are uniform.

eg "human".

VARIABLE

We say a set of observations are "variable" if they are non-uniform.

eg age/sex

QUANTITATIVE

We say a variable is "quantitative" if their values take numerical values.

eg age

QUALITATIVE

We say a variable is "qualitative" if their values take on categorical values.

eg sex (male/female)

PARAMETER

A "parameter" is a numerical or other measurable factor that describes an aspect of the population.

- eg population mean = μ

STATISTIC

A "statistic" is a numerical or other measurable factor that describes an aspect of the sample.

- eg sample mean = $\bar{x}$

SAMPLING ERROR

"Sampling error" is defined as the discrepancy between a population parameter and its corresponding sample statistic.

eg mean: sampling error = | sample mean - pop^n mean |
$= |\bar{x} - \mu|$.

*note: sampling error > 0 always (because we take the absolute value!)

MEASURES OF CENTRAL TENDENCY (2B)

MODE

1. The "mode" is the category that occurs the most frequently from a set of data.
2. Mode is typically used for categorical data.

MEAN

1. The "mean" is defined as the mathematical average of all the scores in a set of data.
2. The mean is calculated via $\mu = \frac{\Sigma X}{n}$.

MEDIAN

1. The "median" is defined as the middle score (or the midpoint between the two middle scores) in the set of data.
2. The median is typically used for skewed distributions because it is not as strongly influenced by outlier values.

MEASURES OF VARIABILITY (2C)

"Measures of variability" tell us how spread-out the scores are in a set of data.

MEAN (μ)

The "mean" is defined as the "typical" score of a set of data, and is calculated by

$$\mu = \frac{\Sigma X}{N}.$$

VARIANCE (σ^2)

The "variance" describes the average amount of squared deviation, and is calculated by

$$\sigma^2 = \frac{\Sigma (X-\mu)^2}{N}.$$

STANDARD DEVIATION (σ)

The "standard deviation" describes the average amount of deviation, and is calculated by

$$\sigma = \sqrt{\frac{\Sigma (X-\mu)^2}{N}}.$$

CORRELATION COEFFICIENT (2D)

The "correlation coefficient", denoted as "r", is a statistic that describes the strength and direction of the relationship between two variables.

SCATTER PLOT

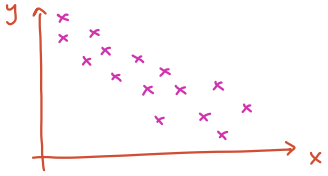
A "scatter plot" is a graph which plots a set of data by their values of two variables.

POSITIVE RELATIONSHIP

We say two variables have a "positive relationship" if high values on one variable are associated with high values on the other variable.

NEGATIVE RELATIONSHIP

We say two variables have a "negative relationship" if high values on one variable are associated with low values on the other variable.



STRENGTH OF CORRELATION COEFFICIENT

The value of the correlation coefficient can tell us of the "strength" of the relationship between the two variables.

The greater the magnitude of the correlation coefficient is, the greater the "strength" of the correlation.

INFERENTIAL STATISTICS (2E)

"Inferential statistics" can be used to compare two sets of scores to determine whether there is a significant difference between them or not.

STATISTICALLY SIGNIFICANT

We say a result is "statistically significant" if its "p-value" is less than 0.05.

This is usually used to verify whether the "difference" between two groups is "real" or not.

Common statistical tests include

① the t-test (two groups); and

② the F-test (three or more groups).

Reading 2.1: History of Psychology

A PRE-HISTORY OF PSYCHOLOGY (H1)

EMPIRICISM - LOCKE & REID (1700s) (H1 P1)

"Empiricism" is the notion that all knowledge comes from experience.

Empiricism was taught in universities, especially in the faculties of intellect, will and the senses.
(S: Fuchs, 2000)

PHYSIOLOGY & PSYCHOPHYSICS (H2)

NEURAL IMPULSE - HELMHOLTZ (1800s) (H2 P1)

The "neural impulse" is an electo-chemical signal that enables neurons to communicate.

Helmholtz measured the speed of the neural impulse, and through his study of the physiology of hearing/vision he showed our senses can deceive us, suggesting the science of psychology was feasible.

PHYSIOPHYSICS - WEBER & FECHNER (H2 P2)

"Physiophysics" is the study between physical stimuli and the perception of those stimuli.

EXPERIMENTAL PSYCHOLOGY - WUNDT (H2 P3)

"Experimental psychology" is the scientific and empirical approach to the study of the mind.

INTROSPECTION - WUNDT (H2 P4 (1))

"Introspection" is the process where subjects train themselves to offer detailed self-reports of their reactions to various stimuli.

CONSCIOUSNESS (H2 P4 (2))

"Consciousness" is the awareness of ourselves and the environment.

SCIENTIFIC PSYCHOLOGY COMES TO THE UNITED STATES (H3)

STRUCTURALISM - TITCHENER (1900s) (H3 P1 (1))

"Structuralism" was a school of American psychology that sought to describe the elements of conscious experience.
(S: Evans, 1972; Titchener, 1909)

AMERICAN PSYCHOLOGICAL ASSOCIATION (APA) (1892) (H3 P2 (1))

The American Psychological Association (or APA) is a scientific professional organisation of psychologists.

SOCIETY OF EXPERIMENTAL PSYCHOLOGISTS (SEP) (1904) (H3 P2 (2))

The Society of Experimental Psychologists (or SEP) is another scientific professional organisation of psychologists, founded by Titchener.

AMERICAN PSYCHOLOGICAL SOCIETY / ASSOCIATION FOR PSYCHOLOGICAL SCIENCE (1988) (H3 P3)

The American Psychological Society, known today as the Association for Psychological Science, is an international non-profit organisation whose mission is to promote, protect & advance the interests of scientifically oriented psychology in research, application, teaching and the improvement in human welfare.

TOWARD A FUNCTIONAL PSYCHOLOGY (H4)

FUNCTIONALISM – JAMES, HALL & CATTELL (1800s) (H4 P1)

1. "Functionalism" was a school of American psychology that focused on the utility of consciousness.
2. Note that it laid the groundwork for the study of animal & comparative psychology.

(S: Benjamin, 2007).

PRINCIPLES OF PSYCHOLOGY – JAMES (1890) (H4 P2)

1. "Principles of Psychology" was one of James' most influential books in psychology, where he argues that consciousness is ongoing and continuous.
2. Indeed, according to James, consciousness helped us adapt to our environment, in ways like allowing us to exhibit free will over our choices.

MARY WHITON CALKINS (1900s) (H4 P3)

Mary Whiton Calkins was one of James' students, who was an accomplished researcher and the first woman elected president of the APA.

(S: Scarborough & Furumoto, 1987)

G. STANLEY HALL (1900s) (H4 P4 (1))

G. Stanley Hall was a psychology professor who made many notable contributions to the field, including creating the first American psychology journal (the "American Journal of Psychology"), and founding the APA.

FRANCIS CECIL SUMNER (1900s) (H4 P4 (2))

Francis Cecil Sumner was one of Hall's students who became the first African-American to earn a doctorate in psychology.

JAMES MCKEEN CATTELL (1900s) (H4 P5 (1))

James McKeen Cattell was a psychology academic who worked on the study of individual differences and the belief that mental abilities (eg intelligence) are hereditary.

EUGENICS (H4 P5 (2))

"Eugenics" describes the practice of selective breeding to promote desired traits.

THE GROWTH OF PSYCHOLOGY (H5)

GESTALT PSYCHOLOGY – WERTHEIMER, KOFFKA, KOHLER & LEWIN (1900s) (H5 P1)

1. "Gestalt psychology" revolves around the belief that studying the whole of any experience is richer than studying individual parts of that experience.
2. The work of Gestalt psychologists most likely played a role in the rise of "cognitive psychology" in America.

*see below for definition of cognitive psychology.

BEHAVIOURISM – WATSON & SKINNER (1900s) (H5 P2)

1. "Behaviourism" is the study of overt and observable behaviour, rejecting any reference to the intangible mind.
2. Note that Pavlov (champion of classical conditioning) was also an early influencer of behaviourism in America.

COGNITIVE PSYCHOLOGY – BARTLETT, BRUNER, BROWN & MILLER (1900-2000s) (H5 P3 (1))

1. "Cognitive psychology" refers to the study of mental processes.
2. The field serves as a successor to behaviourism, as psychologists began to realise it could not fully explain human behaviour since it rejected mental processes.

CONSTRUCTIVE MIND – BARTLETT (H5 P3 (2))

The "constructive mind" idea revolves around the notion that people use their past experiences to construct frameworks in which to understand new experiences.

FLASHBULB MEMORY – BROWN (H5 P3 (3))

A "flashbulb memory" refers to a highly detailed and vivid memory of an emotionally significant event.

TIP-OF-THE-TONGUE PHENOMENON (H5 P3 (4))

The "tip-of-the-tongue" phenomenon describes the inability to pull a word from memory even though there is a sensation that that word is available.

THE MAGIC NUMBER SEVEN, PLUS OR MINUS TWO – MILLER (H5 P3 (5))

"The Magic Number Seven, Plus Or Minus Two" is one of the most citated papers in psychology, which posits that the number of bits of information an average human can hold in working memory is 7 ± 2.

APPLIED PSYCHOLOGY IN AMERICA (H6)

MODERN INTELLIGENCE TESTS - BINET (1857-1911) (H6 P1 (1))

Binet's "modern intelligence test" used tasks of problem solving and reasoning to help identify schoolchildren in need of educational support.

MODERN INTELLIGENT TESTS IN AMERICA - GODDARD (1866-1957), TERMAN (1877-1956) (H6 P1 (2))

The modern intelligence tests by Binet was first introduced in the United States by Goddard & Terman.

NATURE-NURTURE DEBATE (H6 P1 (3))

The "nature-nurture" debate revolves around the strength of the relative contributions heredity and environment play in determining intelligence.
(S: Fancher, 1987)

HUGO MUNSTERBERG (1863-1916) (H6 P2(1))

Hugo Munsterberg made heavy contributions to areas such as employee selection, eyewitness testimony, and psychotherapy.

WALTER D SCOTT (1869-1955) & HARRY HOLLINGWORTH (1880-1956) (H6 P2(2))

Scott and Hollingworth produced original work on the psychology of advertising and marketing.

LILIAN GILBRETH (1878-1972) (H6 P2(3))

Gilbreth helped promote the use of time and motion studies to improve efficiency both in industry and in the home.
eg pop-up trashcan, fridge door shelving

CLINICAL PSYCHOLOGY - WHITNER (1867-1956) (H6 P3)

Witmer is responsible for the founding of the first psychological clinic (1896), where he treated children with learning and behavioural problems using his psychological expertise on sensation and perception.

PSYCHOLOGY AS A PROFESSION (H7)

AMERICAN ASSOCIATION FOR APPLIED PSYCHOLOGY (AAAP) (1930s) (H7 P1)

1. In 1917, applied psychologists organised to create standards for education, training and licensure.
2. This culminated with the founding of the "American Association for Applied Psychology", or "AAAP", which dealt with the interests of psychologists in education, industry, consulting and clinical work.

EFFECT OF WWII ON APPLIED PSYCHOLOGY (H7 P2 (1))

1. During WWII, the abundance of the psychiatric casualties of war overwhelmed the mental health industry.
2. This led to the federal government merging the AAAP & APA, and the focusing of training of professional psychologists.

NATIONAL MENTAL HEALTH ACT OF 1946 (H7 P2 (2))

The "National Mental Health Act of 1946" provided funding to allow the collaboration of the APA, the Veterans Administration and the Public Health Service to develop training programs for clinical psychologists.

BOULDER CONFERENCE ON GRADUATE EDUCATION IN CLINICAL PSYCHOLOGY (1949) (H7 P2 (3))

The "Boulder Conference in Graduate Education in Clinical Psychology", convened shortly after the National Mental Health Act of 1946, launched doctoral training programs in psychology, counseling and school psychology.

SCIENTIST-PRACTIONER MODEL OF TRAINING (H7 P2 (4))

The "scientist-practioner" model of training is a model of training that emphasises the development of both clinical and research skills.

PRACTIONER-SCHOLAR MODEL OF TRAINING (H7 P2(5))

1. The "practioner-scholar" model of training instead focuses on the development of clinical practice.
2. The model was suggested at the Vail Conference on Professional Training in Psychology in 1973, as an alternative to the "scientist-practioner" model.

PSYCHOLOGY AND SOCIETY (H8)

SOCIETY OF THE PSYCHOLOGICAL STUDY OF SOCIAL ISSUES (SPSSI) (1936) (H8 P1(1))

The "Society of the Psychological Study of Social Issues", or "SPSSI", supports research and action on a wide range of social issues.

PSYCHOLOGY OF SEX

HELEN THOMPSON WOOLLEY (1874-1947) (H8 P1 (2))

In the early 1900s, when women's rights were marginalised, Thompson examined the assumption that women were more overemotional compared to men and found that emotion did not influence women's decisions any more than it did men's.

LETA S. HOLLINGWORTH (1886-1939) (H8 P1 (3))

Hollingworth investigated and found that menstruation did not negatively impact women's cognitive or motor activities.

PSYCHOLOGY OF RACE

MAMIE PHIPPS CLARK (1917-1983) & KENNETH CLARK (1914-2005) (H8 P2(1))

The Clorks studied the ways in which school segregation negatively impacted the self-esteem of African-American children.

BROWN V. BOARD OF EDUCATION (1954) (H8 P2(2))

In the Supreme Court case of "Brown v. Board of Education", it was ruled that school segregation would end, primarily due to the research of the Clarks.

(S: Guthrie, 2003)

ASSOCIATION OF BLACK PSYCHOLOGISTS (ABPsi) (1968) (H8 P2 (3))

The "Association of Black Psychologists", or "ABPsi", helped push for greater advocacy for issues impacting the African American community.

PSYCHOLOGY OF GENDER

THE ADJUSTMENT OF THE MALE OVERT HOMOSEXUAL - HOOKER (1907-1996) (H8 P3)

1. "The Adjustment of the Male Overt Homosexual" showed that there were no significant differences in psychological adjustment between homosexual and heterosexual men.

2. Hooker's research helped to de-pathologise homosexuality, eventually leading to the decision by the APA to remove homosexuality from the Diagnostic and Statistical Manual of Mental Disorders in 1973.

(S: Garrets & Kimmel, 2003)

Reading 2.2: Research Designs

EXPERIMENTAL RESEARCH (H2)

SPENDING & HAPPINESS - DUNN (2008) (H2 P1)

1. Dunn's study aimed to test the common intuitive idea that we are happier when we spend money on ourselves compared to when we spend it on others.
2. Methodology:
   1. Dunn gave each of the participants $20.
   2. The participants were then tasked to spend the money by the end of the day.
   3. One group was told to spend the money on themselves;
   4. The other group was told to spend the money on others.
   5. At the end of the day, she measured participants' "levels" of happiness using a self-report questionnaire.
   6. Dunn found the group who had spent the money on others were happier than those who had spent the money on themselves. (H2 P2)
3. The researchers concluded spending on others causes us to be happier than spending on ourselves. (H2 P2)

INDEPENDENT VARIABLE (H2 P2(1))

1. The "independent variable" is the variable that is changed / manipulated in the experiment.
   eg whether participants spent money on themselves or others in Dunn's study.

DEPENDENT VARIABLE (H2 P2(2))

1. The "dependent variable" is the variable that is measured in the experiment.
   eg participants' happiness in Dunn's experiment.
2. Importantly, the dependent variable must depend on what happens to the independent variable.

RANDOM ASSIGNMENT (H2 P4)

1. "Random assignment" is the process of assigning participants to receive different conditions of an experiment by chance.
2. Random assignment is done to even out any other "external factors" that could otherwise explain the cause of any observable trend between the independent and dependent variables.

CONFOUNDS (H3 P1 (1))

1. "Confounds" are things that could undermine our ability to draw causal inferences.
   eg placebo effect (see below)

PLACEBO EFFECT (H3 P1(2))

1. The "placebo effect" occurs when a person, just by knowing that they are receiving special treatment, actually causes changes in behaviour or perception.
   eg treating someone "special" (ie in an experiment) could make them happier.

PARTICIPANT DEMAND (H3 P1 (3))

1. "Participant demand" occurs when participants try to behave in a way they think the experimenter wants them to behave.

EXPERIMENTER EXPECTATIONS (H3 P1 (4))

1. "Experimenter expectations" occurs when the expectations / bias of the experimenter influences the outcome of a study.

DOUBLE-BLIND PROCEDURE (H3 P2)

1. In a "double-blind procedure", neither the participant nor the experimenter knows which condition the participant is in.
2. A double-blind procedure can minimise the effects of confounds.
   eg placebo effect, experimenter expectation

CORRELATIONAL DESIGNS (H4)

In a "correlational design", we identify patterns of relationships, but cannot infer what causes what.

*see Module 2 for info on scatterplots/correlation coefficient.

Note that correlation does not imply causation, because there may be other factors that explain the correlation.

eg a third variable

QUALITATIVE DESIGNS (H5)

PARTICIPANT OBSERVATION (H5 P1)

"Participant observation" is a methodology that involves the researcher embedding themselves into a group in order to study its dynamics.

eg researchers pretending to be cult members to study its dynamics
(S: Festinger, Riecken & Shacter, 1956)

CASE STUDY (H5 P2)

In a "case study", specific individuals or contexts are subjected to intensive examination by researchers.

eg intense examination of one person with brain injury.

Sigmund Freud, the father of psychoanalysis, was famous for using this method.

NARRATIVE ANALYSIS (H5 P3)

"Narrative analysis" centers around the study of stories and personal accounts of people, groups or cultures.

In this methodology, researchers examine people's personal testimonies in order to learn more about the psychology of those individuals/groups.

QUASI-EXPERIMENTAL DESIGNS (H6)

In a "quasi-experimental design", assignment to certain conditions is based off existing group memberships rather than random assignment. (H6 P2)

eg single/married, class membership

It is harder to draw causal inferences from a quasi-experimental design, simply because there are numerous other external factors that could explain a trend.

why? → random assignment is not used.

LONGITUDINAL STUDIES (H7)

In a "longitudinal study", the same people are tracked over a period of time (from few weeks to decades) to draw inferences.

eg a German study to determine people who end up getting married start off a bit happier than their peers who never marry, by tracking 20,000 Germans for two decades.

Note that longitudinal studies can be quite costly to conduct, especially if they follow many people for many years.

SURVEYS (H8)

"Surveys" involve using old-fashioned or Internet-based questionnaires to collect information.

HAPPINESS & PROBABILITY PERSON WILL GET INTO HEAVEN – KING & NAPA (1998) (H8 P1)

This study tested the hypothesis of whether happy people were judged as more likely to get into heaven compared to unhappy people.

Methodology:

① Participants were presented surveys completed by both happy and unhappy people.

② They were then asked who were more likely to go to heaven.

③ The researchers found happy people were judged to be more likely to go to heaven than unhappy people.

SMILE INTENSITY OF YEARBOOK PHOTOS & MARITAL STATUS – HARKER & KELTNER (2001) (H8 P2)

In this study, Harker and Keltner examined the smile intensity of women's college yearbook photos.

They found smiling in the photos was correlated with the woman being married 10 years later.

TRADEOFFS IN RESEARCH (H9)

RESOURCE AVAILABILITY (H9 P1)

"Resource availability" (eg cost/resources) may be a primary factor in deciding the method used for a particular study.

eg longitudinal studies are better than surveys, but they take up a lot more time and resources.

ETHICS OF A STUDY (H9 P2)

The "ethics" of a study is also a primary factor in deciding the method used for a study.

eg we could not intentionally inflict people with brain injuries to study them.