

PSYCH 101

Personal Notes

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KEY

- H: heading
= HO
abstract
- P: paragraph
= PO
Do not count learning objects
- S: study
= SO

Chapter 1: Conditioning and Learning

CLASSICAL / PAVLOVIAN CONDITIONING (HI P1)

Q1: "Classical conditioning", or "Pavlovian conditioning", occurs when neutral **stimuli** are associated with psychologically significant **events**. (HI P4)

- eg associating the action of "eating fish" (**stimulus**) with getting sick (**event**)

Q2: The effect was studied by Russian physiologist Ivan Pavlov around the turn of the 20th century. (HI P3)

PAVLOV'S DOG (HI P2)

Q1: "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.

Q3: 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, shades, illness etc

CLASSICAL CONDITIONING IN HUMANS (HI P3(1))

Q1: 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 (HI P3(2))

Q1: 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 affect the strength of classical conditioning, which warrants research and theory; and
(S: Rescorla & Wagner, 1972; Pearce & Burton, 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 & Pouille, 2005; Thompson & Steinmetz, 2009) (H3 P5)

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

Q1: We say a **stimulus** and its **associated response** are "unconditioned" if the **stimulus** automatically triggers the **response** **without** any kind of "teaching" or "training".

Q2: 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) (HI P6)

Q1: On the other hand, we say a **stimulus** and its corresponding **response** is "conditioned" if the **stimulus** **must** be **pairs with something** that does have **importance** to elicit the **response**.

Q2: Note that the **stimulus** **must not** have any **importance** to the **organism** in question in the **absence** of the **thing of importance**.

Q3: 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

Q4: 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)

Usually, CSs do not elicit only one reflex; they usually trigger a whole system of responses.

For instance, in the presence of a CS, an organism will respond to ready its body for the upcoming food (the US). (S: Timberlake, 2001).

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)

"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 foot, the tone will elicit fear/anxiety after one or two pairings.

Note that fear conditioning creates many anxiety disorders in humans, including phobias and panic disorders.

(S: Mineka & Zinberg, 2006)

CONDITIONED COMPENSATORY RESPONSES (H2 P5)

A "conditioned compensatory response" is a CR that opposes/weakens the strength of the UR, rather than strengthening it.

(S: Siegel, 1981)

eg someone addicted to morphine can increase their pain sensitivity when told that the drug is coming.

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.

(S: Siegel, Hansen, Krauk & McCull, 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)

"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.

Blocking occurs because since CS A already predicts the US, it is not "surprising" that the US occurs with CS B.

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)

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).

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)

"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)

"Extinction" is the phenomenon where there is a decrease in the strength of a learned behaviour, resulting in the eventual "extinguishing" of the response.

This is accomplished by presenting the CS repeatedly without the US.

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)

"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.

The existence of spontaneous recovery tells us that extinction does not necessarily destroy the original learning.

(S: Bouton, 2004)

CONTEXT (H4 P3 (1))

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

RENEWAL EFFECT (H4 P3 (2))

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.

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.

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 (HI P7(1))

💡 "Instrumental conditioning", or "operant conditioning", occurs when a behaviour is associated with the occurrence 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 (HI 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 (HI 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 (HI 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 (HI 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)

PUNISHERS (HI 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.

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

💡 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 PI)

💡 "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)

E₁: Note that operant conditioning always requires choosing one behaviour over others.

eg rat chooses to press the lever instead of sleeping, etc

E₂: Moreover, the alternative behaviours are each associated with their own reinforcers:

E₃: 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)

E₁: 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?

E₃: 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)

E₁: 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))

E₁: 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))

E₁: 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)

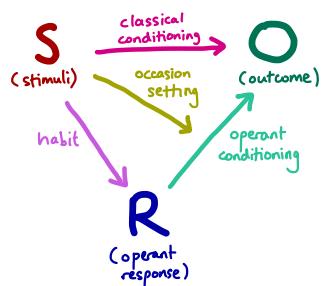
E₁: A "habit" is any instrumental behaviour that occurs automatically in the presence of a stimulus, with the animal's knowledge of the reinforcer's value not being able to influence the behaviour anymore.

E₂: 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)