Chapter 11: Theories of learning

Learning activity suggested answers

Learning Activity 11.1 (p. 402)

Practical activity on classical conditioning of an eye blink

Students answers will vary depending upon the results obtained.

However:

- the UCS is the air-puff
- the CS is the tapping sound
- the UCR is eye blinking
- and the CR is eye blinking.

Learning Activity 11.2 (p. 404)

1 What observation led Pavlov to study classical conditioning?

Observing dogs salivating when they saw or heard the lab technician preparing their food (e.g. the dogs salivated when they heard the rattling sound of the spoon against the container as the food was being prepared).

2 Define classical conditioning and briefly describe how it occurs, without referring to any ‘technical’ terms.

- Examples of definition:
  - a type of learning that occurs when a response that is automatically produced by one event becomes associated with another event that would not normally produce this response;
  - a type of learning that occurs through the association of two events that occur together on several different occasions;
  - a type of learning that occurs through the repeated association of two (or more) different events.

- Learning is said to have occurred when a response/behaviour is linked with an event (or object) that does not normally produce this response and the new/different event alone actually produces the response.

3 In what way(s) did the restraint of the dogs in Pavlov’s experiments help to control the potential influence of extraneous variables?

Ways may refer to:

- control of presentation of different stimuli, e.g. amount of meat powder, frequency/constancy of intensity of visual and auditory stimuli;
• control of exposure to other stimuli that may produce saliva;
• control of dogs’ responses, e.g. restricting range of possible movements and other responses;
• precise observations/measurements of the quantity and rate of saliva produced.

4

a Define and explain the role of each of the different kinds of stimuli and responses in classical conditioning: UCS, CS, CR, UCR.

• UCS (unconditioned stimulus): any stimulus that consistently produces a particular, naturally occurring, automatic response/ UCR.
• CS (conditioned stimulus): the stimulus that is ‘neutral’ at the start of classical conditioning and does not normally produce the UCR (but eventually becomes associated with the UCS and elicits the CR alone).
• CR (conditioned response): the learned or acquired response to the CS.
• UCR (unconditioned response): the response that occurs automatically as a result of the UCS; (usually a reflexive or involuntary response that is predictably caused by a UCS).

b Which of the stimuli is originally a neutral stimulus?

conditioned stimulus (CS).

c Why is it called a neutral stimulus?

• Initially (i.e. at the start of the CC process) a neutral stimulus does not elicit/produce the UCR or CR when presented alone.
• That is, it is ‘neutral’ and does not produce any particular response.
• However, when used together with an UCS, the neutral stimulus becomes a conditioned stimulus.

d Explain the relationship between the neutral stimulus and the conditioned stimulus in classical conditioning.

The neutral stimulus becomes the CS after repeated associations with the UCS. The UCS automatically elicits the UCR and by repeatedly pairing the UCS and the neutral stimulus, the neutral stimulus becomes conditioned (the CS) to elicit the response that the UCS would have produced (now called the CR as it occurs in response to the CS).

5 At what point in the process of classical conditioning can it be said that a response has been learned?

When the CS alone produces the CR.

6 Draw and label a diagram like figure 11.6, showing the elements in classical conditioning as they occur for the conditioned response to the sight or sound of the food container demonstrated by the dog in figure 11.5.

Student example involving a sound:

Before conditioning

sound of a rattling can is a neutral stimulus at this stage: no salivation or irrelevant response
During conditioning
CS (sound of rattling can) which was originally neutral is associated/paired with the UCS (dog food)

UCS: dog food
UCR: salivation

After conditioning
Salivation has now become a CR to the sound of a rattling can (which was originally neutral)

CS: sound of rattling can
CR: salivation

The CR is very similar to the UCR.
Learning Activity 11.3 (p. 405)

Identifying elements of classical conditioning

Identify the CS, UCS, CR and UCR in each of these three scenarios.

Scenario A
UCS: cyclone
UCR: fear
CS: bathroom
CR: fear

Scenario B
UCS: planes crashing into buildings
UCR: anxiety
CS: seeing or hearing a low-flying plane
CR: anxiety

Scenario C
UCS: electric shock
UCR: hand movement
CS: buzzer
CR: hand movement

Learning Activity 11.4 (p. 408)

1
a Explain the meaning of the term acquisition in relation to classical conditioning.
Acquisition is the overall process during which an organism learns to associate two events, the CS and the UCS.

b What is being acquired?
• What is being acquired (learned) is a CR.
• More specifically, the ability of the UCS (which was originally neutral) to produce a CR.

c How is this acquired?
This is acquired through repeated presentations of the CS and UCS (close together in time) or by repeatedly associating the CS and the UCS (which occur close together in time).

d Describe the relationship between timing and acquisition.
Timing is important in acquisition because the CS and UCS must be presented/paired close together in time (contiguous and about half a second maximum delay) in order for an organism to most efficiently form the association between the CS and UCS or in order to maximise the speed with which the CR may be acquired.
2  
   a  What does extinction mean in classical conditioning?  
      Extinction is the gradual decrease in the strength or rate of a CR that occurs when the UCS is no longer presented (until apparent disappearance).
   b  When is extinction evident in classical conditioning?  
      Extinction is evident in classical conditioning when a CR does not occur following presentation of the CS.

3  
   a  What does spontaneous recovery mean in classical conditioning?  
      Spontaneous recovery is the reappearance of a CR when the CS is presented after the CR appears to have been extinguished.
   b  When is spontaneous recovery evident in classical conditioning?  
      Spontaneous recovery is evident in classical conditioning when the CR reappears in response to the CS following extinction of the CR.

4  What is the key difference between spontaneous recovery and extinction? Explain with reference to an example not used in the text.
   • When spontaneous recovery occurs, the CS suddenly produces a reappearance of the CR; whereas when extinction occurs, the CS no longer produces the CR.
   • Spontaneous recovery involves a sudden and temporary increase in the strength of a condition stimulus-response association
   • whereas extinction is a gradual decrease in the strength or rate of a conditioned stimulus-response association.
     Discuss student examples to clarify conceptual understanding.

5  Explain the meaning of the terms stimulus discrimination and stimulus generalisation, in relation to classical conditioning. Ensure you refer to an example from everyday life, but not one used in the text.
   • Stimulus discrimination occurs when the organism responds to the CS only, but not to any stimulus similar to the CS i.e. distinguishing between the CS and a stimulus like the CS (and therefore not producing the CR for the like stimulus).
   • Stimulus generalisation occurs when the organism responds with the CR (or like the CR) to a stimulus like the CS.
     Discuss student examples to clarify conceptual understanding.

**Learning Activity 11.5 (pp. 409)**

Key terms in classical conditioning

Select the five correct terms from the list below to complete the sentences in each of the following scenarios.

1  Elizabeth’s refusal to handle red flowers is an example of stimulus generalisation.
The results in the table show that the dogs demonstrated stimulus discrimination.

a In this experiment, Peta was in the acquisition stage of classical conditioning.

b Elke made sure this wouldn’t happen by presenting the pencil tap alone for some time until she was sure that the stage of extinction had been achieved.

c This suggests that spontaneous recovery may have occurred.

**Learning Activity 11.6 (p. 410)**

Summarising key processes of classical conditioning

Construct a table similar to the one below to summarise the key processes of classical conditioning.

<table>
<thead>
<tr>
<th>Name of process</th>
<th>Description of process</th>
<th>Example of process</th>
<th>Key factors influencing process</th>
</tr>
</thead>
<tbody>
<tr>
<td>acquisition</td>
<td>the overall process during which an organism learns to associate two events (the CS and the UCS)</td>
<td>an infant is swaddled (wrapped tightly in bedclothes) whenever it is time to go to sleep: the infant learns to associate swaddling and going to sleep.</td>
<td>timing of CS and UCS presentations influences how quickly the CR is acquired, i.e. very short period of about half a second</td>
</tr>
<tr>
<td>extinction</td>
<td>the gradual decrease in the strength or rate of a CR that occurs when the UCS is no longer presented (until apparent disappearance of the CR)</td>
<td>a child stops playing with her toy cars after being teased by her older brother whenever she plays with the cars</td>
<td>extinction rate can vary between individuals for the same CR and for different CR types</td>
</tr>
<tr>
<td>spontaneous recovery</td>
<td>the reappearance of a CR when the CS is presented after the CR appears to have been extinguished</td>
<td>someone feels excited again after seeing an old boyfriend or girlfriend, even though years have passed since last seen (and extinction has occurred)</td>
<td>does not always follow extinction and often short-lived; when it does occur, the CR is weaker than when first acquired</td>
</tr>
<tr>
<td>stimulus generalisation</td>
<td>responding with the CR (or like the CR) to a stimulus like the CS</td>
<td>an infant who cried when given an immunisation injection by a doctor wearing a white coat bursts into tears in response to a</td>
<td>the greater the similarity between stimuli, the greater the possibility that a generalisation will</td>
</tr>
</tbody>
</table>
Learning Activity 11.7 (p. 412)

1. Explain why Pavlov actually used the term conditioned reflex rather than conditioned response. What might he have called the UCS?

   Explanation should refer to the involuntary, reflexive salivation response of Pavlov’s dogs.

2. Explain how classical conditioning may account for acquisition of the conditioned response referred to in each of the following scenarios.

   a. A person under treatment for a gambling addiction often feels an urge to play the pokies whenever he again encounters cues such as driving past a gaming venue where he experienced a huge ‘buzz’ after hitting a jackpot, and hearing about someone else’s big win on the machines.

      The UCS is ‘sights and sounds of a big pokie win’ and the UCR is a ‘huge buzz’ or euphoria. Through classical conditioning, the ‘sight and sound of a big pokie win’ (UCS) become associated with the sight of a gaming venue (CS) and the CS alone produces the CR of euphoria.

   b. After swimming in the lake near his home one day, Glen emerged from the water covered with slimy blood-sucking leeches all over his back and legs. He was revolted as he removed the leeches. Now, every time he passes the lake, Glen shudders in disgust.

      Leeches are the UCS and the UCR is disgust. Through classical conditioning, the leeches (UCS) become associated with the lake (CS), and the CS alone produces the CR of disgust.

   c. When Mardi and her sisters were toddlers, their mother frequently used their nap time to vacuum. Now, when Mardi and her sisters hear vacuum cleaners, they feel sleepy.

      The UCS is sleepiness and the UCR is sleep. Sleepiness (UCS) becomes associated with the sound of a vacuum cleaner (CS) and the CS alone produces the CR of sleep.

   d. Every time three-year-old Sienna heard the doorbell ring, she raced to open the front door. On Halloween night, Sienna answered the doorbell and encountered a scary monster that intentionally startled her. Sienna screamed in fear and ran away. Now Sienna whimpers and hides whenever the doorbell rings.

      The UCS is a monster and the UCR is fear. Through classical conditioning, the doorbell ringing (CS) becomes associated with the presence of a monster (UCS), and the CS alone produces the CR of fear.
A flashing light suddenly appearing on the control panel triggers a burst of adrenaline in an aeroplane pilot.

The flashing light has previously been associated with an alarming event through classical conditioning. The UCS was an alarming stimulus and the UCR an adrenaline burst. Through classical conditioning, the flashing light (CS) becomes associated with an alarming event (UCS) and the CS alone produces the CR of an adrenaline burst.

**Learning Activity 11.8 (p. 416)**

1. Draw a diagram like that in figure 11.6 to illustrate the classical conditioning of Little Albert’s fear response to the white rat.

Example by a student:

**Before conditioning**

- **Rat**: neutral stimulus at this stage
- **No fear or irrelevant response**

**USC**: loud noise

**UCR**: fear

**During conditioning**

- **CS**: rat (originally the NS) is now associated with:
  - **UCS**: loud noise
  - **UCR**: fear

Wah! BANG! leads to … Wah!
After conditioning
Fear has now become a CR to the presence of a rat, which was originally neutral.

CS: rat  CR: fear

leads to …

Wah

2 To which objects did Albert demonstrate stimulus generalisation?
   • fearful reactions: a white rabbit, a dog and a sealskin coat
   • less fearful reactions to: cotton wool balls and a Santa Claus mask

3 Consider Watson and Rayner’s (1920) study from an ethical perspective. To what extent were ethical principles for psychological research applied in the ‘Little Albert’ experiment? Explain with reference to both ethical guidelines and procedures used by Watson and Rayner.

Breaches of ethical guidelines include:
   • participant wellbeing, e.g. despite the experiment testing a conditioned fear response, subjecting an infant to a procedure designed to induce severe anxiety and distress and to potential long-term psychological harm; not concluding the experiment when it became apparent the infant was experiencing severe anxiety and distress;
   • withdrawal rights, e.g. not informing the mother of the right to withdraw her infant prior to or during the experiments (e.g. when Albert experienced distress), but unclear whether or not this occurred;
   • voluntary participation: because she knew Watson and because she was an employee of ‘the clinic’ where the experiments were conducted, the mother may have felt obliged and/or been pressured to permit Albert’s participation, but there is no evidence of either;
   • debriefing, e.g. not taking steps to extinguish the fear response as soon as practicable after the experiments concluded;
   • informed consent, but unclear whether or not obtained from a parent so cannot be legitimately raised as a breach.

4 Suggest an ethically acceptable procedure involving classical conditioning that could be used to extinguish Albert’s fear response to white furry objects. You should present your answer in diagram form and indicate the CS, UCS, CR and UCR.
   • See graduated exposure (pp. 416-417) and systematic desensitisation (pp. 591-592 ).
   • See counter-conditioning in Box 14.12 (pages 592-593) The case of Peter (1924)
   • Example: it would be ethically acceptable to extinguish Little Albert’s phobia using counter conditioning. In counter conditioning, the conditioned stimulus is paired with something pleasant (e.g., food, praise).

1 Before extinction  CS (white furry objects)  fear

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During extinction, CS (white furry objects) is associated with positive feelings UCS (cuddles and sweets).

After extinction:
- CS (white furry objects) does not lead to UCR (fear)
- CS (white furry objects) CR (positive feelings)

Learning Activity 11.9 (p. 420)

1. Explain the meaning of exposure therapy with reference to the key feature of graduated exposure and that of flooding.
   - Exposure therapy is an umbrella term that refers to behavioural therapies or ‘treatment methods’ for mental health problems involving a CR of fear or anxiety (i.e. anxiety disorders).
   - The therapy may require the client to gradually confront a fear or anxiety inducing stimulus or successive approximations of the CS (i.e. gradual exposure), or to be immediately brought into direct contact with the CS (i.e. flooding) until the CR is extinguished.

2. a. Define graduated exposure with reference to an example not used in the text.

   Graduated exposure is presenting successive approximations of the CS until the CS itself does not produce the CR, i.e. progressively or ‘gradually’ introducing or ‘exposing’ the client to increasingly similar stimuli that produce the conditioned response requiring extinction and ultimately to the CS itself.

   Discuss student examples to clarify conceptual understanding.

   b. Construct a hierarchy of frightening situations (such as that for fear of flying in figure 11.15) for someone with one of the following fears:

   Examples:
• dogs
  • heights
  • swimming

Most frightening

• Interacting with an unleashed dog
• Riding in a hot air balloon
• Diving into the deep end and swim

• Being alone with an unleashed dog
• Riding a Ferris wheel
• Applying simple swimming strokes in the deep end of the pool

• Patting a leashed dog
• Abseiling down a wall
• Learning simple swimming strokes in a pool where you can touch the bottom

• Allowing a leashed dog to sniff your hand
• Looking at the view from the rooftop of a building
• Submerging in a pool

• Walking past a dog that is tied up
• Looking at a view from a balcony
• Floating in a pool

• Looking at puppies through a window
• Climbing to the top of a ladder
• Walking down the stairs into a pool

• Seeing an image of a dog
• Climbing up a few rungs of a ladder
• Watching others swim in a pool

Least frightening

(Note: when using systematic desensitisation, fear hierarchies usually have 10–15 items.)
3

a Define flooding with reference to an example not used in the text.

Flooding is bringing the client into direct contact with the anxiety or fear producing stimulus and keeping them in contact with it until the CR is extinguished.

Discuss student examples to clarify conceptual understanding.

b Give an example of how flooding might be used to eliminate a conditioned response associated with your choice of fear for question 2(b).

Discuss student examples to clarify conceptual understanding.

4 Distinguish between imaginal and in vivo exposure.

Both involve the person being exposed to their feared object/situation, however the method by which this is achieved differs.

- using imaginal exposure, the person is exposed to their feared object/situation by using visual imagery (i.e. using their imagination)
- whereas using in vivo exposure, the person is exposed to their feared object/situation in real-life.

5

a What is aversion therapy?

Aversion therapy is a form of behaviour therapy that applies classical conditioning processes to inhibit (‘block’) or discourage undesirable behaviour by associating it with an aversive (unpleasant) stimulus such as a feeling of disgust, pain or nausea.

b Refer to figure 11.19 and draw a diagram to illustrate the use of aversion therapy to treat someone with an addiction to cigarette smoking or an over-the-counter medication.
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Key:

= Cigarette smoking

= Over-the-counter medication

= Nausea producing drug

1. (UCS) Nausea producing drug leads to nausea (UCR).

2. (UCS) Nausea producing drug added to cigarettes (NS) leads to nausea (UCR).

3. (CS) Cigarette, without nausea inducing drug, leads to nausea (CR).

1. (UCS) Nausea producing drug leads to nausea (UCR).

2. (UCS) Nausea producing drug added to over-the-counter medication (NS) leads to nausea (UCR).

3. (CS) Over-the-counter medication, without nausea inducing drug, leads to nausea (CR).
c What are two limitations or criticisms of aversion therapy?

1 The effects of aversion therapy are not necessary permanent. For example, individuals who are addicted to alcohol avoid alcohol when taking a drug called ‘Antabuse’ (which induces very unpleasant physical symptoms shortly after alcohol consumption), but they return to drinking as soon as they stop taking the drug. So extinction may occur when the UCS and CS are no longer repeatedly paired.

2 The learned aversion often fails to generalise to situations other than those under which the learning took place. This may be due to the conditioning being dependent on cues that indicate the aversive stimulus will follow. Again using the example of Antabuse, people may experience the aversion only when they know that the UCS (nausea-inducing drug) is going to coincide with alcohol consumption.

Learning Activity 11.10 (p. 422)

1 Define trial and error learning.

Trial and error learning is learning by trying alternative possibilities until the desired outcome has been achieved.

2 Give a personal example of trial and error learning in everyday life.

Discuss student examples to clarify conceptual understanding.

3 Mardi tries several new routes to school and eventually discovers the quickest, which she decides to use every day. Explain Mardi’s behaviour and discovery with reference to trial and error learning theory.

Trial and error learning usually involves a number of attempts (trials) and a number of incorrect choices (errors) before the desired outcome is achieved.

Mardi had a number of attempts/trials (she tried several routes) which resulted in a number of incorrect choices/errors (not getting to school quickly), before finally achieving the desired outcome (finding the quickest route to school).

Mardi did not find the quickest route to school on her first attempt, therefore her behaviour was typical of trial and error learning.

4 Is ‘learning through mistakes’ a suitable alternative name for trial and error learning? Explain your answer.

Yes, ‘learning through mistakes’ is a suitable alternative name for trial and error learning because making ‘mistakes’ is typically involved in trial and error learning.

In trial and error learning, people usually make a number of ‘mistakes’ before finally achieving the desired outcome.

For example, in order for an architect to come up with a design solution, he or she is likely to make a number of ‘mistakes’ (i.e. generate a number of unsuccessful designs) before finally achieving the desired outcome.

Similarly, it is not typically possible for someone to be able to ride a bicycle on their first attempt (trial) at it and they are likely to make a number of ‘mistakes’ (i.e. fall off, crash) before finally being able to achieve the desired outcome of the required balance and control.

5 What are two key differences between classical conditioning and trial and error learning?
• In classical conditioning a neutral stimulus becomes associated with an involuntary, reflexive response (such as salivation or increased heart rate), whereas in trial and error learning, no reflexive responses are involved.
• In classical conditioning the learner is passive whereas with trial and error learning the learner active (motivated to achieve a goal).

Learning Activity 11.11 (p. 425)

1 What is operant conditioning?
   • a type of learning for which the likelihood of a response or behaviour occurring is determined by its consequences
   • an organism will tend to repeat a behaviour that has a desirable consequence (or that will enable it to avoid a undesirable consequence) and will tend not to repeat a behaviour that has an undesirable consequence
     i.e. it learns to make responses in order to obtain or avoid certain consequences.

2 Why did Skinner adopt the term operant conditioning rather than instrumental learning? In your answer, include a definition of an operant with reference to an example not used in the text.

Skinner used the term operant conditioning to emphasise the fact that organisms learn to operate on the environment to produce desired or satisfying consequences; that is, to make a response or set of responses (called operants) that act on the environment to produce some kind of effect/generate consequences.

Example: any response or behaviour of an organism that is modifiable by its consequences.

3 What is the main difference between an antecedent and a consequence in relation to timing?

An antecedent occurs before a behaviour and a consequence occurs after a behaviour.

4 Briefly describe the three-phase model of operant conditioning.

The three-phase model of operant conditioning has three parts that occur in a specific sequence:

1 the discriminative stimulus (SD) that occurs before a particular response
2 the response (R) that occurs due to the discriminative stimulus
3 the consequence (C) to the response.

This is usually expressed as stimulus (SD) → response (R) → consequence (C).

5
   a What is a discriminative stimulus?
      The discriminative stimulus (SD) is the stimulus (object or event) that precedes a particular response, signals the probable consequence for the response and therefore influences the occurrence of the response.
   b In what way does a discriminative stimulus influence the occurrence of a particular response?
In operant conditioning, a discriminative stimulus “sets the occasion” for a response to be elicited when a response is consistently followed by a reinforcer in the presence of a particular stimulus, that stimulus comes to serve as a “signal” indicating that the response is likely to lead to a reinforcer.

Discriminative stimuli are therefore “cues” that influence the occurrence of a particular response by indicating the probable consequences (reinforcement or non-reinforcement) of that response.

For example, if you are praised for raising your hand in class and asking an intelligent question, you’re not likely to begin walking down the street repeatedly raising your hand. You understand that raising your hand is reinforced (rewarded) only in a particular situation i.e. the classroom. What you really learn is that your classroom is the discriminative stimulus which “signals” you to elicit a particular behaviour (raising your hand), because a particular consequence is likely to follow (praise). Because raising your hand is usually followed by a positive consequence (praise) this will increase the likelihood of you raising your hand in this situation (the classroom) in the future.

6 Sienna experienced the ‘runner’s high’ (due to endorphin release) when she ran a mini-marathon and as a result has started running 10 kilometres three times a week. Explain Sienna’s changed behaviour using the three-phase model of operant conditioning.

<table>
<thead>
<tr>
<th>Stimulus (SD)</th>
<th>Response (R)</th>
<th>Consequence (C)</th>
<th>Effect on future behaviour</th>
</tr>
</thead>
<tbody>
<tr>
<td>Running a mini-marathon</td>
<td>Experiencing ‘runner’s high’ due to endorphin release</td>
<td>Sienna feels good, motivated</td>
<td>Sienna increases her running – she runs 10 km three times per week</td>
</tr>
</tbody>
</table>

7 Consider toddler Alex who is being toilet trained by her parents using operant conditioning. Her parents wait until after Alex has had a drink and her bladder is full, then put her on a potty seat and wait for nature to take its course. When Alex urinates in the potty, her parents provide verbal praise (“What a good girl you are, Alex!”) or even some stickers that she loves. She is also punished when she has a wetting accident by verbal disapproval (“Mommy is very disappointed in you, Alex.”). Gradually, Alex learns enough bladder control to recognise when urination is imminent, and to withhold the response long enough for a quick trip to the potty seat—thus obtaining a reward and avoiding punishment. Eventually, the behaviour becomes automatic enough that Alex continues to use the potty seat. Explain Alex’s successful toilet training using the three-phase model of conditioning. Ensure you refer to each component with reference to the relevant aspect(s) of Alex’s toilet training.

<table>
<thead>
<tr>
<th>Stimulus (SD)</th>
<th>Response (R)</th>
<th>Consequence (C)</th>
<th>Effect on future behaviour</th>
</tr>
</thead>
<tbody>
<tr>
<td>full bladder</td>
<td>urination in potty</td>
<td>praise or stickers</td>
<td>positive reinforcement—more likely to seek potty seat when bladder is full</td>
</tr>
<tr>
<td>full bladder</td>
<td>wetting accident</td>
<td>parental disapproval</td>
<td>punishment (positive)—less likely to have a wetting accident</td>
</tr>
</tbody>
</table>
Alex will learn that (SD), urination in a potty (R) will result in the reinforcement of parental praise or stickers (C) and in other contexts, a wetting accident (R) will result in the punishment of parental disapproval (C).

**Learning Activity 11.12 (p. 427)**

1. Briefly outline a procedure for an experiment using a Skinner box to:
   a. operantly condition a rat to produce a particular response.
      
      Example:
      
      - place a hungry rat in a Skinner box; the rat will eventually move around and explore
      - when the rat randomly/‘accidentally’ presses the lever (e.g. with a paw, its nose), the food reward of a pellet is delivered by the food delivery device
      - delivery of a food pellet is repeated whenever the lever is pressed until lever pressing occurs consistently
      
      Stimulus (lever in Skinner box)
      Response (press lever)
      Consequence (food pellet/get food)

      (Note: Shaping can be used to minimise waiting time e.g. wait until the rat happens to wander near the food tray, then drop in a food pellet; the rat eats the food and starts to learn the association between the tray and food; after a few trails the rat starts spending all its time near the food tray; change response/behaviour requirement by waiting until rat is adjacent to the food tray before delivering food; once established, change response/behaviour requirement by delivering food only when the rat touches the food tray etc.)

   b. operantly condition a rat not to produce a particular response.
      
      Example:
      
      - place a hungry rat in a Skinner box; the rat will eventually move around and explore
      - when the rat randomly/‘accidentally’ presses the lever (e.g. with a paw, its nose), a mild electric shock is delivered through the electric grid on the floor
      - repeat shock delivery whenever the rat presses the lever and the rat will be less likely to press the lever to avoid the unpleasant consequence.

      Stimulus (lever in Skinner box)
      Response (press lever)
      Consequence (shock)

2. In Skinner’s view, what are the main driving forces behind behaviour?

   Skinner believed that all behaviour could be explained by the relationships between the behaviour, its antecedents (the events that come before it) and its consequences (the events that follow it).
Any behaviour that is followed by a consequence will change in strength (become more, or less, established) and frequency (occur more, or less, often) depending on the nature of that consequence (reward or punishment).

3

a Identify the operationalized IVs and DVs in Skinner’s (1938) experiment with the hungry rat outlined on pp. 426-427.

   IV: lever pressing
   DV: number of lever presses

b Explain the rat’s learning through operant conditioning using the three-phase model of conditioning.

<table>
<thead>
<tr>
<th>Stimulus (S)</th>
<th>Operant response (R)</th>
<th>Consequence (C)</th>
<th>Effect on future behaviour</th>
</tr>
</thead>
<tbody>
<tr>
<td>lever in Skinner box</td>
<td>press lever</td>
<td>food pellet presented</td>
<td>the hungry rat is more likely to press the lever again (because food presentation is a satisfying/desirable consequence)</td>
</tr>
</tbody>
</table>

Learning Activity 11.13 (p. 430)

1 Define the term reinforcement with reference to an example.

Reinforcement occurs when a stimulus (object or event) strengthens or increases the frequency or likelihood of a response that it follows.

Use student examples to clarify the conceptual distinction between reinforcement (i.e. the process of providing a reinforcer) and a reinforcer (i.e. the actual stimulus).

2 Define the terms positive reinforcement and negative reinforcement.

Positive reinforcement involves using a positive stimulus to subsequently strengthen or increase the frequency or likelihood of a preceding response or operant.

Negative reinforcement involves removing a negative stimulus to subsequently strengthen or increase the frequency or likelihood of a preceding response or operant.

3 In what way are positive reinforcers and rewards similar and in what way are they different?

Similarities:
- both lead to the strengthening of a response
- both have satisfying/desirable consequences
- both add something positive.

Difference:
- a reward suggests an outcome that is positive, such as satisfaction or pleasure, but a stimulus is only a reinforcer if it strengthens the preceding behaviour, regardless of whether the organism experiences pleasure or satisfaction.
4

a What do positive and negative reinforcers have in common in terms of their consequences?

Common principles include:

- both have pleasant/satisfying/desired consequences, e.g. a positive reinforcer involves a presentation of a pleasant stimulus and a negative reinforcer involves removal of an unpleasant stimulus
- both strengthen a response or make it more likely to recur.

b Identify three positive and negative reinforcers that you have observed teachers use in the classroom and three that you have observed in other real-life contexts.

Discuss student examples to clarify conceptual understanding.

c How are positive and negative reinforcers different?

A positive reinforcer involves a presentation/delivery of a pleasant stimulus (thereby providing a desired consequence) and a negative reinforcer involves removal/avoidance of an unpleasant stimulus (thereby providing a desired consequence).

Learning Activity 11.14 (p. 434)

1

a Define the term punishment.

Punishment is the delivery of an unpleasant consequence following a response or the removal of a pleasant consequence following a response.

b Explain what punishment involves and why it is used, with reference to an example not given in the text.

- Punishment involves weakening a response, or decreasing the probability of that response occurring again over time.
- Example: until the 1960 or so, teachers in Victorian schools were permitted to use corporal punishment (e.g. ‘the strap’) to suppress or weaken student behaviours such as inattentiveness, lateness, use of disrespectful expressions.

2 Distinguish between positive and negative punishment with reference to an example not used in the text.

- positive punishment: the presentation or introduction of a stimulus to decrease (or weaken) the likelihood of a response occurring again, e.g. principal Skinner requires Bart Simpson to write lines on the blackboard: ‘I will not waste chalk’
- negative punishment: the removal of a stimulus to decrease (or weaken) the likelihood of a response occurring again, e.g. when principal Skinner sets detention for Bart Simpson after school, he removes a positive (free time)

Note: positive punishment involves adding (like a positive number in Maths) and negative punishment involves subtracting (like a negative number in Maths).
3

a. What is response cost?
Response cost is the removal of a valued stimulus to weaken or prevent a response, whether or not the stimulus causes the behaviour.

b. Explain why it is a form of negative punishment with reference to an example not used in the text.

- Like negative punishment, response cost involves taking something away to weaken behaviour.
- Example: a member of a gym who has not paid their fees is barred from access.

c. Does response cost always involve something of monetary value? Explain with reference to an example.

No. Response cost can involve stimulus perceived as having intrinsic or extrinsic value by the individual whose response is being punished. In addition, the stimulus that is ‘lost’ does not necessarily have to cause the response being punished. For example, if a parent confiscates a gun for indiscriminate shooting when duck hunting, because the gun is perceived as causing the behavior. This is response cost. Similarly, if the parent punishes by removing any other valued stimulus that would not be perceived as causing the behavior.

4

How does punishment differ from negative reinforcement? Explain with reference to an example.

- Differences may refer to:
  - Punishment has the same unpleasant quality as a negative reinforcer, but unlike a negative reinforcer, the punishment is given or applied, whereas the negative reinforcer involves removal of an aversive stimulus.
  - The outcome of punishment is the opposite to removal of a negative reinforcer—punishment weakens the response, or decreases the probability of that response occurring again over time; whereas negative reinforcement has the effect of increasing the likelihood of a response being repeated and thereby strengthening the response.
  - Punishment may either add something negative or remove something positive to create an undesirable outcome to weaken behaviour; whereas negative reinforcement involves removal only.

- Example: Phillip conscientiously drives under the speed limit to avoid getting a ticket (i.e. negative reinforcement as the good or legal driving behaviour is made to avoid an aversive consequence). Phillip has never exceed the speed limit for over two years when he regained his licence following suspension of his licence for a serious speeding offence (i.e. negative punishment as taking away his licence for a period of time weakens subsequent speeding behaviour) and being given a big fine (i.e. positive punishment as has been added to weaken future speeding behaviour).

5

How does punishment differ from extinction? Explain with reference to an example.
- Punishment is introduced (i.e., a stimulus is added or taken away) to weaken or suppress an undesirable response, whereas extinction involves removal or withholding of a reinforcer that maintains a response.

- Example: Toddler A has stopped blowing bubbles in her milk because she is no longer praised by her sister for doing so (extinction through withholding a reinforcer), whereas toddler B has stopped blowing bubbles in her milk because she has been reprimanded by her parents (i.e., punishment to suppress).

6. Describe three key factors involved in effective punishment.

Factors include:

- order of presentation, i.e., punishment needs to occur after the response has occurred, never before

- timing, i.e., should be delivered immediately after the response has occurred to help ensure the response and unpleasant consequence are associated, without interference from other factors during the time delay

- appropriateness, i.e., punisher should actually provide and unpleasant consequence for the specific organism involved.

7. a. Describe a situation in which a punisher might reinforce a behaviour rather than weaken it or reduce its frequency.

Example: A talkative, attention-starved Year 8 student may respond to being verbally reprimanded in class—his teacher’s intended punisher—by increasing his talkative behaviour. For him, the verbal scolding at least gives him the attention he craves and this attention then acts as a reinforcer for the talkative behaviour.

b. Describe a situation where an effective punisher could reduce the incidence of behaviour recurring.

Discuss student examples to clarify conceptual understanding.

8. a. Describe three ways in which punishment may be used ineffectively.

Ineffective ways may refer to:

- order of presentation, i.e., delivered before the response has occurred (e.g., a pet dog is scolded about digging up the garden before being allowed into the backyard)

- timing, i.e., delivered after a long delay (e.g., a pet dog is scolded for digging up the garden when the owner discovers the damage the next day so the dog consequently cannot establish an association between the punisher and the inappropriate behaviour)

- appropriateness, i.e., punisher does not actually provide an unpleasant consequence (e.g., a misbehaving child is sent to their bedroom as punishment but the room has TV and Facebook access)

- punishment is too intense, e.g., produces undesirable outcomes such as timidity, aggression, fear, anxiety, hostility
• when concurrent reinforcement undermines the punishment, e.g. a student who is reprimanded for clowning around in class will withhold this behaviour much less if the behaviour is simultaneously reinforced by approval from classmates; even if a hoon driver is punished with a substantial fine, the effects of the punisher may be counteracted by the reinforcement provided by the fun of honing

• when a more desirable or alternative response is unclear or unknown.

b Suggest practices other than punishment that could be used by a parent to deal with a child who persistently engages in one of the following behaviours: teasing, swearing, keeping their bedroom messy, being late home.

As proposed by Skinner, punishment may temporarily suppress or decrease the occurrence of undesirable behaviour but it does not promote more desirable or alternative behaviour in its place. Therefore, Skinner advocated the greater use of positive reinforcement to strengthen desirable behaviours or to promote the learning of alternative behaviours to punishable behaviours. For instance, by:

• reinforcing an alternative behaviour that is both constructive and incompatible with the undesirable behaviour, e.g. if dealing with swearing, reinforce use of language other than swearing

• reinforcing the non-occurrence of the undesirable behaviour

• not reinforcing the undesirable behaviour, e.g. initiate extinction by identifying then eliminating the reinforcer maintaining the undesirable behaviour.

Discuss student examples to clarify conceptual understanding.

9 What was Skinner’s view on the use of punishment in everyday life?

Skinner was not an advocate of punishment in everyday life at all. Instead, Skinner advocated the greater use of positive reinforcement to strengthen desirable behaviours or to promote the learning of alternative behaviours to punishable behaviours.

Learning Activity 11.15 (p. 434)

Reinforcement and punishment

Identify the operant conditioning process that is being illustrated in each of the following examples. Choose from positive reinforcement (PR), negative reinforcement (NR), positive punishment (PP) and negative punishment (NP). Write the initials of the correct responses in the spaces provided.

1 When Lina turns the shopping trolley down the lolly aisle, her two-year-old son, Ali, starts screaming, ‘Want lollies! Lollies!’ Lina moves to another aisle, but Ali continues to scream. As other customers begin staring and Lina starts to feel embarrassed, she finally gives Ali a bag of M&Ms. Ali is now more likely to scream in a supermarket when he wants lollies because he has experienced PR - positive reinforcement.

2 If Lina is more likely to give in to Ali’s temper tantrums in public situations in the future, it is because she has experienced NR - negative reinforcement.

3 Feeling sorry for an apparently homeless person sitting outside a bakery, Chris offers him a $2 coin. The person snarls at Chris and tries to grab his leg in a threatening manner. Chris no longer offers money to homeless people in the street because of NP - negative punishment.
4 Justin is caught using Facebook on his computer at work and is reprimanded by his boss. Justin no longer accesses Facebook on his work computer because of PP - positive punishment.

5 As you walk down the corridor between classes, you spot a student whom you greatly dislike. You immediately duck into an empty classroom to avoid an unpleasant interaction with them. Because NR - negative reinforcement, has occurred, you are more likely to take evasive action when you encounter people you dislike in the future.

6 Having watched Superman fly in a movie, three-year-old Tran climbs onto the kitchen table, then launches himself into the air, only to fall onto the tiles and hurt himself. Because Tran experienced PP - positive punishment, he tried this stunt only once.

7 Thinking she was making a good impression in her new job by showing how knowledgeable she was, Sana corrected her supervisor in two different meetings. Not long after the second meeting, Sana was retrenched because the company said it was making her position redundant. Because she experienced NP - negative punishment, Sana no longer publicly corrects her superiors.

Learning Activity 11.16 (p. 435)

Concept summary

Copy the table below and provide appropriate descriptions and examples to illustrate your understanding of the different concepts and processes involved in reinforcement and punishment.

<table>
<thead>
<tr>
<th>Concept</th>
<th>Description</th>
<th>Example</th>
</tr>
</thead>
<tbody>
<tr>
<td>positive</td>
<td>presenting a stimulus that provides a satisfying consequence to strengthen or increase the frequency or likelihood of a desired response (or operant)</td>
<td>Gilda’s mother gives her a sticker for every helpful action she performs in the kitchen, i.e. something is added to strengthen desired behaviour</td>
</tr>
<tr>
<td>negative</td>
<td>removing an unpleasant or aversive stimulus to strengthen or increase the frequency or likelihood of a desired response (or operant)</td>
<td>a team leader tells Sam that he no longer has to do a boring task because of Sam’s hard work, i.e. something is subtracted to strengthen desired behaviour</td>
</tr>
<tr>
<td>positive</td>
<td>presenting or introducing a stimulus that decreases (or weakens) the likelihood of a response occurring again</td>
<td>Tina is given additional chores for getting home late, i.e. addition of a stimulus to weaken</td>
</tr>
<tr>
<td>punishment</td>
<td>removing a stimulus and thereby decreasing (or weakening) the likelihood of a response occurring again</td>
<td>Tina’s parents take away her car keys for when she gets a second speeding fine a day after the first fine, i.e. removal of a stimulus to weaken</td>
</tr>
<tr>
<td>response cost</td>
<td>removing a valued stimulus, whether or not it causes a response, to decrease (or weaken) the likelihood of the response</td>
<td>Tina’s parents take away her car keys for getting home late, i.e. removal of a valued stimulus to weaken but the stimulus doesn’t necessarily cause or increase the likelihood of the response</td>
</tr>
</tbody>
</table>
Learning Activity 11.17 (p. 438)

1. What does the term schedule of reinforcement refer to?
   
   A schedule of reinforcement is a program for giving reinforcement, specifically the frequency and manner in which a desired response is reinforced.

2. Distinguish between continuous and partial reinforcement with reference to a relevant example in a laboratory setting.
   
   Continuous reinforcement involves reinforcing every correct response after it occurs, e.g. a rat in a Skinner box receives a food pellet every time it presses the lever with sufficient intensity.
   
   Partial reinforcement involves reinforcing some correct responses but not all of them, e.g. a rat in a Skinner box receives a food pellet after every three presses of the lever with sufficient intensity.

3. Give two examples of continuous and partial reinforcement in everyday life.
   
   Discuss student examples to clarify conceptual understanding.

4. Which is more effective in strengthening a response once it has been acquired: continuous or partial reinforcement? Explain your answer with reference to research findings.
   
   - partial reinforcement
   
   - Skinner (1956) unintentionally observed that responses maintained through a program of partial reinforcement are stronger and more resistant to extinction when he ran out of food pellets for his rats during an experiment and was forced to deliver reinforcement less often. It is now widely established that responses maintained through a program of partial, or intermittent, reinforcement are stronger and less likely to weaken or cease than those maintained by continuous reinforcement.

5. When in the operant conditioning process is it most advantageous to use continuous reinforcement?
   
   During the acquisition phase (when the desired response/behaviour is being established).

3. Construct a table in which you summarise and distinguish between the four basic schedules of reinforcement. Include two examples of each schedule in your table.

<table>
<thead>
<tr>
<th>Schedule of reinforcement</th>
<th>Summary</th>
<th>Examples</th>
</tr>
</thead>
<tbody>
<tr>
<td>fixed ratio</td>
<td>reinforcement after a predetermined set number of correct responses</td>
<td>loyalty card, e.g. a free X after every sixth X is purchased; $10 for every 100 items of junk mail delivered</td>
</tr>
</tbody>
</table>
### Variable Ratio
- Reinforcement after an unpredictable number of correct responses (but involving a constant mean number of correct responses for delivery of the reinforcer)
- ‘Scratchie’ lottery tickets
- A river trout fisherman casts a fly rod on average about 65 times to catch a trout, but only one predictable cast will be successful

### Fixed Interval
- Reinforcement after a predetermined time period has elapsed since the previous reinforcer (provided the correct response has been made)
- Weekly pay cheque
- A student is allowed to watch TV after school only after completing 90 minutes of study

### Variable Interval
- Reinforcement after irregular, unpredictable periods of time have passed (provided the correct response has been made)
- Staying ‘on hold’ when ringing service support
- A child may cry for 10 seconds, 1 minute, or 5 minutes before a parent attends, and the crying only ceases when attention is received

4. What are some possible effects of a long delay in the presentation of a reinforcer?

Effects may include:
- The reinforcer may not be associated with the desired response.
- If the delay is fixed, the desired response may taper off until the time nears when the reinforcer will be presented.
- If the delay is variable, it often results in a low but very steady rate of responding.
- An exceptionally long delay (i.e., no reinforcer is offered) may result in extinction.

5. At what stage of the learning process should a reinforcer be presented to be most effective? Explain your answer.

An essential feature of reinforcement is that a reinforcer must only be presented after the desired or correct response is made. This helps ensure the reinforcer is associated with the response and the organism learns the consequence of a particular response.

6. How might the use of an inappropriate reinforcer affect the learning process?

For any stimulus to be a reinforcer, it must provide a pleasing or satisfying consequence for its recipient. If the consequence is inappropriate, i.e., not effective, it will not reinforce the behaviour and delay or stall the learning process.

7. a. Explain, with reference to the three phase model, how this situation may have developed.

   SD: awaken in the ‘middle of’ the night
   R: continual crying
   C: moved to parent’s room
Toddler learns that awakening during the nighttime sleep (SD) and continually crying (R) will result in relocation to the parent’s bed (C).

b Describe a reinforcement strategy the parent could use to change the unwanted behaviour of their toddler.

Generally, do not positively reinforce the child when they awaken during the night by moving them into the parent’s room.

Instead, positively reinforce the toddler for sleeping in their own bed, ensuring consistency and that the reinforcer is appropriate to the individual child. Establish the desired response using continuous reinforcement.

8 Refer to the learning curves produced by four different schedules of reinforcement, as shown in figure 11.33.

a Do the curves indicate continuous or partial reinforcement? Explain your answer.

Partial reinforcement—not every correct response is reinforced

b Which schedule of reinforcement is the most effective for the quickest acquisition of a desired response and which is least effective? Explain each answer with reference to relevant curves and theory on the schedules.

Fixed ratio is the most effective for acquiring a desired response or for learning a new behaviour. Variable ratio is best for maintaining a desired response or behaviour following acquisition. Variable-interval is least effective for response acquisition.

Ratio schedules generate high rates of responding (i.e. steep slopes) because the faster the organism responds, the sooner it earns the next reinforcer. Interval schedules have shallow slopes, because reinforcement is limited by the scheduled time interval between reinforcements.

- fixed ratio: reinforcement is given after a specified number of correct responses. Note that in figure 11.33 the responses are relatively stable between reinforcements (due to the predictable nature of fixed-ratio reinforcement), with a delay or pause after each reinforcer is delivered. Note also the number of responses shown is larger than those shown for each of the interval schedules

- variable ratio: reinforcement is given after a varied number of responses. Consequently, the number of desired/correct responses required to receive a reinforcer is subject to change. This unpredictable nature of variable ratio also produces a fast/high and steady response rate, as shown in figure 11.33

(In figure 11.33 fixed ratio shows a delay or pause after the reinforcer is delivered and variable ratio shows hardly any delay or pause between reinforcers (because the next response under VR could produce another reinforcer). Both of the pause trends are consistent with theoretical expectations under laboratory conditions.)

- fixed interval: the first desired or correct response after a pre-determined time period has passed is reinforced and the time period required always remains the same. Note the moderate rate of responding compared to ratio schedules. Note also the ‘scalloping’ effect produced by reinforcement, i.e. a marked drop-off in responding immediately after reinforcement

- variable interval: the first desired or correct response after a pre-determined time period has passed is reinforced. After the time period has passed, a new time period
(shorter or longer) is set. Consequently, the amount of time that must elapse between reinforcers varies. Note that this schedule reduces the scalloping effect. Nor is there any post-reinforcement pause under this schedule as the pigeon keeps pecking to find out whether a new reinforcer is available.

c Assuming the graph shows the learning curves of four different pigeons reinforced for pecking responses, suggest which pigeon’s behaviour will be most resistant to extinction (cessation or elimination) and which pigeon’s behaviour will be least resistant. Explain each answer.

Generally, responses or behaviours conditioned on partial schedules tend to be more resistant to extinction than are responses conditioned using continuous schedules (and ratio schedules tend to be more resistant than interval).

When pigeons (or humans) have experienced partial reinforcement, they’ve learned that despite intermittent delays and non-reinforced responses reinforcement can still occur, if the correct response is made, so responding tends to be more persistent. Essentially, it is harder to detect the change from reinforcement to non-reinforcement (and therefore also commencement of the extinction procedure).

- most resistant: variable ratio schedule—pigeon expects that a reinforcer will eventually be received so pecking behaviour is likely to be most persistent
- least resistant: fixed interval schedule—pecking activity increases as anticipated time for the delivery of reinforcement and then falls into a trough after the deadline passes, because the pigeon knows that its pecking behaviour won’t be reinforced again with food until the next interval elapses; the fixed interval ‘scallop’ graph provides evidence of predictability of reinforcement (and therefore also predictability of the commencement of the extinction procedure).

Learning Activity 11.18 (p. 439)

Identifying schedules of reinforcement

Name the schedule or reinforcement operating in each of the following examples.

<table>
<thead>
<tr>
<th>Example</th>
<th>Schedule of reinforcement</th>
</tr>
</thead>
<tbody>
<tr>
<td>an author who takes a break after writing each chapter of a novel</td>
<td>fixed ratio</td>
</tr>
<tr>
<td>a radio station gives a prize to the 13th telephone caller</td>
<td>fixed ratio</td>
</tr>
<tr>
<td>a teacher who checks on a student every so often and praises them for</td>
<td>variable interval</td>
</tr>
<tr>
<td>the work being completed.</td>
<td></td>
</tr>
<tr>
<td>a netballer who takes a break every time she shoots ten goals</td>
<td>fixed ratio</td>
</tr>
<tr>
<td>consecutively</td>
<td></td>
</tr>
<tr>
<td>a salesperson who is paid a retainer (base salary) plus a</td>
<td>fixed ratio</td>
</tr>
<tr>
<td>commission for each sale</td>
<td></td>
</tr>
<tr>
<td>Concept</td>
<td>Definition</td>
</tr>
<tr>
<td>-------------------------------</td>
<td>---------------------------------------------------------------------------</td>
</tr>
<tr>
<td>acquisition</td>
<td>the establishment of a response through reinforcement</td>
</tr>
<tr>
<td>extinction</td>
<td>the gradual decrease in the strength or rate of a conditioned (learned) response following consistent non-reinforcement of the response</td>
</tr>
<tr>
<td>spontaneous recovery</td>
<td>the reappearance of a conditioned (learned) response in the absence of reinforcement after a period of time without reinforcement and its apparent extinction</td>
</tr>
</tbody>
</table>
11 Theories of learning

stimulus generalisation

<table>
<thead>
<tr>
<th>stimulus generalisation</th>
<th>when the correct response is made to another stimulus that is similar (but not necessarily identical) to the stimulus that was present when the conditioned response was reinforced</th>
</tr>
</thead>
<tbody>
<tr>
<td>a pigeon in a Skinner box pecks a disk that is a different shape from the one it was conditioned to peck</td>
<td>a pet dog sits on the command of ‘mit’, which is similar-sounding to the stimulus conditioned through reinforcement</td>
</tr>
</tbody>
</table>

stimulus discrimination

<table>
<thead>
<tr>
<th>stimulus discrimination</th>
<th>making a learned response to a specific stimulus but not any other similar stimulus</th>
</tr>
</thead>
<tbody>
<tr>
<td>a pigeon in a Skinner box will only peck the round disk and not a disk of any other shape</td>
<td>a pet dog will only sit on the command of ‘sit’, and not in response to any similar-sounding words such as ‘mit’</td>
</tr>
</tbody>
</table>

2 Explain the role of a discriminative stimulus (SD) in stimulus discrimination.

In operant conditioning, stimulus discrimination occurs when an organism makes the correct response to a stimulus and is reinforced, but does not respond to any other stimulus, even when stimuli are similar (but not identical)

The organism ‘discriminates’ between closely related stimuli (tells them apart) and responds (positively/correctly) only in the presence of that stimulus

The role of the discriminative stimulus (SD) is therefore to ‘cue’ or ‘signal’ when (under what circumstances/setting) to respond and elicit the correct behaviour

For example, a pigeon in a Skinner box could be taught to discriminate between a red and a green light. If the pigeon was reinforced every time it pecked at a disk while a green light was illuminated, but never reinforced for pecking the disk when a red light shone, it would soon learn to discriminate by responding only when the green light was on. When this occurs, the green light has become a discriminative stimulus (SD) as it ‘signals’ the pigeon to elicit the correct response (pecking only when a green light is illuminated).

3 Which of the following scenarios involve stimulus generalisation? Which involve stimulus discrimination?

| a | Lauren asks Gino out on a date but he declines. Lauren decides that she won’t ask another boy out again. | stimulus generalisation |
| b | Toula is paid for doing chores around the home and expects to be paid for doing chores at her auntie’s place when she stays there. | stimulus generalisation |
| c | Jackson is scared of the sound of a lawnmower but not the sound of an electric toothbrush. | stimulus discrimination |
| d | Sam is scared of the sound of his dad’s electric drill. When his dad stops using the drill he relaxes. Sam’s dad then reaches for the electric saw. As soon as Sam sees this, he is scared and runs inside. | stimulus generalisation |
4 Mr Ying is a young, handsome Psychology teacher who has just been appointed to a girls’ college. Unfortunately, his Psychology class is so distracted by his appearance that they find it difficult to focus on their work and on his instructions. There is a lot of giggling, whispering and a general lack of attention. Mr Ying is determined to make a good impression with his classroom control and with his teaching methods. He decides to use detention as a means of pulling the girls’ behaviour into line. He runs a lunchtime detention session for six girls whose behaviour has been the worst. In the next class, not only do these six girls misbehave, but they are joined at the next detention by four others. This trend continues until it’s not long before almost the entire class is on detention.

a Which operant conditioning process is Mr Ying trying to use to change the girls’ behaviour?
Negative punishment—loss of lunchtime to weaken inappropriate classroom behaviour.

b Provide a description of its effectiveness and an explanation as to why this is so.
It is ineffective due to concurrent use of negative punishment (i.e. loss of lunchtime) and positive reinforcement (i.e. Mr Ying’s presence).

c How could Mr Ying change his strategy with the girls and still use operant conditioning?
Explanation may refer to:
• avoiding concurrent reinforcement, e.g. detention is supervised by another teacher
• practices other than punishment e.g. ignoring inappropriate behaviour and using positive reinforcement to promote and strengthen appropriate behaviour.

5 Maria had enjoyed attending the same P-12 college for ten years. Quite suddenly this year, her friendship group had drifted away from her and she is now being bullied by some other girls because she has become a ‘loner’. After an unsuccessful attempt to solve her problems by speaking with her year-level coordinator, Maria started to take days off school, telling her mother she wasn’t feeling well. Her absenteeism increased. Although she was concerned about missing school, she couldn’t face the unpleasant actions of the bullies.

a Which operant conditioning process explains the increase in Maria’s behaviour of deceiving her mother and staying home from school? Explain how this process worked in Maria’s situation.
negative reinforcement—by avoiding the unpleasant school situation or by removing the unpleasant stimulus, Maria feels better and therefore experiences a satisfying consequence

b Which operant conditioning process describes the consequence of the bullying behaviour for Maria? Explain its effect on Maria’s attendance behaviour.
punishment—exposure to the unpleasant stimulus of bullying behaviour decreased Maria’s school attendance behaviour

Learning Activity 11.20 (p. 446)

1

a Define the term shaping.
Shaping is an operant conditioning procedure in which a reinforcer is given for any response that successively approximates and ultimately leads to the final response or to the target behaviour.

b Under what circumstances would shaping be used to promote learning?
When the desired response has a low probability of occurring naturally.

c Give an example of when you have used shaping to modify either a person’s or an animal’s behaviour and describe the shaping procedure used.
Discuss student examples to clarify conceptual understanding.

2

a What is a token economy? Explain with reference to key operant conditioning principles and processes.
A token economy is a setting in which an individual receives tokens (reinforcers) for desired behaviour and these tokens can then be collected and exchanged for other reinforcers in the form of actual or real rewards.

• Desirable behaviour is strengthened by positively reinforcing responses in awarding tokens.
• Undesirable behaviour is punished by removing tokens, using the principle of negative punishment to weaken unwanted responses.

b Under what circumstances might the use of a token economy be ineffective?
May be ineffective when:
• people feel manipulated and therefore refuse to cooperate
• when overly complex
• when inadequately controlled e.g. inconsistent application of reinforcers and punishers.

Note: At Hogwarts in Harry Potter, awarding and removal of house points at a teacher’s discretion is used to reinforce good behaviour. It is shown to be a powerful motivator when the children are young. However, the system is not employed consistently, e.g. Slytherin masters always seem to penalise Gryffindor students. As a result, the points system loses its potency, value and relevance, particularly as the students’ age (and the series) progresses.

3 Throughout his career, Skinner proposed numerous applications of operant conditioning. For example, during World War II, he developed the idea of ‘Project Pigeon’. This was a secret project in which he conditioned pigeons to guide missiles towards an enemy target. The birds were placed in the nose of a missile, harnessed in front of a screen on which the moving image of a target flashed. When the missile was in flight, the pigeons would peck the moving image, which produced corrective signals that would keep the missile on course. The US Department of Defense determined that pigeons could play an effective role, but they were never used in actual warfare because the development of electronic missile guidance systems made it unnecessary.
Suggest how shaping may have been used to train the pigeon to be comfortable within the confines of a missile nose and to peck at the correct target on a screen to keep the missile on the required flight path.

See YouTube for a 6min 19sec video byte (produced by an American third-year psychology student) outlining the procedure Skinner used in developing Project Pigeon. Go to: http://www.youtube.com/watch?v=-Ygby75XXFM&feature=related.

**Learning Activity 11.21 (p. 446-7)**

**Applying operant conditioning**

1. Choose one of the examples presented below and explain how operant conditioning principles could be used for a solution. Your explanation should use operant conditioning terms where appropriate.

   Discuss student examples to clarify conceptual understanding.

2. A teacher cannot conduct her lesson because the students are rowdy and inattentive in the last period, so she lets them out early. What are the students learning? Which operant conditioning principles are at work here?
   - Students are learning that their rowdiness and inattention or inappropriate classroom behaviour results in the desirable consequence of being let out of class early/early dismissal.
   - Students are more likely to behave this way the next time they encounter this teacher as she has positively reinforced their behaviour by giving them a treat for misbehaving.
   - The students have negatively reinforced the teacher’s behaviour through removal of the aversive stimulus of rowdiness and inattention, i.e. when they leave the classroom.

3. Analyse and describe each of the following scenarios in terms of the three phase model of operant conditioning. You should also indicate whether each scenario is an example of positive or negative reinforcement or punishment.
   - Zeta’s dog Belle keeps escaping from the backyard by crawling through a gap under the fence. Zeta purchases a small detector that she places either side of the gap and puts a collar on Belle that makes a high-pitched noise whenever she gets too close to the gap. The first time Belle tries to escape under the gap, the noise plays and distresses her. Soon Belle learns to avoid the noise by staying inside the backyard.
   - Discriminative Stimulus: → Response: crawling through the gap/escape → Consequence: high-pitched noise.
   - Discriminative Stimulus: gap under fence → Response: stay in the backyard/not crawl through the gap/escape → Consequence: no noise.
   - Positive punishment: the noise is added to weaken escape behaviour.
   - During a close soccer match, an opponent tackles Jack roughly. Jack retaliates by starting a fight with the opponent. Jack’s coach considers the behaviour unacceptable and suspends him for one match, which also means Jack won’t get paid for playing at a time when he needs the money. When Jack next plays and is again tackled roughly, he reacts by telling off the player and complaining to the referee, stopping short of starting another fight.
• Discriminative Stimulus: rough tackle by opponent → Response: starting a fight with the opponent → Consequence: suspension/playing privileges taken away.
• Discriminative Stimulus: rough tackle by opponent → Response: verbal rebuke to opponent and complaint to referee → Consequence: no suspension/loss of playing privileges.
• Negative punishment/Response: playing privileges are taken away.

Learning Activity 11.22 (p. 447–8)

Data analysis

The following two scenarios describe educational settings in which operant conditioning principles have or could have been applied to change behaviour. Choose one of the scenarios and answer the questions about it.

Scenario 1: changing a teacher’s behaviour

1 What is the purpose of baseline data?
   • Baseline data is information gathered prior to the start of an experiment/study
   • at the end of the experiment/study, the data is used to provide a standard of comparison for determining and comparing how effective the experiment/study fared in achieving its goals
   • its purpose is therefore to serve as a basis for comparison for subsequently collected data.

2 Explain the difficulties experienced by the teacher with reference to three operant conditioning principles.
   Explanation may refer to:
   • failure to positively reinforce appropriate or more desirable behaviour, e.g. ‘he was never observed to take notice of appropriate behaviour; for example give praise for not talking’;
   • failure to positively reinforce alternative behaviour that is both constructive and incompatible with the undesirable behaviour;
   • ineffective punishment due to inconsistent application, e.g. ‘responded to inappropriate talking about 25% of the time’; “he continued trying to teach “over the top”’;
   • ineffective punishment due to inappropriateness of punisher, i.e. punishers such as general threats, ‘shhh’ and ‘be quiet’ do not actually provide an unpleasant consequence;
   • ineffective punishment or potential use of negative reinforcement through failure to target individuals, e.g. ‘responses were directed at the whole class and rarely to offending individual students’;
   • ineffective punishment due to inappropriate timing, e.g. not implemented with minimal delay.

3 Make two suggestions involving operant conditioning principles to help the teacher overcome the difficulties with his class.
   Suggestions may refer to:
   • effective use of positive reinforcement to identify and strengthen/increase frequency of appropriate behaviours, e.g. consistent application of positive reinforcers such as praise,
smiling, compliments etc. as soon as possible after desired responses are observed, while consistently ignoring or punishing unwanted responses;

- effective use of negative reinforcement, e.g. providing opportunity and clarifying for avoiding an unpleasant homework task if accomplished during class time;
- effective use of punishment;
- effective use of shaping to modify behaviour of individuals;
- token economy practices;
- principles outlined in the answer to Learning Activity 10.17 question 8b.

Scenario 2: changing a student’s behaviour

1. What is the operationalised independent variable?
   Amount of teacher praise given (lots versus none).

2. On which days was the ‘control’ condition conducted? What was the purpose of this?
   Days 1–4 to establish baseline data; days 12–16 to check IV effect.

3. Identify the key elements of operant conditioning evident in this scenario.
   - effective use of positive reinforcement, e.g. ‘girl enjoyed teacher praise’;
   - consistently reinforcing desired responses and consistently not reinforcing/ignoring unwanted responses
   Note: No information on negative reinforcement, shaping or punishment.

4. In which condition was the young girl’s interaction with other children at its lowest? At its highest? What do these data tell you about the success or failure of the program devised by the team of psychologists and undertaken by the teachers?
   - day 1
   - day 24
   - answers should propose a case for success of the program with reference to the data in relation to the program’s goals.

5. Why did the teachers stop using praise with the young girl for a period of time and then recommence its use?
   to check that the behaviour modification was actually the result of their IV (selective teacher praise administration), e.g. by withholding the IV (‘treatment’) and measuring participant responses

**Learning Activity 11.23 (p. 451)**

Matching exercise

Match the classical and operant conditioning terms in the left-hand column with the descriptions in the right-hand column. The answers are on page 755.

1. operant conditioning – h
2. discriminative stimulus – o
<table>
<thead>
<tr>
<th>Feature</th>
<th>Classical conditioning</th>
<th>Operant conditioning</th>
</tr>
</thead>
<tbody>
<tr>
<td>process of acquisition</td>
<td>learning through repeated association of the CS and UCS</td>
<td>learning through repeated association of a response and its consequence; in the three-phase model, a three-way S-R-C association</td>
</tr>
<tr>
<td>extinction</td>
<td>gradual decrease in the strength or rate of a CR when the UCS is no longer presented</td>
<td>gradual decrease in the strength or rate of a conditioned/learned response following its consistent non-reinforcement</td>
</tr>
<tr>
<td>stimulus generalisation</td>
<td>when similar stimuli produce the same type of response i.e. the CR occurs for stimuli like the CS</td>
<td>when the correct response is made to another stimulus that is similar to the stimulus that was present when the conditioned response was reinforced</td>
</tr>
<tr>
<td>stimulus discrimination</td>
<td>making a learned response to a specific stimulus but not any</td>
<td>making a learned response to a specific stimulus but not any</td>
</tr>
</tbody>
</table>

**Learning Activity 11.24 (p. 452)**

Comparing classical and operant conditioning

Copy the table below and complete each row to summarise similarities and differences between classical and operant conditioning.
other similar stimulus i.e. CR occurs in the presence of the CS but not in the presence of similar stimuli  
other similar stimulus

<table>
<thead>
<tr>
<th>Spontaneous recovery</th>
<th>Reappearance of a CR when the CS is presented after apparent extinction</th>
<th>Reappearance of a conditioned (learned) response in the absence of reinforcement after apparent extinction</th>
</tr>
</thead>
<tbody>
<tr>
<td>Role of learner</td>
<td>Passive</td>
<td>Active</td>
</tr>
<tr>
<td>Timing of stimulus and response</td>
<td>CR depends on UCS occurring first</td>
<td>Reinforcement or punishment after the response</td>
</tr>
<tr>
<td>Nature of response (reflexive/voluntary)</td>
<td>Reflexive, involuntary</td>
<td>Voluntary and involuntary</td>
</tr>
</tbody>
</table>

### Learning Activity 11.25 (p. 452)

**Classical versus operant conditioning**

Consider each of the following scenarios and state whether the behaviour that is described is best explained by classical conditioning, operant conditioning or a combination of both these types of learning.

Give a reason for each answer.

1. Sally cries whenever she hears a barking dog. Prior to this beginning, Sally had seen a stray dog, reached out to pat it, and the dog barked and bit her hand.
   - **Classical conditioning**
   - Associated a dog’s bark (initially neutral, then a CS) with a dog bite (UCS), then CS alone results in crying (UCR → CR)

   - **Classical conditioning**
   - Associated musk perfume (initially neutral, then a CS) with unpleasant experience of ex-girlfriend (UCS), then CS alone results in cringing (UCR → CR)

3. A father refuses to let his daughter borrow his car after she has ‘borrowed’ it previously and returned it with a near empty petrol tank.
   - **Operant conditioning**
   - S (father’s car) → R (daughter borrows car) → C (returns car with near empty petrol tank)

4. Emilia arrives home on time after having been grounded for being home late the last time she went out with her friends.
   - **Operant conditioning**
• initially: S (going out with friends) à R (home late) à C (grounded)
• now: S (going out with friends) à R (home on time) à C (no grounding, i.e. negative punishment)

Learning Activity 11.26 (p. 455)
1 Define observational learning, with reference to an example.
Observational learning occurs when someone uses observation of another person’s actions and the consequences of those actions to guide their future actions.
Example: after witnessing an older sibling being punished for taking a biscuit without asking, the younger child does not take biscuits without permission.

2 Why is observational learning also referred to as modeling?
Involves watching a model/s.

3 What are two key assumptions of Bandura’s social learning theory?
• the social context in which learning occurs provides a rich source of behavior and associated consequences for observational learning
• learning does not necessarily involve performing actions and experiencing consequences – the learning can occur by watching others do something and experience the consequence
• people are more likely to model, learn and reproduce responses observed to have desirable consequences
• observational learning can involve conditioning e.g. vicarious conditioning
• observational learning involves crucial cognitive processes e.g. attention, memory
• some models are perceived as more significant or important than others, and therefore their behaviour is more likely to be imitated

4 What does vicarious conditioning involve when observing a model?
During vicarious conditioning, the individual watches another person displaying behaviour that is either reinforced or punished, and then subsequently behaves in exactly the same way or in a modified way, or refrains from the behaviour as a result of what they have observed, i.e. no direct, ‘personal’ experience is required—observation is adequate.

5 Distinguish between a live model and symbolic model with reference to relevant examples.
A live model is a real-life person who may be demonstrating, acting out and/or describing or explaining a behavior e.g. parents, a teacher, a tennis coach etc.
A symbolic model is a real or fictional character displaying behaviour in books, movies, television programs, online and other media e.g. a rock star, comic book character.

6 Describe three different responses you probably learned through observational learning. Try to think of a variety of behaviours; for example, actions, cognitions or emotions ranging from relatively simple to more complex. For each response, what model did you observe, what did you observe, and how similar were your responses to theirs?
Students responses will vary.
7 Give two examples of learned behaviours that are not acquired through observational learning. Explain your choice of examples.

Examples should be of other forms of learning, e.g. conditioned responses acquired through classical conditioning, operant conditioning or trial and error learning.

**Learning Activity 11.27 (p. 457)**

Evaluation of research

1 Prepare a flowchart or written summary of the key features of Bandura’s 1965 experiment. Include a brief descriptions of:

   a a research hypothesis that could have been tested in the experiment
   b the operationalised IV(s) and DV(s)
   c the different conditions of the experiment
   d the results
   e conclusions
   f ethical concerns that may be relevant to the research.

See flow-chart overleaf.

2 Name the experimental design used by Bandura. Suggest a reason why this design was used rather than repeated measures.

Independent-groups design

3 Identify any extraneous variable that may have influenced the results in an unwanted way.

This is a classic a study with relevant variables well-controlled e.g. similar-aged children randomly assigned to different conditions in equal numbers of boys and girls to control relevant participant variables such as age, pre-existing predisposition to aggression, gender, intelligence, cultural and socio-economic background. The study can be queried in relation to artificiality, results not so clear-cut and the possible short-term effects of observing the aggressive acts.

4 What generalisations can be made to:

   a other types of modelled behaviour?

      Bandura’s generalisations to other types of modeled behavior include:
      • children learn through observation and imitation
      • observational learning can occur by simply viewing a model even if the model is neither reinforced nor punished
      • observational learning can occur without being evident in immediate performance following the learning
   
   b participants of other ages?

      On the basis of this study and its procedures, generalisations to from the results of children to older age groups (e.g. adolescents, adults) about imitation of observed aggressive behavior are unlikely to be made without testing the procedures with such age groups.
Bandua’s (1965) BoBo doll experiment

**Hypothesis**: Young children exposed to an aggressive model being rewarded for aggressive behaviour will perform more aggressive responses when given an opportunity to do so than will young children exposed to an aggressive model who is punished and young children exposed to an aggressive model who is not rewarded or punished. Aggressive behaviour.

**IV**: model rewarded, model punished, model neither rewarded or punished

**DV**: number of aggressive responses by children in each condition

*Note* – Other hypotheses could be stated e.g. sex differences, use of reinforcers for imitating.

**DV** = amount of verbal and physical aggression shown by the child

Participants assigned to one of three conditions (in equal numbers of boys and girls)

**Condition 1**: Watch movie showing an aggressive, adult model being rewarded

**Condition 2**: Watch movie showing an aggressive, adult model being punished

**Condition 3** (Control): Watch movie showing an aggressive, adult model neither rewarded nor punished

- Participants placed individually in a room and observed through a two-way mirror for imitations of modelled behaviour.
- Some offered a reward for imitating and others not

**Results**:
- Children who watched the aggressive model either being reinforced or experiencing no consequences for their aggressive behaviour imitated aggressive behaviour more than the children who watched the aggressive model being punished
- When children were offered a reward for imitating the model’s aggressive behaviour, even children who had seen the model punished tended to imitate the model’s behaviour
- The boys were more aggressive than the girls in all three conditions, but the girls were nearly as aggressive as the boys if they were offered a reward
Learning Activity 11.28 (p.461)

1 Distinguish between learning and performance. Explain with reference to an example that is not used in the text.

Learning is the internal, non-directly observable process through which there is a relatively permanent change occurring through experience whereas performance is the observable action/behaviour assumed to demonstrate the learning that has or has not occurred and therefore used to measure learning and make inferences about learning.

Essentially, learning cannot be observed until the organism physically does something that relates in some way to the underlying learning process.

2 What is the role of the learner in observational learning?

The learner has an active role, e.g. watch the model and consequences, interpret consequences, remember the model’s behaviour, recall from memory to reproduce, decide whether to reproduce etc.

3 Describe and explain each of the processes of observational learning with reference to an example not used in the text.

Five processes of Bandura’s OL/modelling theory in their correct order are:

1 attention: must attend to or closely watch the model’s behavior and the consequences in order to recognize distinctive features of the observed behavior and to notice the consequences
2 retention: remember the model’s behavior so that it can be retrieved and reproduced
3 reproduction: reproduce/imitate what was observed (but must have the ability to do so)
4 motivation: motivation/need/want to perform the observed behavior
5 reinforcement: incentive to motivate reproduction/performance of the learned behavior

Ensure a suitable example is used.

4 Explain, with reference to its processes, why observational learning is referred to as a form of cognitive learning.

Explanation should refer to the role of cognition or cognitive processes in observational learning, e.g. attention, mentally representing what is observed, memory, processing consequences, decision making about imitation/reproduction.

5 Many people believe that violent behaviour is learnt by observing violence in television programs, movies and other media, and/or through playing violent computer games.

a What does research evidence suggest about such learning?

Bandura’s study provides evidence to support, at least for young children, but not necessarily for persistent/long-term effects of cumulative effects of observing violence over time.

b What other variables may impact on observational learning of violence?

Variables may include:
- failure of any of the five processes e.g. attention, retention, reproduction and motivation–reinforcement
- amount, duration, type of exposure
- participant variables e.g. sex, age, intelligence, culture, religion, socio-economic circumstances, peers/friendship groups, educational qualifications

**Learning Activity 11.29 (p.462)**

Applying observational learning processes to the Suzuki method

Attention – Bandura states that the observer must attend to the model’s behavior and the consequence in order to recognize distinctive features of the observed behavior and to notice the consequences. Similarly, Suzuki advises parents to teach violin information only when the child is actually looking at and watching what is being done. Parents are told to stop teaching and wait if the child rolls around on the floor, jumps up and down or talks about unrelated things.

Retention – Bandura states that the observer must remember the model’s behavior so that it can be retrieved and reproduced. Similarly, Suzuki advises parents that they should present information in ways a young child can understand, presumably because this will help ensure reproduction. Because a 3-4 year old does not have fully developed verbal skills or memory, little time is spent giving verbal instructions. Instead, the young child is given violin information through games and exercises.

Reproduction – Bandura states that the observer must be able to reproduce/imitate what was observed (but must have the ability to do so). Similarly, Suzuki suggests that children start learning violin at about 3-4 years old, the earliest age when they can physically perform the required
movements and imitate their parents and teachers e.g hold the violin, hold the bow and press the strings. Girls can start earlier than boys because they physically mature earlier

Motivation and reinforcement – Bandura says that the observer must have some reason, or incentive to perform the model’s behaviour. Similarly, Suzuki emphasises that an important role of the parent is to constantly reward and reinforce the child for observing and “doing what mummy or daddy is doing”.

Learning Activity 11.30 (p. 462-3)

Evaluation of research
1 Construct a research hypothesis that could have been tested in the experiment.

Example of a research hypothesis that could be tested:

Children who hear and see an adult model preaching and behaving charitably, will behave more charitably than participants who hear an adult role model preaching about being charitable but not behaving charitably.

Note: Researchers often report several different hypotheses that were tested, as was the case for this study.

2 Identify the operationalised variables.

Generally, depending on the specific hypothesis proposed by students:

IV: type of talking (charitable or selfish) and type of behaviour (charitable or selfish) demonstrated by an adult model

DV: number of lollies donated by the children who observed a model

3 Name the experimental design.

independent-groups design.

4 Explain whether the results support the hypothesis.

Answer will depend on the hypothesis.

5 Are the results consistent with Bandura’s observational learning theory? Explain your answer.

Generally, the results are consistent despite consequence for each model’s behavior not being observed. Groups 1 and 4 both observed charitable behavior donated the most lollies (regardless of what was heard) and Groups 2 and 3 both observed selfish behaviour donated the least lollies (regardless of what was heard).