Escape, Avoidance and Punishment

Chapter 9

1

Escape vs. Avoidance

2

Escape behavior→ performance of the behavior terminates the aversive stimulus,

Avoidance behavior→performance of the behavior prevents the aversive stimulus from occurring.

e.g. We escape from the rain when we run indoors after it has started; we avoid the rain when we head indoors before it has started.

One first learns to escape from an aversive stimulus and then to avoid it.

Learned Helplessness

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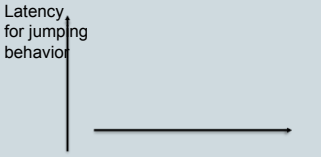

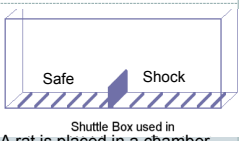

Shuttle Box used in

A rat is placed in a chamber divided by a low barrier. A stimulus such as a light, is presented for 10 seconds, followed by a mild electric shock. The rat can escape the shock by climbing over the barrier to the other side of the compartment. Crossing the barrier is then negatively reinforced by the removal of shock.

Escape vs. Avoidance

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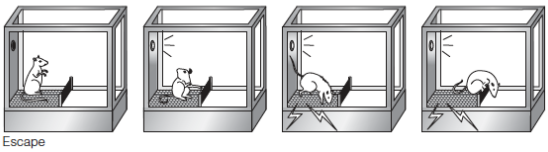
FIGURE 9.1 Escape and avoidance in a shuttle avoidance task. As shown in the top panel, the animal first learns to escape from the shock by climbing over the barrier whenever a shock occurs. Later, as it learns that the light predicts the occurrence of shock, it climbs over the barrier whenever the light appears, thereby avoiding the shock (as shown in the bottom panel). (*Source:* Nairne, 2000.)



Escape

Shock: *Cross barrier* → Removal of shock

Escape vs. Avoidance

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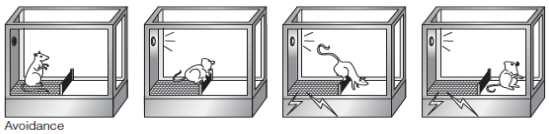

Avoidance

Shock is preceded by the presentation of a light. It means that light is a warning which signals that a shock is about to occur. As the rat learns to associate the light with the shock, it will begin crossing the barrier whenever the light is presented and before the shock begins. **Light: *Cross barrier* → Avoidance of shock**
S^D R S^R

Light

Shock

Escape vs. Avoidance

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- In similar fashion, we might first learn to escape from an upsetting conversation with a racist acquaintance by inventing an excuse for leaving. After a few experiences, however, we might begin actively avoiding that individual before any encounter. By doing so, we avoid having to endure any exposure to that person's racist views.
- http://www.youtube.com/watch?v=fwzEbzgPszk
- Behavior that terminates an aversive stimulus is called _____behavior, whereas behavior that prevents an aversive stimulus from occurring is called _____ behavior.
- Typically, one first learns to _____ from an aversive stimulus, and then to _____ it.

Escape vs. Avoidance

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- Julio initially takes vitamin C whenever he has a cold, in the hope that it will shorten the duration of his symptoms. Feeling that this is effective, he begins taking it daily in the hope that it will keep him from contracting a cold. Julio initially took the vitamin C to (avoid/escape) _____ the symptoms of a cold; he later took it to _____ the symptoms of a cold.
- In the shuttle avoidance procedure described previously, the rat first learns to _____ from the shock, with the _____ acting as the S^D for the behavior. The rat later learns to _____ the shock, with the _____ acting as the S^D for the behavior.

Two-Process Theory of Avoidance

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- Escape behavior is relatively easy to understand. The rat moves from a clearly aversive situation to a nonaversive situation. But the motivation underlying avoidance behavior is less apparent.
- When climbing over a barrier to avoid shock, the rat seems to be moving from one nonaversive situation (no shock) to another nonaversive situation (no shock).
- So, no aversive stimulus! where is the reinforcer here? Is it possible to occur conditioning without reinforcer?

Two-Process Theory of Avoidance

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- Two-process theory of avoidance (also known as the two-factor theory of avoidance) proposed by Mowrer (1947, 1960) tried to explain this.
- 2 processes are involved in learning an avoidance response. The first process is classical conditioning of a fear response to a CS.

Light: Shock → *Fear*
NS US UR
Light → *Fear*
CS CR

Two-Process Theory of Avoidance

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- Once this conditioned fear has been established, it then forms the basis of an operant conditioning procedure.
- If the CS generates a conditioned fear response, then moving away from the CS should result in a reduction of fear. This *reduction of fear* should in turn serve as a negative reinforcer for the response.

Light: *Climb over barrier* → Reduction in fear
S^D R S^R

Two-Process Theory of Avoidance

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- Two distinct processes:

(1) classical conditioning, in which a fear response comes to be elicited by a CS, and then

(2) operant conditioning, in which moving away from the CS is negatively reinforced by a reduction in fear.

SO, avoidance response is not reinforced by 'nothing'! It is reinforced by 'reduction of fear'! This explanation is indeed very similar to what Hull says (drive reduction).

Two-Process Theory of Avoidance

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- Some problems about this theory:
  - Avoidance responses are often extremely persistent. One can make more than 600 avoidance responses in a shuttle box. Yet, avoidance was no longer necessary because shock was not presented.
  - If the animal repeatedly encounters the CS in the absence of the US, then fear of the CS should eventually extinguish—meaning that the animal should eventually stop jumping over the barrier.
  - But no! it did not stop jumping.

Two-Process Theory of Avoidance

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- A possible answer comes from 'anxiety conservation hypothesis'.
- Avoidance responses usually occur so quickly that there is insufficient exposure to the CS for the conditioned fear to fully extinguish—that is, a good deal of the conditioned fear is conserved because exposures to the CS are too brief for extinction to take place.
- 2nd problem about the theory: after repeated avoidance trials, animals appeared to show no evidence of fear but continued to make the avoidance response anyway. If the animals were no longer afraid of the CS, how could avoidance of the CS have been negatively reinforced by a reduction in fear?

Two-Process Theory of Avoidance

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- Levis argued that although animals in avoidance experiments may become significantly less fearful with experience, there is no evidence that they become completely nonfearful.
- In fact, evidence suggests that if an animal completely loses its fear of the aversive CS, then, just as two-process theory predicts, the avoidance response stops.
- But as long as some fear remains, the avoidance response continues, suggesting that fear reduction is still functioning as a negative reinforcer for the behavior.

Two-Process Theory of Avoidance

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- Since it's too persistent, how can we extinguish it?
  - Presenting the shock in the 'safe' part.
  - Blocking the avoidance response. (a long barrier works.)

Avoidance Conditioning and Phobias

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- examining the role of avoidance learning in phobic development.
- There are 2 limitations in applying models of experimental avoidance to human phobias.
- FIRST;
- In experimental avoidance conditioning, the animal avoids the aversive US (avoiding shock).
- In human phobias, however, people avoid the CS. E.g. A person who has a fear of elevators because he was once trapped in an elevator does not simply avoid being trapped in an elevator; he avoids elevators altogether.

Avoidance Conditioning and Phobias

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- SECOND;
- The avoidance behavior seems to condition less readily than does avoidance behavior in a phobia. It requires at least a few pairings of the CS and the US.
- By contrast, human phobias often require only a single, brief conditioning trial to produce an avoidance response that is strong and persistent. For example, a very strong and persistent dog phobia may develop following a single dog attack.

Avoidance Conditioning and Phobias

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- Then, Stampfl (1987) proposed that an adequate experimental analogue of a human phobia would require
(1) the reliable establishment of a fear response with only a single, brief pairing of the CS and US,
(2) subsequent avoidance of the CS as well as the US, and
(3) the occurrence of successful avoidance on 100% of trials.
- Stampfl 's (1987) procedure focuses on the fact that human phobics typically make the avoidance response early in the chain of events leading up to the feared stimulus.
  - E.g. a person with an elevator phobia will plan his day well ahead of time so that he will not be faced with any pressure to take an elevator.

Avoidance Conditioning and Phobias

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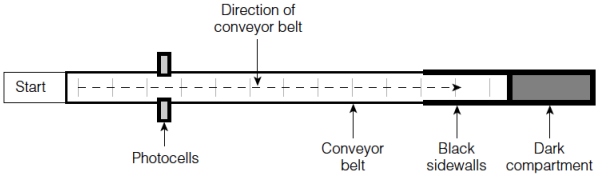
However, Stampfl designed an apparatus.



Each rat was first allowed to explore the alleyway. Rats prefers dark (black compartment). The rat was then given a foot shock while in the black compartment. The rat ran to the far end of the alleyway. Three minutes later, a conveyor belt was turned on that began to slowly carry the rat toward the dark compartment.

Avoidance Conditioning and Phobias

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- During this first trial, most rats waited until they reached the black sidewall area of the apparatus before running back to the far end.
- When they did run back to the far end, the conveyor belt stopped for a 3-minute period (photocells). The conveyor belt then started up again, and the procedure was repeated. This initial session lasted 2 hours.
- During the second session, the response requirement for stopping the conveyor belt was increased from FR 1 to FR 10 (the rat had to run back and cross the photocells 10 times before the conveyor belt would stop).

Avoidance Conditioning and Phobias

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- The rats soon learned to run back to the safe area immediately after the conveyor belt started up. In other words, rather than waiting until they reached the black sidewalls before running back, they began running back after traveling only a short distance. In this manner, they were able to minimize the effort involved in breaking the photobeam and stopping the belt.
- Under these circumstances, the rats completely avoided entering the black compartment on more than 1,000 consecutive trials, thereby consistently avoiding the aversive CS that was associated with shock. Furthermore, this persistent avoidance response resulted from only a single brief exposure to shock.

Avoidance Conditioning and Phobias

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- The critical aspect here is: The avoidance response occurs early in the sequence of events leading up to the phobic stimulus in rats.
- Exposure to the aversive stimulus is so minimal that the avoidance response is extremely resistant to extinction. It is not surprising that phobic behaviors are often extremely persistent.

Escape, Avoidance and **Punishment**

Chapter 9 (continued)

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Types of Punishment

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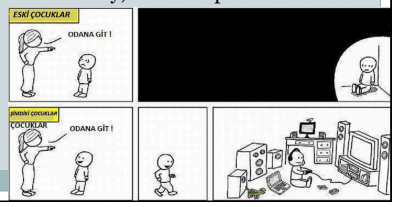
- Various types of punishment, the application of punishment.
- There are two basic types of negative punishment: time-out and response cost.
- Time-out involves the loss of access to positive reinforcers for a brief period of time following the occurrence of a problem behavior. Unfortunately, time-out procedures have little effect on the problem behavior depending on the time-out setting.



Types of Punishment

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- Another problem is that parents often use time-outs that are too long.
- The aim of time-out is to facilitate the development of more appropriate behaviors. Those appropriate behaviors need to be reinforced.
- For time-out procedure, one does not have to clearly identify a specific reinforcer before implementing the procedure.

Types of Punishment

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- Response cost is the removal of a specific reinforcer following the occurrence of a problem behavior.
- E.g. Receiving a fine (which leads to loss of money) for speeding or taking a child's toys away for playing too roughly.
- First. you must clearly identify a reinforcer which probably will have an impact on behavior.
- Moreover, one can easily modify the severity of the punishment to suit the behavior.

Types of Punishment

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- When Bobbi started to scream very loudly, her mother turned off the television program that Bobbi was watching. Bobbi's mother is attempting to apply a (response cost/ time-out) _____ procedure.
- When Bobbi started to scream very loudly, Bobbi's mother made her sit in the corner for a minute. Bobbi's mother is attempting to apply a (response cost/time-out) _____ procedure.

Types of Punishment

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- Other differentiations (1):
  - Intrinsic punishment is punishment that is an inherent aspect of the behavior being punished. In other words, the activity itself is punishing.
  - E.g. Watching an upsetting television show is intrinsically punishing if you stop watching such shows in the future because of their upsetting nature.
  - Extrinsic punishment is punishment that is not an inherent aspect of the behavior being punished. Yet, the activity is followed by a separate event that serves to punish the activity if it subsequently reduces how frequently you do the behavior.
  - E.g. after lighting up a cigarette, being accused.

Types of Punishment

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- Other differentiations (2):
  - Primary (or unconditioned) punisher is an event that is innately punishing. E.g. Electric shock, intense heat, and loud noise.
  - Secondary (or conditioned) punisher is an event that has become punishing because it has in the past been associated with some other punisher.

Tone: Shock → *Fear*
NS US UR
Tone → *Fear*
CS CR

The bad taste of rotting food will likely, for most people, function as a (primary/secondary) _____ punisher, while a restaurant that has served such food will function as a _____ punisher.

Problems with the Use of Punishment

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1. Punishment of an inappropriate behavior does not directly strengthen the occurrence of appropriate behavior. It may even result in a general suppression of behavior.
2. The person delivering the punishment could become an S^D for punishment, with the result that the unwanted behavior is suppressed only when that person is present.
3. Punishment might simply teach the individual to avoid the person who delivered the punishment.
4. Punishment is likely to elicit a strong emotional response.
5. Punishment can sometimes elicit an aggressive reaction.

Problems with the Use of Punishment

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6. The use of punishment, through the process of modeling, could teach the person that punishment is an acceptable means of controlling behavior.
   - e.g. children who are abused will sometimes (but not always) begin to abuse others.
7. Because punishment often has an immediate effect in stopping an unwanted behavior, the use of punishment is often strongly reinforced.

Effective Use of Punishment

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- There are some criteria to meet for an effective punishment.

1. As much as possible, punishment should be immediate rather than delayed.
2. Punishment should consistently follow each occurrence of the unwanted behavior.
3. Punishment should be intense enough to suppress the target behavior.
4. Occurence of punishment shouldn't be signalled by any other stimuli in the environment.

Brown & Martin

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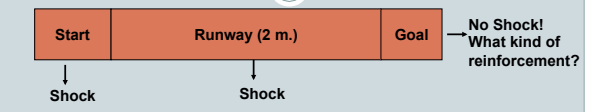
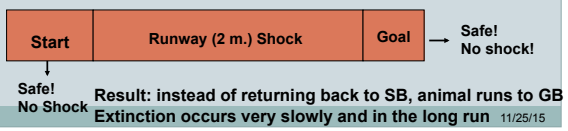


Result: Rat learns to run faster and faster gradually and reaches the goal box.

Question: How can we extinguish this behavior?



Result: instead of returning back to SB, animal runs to GB
Extinction occurs very slowly and in the long run

Brown & Martin

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Conditioned by punishment.
Organism continues running **in spite of shock**!
Although rat receives shock, the resistance to extinguish is high so it takes so much time to extinguish the behavior. This is the underlying mechanism of masochism.
Getting conditioned through punishment→basic of masochism

One of the reasons: 'species-specific defense reaction'
'running when encountered a dangerous situation' is a species-specific response.
It is impossible to teach just the opposite behavior to organism .
(fight-or-flight)
Running away from danger → species-specific behavior.

Tinsley & Renner

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Conducted with university students
Light→ S^D
Stimulus→ electric shock given to the finger of participants.
Behavior→ pressing the key in front of themselves for 60 times.→shock is off. Escape from shock by pressing key.
Result: by presenting the light, participants start to press the key with no taking the shock.

And then experimental setting's been changed: no shock will be given to participants, they do not know it though. So, as soon as they see the light, they start to press the key without waiting for the shock.
However, if they do not press key anymore, they will not be presented the shock. When they press, they are given.

Tinsley & Renner

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If the participant did not press the key, s/he will not take shock. However, s/he escaped from shock by pressing the key before, so whenever s/he sees the light, s/he performed the behavior without being sure whether shock will be presented or not.

Result: Brown & Martin's rat = Human-being
This is also a sort of species-specific response for humans. This mechanism is innate.
Punishment results in primitive behaviors. Using punishment is dangerous. It pushes the organism to perform primitive mechanisms.

Muenzinger

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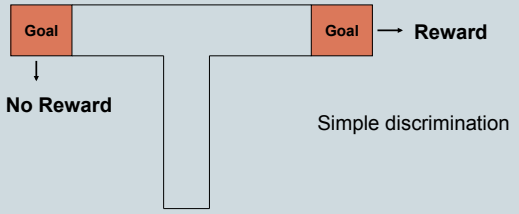
Punisher used as a S^D

1st Group (learn discrimination)



Simple discrimination

11/25/15

Muenzinger

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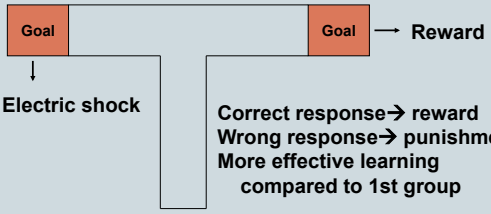
2nd Group (reinforcement+punishment)



Correct response→ reward
Wrong response→ punishment
More effective learning compared to 1st group

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Muenzinger

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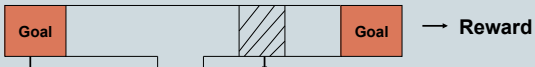
3rd Group



NO Reward
NO Electric shock

Electric shock

Correct response→ punisher+reward
Wrong response→ nothing

S^D→ Electric shock
"I'll turn right, get shocked, and then get the food."

Systematic pairing:
Shock-Food (right box)
NO Shock-NO Food (left box)

Shock becomes a S^D for reward.
Result: more effective learning than 1st groups. Equal to 2nd group.

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Muenzinger

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For example:

Spoiled kid.

Reaction of mother during day: beating..

Reaction of father when get home at evening: getting angry at mother

What is S^D here?

Result: Although the kid is beaten by the mother, spoiled behaviors are reinforced by the father.

Beaten by mother is the S^D for kid.

Mother is beating→ father is rewarding **Systematic pairing!**

Mother is NOT beating→ father is NOT rewarding

In this sense, moderate punishers are not functional! Do not eliminate unwanted behaviors. They only work like discrimination, not like a punishment.

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General Conclusion

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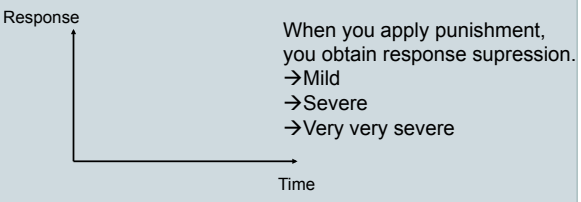
With mild punishers, behavior is recovered earlier.
With severe punishers, behavior is recovered later.
With much much severe punishers, behavior is NOT recovered, do not come back!



When you apply punishment, you obtain response supression.
→Mild
→Severe
→Very very severe

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Theories of Punishment

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- Conditioned Suppression Theory (Skinner, 1938).

Although punishment can quickly suppress a behavior, the behavior often quickly recovers when the punishment is withdrawn.

It is because punishment generates an emotional response that tends to suppress any ongoing appetitive behavior.

Punishment does not weaken a behavior but instead produces an emotional response.

e.g. when the rat is shocked for pressing a lever that produces food, it becomes so upset that it loses interest in the food and therefore does not press the lever to obtain it. If, however, the shock is withdrawn, the rat resumes lever pressing as soon as it calms down.

Theories of Punishment

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- Skinner concluded that punishment is an ineffective means for producing a lasting change in behavior.
- However, he used a relatively weak form of punishment. Subsequent research revealed that more intense forms of punishment, such as strong electric shocks, are capable of suppressing behavior for much longer periods of time.

Theories of Punishment

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- Avoidance Theory of Punishment.

Punishment actually involves a type of avoidance conditioning.

In the shuttle box, behavior of doing "anything other than lever pressing" reinforced by shock avoidance in a punishment-of-lever-pressing situation.

Lever press → Shock
R S^P

one is actually carrying out the following avoidance conditioning procedure:

Any behavior other than lever pressing → No shock
R S^R

Punishment does not directly weaken a behavior. It simply replaces the punished behavior with an avoidance response of some sort.

Theories of Punishment

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- The Premack Approach to Punishment.

A low probability behavior can be used to punish high probability behavior.

- A rat that is both hungry and also tired of exercising.

The rat is much more likely to eat food (an HPB) than to run in a wheel (an LPB). This means that the behavior of eating can be used as a reinforcer for the behavior of running in a wheel.

Running in a wheel (LPB) → Eating food (HPB)
R S^R

The experimenter can also use running in a wheel to punish the response of eating.

Eating food (HPB) → Running in a wheel (LPB)
R S^P

If Sally rarely washes dishes and often bites her nails, then the behavior of washing dishes can be used to punish the occurrence of chewing nails.

Effects of Noncontingent Punishment

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- In a punishment procedure, if the organism does not make the response, then it will not be punished. There is a contingency here!
- What happens if contingency were absent in another setting? What if the aversive event was essentially uncontrollable (and even unpredictable), such that whatever you do, you are unable to influence your exposure to that event?

Learned Helplessness

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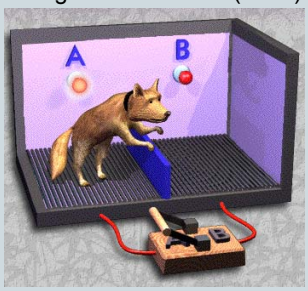
Seligman and Maier (1967).



Learned Helplessness

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- 2 different settings, phases: in the first setting, there is a panel who prevents escaping. In the second one, there is a barrier!
- 3 groups of dogs:
  - 1st group. Naive group (no shock control group. Added to experiment in the 2nd setting)
  - 2nd group. Escape group. escapable-shock condition. (they are acquired the escape and avoidance learning in 1st and 2nd setting)
  - 3rd group. Yoked group. inescapable-shock condition (yoked to 2nd group, paired up with them. so they have to do what 2nd group do!)

Learned Helplessness

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- They are neighbours but can not see each other!
- $S^{D:}$ light
  Light→Shock
- Pressing the panel→offset of shock (3rd group can not learn this association) When shock was turned off for the dog itself in 2nd condition, it also turned off the shock for its partner dog in the other condition (3rd condition).
- The dog in the escapable-shock condition had control over the shocks while the dog in the inescapable-shock did not.
- In the 2nd experimental setting, there was a barrier. learn to avoid shock by jumping over a barrier, however 3rd group can not learn avoidance learning.

They made no effort to escape the shock. Due to the uncontrollable punishment for 3rd group. lack of contingency

Learned Helplessness

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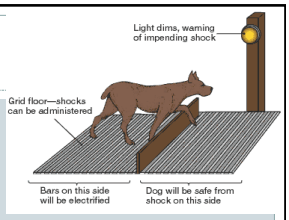

Latency for jumping behavior

Time

→dogs which were yoked (to the 2nd group)
→2nd group which learned how to avoid. There was a barrier which prevents running away from the shock. But, just by chance, touching to a panel on the barrier with their nose, the block was gone.
→Naive group (in their learning history, there is NO any uncontrollable, unpredictable learning)

Learned Helplessness

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- It's a headache for behaviorists. Even the 3rd group get the reinforcer, why doesn't avoidance learning occur?
- Answer: no connection is formed. Because of what behavior, the electric shock is gone? They can not learn this. Maybe at that time point, the dog was standing and looking at the ceiling or doing anything else when the elecktric shock was gone. Absence of shock is related to what?
- Loss of control over one's environment, even when temporary, is very stressful and anxiety producing. Aversive events that occur outside of one's control are much more stressful and arousing.
- Such uncontrollable and unpredictable events may be the most common source of neurotic behaviors.

Learned Helplessness

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- Is this valid only for punishment? Nope. For reward, it's called 'learned indolence' (insensitivity)

Punishment: a child who is beaten constantly.

Reinforcement: a mom who always brings chocolate for her child every night.

Learned Helplessness

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- The original experiments on learned helplessness that dogs that had first been exposed to inescapable shock had (no difficulty/difficulty) _____learning an escape response when later exposed to (escapable/inescapable) _____ shock.
- It seemed as though these dogs had learned that there (is/is not) _____a contingency between their behavior and the offset of shock.
- This effect can be overcome by (forcing/enticing) _____ the dogs to make an escape response. As well, dogs that have had previous exposure to escapable shock are (more/less) _____ susceptible to becoming helpless when later exposed to inescapable shock.
- Learned helplessness may account for various difficulties in humans, including the clinical disorder known as d_____.