

Experimental Analysis of Behavior

Chapter 8

Initial Considerations

- **John Watson – Father of American behaviorism**
 - Psychology should emphasize the study of overt rather than covert behaviors
- **E.L. Thorndike – Law of Effect**
 - When a behavior or performance is associated with satisfaction, it tends to happen again...

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<p>Two Forms of Learning</p> <ul style="list-style-type: none">• Classical Conditioning• Instrumental (Operant) Conditioning <p>Classical Conditioning</p> <ul style="list-style-type: none">• Pavlov's salivating dog• Unconditioned Stimulus (UCS or US)• Conditioned Stimulus (CS)• Conditioned Response (CR)• Experimental Extinction• Unconditioned Reflex• Conditioned Reflex• Stimulus Generalization <p>Instrumental (Operant) Conditioning</p> <ul style="list-style-type: none">• Operant (R)• Discriminative Stimulus (S^D)• Contingency• Reinforcement (S^R) <p>Schedules of Reinforcement</p> <ul style="list-style-type: none">• Fixed Interval• Variable Interval• Fixed Ratio• Variable Ratio <p>Types of Reinforcement</p> <ul style="list-style-type: none">• Positive Reinforcement• Negative Reinforcement• Positive Punishment• Negative Punishment <p>Classical Conditioning & Phobias</p>	<p>Instrumental Conditioning & Phobias</p> <p>Preparedness</p> <p>Depression</p> <ul style="list-style-type: none">• Learned Helplessness• Lewinsohn's Model <p>Conditioning and Health</p> <p>Systematic Desensitization</p> <p>Punishment</p>
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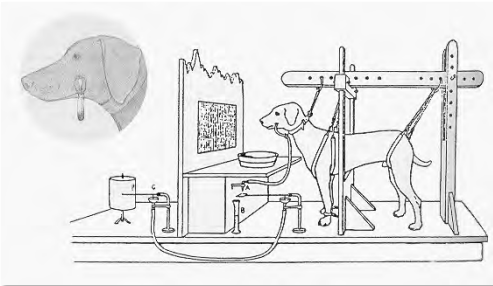
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Classical (Pavlovian) Conditioning



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Salivary Conditioning Apparatus



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Classical Conditioning

- Pavlov's salivating dog
- A form of learning in which a hitherto neutral stimulus, the conditioned stimulus (CS) is paired with an unconditional stimulus (UCS) regardless of what an animal does in turn, this pairing leads to a conditioned response (CR)

Unconditioned Stimulus (UCS or US)

- the stimulus which elicits the unconditioned response and the presentation of which acts as reinforcement (**Food** elicits Salivation)

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Classical Conditioning

Conditioned Stimulus (CS)

- the stimulus which comes to elicit a new response by virtue of pairings with the UCS (**Bell** elicits Salivation)

Conditioned Response (CR)

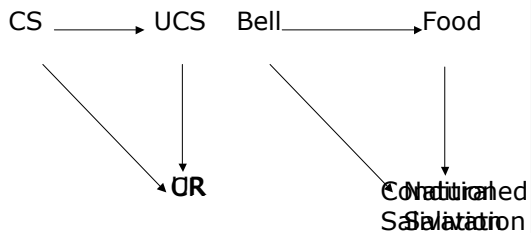
- a response elicited by some initially neutral stimulus, the (CS) and the (UCS). (Bell elicits **Salivation**)

Experimental Extinction

- the weakening of the tendency of the CS to elicit the CR by unreinforced presentations of the CS. The CS is presented without UCS. After some trials, the CS no longer elicits the CR

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Classical Conditioning



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Classical Conditioning

Unconditioned Reflex

- an inborn, "hardwired" responses (e.g., the knee-jerk response)

Conditioned Reflex

- the reflex acquired through pairings of the CS and UCS; the "learning" that takes place in classical conditioning

Stimulus Generalization

- the tendency to respond to stimuli other than the original CS. The greater the similarity between the CS and the new stimulus, the greater this tendency will be.

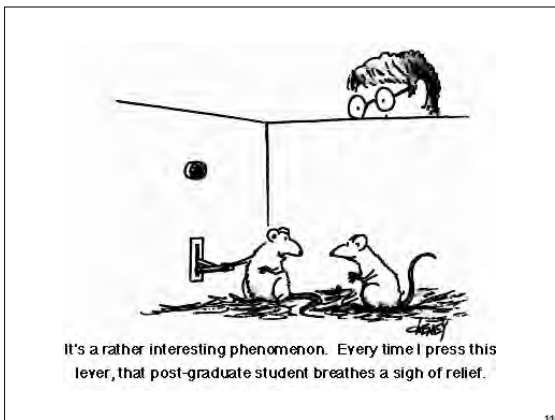
- Frequency of light, buzzer to bell, etc..

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Instrumental (Operant) Conditioning



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Instrumental Conditioning

Instrumental (Operant) Conditioning

- a form of learning in which a reinforcer (e.g., food) is given only if the animal performs the instrumental response (e.g., pressing a lever).
 - In effect, what has to be learned is the relationship between the response and the outcome.
 - Operant (R) according to Skinner, in instrumental response; a behavior that is emitted to receive the reinforcer

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Instrumental Conditioning

Discriminative Stimulus (S^D)

- a stimulus (e.g., a tone, light, a behavior) that sets the occasion for the operant response to be performed in order to receive the reinforcer.
 - The S^D signals a particular relationship between the instrumental response and the reinforcer
 - A discriminative stimulus can also be a signal that the instrumental response will not currently deliver the reinforcer (S^Δ)

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Instrumental Conditioning

Contingent

- a relation between two events in which one is dependent upon another (the animal *must* press the lever for food to be delivered)

Reinforcement (S^R)

- the procedure by which the instrumental response is made contingent upon some sought-after outcome

Three-Term Contingency

- the relationship between the S^D , the R and the S^R ; the S^R can then serve as the S^D for a different three-term contingency

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Instrumental Conditioning

Shaping

- is the process in which an organism's behavior is deliberately and gradually molded into the desired form
 - Rat moves randomly around a box
 - When it approaches a lever, it is rewarded
 - Later, it must approach more closely
 - Touch the lever
 - Pull lever full distance

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Instrumental Conditioning

S^D → R → S^R
Light Lever Press Food

S^A → R → S^R
Dark Lever Press Food

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Schedules of Reinforcement

- Initial research conducted by Skinner in order to maximize learning in his “subjects”
 - Continuous reinforcement refers to reinforcement that occurs whenever the desired behavior occurs
 - Rapid initial strengthening of response, fades quickly w/out reinforcement

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Schedules of Reinforcement

- Interval reinforcement refers to reinforcement in which a certain time period must elapse between reinforcements, regardless of responding
 - Fixed (every 5 minutes)
 - Variable (once in a 5 minute time frame)
- Ratio reinforcement is determined by the number of correct responses an individual provides
 - Fixed (reinforcement for every 5 correct responses)
 - Variable (number of correct responses changes)
 - Most effective in maintaining a behavior, very unlikely to disappear → Gambling

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Instrumental Conditioning

Types of Reinforcement

- Positive Reinforcement any stimulus the presentation of which strengthens the behavior upon which it is made contingent. (e.g., lever pressing for food)
- Negative Reinforcement any (aversive) stimulus the withdrawal of which strengthens the behavior. (e.g., lever pressing to terminate or escape shock)

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Instrumental Conditioning

Types of Punishment

- Positive Punishment any (aversive) stimulus the presentation of which weakens a behavior. (e.g., spanking a child for misbehaving)
- Negative Punishment any stimulus the withdrawal of which weakens a behavior. (e.g., taking candy from a child for misbehaving)
- We'll look at punishment more later...

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Behavioral Model of Phobias

- Some neutral stimulus takes on the properties of the light or flight response
- Individuals conditioned to CS learn certain behaviors or responses that lessen the amount of fear experienced or avoid the situation entirely
- Escape or avoidance responses are instrumentally conditioned by negative reinforcement
- Phobias become troublesome when the escape behaviors become elaborate and begin to interfere with an individual's day-to-day functioning
 - Bridge-phobic from Marin County, CA accepts a job in SF and must cross the Golden Gate Bridge each day

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Classical Conditioning & Phobias

- During some fearful situation, a previous novel stimulus (or situation) will take on properties like a CS
- Subsequent exposure to the CS or similar stimuli (stimulus generalization) will elicit the fearful sensations, yet there is no real danger present; the fear is only perceived
 - Fear of snakes, blood, etc.
- In animal research, this phobic phenomenon is referred to as conditioned fear or conditioned emotional response (CER)

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Classical Conditioning & Phobias

- In some instances, the fearful stimulus is very diffuse (extreme stimulus generalization); such an individual may likely have the disorder known as Generalized Anxiety Disorder (DSM-IV)
- In other instances, the CS is some bodily sensation that has become paired with the fearful emotion; some researchers believe that Panic Disorder results from what they term interoceptive classical conditioning
 - Interoceptive - awareness of internal states

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Instrumental Conditioning & Phobias

- Sometimes the escape/avoidance behaviors become elaborate, repetitive and debilitating
 - Washing one's hands for fear of being contaminated
 - Checking the door lock
 - Checking the pilot light in the oven, etc.
- Extreme version of escape/avoidance learning may be at the basis of Obsessive Compulsive Disorder

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Preparedness

- Clinical observations that phobics fear stimuli or situations such as animals, heights, water
- Animal research showing that some CS were more easily conditioned in certain species
 - Olfactory or gustatory stimuli in rats
 - Visual stimuli in pigeons
- Seligman (1970) all organisms are biologically predisposed to form classically conditioned associations to certain stimuli easily and to other stimuli less easily

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Preparedness

- At one time, it was adaptive to be fearful of snakes, heights, water, etc. . . it might have kept us alive
 - Also, why it's relatively rare to see fears of cats, squirrels, and deer
- The predisposition of being fearful of those situations evolved with us and still appears at times

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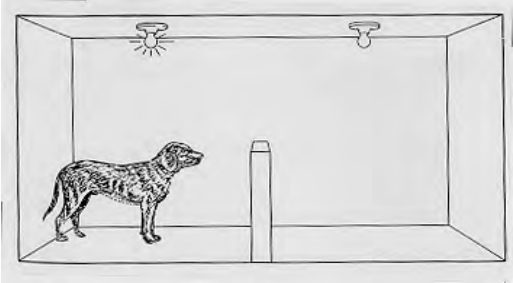
Depression

Learned Helplessness

- Dog in a shuttle-box
- "A dog that had been given inescapable shock showed a strikingly different pattern. The dog's first reactions to shock in the shuttle box were much the same as those of a naive dog: it ran around frantically for about thirty seconds. But then, it stopped moving; to our surprise, it lay down and quietly whined . . . on the next trial, the dog did it again . . . on all succeeding trials, the dog failed to escape. This is the paradigmatic learned-helplessness effect." (Seligman, 1975, p.22)

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Dog in Shuttle Box



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Seligman's Explanation

- Three components to learned helplessness:
 1. **Motivational**
 - Subject lost motivation to try and control the events in their environment
 2. **Cognitive**
 - Lowered impairment to learn from experience
 - If behavior has previously had not impact on environment, learning is slower
 3. **Emotional**
 - Response in animals include ulcers in rats, increases in blood pressure in humans, and illness in monkeys

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Depression

Learned Helplessness

- Extended to compelling approach to human depression
- Helpless organism has lost the ability to see the contingencies in one's life
 - Expectancy to fail and an expectancy that one's responses will have no effect on the outcomes
- Undergone revisions that will be discussed in more detail later in the course (Chapter 16)

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Depression

Lewinsohn's Model

- Similar to learned helplessness
- Considers that depressed people suffer from deficits in skills that could produce positive reinforcement or skills that could minimize unpleasant outcomes
- As a person becomes more depressed, they become less active, emit fewer behaviors, thus limiting further, the opportunity to receive reinforcement

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Conditioning and Health Immune System

- Chemotherapy is often a treatment prescribed for cancer patients; it's a very powerful drug with many unpleasant side effects including
 - Nausea & vomiting
 - Complete immunosuppression
 - Lymphocytes, T-cells, NK-cells wiped out

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Conditioning and Health Immune System

- When chemotherapy produces these side-effects, often classical conditioning occurs
- CS can range from the foods eaten that morning to the sight of the hospital waiting room to even the sight of the doctor or nurse who performs the procedure
- Called anticipatory nausea/vomiting
- Patients have become nauseous at the sight of the doctor/nurse as much as ten years after treatment
 - Evolutionary benefits to this form of conditioning

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Chemotherapy Revisited

- Psychologists have tried to capitalize on classical conditioning to avoid the anticipatory vomiting and unwanted conditioned immunosuppression
- Chemotherapy patients are presented with a glass of green Kool-Aid prior to a treatment
- Distinctive taste, color and smell, becomes the CS rather than a more general, unwanted CS
- This CS is a salient stimulus that the patient will hopefully encounter infrequently in a daily routine

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Exposure Therapy



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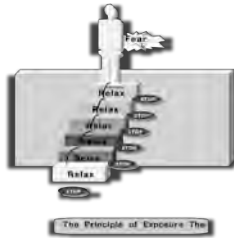
Exposure Therapy

- Systematic Desensitization
- Effective treatment for phobia developed by Wolpe
- Attempts to extinguish the classically conditioned fearful stimuli
- First step, the client and therapist discuss the phobia and create a hierarchy of fearful stimuli that ranges from slightly fearful to most fearful

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Exposure Therapy

- Learn to master situations that cause mild, then gradually greater, anxiety.
- Teach & test a relaxation strategy before to reduce distress/panic during exposure
- Aim is to achieve relative relaxation before next step



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Skinner (1953) on Punishment:

"The commonest technique of control in modern life is punishment. The pattern is familiar: if a man does not behave as you wish, knock him down; if a child misbehaves, spank him; if the people of a country misbehave, bomb them. Legal and police systems are based upon such punishments as fines, flogging, incarceration, and hard labor. Religious control is exerted through penances, threats of excommunication, and consignment to hell-fire. Education has not wholly abandoned the birch rod. In everyday personal contact we control through censure, snubbing, disapproval or banishment."

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Three Implications of Punishment

- Punishment does not refer to subjective feelings of unpleasantness
- Effects of the punishment are specific
 - An event that reduces the likelihood of several unrelated behaviors should not be called a punisher
- Future likelihood of the reduction of a behavior must be designated before terming a stimulus a punisher

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Types of Punishment

- **Physical Punishment**
 - Includes all punishers that involve application of intense physical stimuli
 - Corporal punishment (e.g., spanking), loud noises, electric shock, unpleasant tasting substances
- **Reprimands**
 - Negative verbal statements

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Types of Punishment

- **Timeout**
 - Subject transferred to a less reinforcing situation following the undesired response
 - Effectiveness reliant on the disparity between the pre- and post- environments
- **Overcorrection**
 - Make the individual perform an undesired task
 - Problem: Subject will not make his bed
 - Overcorrection: Make all the beds in the house

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Types of Punishment

- **Response Cost**
 - Punished behavior leads to loss of a specific amount of a reinforcer
 - Tokens, points, money
 - Library fees, traffic fines, late fees at Blockbuster, late credit interest charges

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Advantages of Punishment

- **Rapid Results**
 - When faced with suppressing dangerous, self-destructive behaviors
→ self-mutilation/suicide
- **Distinct from Reinforcement History**
 - No need to identify reinforcers
 - Nature of reinforcement can be intrinsic to the behavior
 - Masturbation

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Advantages of Punishment

- **Complete Suppression**
 - By punishing a behavior
 - Alternate responses occur
 - Reinforcing these alternate responses, the punished behavior remains suppressed
- **Increase in Desired Behaviors**
 - Alternate responses occurring often are desired target behaviors
 - Attentiveness, appropriate physical contact, smiling

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Disadvantages of Punishment

- **Emotional Effects**
 - While occurring, not necessarily permanent
- **Elicited Aggression**
 - Shock induced fighting → trigger a survival instinct
 - Controllable through contingent punishment of the fighting behavior
- **Operant Aggression**
 - Aggressiveness maintained by removal from punishing situation
 - Controlled through punishing the the attack response and reinforcing alternate behaviors

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Disadvantages of Punishment

- **Imitation of Punishing Agent**
 - Subject models the behavior of agent
 - Critics of punishment argue that punishment here could be the basis for child abuse
- **Failure to Generalize**
 - Punisher salient to specific situation
 - Alternative behaviors important here
 - If post-punishment environment becomes highly reinforcing, the subject will not try to escape the punishing situation for less desired behaviors that are less punishing

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