Learning and conditioning

John Watson’s extreme environmentalism (c. 1913)

“Give me a dozen healthy infants, well-formed, and my own special world to bring them up in, and I’ll guarantee to take any one at random and train him to be any type of specialist I might select—doctor, lawyer, artist, merchant-chief, and yes, beggar-man or thief, regardless of his talents, inclinations, tendencies, abilities, vocations, or race of his ancestors.”

Definitions

Learning
A relatively permanent change in behavior due to experience

Behaviorism
An approach to psychology that emphasizes the study of observable behavior and the role of the environment as a determinant of behavior

Conditioning
The association between environmental stimuli and the organism’s responses

Classical conditioning

The process by which a previously neutral stimulus acquires the capacity to elicit a response through association with a stimulus that already elicits a similar response

New reflexes from old

Unconditioned stimulus (US)
Elicits a response in the absence of learning

Unconditioned response (UR)
The reflexive response to a stimulus in the absence of learning

A neutral stimulus is then regularly paired with an unconditioned stimulus.
New reflexes from old

Conditioned stimulus (CS)
An initially neutral stimulus that comes to elicit a conditioned response after being paired with an unconditioned stimulus

Conditioned response (CR)
A response that is elicited by the conditioned stimulus
Occurs after the CS has been associated with the US
Is usually similar to the US

Your turn

You are visiting a house to see if you want to buy it. When you step through the front door, you are met with the smell of oatmeal chocolate chip cookies—just like your grandmother used to make. Suddenly you find yourself feeling that this house is a warm and friendly place. In this scenario, what is the-CS?

1. The smell of oatmeal chocolate chip cookies
2. The new house
3. Your grandma
4. The feeling of warmth and friendliness

Principles of classical conditioning

Extinction
Higher-order conditioning
Stimulus generalization
Stimulus discrimination

Extinction
The weakening and eventual disappearance of a learned response
In classical conditioning, it occurs when the conditioned stimulus is no longer paired with the unconditioned stimulus.

Higher-order conditioning
A neutral stimulus can become a conditioned stimulus by being paired with an existing conditioned stimulus.

Can opener + food = dog salivates
Can opener = dog salivates
Light + can opener = dog salivates
Light = dog salivates
**Stimulus generalization**

In classical conditioning, occurs when a new stimulus that resembles the conditioned stimulus elicits the conditioned response.

Bell = salivation  
Horn = salivation

**Stimulus discrimination**

The tendency to respond differently to two or more similar stimuli.

In classical conditioning, occurs when a stimulus similar to the conditioned stimulus fails to evoke a conditioned response.

Bell = salivation  
Guitar does not

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**What is learned in classical conditioning?**

For classical conditioning to be most effective, the stimulus to be conditioned should precede the unconditioned stimulus.

We learn that the first stimulus predicts the second.

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**Learning to like**

Where do sentimental feelings come from?

Objects have been associated in the past with positive feelings.

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**Learning to fear**

Research suggests we can learn fear through association.

Watson and Raynor conditioned “Little Albert” to be afraid of white rats by pairing the neutral stimulus (rats) with an unconditioned stimulus (loud noise). Within days, Albert was afraid of rats, and his fear generalized to other furry objects.

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**Unlearning fear**

**Counterconditioning**

The process of pairing a conditioned stimulus with a stimulus that elicits an incompatible response.

Another child’s fear of rabbits was removed by pairing rabbits with a stimulus that elicited happiness.
Accounting for taste

Slugs learned an aversion to the smell of carrots, which they normally like, after the smell of carrots was paired with a bitter-tasting chemical.

Psychologist Martin Seligman developed an aversion to béarnaise sauce after he came down with the flu following a meal of filet mignon with béarnaise sauce.

Reacting to medical treatments

Some cancer patients react to waiting rooms with nausea, because the waiting room has been associated with chemotherapy, which chemically causes nausea.

Placebos—inert substances presented as medications—sometimes give patients real relief.

Operant conditioning

The process by which a response becomes more or less likely to occur depending on its consequences.

Person’s behavior “operates on” the environment (creates effects) which increase or decrease it. (ex: child’s tantrum)

Consequences of behavior

A neutral consequence neither increases nor decreases the probability that the response will recur.

Reinforcement: strengthens the response or makes it more likely to recur

Punishment: weakens a response or makes it less likely to recur

Reinforcement

A stimulus strengthens or increases the probability of the response that it follows.

Primary reinforcers are inherently reinforcing and typically satisfy a physiological need.

Secondary reinforcers are stimuli that have acquired reinforcing properties through associations with other reinforcers.

Types of reinforcement

Positive reinforcement

When a pleasant consequence follows a response, making the response more likely to recur.

Negative reinforcement

When an unpleasant consequence is removed following a response, making the response more likely to recur.
Punishment

The process by which a stimulus weakens or reduces the probability of the response that it follows.

*Primary punishers* are inherently punishing.

*Secondary reinforcers* are stimuli that have acquired punishing properties through associations with other punishers.

Types of punishment

**Positive punishment**
When an unpleasant consequence follows a response, making the response less likely to recur.

**Negative punishment**
When a pleasant consequence is removed following a response, making the response less likely to recur.

Your turn

Your first time camping in the woods, you are bitten over 45 times by mosquitoes, resulting in lots of swollen, itchy bumps on your arms, legs, and back. You never want to go camping again. What kind of consequence did you confront on your first camping experience?

1. Positive reinforcement
2. Negative reinforcement
3. Positive punishment
4. Negative punishment

BF Skinner: The “Skinner box”, “radical behaviorism”

Initially, the rat pressed the bar for food by accident (randomly). Soon, however, it was pressing the bar as fast as it could!

Principles of operant conditioning

**Extinction**
In operant conditioning, occurs when a response is no longer followed by a reinforcer

**Stimulus generalization**
Stimuli that are similar to the original stimulus are more likely to trigger a response.

**Stimulus discrimination**
The tendency of responses to occur in the presence of one stimulus but not another. Could train this to occur for example teach a pigeon to peck for food at only the circle by only rewarding the circle.

**Discriminative Stimulus**
An animal or human learns that a certain stimulus will only bring reinforcer when ANOTHER stimulus is present. For example. Light on, begging works, light off, it doesn’t.
Schedules of reinforcement

Continuous
Every occurrence of a response is reinforced. At first, learning occurs most frequently if this is the case.

Intermittent
HOWEVER, once a response is learned, it is more resistant to extinction if it is rewarded only occasionally or intermittently. Only some occurrences of a response are reinforced.

Fixed-ratio, fixed-interval, variable-ratio, variable-interval
Best choice for continuation of response

Helps explain some ritual and superstitious behavior

Shaping

To teach complex behaviors (w/ a low chance of occurring by chance), you may need to reinforce successive approximations of a desired response

For example, training animals to do tricks (skinner trained pigeons to bowl, he was a funny guy), getting children to make their beds (close enough THIS time! :-)

Instinctive drift: Of course, you ignore biology entirely. Organisms may revert to instinctive behavior... pigs rooting behavior....

Behavior modification

The application of operant conditioning techniques
To teach new responses
To reduce or eliminate maladaptive or problematic behavior
Real-world settings

Also called applied behavior analysis
Teach mentally retarded adults to dress themselves and work, help autistic kids improve social and language skills
To reduce or eliminate maladaptive or problematic behavior
Real-world settings.

BUT, when non-psychologist try to apply conditioning principle that often are less than successful. Why? They may underestimate some of the principles and delay a reward too long or accidentally reinforce unwanted behavior every so often (intermittently)....both reinforcement and punishment are VERY easy to apply incorrectly....

When punishment works

When it immediately follows the behavior
When it is mild rather than harsh
When it is consistent (more important than severity). Consider what happens when you sometimes “get away with it”. Very resistant to change.

When punishment fails

1. When it is administered inappropriately or mindlessly
Physical punishment in childhood is a risk factor for depression, low self-esteem and many other problems.

3. Effectiveness often temporary anyway... depends a lot on presence of punisher. In childhood what we all too often learned... was not to get caught!

4. Punishment works best if it immediately follows behavior
This is often hard to accomplish. Your dog ate your shoes when you were at work... does it do any good to punish?

5. Punishment conveys little information
Spanking a toddler for pooping in her pant doesn’t teach her to use the potty.

6. When a consequence thought to be a punishment proves to be reinforcing
Yelling at a child for whining or biting may be just what she was after anyway... attention from you.
**External and internal reinforcers**

**External (extrinsic) reinforcers**
Reinforcers not inherently related to the behavior being reinforced.
Money, praise, gold stars, applause...

**Internal (intrinsic) reinforcers**
Reinforcers inherently related to the behavior being reinforced

External reinforcers can Kill intrinsic motivation. Preschool students rewarded for felt-tip pens and began to use them less...

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**Rewards can backfire**

Preschoolers played with felt-tipped markers. Divided into three groups:
1. Given markers again and asked to draw
2. Promised a reward for playing with markers
3. Played markers, and then rewarded

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**Latent learning—Tolman’s 1938 heresay, said his rats “seemed to be deciding at maze junctions”**.

Learning that isn’t immediately expressed in performance.

Rats received one maze trial per day.

Rats reinforced on the 11th day did just as well as those always reinforced.

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**Social learning theory**

Social cognitive theories emphasize how behavior is learned and maintained.
Mostly through observation and imitation of others
Consequences DO play a role
BUT humans also have many “Cognitive Processes” such as Plans, Expectations, and Beliefs

SO Observational learning involves learning new responses by observing the behavior of another rather than through direct experience.
Behaviorists had called it vicarious conditioning and tried to explain it in SR terms. But social-cognitive theorists said you really need to consider cognition

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**Bandura’s “Bobo Doll” study**

Nursery school children watched a film of Aggressive modeling.
Children who watched the video were significantly more violent afterward than children in a control group.

They also picked up the novel aggressive language

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**Media violence**

Since Bandura, hundreds of other experimental studies have corroborated the findings.
Meta-analysis shows that greater exposure to violence is related to more aggressive behavior when controlled for social class, intelligence, and other factors.

Still a few other researchers are less concerned because they believe that media violence does not cause MOST adult viewers to become aggressive. Personality variables intervene in how we identify what we see...Aggressive individuals may be drawn to violent programming.

So it does seem to affect a few. BUT, what should we DO? Censorship, which some people think is the answer, has problems. What do we ban? Hamlet? Cartoons? The Matrix Reloaded?