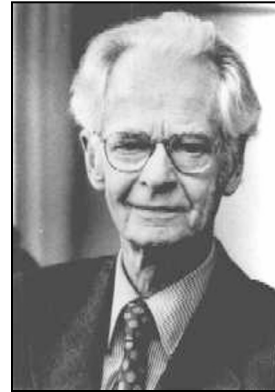




Learning II: Operant Conditioning

B. F. Skinner
& Applied Behavior Analysis



1



What would be the best way to...?

- Get your 7-year-old child to study harder in school?
- Get your 14-year-old child to decrease how much time he or she spends on the family phone?
- Increase how many homes your sales team sell in your real estate firm?
- Teach your pet dog to “heel”?

2



B(urrhus) F(rederick) Skinner

- 1904-1990 b. Susquehanna, PA
- College @ Hamilton as English major
- Ph.D. in Psychology from Harvard
- Invented “Skinner box” as grad student
- 1938 *Behavior of Organisms* (= animals)
 - ✓ Operant (rather than reflex or Pavlovian) conditioning: animals display operant behaviors which operate (do something) upon the environment & receive rewards (or punishments)
 - ✓ Such behaviors can be shaped by those rewards (or punishments)
 - ✓ Believed that most behavior arises as the result of the world’s reactions

Skinner as Young Teacher



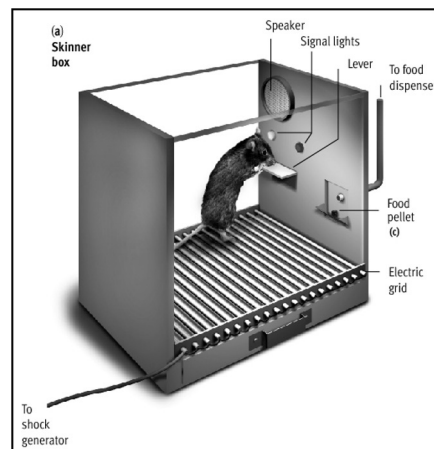
<http://www.wabash.edu/depart/psych/Courses/psych97A/STUDENT%20PROJECTS/Skinner/hartille/skinner.gif>

3



“Skinner Box”

- Lever or some other target upon which the animal will operate (do something)
- Signal such as a light
- Source of reward such as a food pellet tray or a punishment such as an electrical shock grid
- Mechanism to record animal’s behavior (frequency counter)
- First used with rats, then with pigeons



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New Language I: Contingencies

- Reinforcement = any consequence which increases the likelihood that the behavior will occur again
 - ✓ Positive Reinforcement: a pleasant reward which leads to an increase in a behavior
 - Having a good time on a Thursday night
 - ✓ Negative Reinforcement: removal of something aversive or unpleasant which leads to increase in a behavior
 - Taking an aspirin or Advil to relieve a headache
- Punishment = Any consequence which decreases the likelihood that the behavior will occur again

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New Language II: Behavioral Control

- Animals acquire new behaviors
- Shaping: reinforcement of closer and closer approximations of a desired response
 - How do you train your dog to do a trick?
 - How do you teach animals in movies to do a remarkable set of behaviors?
 - How do you help children learn a new skill? Often by praising their first imperfect efforts and continuing to praise them as they do better and better.

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New Language III: Behavioral Control

- Behaviors are extinguished by a lack of reinforcement when they occur
- Resistance to extinction: the tendency of an animal to continue behaving in the absence of reinforcement
 - We'll see that different frequencies of reinforcement will promote resistance

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New Language IV: Behavioral Control

- Discriminative stimuli are cues (signals) that influence behavior; they suggest the consequence of behavior
 - Do you ask your parents for something you want when they are in a good or a bad mood?
- Generalized responses are behaviors which are like behaviors which have been rewarded or punished in the past

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New Language V: Behavioral Control

Types of Reinforcers

- Primary reinforcers = events that are inherently reinforcing because they satisfy biological needs
 - Food, sex, warmth, protection, etc.
- Secondary reinforcers = events that acquire reinforcing qualities by being associated with primary reinforcers
 - Money, grades, flattery, material goods
 - By itself money means little, but it allows us to obtain primary reinforcers

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Schedules of Reinforcement I

- 1957 *Schedules of Reinforcement*

A schedule of reinforcements is a **specific pattern of presenting reinforcers over time**.

Continuous reinforcement = giving a reinforcer every time a desired behavior occurs (or)

Intermittent reinforcement = reinforcing a behavior only some of the time it occurs

Which type of reinforcement is better, that is, leads to long-lasting effects?

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Schedules of Reinforcement II

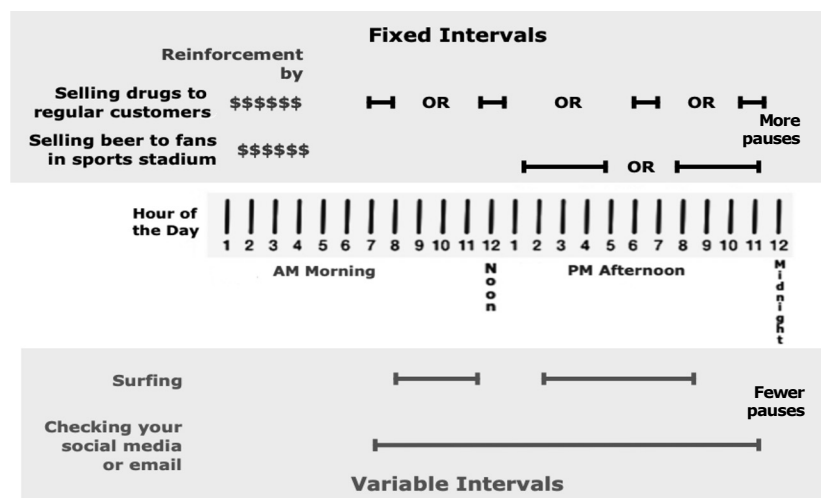
Types of Schedules

- By intervals of time: fixed (FI) or variable (VI)?
- By the number of responses (= ratio): fixed (FR) or variable (VR)?

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Interval Reinforcement Schedule



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Ratio Reinforcement Schedules

Fixed Ratio (FR) = Reinforced for a certain number of behaviors

“Piecemeal” work -> making clothes
Paid \$ per X number of units



Variable Ratio (VR) = Reinforced for an unpredictable number of behaviors

- Slot machines
- Real estate commissions



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Schedules of Reinforcement III

Variable reinforcements are more resistant to extinction and produce steady and continuous response rates

Fixed reinforcements are less resistant to extinction & produce pauses in response rates after reinforcement
(= people “take a breather”)

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Negative Reinforcement

Negative Reinforcement = removal of something aversive or unpleasant which leads to increase in a behavior, e.g.,

- Getting out of bed to turn off a noisy alarm clock
- Leaving the house early to avoid a traffic jam
- Feeding the baby to keep it from crying
- Applying sunscreen before going to the beach to avoid getting a sunburn
- Waiving a car to pass you to stop its honking
- Wearing earplugs in bed at night if your partner snores
- Cutting the number of hours of work at the end of the month if the work team is more productive

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Punishment vs. Negative Reinforcement

✓ Punishment = Any consequence which decreases the likelihood that the behavior will occur again versus Negative Reinforcement = removal of something aversive or unpleasant which leads to increase in a behavior

1. Punishment has the opposite effect of negative reinforcement
2. Punishment ≠ just disciplinary actions
 - Being laughed at by peers for doing or wearing something they don't like is an example of punishment
 - Over the long run, corporal punishment by parents is associated with increased aggressiveness

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Punishment vs. Negative Reinforcement II

An older couple is trying to go to sleep at 11 pm one night. Outside their house, a group of teenagers from the neighborhood are making noise and playing loud music. The couple call the police who come. The police threaten the teenagers with arrest if they don't leave immediately. The teens leave. The next night, the same group of teens are back making noise in the same place.

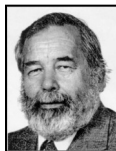
- What does the couple do? Why?
- The couple were negatively reinforced the previous night
- The teens were threatened with punishment

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The “Garcia” Effect & Conditioning

- “Learning predispositions” or “biological constraints” = evolution has shaped an animals’ s associative apparatus, sensory, and motor abilities.
 - ✓ Certain of these can’t be modified (or at least only with great difficulty), e.g. grooming behavior in a cat. Others can be quickly modified.
- ✓ Garcia Effect: aversion to eating a food after only a single incidence of nausea (“one shot learning”). Described by UCLA psychologist **John Garcia** (1914-2012). Taste or smell can be conditioned quickly. Also found that this is not true of visual or auditory cues.
 - ✓ There is an argument whether the Garcia Effect is an example of classical conditioning or operant conditioning since the learning takes place so quickly.



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Clinical Applications

- Imagine mental disorders as defined solely by their behaviors
 - Treatment is called “applied behavior analysis”
- Depression = inactivity, negative speech
- Autism = head banging, self-mutilation
- Schizophrenia = paranoid speech
- Phobias = withdrawal or rituals
- In school, the use of “gold stars” or other rewards for good behavior
 - Look to change the environment, i.e., the rewards given by the world around us
 - Positive reinforcement is always better than punishment
 - Treatment then becomes (1) the stopping of undesirable behaviors, (2) the increase in desirable behaviors, and (3) the shaping of imperfect behaviors

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Classical vs. Operant Conditioning

Classical

- Something in the environment becomes a signal of what may happen TO YOU or AROUND YOU.

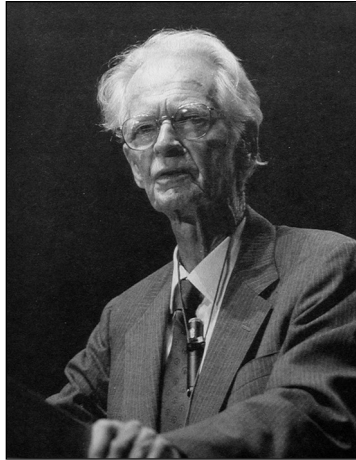
Operant

- Something YOU do is either reinforced (rewarded) or punished

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Died August 18, 1990



Mt. Auburn Cemetery, Cambridge, MA

Addressing APA Convention
Boston, August 10, 1990
upon receipt of the
APA Outstanding Lifetime
Contribution to Psychology Award