

## Learning

### Operant Conditioning



"Once it became clear to me that, by responding correctly to certain stimuli, I could get all the bonuses I wanted, getting this job was a pleasure."

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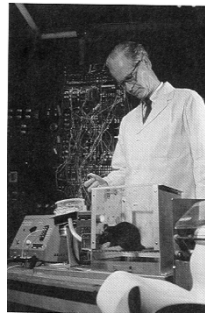
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## B.F. Skinner (1904 - 1990)

- Father of operant conditioning
- Favored a strict behaviorist approach to studying psychology
- Emphasized how environmental factors influence behavior



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## Implications of Behaviorism

- "Freedom and Dignity" (1971)
  - Spelled out the implications of behaviorism
- Behavior is fully governed by environmental stimuli
- Free will is an illusion

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### “Laws” of Behavior

- Principles of reinforcement
- Fundamental principle of operant conditioning
  - Organisms tend to repeat those responses that are followed by favorable consequences
- Much of our every day behavior is regulated by reinforcement
  - Immensely powerful principle

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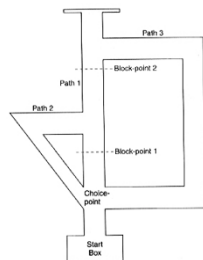
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### The Maze

- Pre-Skinner, the maze was the most popular experimental setting of learning
- Skinner believed the maze was not representative of behavior
  - Separate learning trials



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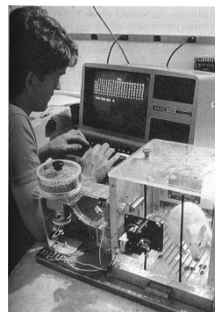
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### The Skinner Box

- Methodology
  - Rigorously experimental
  - Wide generality
  - Did not interfere with the flow of behavior
- Skinner Box
  - “Experimental Space”
- Quickly became the favored methodology in animal research



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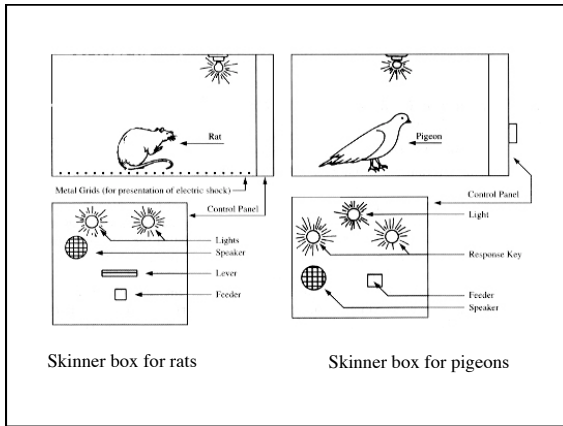
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### Contingencies of Reinforcement

- Scientific study of behavior focuses on
  - Acquisition
  - Retention
  - Setting
- For each behavior, specify the contingencies of reinforcement
  - Setting in which the response is most likely to occur
  - The type of response
  - Reinforcer responsible for acquisition and maintenance

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### The Setting

- Behavior is controlled by its setting
- Learning when a response will be reinforced and when it will not
  - Stimulus discrimination
- Learning to transfer a new response to similar situations
  - Stimulus generalization

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### The Response

- Two types of learning correspond to two types of responses
  - Respondents
  - Operants
- Respondant behavior
  - Unconditionally elicited by a stimulus (UCS – UCR)
- Operant behavior
  - Emitted response
  - Operate on the environment
  - The result of the operation determines likelihood of reoccurrence

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### The Shaping

- Behavior emitted
  - Shaping used to encourage desired response
- Relies on the Law of Effect
  - An animal will be more likely to do that for which it has just been rewarded
- Successive approximations to the goal

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### The Reinforcer

- **Reinforcement:** any event that increases the probability of the operant upon which it is contingent
- The setting and the reinforcer determine what behavior will occur when
- Two types of reinforcement
  - Positive reinforcement
  - Negative reinforcement

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### Positive Reinforcement

- Positive reinforcement corresponds to a reward
- Following a behavior, it **increases** the likelihood that behavior will reoccur

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### Negative Reinforcement

- An event whose termination increases the likelihood that response will reoccur
- Frequently confused with punishment
- Punishment decreases the probability of the behavior

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### Punishment



- Positive Punishment
  - Something that, when applied, decreases behavior
    - “Spanking,” yelling
- Negative Punishment
  - Something that, when removed, decreases behavior
    - “Time Out,” being “grounded”

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### Reinforcement versus Punishment

- Punishment is effective
  - Only if applied correctly
- Punishment has drawbacks
  - Suppressed behavior
  - Aggression, Fear
  - Does not guide toward more desirable behavior

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### Types of Reinforcer

- Primary reinforcer
  - Innately satisfying
- Secondary reinforcer
  - Power comes through their association with a primary reinforcer
- Immediate reinforcer
  - Occurs immediately after behavior
- Delayed reinforcer

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### What Makes a Reinforcer?

- Reinforcement is subjective
- Premack study
  - Choices – candy, pinball
  - Children divided in preference
  - The preferred item could be used to reinforce the less preferred activity
- Premack Principle
  - Hierarchy of reinforcers
    - Activities higher in hierarchy reinforce those lower

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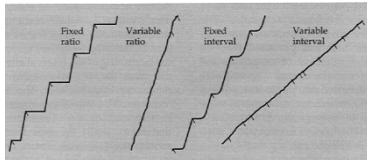
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### Schedules of Reinforcement

- Number of responses
  - Fixed ratio
  - Variable ratio
- Time elapsed
  - Fixed interval
  - Variable interval



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### Reinforcement and Fixed Ratio

- Post-reinforcement pause for fixed ratio and interval schedules is very common
- Fixed ratio- Large number of responses necessary to receive next reward

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### Reinforcement and Fixed Interval

- On a fixed interval, once reward has been delivered, no chance of another for a period of time
- Scheduling of tests
- More frequent tests would result in more frequent studying

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## Humans and Schedules of Reinforcement

- Fixed ratio, fixed interval
- Other schedule of reinforcement are not so easily classified
- Humans do not respond appropriately in many situations
- Human behavior is determined by what the subjects believe is happening

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