Schedules of Reinforcement or Punishment: Ratio Schedules

- Continuous Reinforcement (CRF)
- Response Schedules (Ratio)
- Time Schedules (Interval)
- Differentiation Schedules

Continuous Schedules
- Use reinforcement or punishment procedures
- Give a reinforcer or punisher for every occurrence of a behavior
- Usually used in shaping program
- Get rapid and high rates of responding
- Problem - Get rapid extinction once the stimulus is removed

Other issues
- Get satiation if you provide too many reinforcers
- May get emotional responses when providing punishers
- Advantageous for skill acquisition

Ratio Schedules
- Based on responses
- Are different than time (interval) schedules
- Require a specific number of correct responses before one response produces reinforcement
- Two major types
  - Fixed
  - Variable

Fixed Ratio (FR) Schedules
- The number of responses required before reinforcement is given remains constant.
  - FR-2: Reinforcement is delivered after every 2nd correct response.
  - FR-4: Reinforcement is delivered after every 4th correct response.
  - FR-1 = Continuous Schedule
- Produce high rates of responding
- Larger the ratio requirement, the higher the rate of responding.
Some Issues
- Often get a post-reinforcement (preratio) pause following the delivery of the reinforcer
- Pauses occur throughout the session
- Pauses are longer later in the session
  - Lots of reasons: Habituation, Satiation, Sensitization (see McSweeney)
- Pauses are often correlated with the amount or size of the reinforcer

Characteristics
- Gives high rates of responding
- More resistant to extinction than continuous schedules
- May begin to thin the schedule (responses required between reinforcers) when used in applied settings
  - No more than 30%
  - May get Ratio Strain when you make the schedule too long (thin) between reinforcers

Fixed Ratio (FR) Schedule
A = Post-reinforcement pause
B = High rate of response "run"
C = Reinforcer delivered upon emission of nth response

Variable Ratio (VR) Schedules
- The response requirement changes from one reinforced response to another.
  - Variable Ratio – 4 (VR 4). Reinforcement is given on an average of every 4th correct responses
  - Variable Ratio – 20 (VR-20). Reinforcement is given on an average of every 20 correct responses

Variable Ratio (VR) Schedule
A = High steady rate of responding
B = Reinforcement delivered after a varying number of required responses are emitted

Characteristics
- Tends to produce a high and steady rates of responding.
- Generally, the larger the ratio requirement, the quicker the rate of response.
  - Have to increase gradually.
- Tends to not produce post-reinforcement pauses.
- Very resistant to extinction.
Some Issues

• Cannot thin the schedule rapidly
• Need to be careful when using within industrial settings.
• Can be used to understand a large number of behaviors
  o Crying at night
  o Disruptive behavior in classrooms

Final Notes

• Minimal schedule differences between reinforcement and punishment
• Major differences in applications within applied settings
  o Want minimal time between the response and punishment,
  o May allow other reinforcement schedules to take control
  o Review the Azrin and Holz, Campbell and Church, Van Houten materials when using punishing stimuli.

Conclusions

• Ratio Schedules can be highly effective to increase or decrease behavior.
• Industrial settings: Is not liked by groups that focus on trying to decrease worker productivity.
• Need to be careful to increase demands of responding slowly
• Can be used on most behaviors