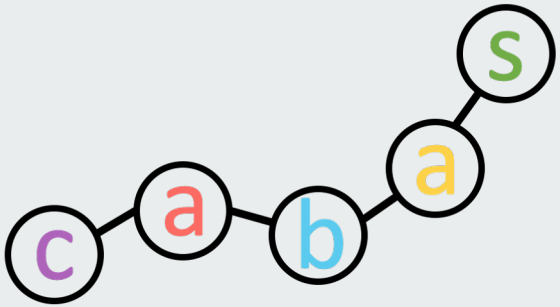
Schedules of Reinforcement

This training program is based on the RBT Task List (2nd ed.) and is designed to meet the 40-hour training requirement for RBT certification. The program is offered independent of the BACB



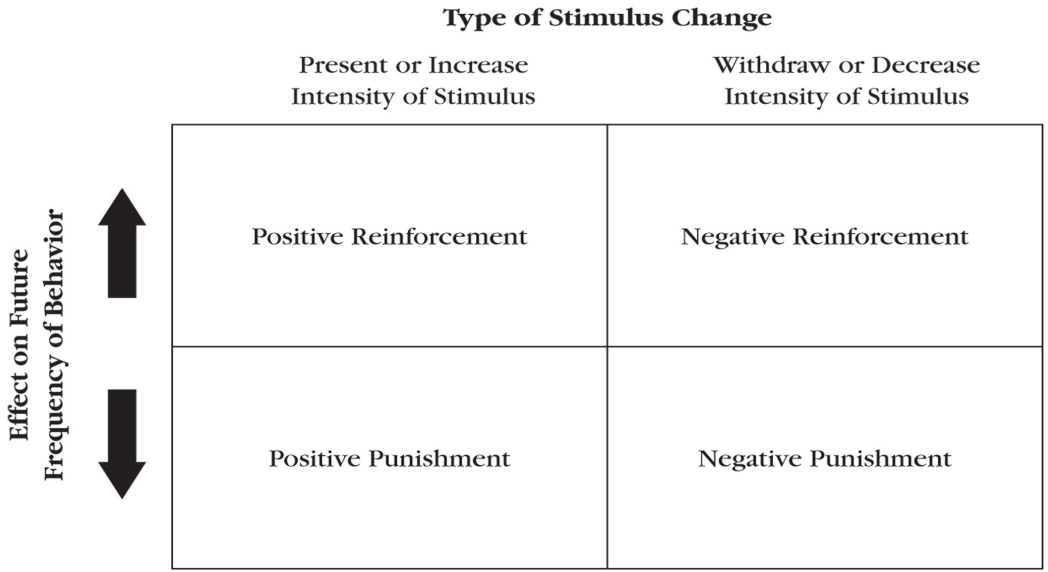
References

- Cooper, J. O., Heron, T. E., & Heward, W. L. (2020). *Applied Behavior Analysis (3rd ed.)*. Hoboken, NJ: Pearson.
- Behavior Analyst Supervisor (BAS) RBT Study Guide→ https://behavioranalystsupervisor.com/
- RBT Task List (2nd Edition)→ https://www.bacb.com/rbt/

In This Presentation

C3→ Use contingencies of reinforcement

Stimulus Changes Functioning as Reinforcers



Schedules of Reinforcement

Wait…what is that?

- Cooper (2007), states that a schedule of reinforcement is a rule that describes a contingency of reinforcement, those environmental arrangements that determine conditions by which behaviors will produce reinforcement.

- Let's break it down…a rule describing ***how*** (type of schedule), ***when*** (rule), and ***why*** (contingency) the reinforcement will be delivered.

Schedules of Reinforcement: Continuous Schedule of Reinforcement

- Continuous Schedule of Reinforcement (CRF):
  - Each target response is immediately reinforced
  - Dense ratio of reinforcement

  Use when:

    - Teaching a new skill (acquisition)
    - A behavior that occurs at a very low frequency
  - Limitations:
    - CRF schedule increases the likelihood of satiation
    - Teaching students to expect reinforcement for following directions
    - Not most efficient method of maintaining behavior once it has been acquired

Applied Behavior Analysis for Teachers, 8th Ed.
Alberto & Troutman
ISBN 0131592920

Continuous Schedules of Reinforcement (CRF)

Scenario: In a classroom a teacher is going through a history lesson and desires to increase responding. Every time a student answers the teacher praises him/her.

Buzzwords: Every time

Regardless if the student's answered correctly or incorrectly the reinforcement was still immediate – regardless of the response (desired to increase responding)

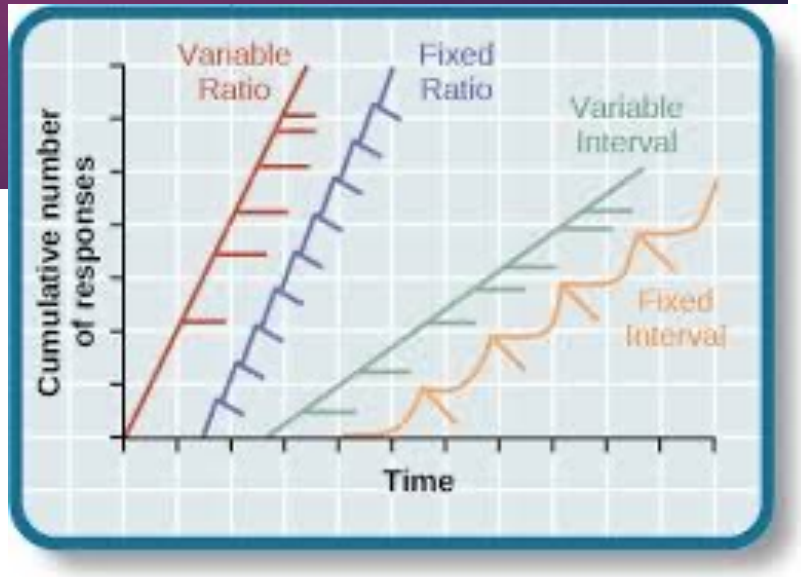
Continuous Schedule of Reinforcement (CRF)

Continuous schedule of reinforcement (CRF) requires a teacher to deliver a reinforcer every instance a student responds correctly.

(Shibutani, 2017)

Different Schedules of Reinforcement

- **Intermittent Schedules of Reinforcement (INT)**
  - **Type of Schedule:** Fixed-ratio (FR), Fixed-interval (FI), variable-ratio (VR), variable-interval (VI).
  - **Rule:** Different for each schedule
  - **Contingency:** Immediate – may or may not depend on response



Intermittent Schedule of Reinforcement

In **intermittent schedule of reinforcement**, a teacher delivers a reinforcer after some correct responses, not every response.
There are 4 different types of **intermittent schedule of reinforcement**.

- **Fixed Ratio Schedule of Reinforcement (FR)**
- **Variable Ratio Schedule of Reinforcement (VR)**
- **Fixed Interval Schedule of Reinforcement (FI)**
- **Variable Interval Schedule of Reinforcement (VI)**

(Shibutani, 2017)

Schedules of Reinforcement: Intermittent Schedules

- Requires greater numbers of correct response for reinforcement
- Decreases likelihood of satiation and more resistant to extinction than CRF schedules
- Ratio Schedules
- Interval Schedules
- Response-duration schedules

Simple Schedules of R+ment and P-ment

Within the four intermittent schedules of Reinforcement there are two dimensions:

Two dimensions→

1. Fixed vs. Variable
2. Ratio vs. Interval

Simple Schedules Cont.

Fixed Schedules

- **Set** number of responses or time

Variable Schedule

- **Average** number of responses or time

Ratio Schedules

- Require a **number** of responses prior to R+ment

Interval Schedules

- Require period of **time** to elapse prior to R+ment

Simple Schedules Cont.

Fixed Schedules

- **Set** number of responses or time

Variable Schedule

- **Average** number of responses or time

Ratio Schedules

- Require a **number** of responses prior to R+ment

Interval Schedules

- Require period of **time** to elapse prior to R+ment

Fixed Ratio (FR)

Delivery of reinforcement based on a fixed number of responses; produces a high steady rate of responding with a post reinforcement pause (a pause in responses immediately following reinforcement).

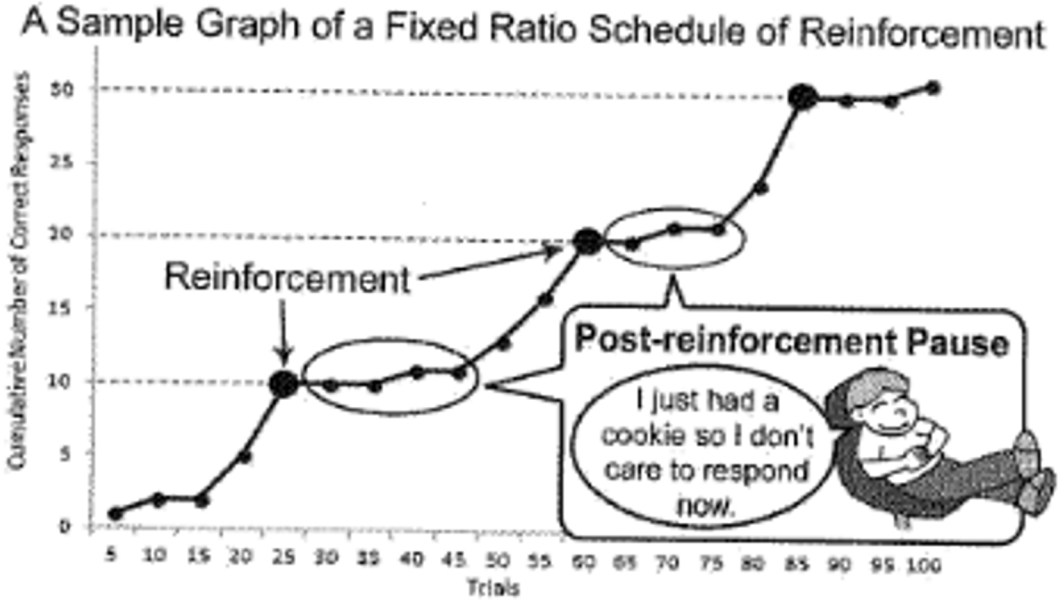
For example, a child receives a cookie every 3 correct responses (FR-3).

C: Correct Response I: Incorrect Response

Trial #	1	2	3	4	5	6	7	8	9	10	11
Response	C	C	C	C	C	C	C	I	C	I	C
Reinforcer (Cookie)	1st C	2nd C	3rd C	1st C	2nd C	3rd C	1st C		2nd C		3rd C

(Shibutani, 2017)

In a fixed ratio schedule of reinforcement, a **post-reinforcement pause** tends to occur.
A post-reinforcement pause is a temporary pause in responding to the S^D after the delivery of a reinforcer.



(Shibutani, 2017)

When the ratio requirement is too high, a **ratio strain** may occur. A **ratio strain** is a decrease in responding due to its high ratio requirement.

(Shibutani, 2017)

Simple Schedules Cont.

Fixed Schedules

- **Set** number of responses or time

Variable Schedule

- **Average** number of responses or time

Ratio Schedules

- Require a **number** of responses prior to R+ment

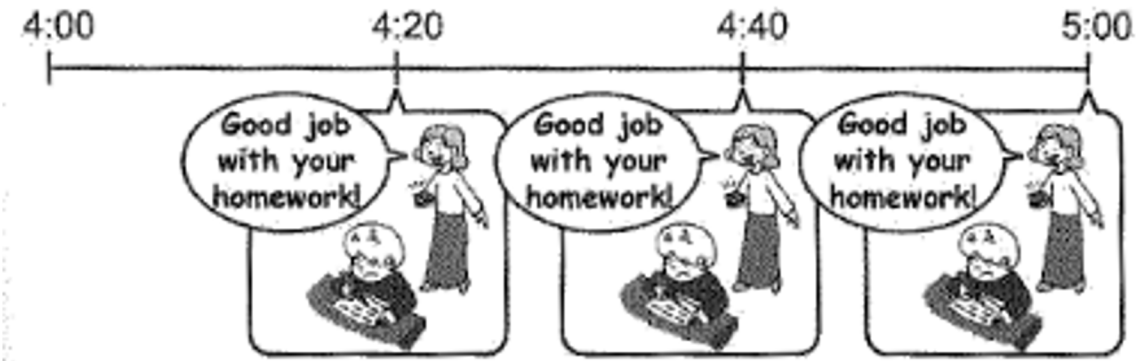
Interval Schedules

- Require period of **time** to elapse prior to R+ment

Fixed Interval (FI)

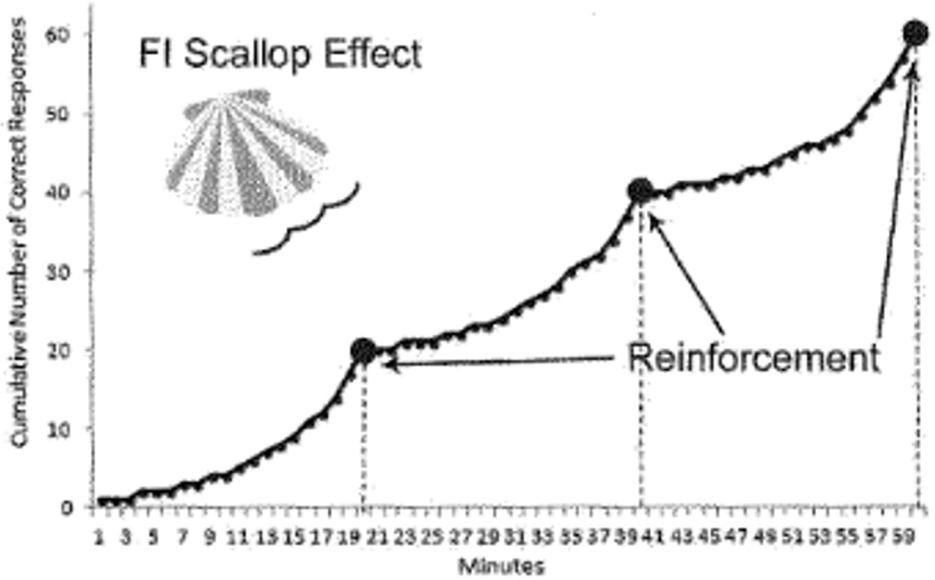
Reinforcement delivered for the first response following a passage of a set duration of time since the last response; results in increasing rate as the end of the interval approaches; post reinforcement pause.

For example, a child receives a cookie when he has answered his homework questions after 20 minutes (FI-20)



(Shibutani, 2017)

A Sample Graph of a Fixed Interval Schedule of Reinforcement



In an FI, a **post-reinforcement pause** can be observed as in an FR.
Because the curve in the graph tends to look like a scallop shell, this phenomenon is called an **FI scallop effect**.

Post-reinforcement Pause in FI

(Shibutani, 2017)

Simple Schedules Cont.

Fixed Schedules

- **Set** number of responses or time

Variable Schedule

- **Average** number of responses or time

Ratio Schedules

- Require a **number** of responses prior to R+ment

Interval Schedules

- Require period of **time** to elapse prior to R+ment

Variable Ratio (VR)

Variable number of responses required for reinforcement; produces steady, high rate of responding.

Must have an average number for the reinforcement rate.

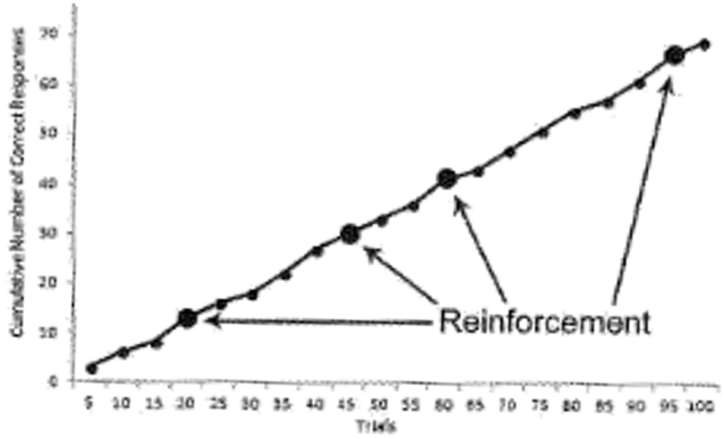
Trial #	1	2	3	4	5	6	7	8	9	10
Response	C	C	C	C	C	C	C	C	C	C
Reinforcer (Cookie)	⊘	⊘	●	⊘	⊘	⊘	⊘	●	⊘	⊘

Total correct responses = 10 Total number of reinforcers = 2 10 / 2 = 5

The above example is VR-5 (5 is the average reinforcement rate).

(Shibutani, 2017)

A Sample Graph of a Variable Ratio Schedule of Reinforcement



Unlike an FR, the rate of responding in a VR is steady. Because one does not know when the reinforcement will occur, he/she continues responding in hopes he/she will receive it soon. Because of its nature, the VR tends to be the most resistant to extinction.

(Shibutani, 2017)

Simple Schedules Cont.

Fixed Schedules

- **Set** number of responses or time

Variable Schedule

- **Average** number of responses or time

Ratio Schedules

- Require a **number** of responses prior to R+ment

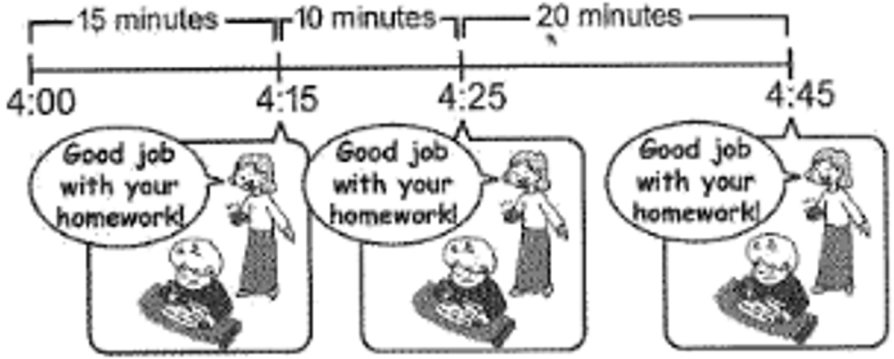
Interval Schedules

- Require period of **time** to elapse prior to R+ment

Variable Interval (VI)

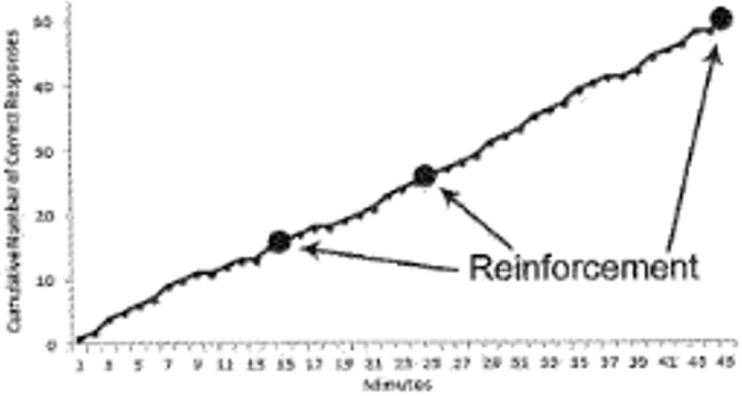
Reinforcement for the first correct response following the elapse of a variable duration of time occurring in a random or unpredictable order; produces constant stable rates of responding.

Must have an average length for the reinforcement interval.



The average length: (15+10+20)/3=15 The above example is VI-15.

A Sample Graph of a Variable Interval Schedule of Reinforcement



(Shibutani, 2017)

Thinning Schedules of Reinforcement

- Reinforcement gradually becomes available less often or in other words, becomes contingent on greater amounts of appropriate behavior
- Dense → Sparse
- Thinning Schedules should result in:
  - Higher, steadier levels of responding
  - Decreasing expectation of reinforcement
  - Maintenance of the behavior
  - Removal of teacher as a necessary behavior monitor
  - Transfer of control to more natural reinforcers
  - Increase in persistence in responding toward working for goals
  - Ability to deliver reinforcers on a lean schedule

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You give a student one token for every 10 single-digit addition problems they answer accurately.

What schedule of reinforcement is this?

You give a student one token for every 10 single-digit addition problems they answer accurately.

What schedule of reinforcement is this? FR10

A child keeps asking you, “What time is it?” The child can keep asking you what time it is as often as they want - sounds annoying - but you won’t tell them until at least 5 minutes has passed since the last time that you answered them.

What schedule of reinforcement is this?

A child keeps asking you, “What time is it?” The child can keep asking you what time it is as often as they want - sounds annoying - but you won’t tell them until at least 5 minutes has passed since the last time that you answered them.

What schedule of reinforcement is this? FI 5

You want a student to read more. You offer to pay them ten cents (and praise) for an average of every ten words correctly read aloud. Sometimes the student receives reinforcement after only 2 words. Sometimes the student receives reinforcement after 20 words.

What schedule of reinforcement is this?

You want a student to read more. You offer to pay them ten cents (and praise) for an average of every ten words correctly read aloud. Sometimes the student receives reinforcement after only 2 words. Sometimes the student receives reinforcement after 20 words.

What schedule of reinforcement is this? VR 10

A child keeps asking you, “What time is it?” You’ll answer their question, on average, about every 10 minutes. Sometimes you’ll wait only a few minutes and sometimes you’ll make them wait for more than 10 minutes.

What schedule of reinforcement is this?

A child keeps asking you, “What time is it?” You’ll answer their question, on average, about every 10 minutes. Sometimes you’ll wait only a few minutes and sometimes you’ll make them wait for more than 10 minutes.

What schedule of reinforcement is this? VI 10

Take Away

Fixed Schedules

- Post-reinforcement pause (pause immediately following reinforcement)
- More easily extinguished

Variable Schedules

- More resistant to extinction

In Application

Fixed Ratio→ Count, then give R+ment after set amount

Fixed Interval→ Use clock or timer (also motivator)

Variable Ratio→ Most difficult, unless you have random number generator (App), for average of 10 set generator between 1 and 20

Variable Interval→ Use same number generator as above

Practice RBT Test Questions

Reinforcement is delivered on the average of every 2 minutes in which the behaviors occur.

a. FI-2
b. FR-2
c. VI-2
d. VR-2

Reinforcement is delivered on the average of every 2 minutes in which the behaviors occur.

a. FI-2
b. FR-2
c. **VI-2**
d. VR-2

Reinforcement provided on the average of every 5 correct responses

a. VR-5
b. VI-5
c. FR-5
d. FI-5

Reinforcement provided on the average of every 5 correct responses

a. VR-5
b. VI-5
c. FR-5
d. FI-5

Reinforcement provided every 2 minutes in which behavior occurred.

a. VI-2
b. VR-2
c. FR-2
d. FI-2

Reinforcement provided every 2 minutes in which behavior occurred.

a. VI-2
b. VR-2
c. FR-2
d. FI-2

Reinforcement provided every 10 minutes that behavior occurs.

a. FI-10
b. FR-10
c. VI-10
d. VR-10

Reinforcement provided every 10 minutes that behavior occurs.

a. **FI-10**
b. FR-10
c. VI-10
d. VR-10

Which of the following examples below is an example of a VARIABLE RATIO schedule of reinforcement?

a. Grandma loves the slots in Vegas! On average, every 30th pull of the slot machine results in a small cash payout. Sometimes the payout occurs on the 15th pull… sometimes on the 45th… but, on average, payout occurs every 30 pulls on the slot machine. Grandma can't wait to hit the jackpot someday!
b. Every time Billy screams, his mother punishes him by taking away his toys for the night
c. Tim gives his students a treat from the candy jar every time they get a 100% on their tests
d. Individuals who pass the RBT exam are given a $50 bonus on their next pay check at ACME ABA company.

Which of the following examples below is an example of a VARIABLE RATIO schedule of reinforcement?

a. **Grandma loves the slots in Vegas! On average, every 30th pull of the slot machine results in a small cash payout. Sometimes the payout occurs on the 15th pull… sometimes on the 45th… but, on average, payout occurs every 30 pulls on the slot machine. Grandma can't wait to hit the jackpot someday!**
b. Every time Billy screams, his mother punishes him by taking away his toys for the night
c. Tim gives his students a treat from the candy jar every time they get a 100% on their tests
d. Individuals who pass the RBT exam are given a $50 bonus on their next pay check at ACME ABA company.

For every third correct response, you deliver a preferred edible. What reinforcement schedule is this?

- FR-3
- FI-3
- VR-3
- VI-3

For every third correct response, you deliver a preferred edible. What reinforcement schedule is this?

- FR-3
- FI-3
- VR-3
- VI-3

TA Rank Components:

1. Deliver contingent reinforcement (approvals) to keep at least one client in the play area (or at the table) for 10 minutes (across at least 2 errorless TPRAs) (C-03, F-02)

2. Take the Quiz “Principles of Behavior”