SCHEDULES OF REINFORCEMENT

Clinical Applications and Everyday Tools

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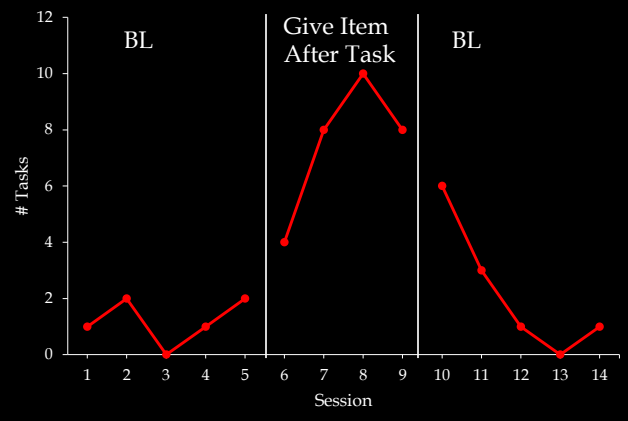
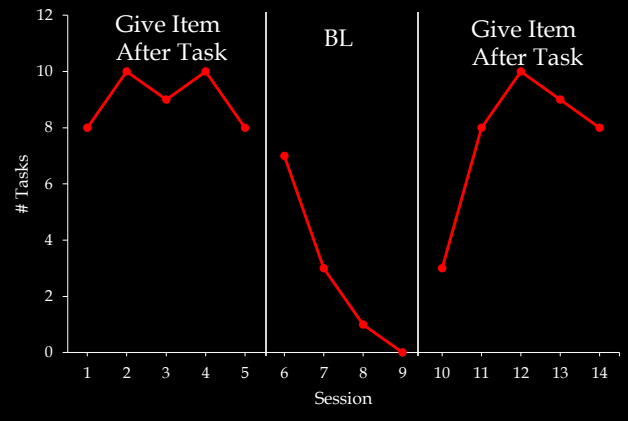
WHAT IS A SCHEDULE OF REINFORCEMENT?

Schedule of reinforcement: A rule that specifies when a reinforcer is delivered.

ABOUT REINFORCERS…



ABOUT REINFORCERS…



KINDS OF REINFORCERS

Positive reinforcers: Giving something after behavior

- Praise
- Snack
- Money
- iPad
- Music
- Attention

KINDS OF REINFORCERS

No snack → Ask for snack → Snack given

No praise → Task done → Praise given

KINDS OF REINFORCERS

Negative reinforcers: Remove something after behavior

- Task
- Headache
- Proximity of a feared person
- Loud music
- Screaming child

KINDS OF REINFORCERS

Task → Aggression → No task

Headache → Take med → No headache

WHEN CAN IT BE GIVEN?

Based on…

- Responses
- Time
- Responses and time

RULE: BASED ON BEHAVIOR

Response-based schedules:

- Ratio
  - Fixed ratio (FR)
  - Variable ratio (VR)

Apply to: tasks, requests, raising hand in class, following directions, correct imitations…

RATIO SCHEDULES

Fixed ratio (FR)

- A fixed # of responses is required to earn reinforcer
  - FR 1 (Aka "continuous reinf")
  - FR 5
  - FR 25
  - FR 100

RATIO SCHEDULES

Variable ratio (VR)

- A variable # of responses is required to earn reinforcer
  - VR 3
  - VR 8
  - VR 15
  - VR 50

But…Total # of responses/# reinforcers must equal the nominal value. Thus…

VARIABLE RATIO SCHEDULES

Variable ratio sample values:

VR 3 = (1,5,4,2,3,3)
VR 5 = (9,1,2,8,3,7,5,5,6,4)
VR 10 = (19,1,18,2,15,5,16,4)

Hint: Identify pairs of #s that average the VR value.

LET'S IMPLEMENT VR

VR 3 (5,1,4,2,3,3)

1. Select value at random
2. Use that value to deliver reinforcer #1
3. Discard value
4. Select a new value
5. Use that value to deliver reinforcer #2

Continue…

BEGIN…

VR 3 (5,1,4,2,3,3)

VR 3 (5,1,4,2,3,3) = FR 4

VR 3 (5,1, 2,3,3) = FR 3

VR 3 (5,1, 2, 3) = FR 5

VR 3 (1, 2, 3) = FR 1

VR 3 (2, 3) = FR 2

VR 3 (3) = FR 3

LET'S PRACTICE!

Select a partner and try:

1. FR 2
2. FR 5
3. VR 3

RULE: BASED ON TIME

Time-based schedules:

Time

- Fixed time (FT)
- Variable ratio (VT)

Apply to: Reducing problem behavior…We will see about this later. Not good for skill acquisition!

TIME SCHEDULES

Fixed time (FT)

- A fixed amount of time is required to earn reinforcer
  - FT 1'
  - FT 5'
  - FT 25'
  - FT 60'

TIME SCHEDULES

Variable time (VT)

A variable amount of time is required to earn reinforcer

- VT 3'
- VT 8'
- VT 15'
- VT 50'

But…Total # of minutes/# reinforcers must equal the nominal value. Thus…

VARIABLE TIME SCHEDULES

Variable time sample values:

VT 3' = (1',5',4',2',3',3')
VT 5' = (9',1',2',8',3',7',5',5',6',4')
VT 10' = (19',1',18',2',15',5',16',4')

Hint: Identify pairs of #s that average the VT value.

LET'S IMPLEMENT VT

VT 3' (5',1',4',2',3',3')

1. Select value at random
2. Use that value to deliver reinforcer #1
3. Discard value
4. Select a new value
5. Use that value to deliver reinforcer #2

Continue…

BEGIN…

VT 3' (5',1',4',2',3',3')

VT 3' (5',1',4',2',3',3') = FT 4'

VT 3 (5',1', 2',3',3') = FT 3'

VT 3' (5',1', 2', 3') = FT 5'

VT 3' (1', 2', 3') = FT 1'

VT 3' (2', 3') = FT 2'

VT 3' (3') = FT 3'

LET'S PRACTICE!

Select a partner and try:

1. FT 10"
2. FT 5"
3. VT 8"

RULE: BASED ON BEHAVIOR AND TIME

Time+ behavior-based schedules:

<u>Duration</u>

Fixed duration (FD)
Variable duration (VD)

Apply to: Activity that should be sustained for a period of time, such as on task, waiting, engage in conversation, swimming 10 laps, running ¼ mile

DURATION SCHEDULES

Fixed duration (FD)

A behavior for a fixed amount of time is required to earn reinforcer

- FD 5”
- FD 10”
- FD 1’
- FD 5’

What if behavior is not sustained for entire time?
Reset!

DURATION SCHEDULES

Variable duration (VD)

A behavior for a variable amount of time is required to earn reinforcer

- VD 5”
- VD 10”
- VD 1’
- VD 5’

But…Total # of min/# reinforcers must equal the VD value. Thus…

VARIABLE DURATION SCHEDULES

Variable duration sample values:

VD 5” = (1”,9”,4”,6”,5”,5”)
VD 20” = (39”,1”,5”,35”,10”,30”,15”,25”)
VD 1’ = (10”,1’50”,1”, 1’59”,30”, 1.5’ ,1’,1’)

Hint: Identify pairs of #s that average the VD value.

LET’S IMPLEMENT VD

VD 10” (1”,19”,5”,15”, 8”,12”)

1. Select value at random
2. Use that value to deliver reinforcer #1
3. Discard value
4. Select a new value
5. Use that value to deliver reinforcer #2

Continue…

BEGIN…

VD 10” (1”,19”,5”,15”, 8”,12”)

VD 10”(1”,19”,5”,15”, 8”,12”) = FD 19″

VD 10”(1”, 5”,15”, 8”,12”) = FD 5″

VD 10”(1”, 15”, 8”,12”) = FD 1″

VD 10”(15”, 8”,12”) = FD 12″

VD 10”(15”, 8”,) = FD 8″

VD 10”(15”,) = FD 15″

LET’S PRACTICE!

Select a partner and try:

1. FD 5”
2. FD 10”
3. VD 5”

IDENTIFY A SCHEDULE

Consider the following:

1. You are teaching a child to imitate by requesting "Do this"
2. In your classroom, you request a child to stay in his seat, and work on his math problems for 5 minutes
3. To keep a child's weight up, you must deliver food every 1 hour, on average
4. You want to increase a teenager's household chore completion

SCHEDULE THINNING

Schedule thinning: gradually increasing the number of responses, or amount of time, that is required.

Why? To make the schedule more natural and feasible.

EXAMPLES

FR 1 → FR 100

EXAMPLES

FR 1→ VR 25

RULES

1. Start small
2. Gradually increase within sessions, not across
3. Steps can get larger
4. Go back to previous requirement if learner quits
5. Be mindful of the reinforcer value

DECREASING PROBLEM BEHAVIOR

Fixed and Variable Time Schedules: Redux

Identify why behavior is occurring, then give item/activity non-contingently

FT/VT

Employee talks out → Supervisor attention

↓

Give attention every hour under FT 1 hour

FT/VT

Student has verbal agg → Task escape

↓

Give task escape every ½ hour

FT/VT

How often is the reinforcer given?

About as often as the problem behavior occurs…or less!

FT/VT

Behavior occurs:

1. 1/hour → FT 1 hr
2. 1/5 minutes → FT 4′
3. 1/30 minutes → FT 30′
4. 2/day → FT 5 hrs

DECREASING PROBLEM BEHAVIOR

Differential Reinforcement of
Alternative Behavior
(DRA)

Identify why behavior is occurring, then teach another way of getting that outcome

DRA

Student talks out → Teacher attention

Student raises hand → Teacher attention
How? Start with FR 1 → VR 4

DRA

Child tantrums → Escape from task

↓

Child completes task → Escape from task

How? Start with FR 1 → FR 25

DECREASING PROBLEM BEHAVIOR

Differential Reinforcement of Incompatible Behavior (DRI)

Identify why behavior is occurring, then teach behavior that is incompatible with the problem behavior

DRI

Client hits head w/hand → Food

↓

Client completes task using hands → Food

How? Start with FD 5″ → FD 3′

DRI

Employee out of seat pestering others → Peer attention

↓

Employee completes tasks → Break to interact with peers

How? Start with FD 10″ → FD 2 hrs

PUTTING IT TOGETHER

Identify potential schedules you might use…

1. Increase task completion
2. Decrease tantrums for attention
3. Increase staying on playground
4. Increase initiating playing with peer
5. Decrease aggression to escape task

ISSUES TO CONSIDER

Schedules of Reinforcement Are Artificial and Not Sustainable

ISSUES TO CONSIDER

Not Sustainable:
Schedule thinning can allow transition to everyday schedules that can be sustained.

Example:
FT schedule thinned from FT 2' to FT 3 hours, which mimics the employment break schedule

ISSUES TO CONSIDER

Example:
FR 1 schedule thinned to FR 100 schedule that approximates the schedule of recess in grade school.

Example:
Hourly reinforcers thinned to 1/week on Saturdays.

ISSUES TO CONSIDER

Artificial:

We all operate under schedules of reinforcement.

Example:

1. Paychecks
2. Bartering systems
3. Conversations
4. Making dinner
5. Phone calls
6. Attending conferences?

ISSUES TO CONSIDER

Artificial:

Artificial reinforcers are used at first, but we try and transition to natural reinforcers.

Example:

1. Reading:
   A. Start with snacks → reading is fun!
2. Math
   A. Start with access to iPad → Use of money to buy stuff

ISSUES TO CONSIDER

Example:

3. Task completion
   A. Start with access to toys → shopping trips on Saturdays
4. Job skill
   A. Start with immediate praise → Paycheck!

ISSUES TO CONSIDER

Schedules of Reinforcement Constitute "Bribery"

ISSUES TO CONSIDER

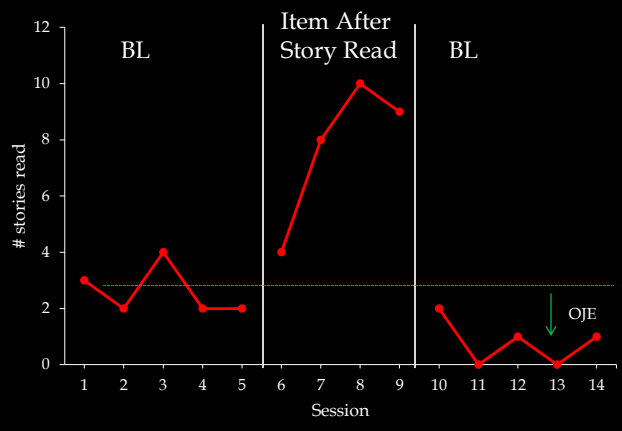
From Webster's New World Dictionary:

Bribe – *anything, esp money, given or promised to induce a person to do something illegal or wrong.*

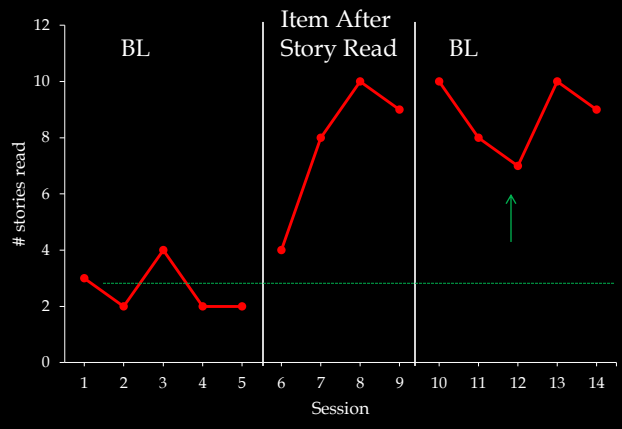
ISSUES TO CONSIDER

Artificial Reinforcers Decrease Intrinsic Value of An Activity: The Overjustification Effect

ALLEGED OJE



MORE LIKELY OUTCOME…



APPLICATION VIDEOS

Case: Develop a method involving schedules of reinforcement to teach a person to accept, and participate in, dental care.

Case: Develop a method using schedules of reinforcement to increase food acceptance

WRAP UP

1. What are schedules
2. Methods of programming
3. Schedule thinning
4. Ways to decrease behavior