

# Operant Conditioning: Schedules of Reinforcement

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## WHAT'S COVERED

This tutorial will expand on the idea of operant conditioning and discuss schedules of reinforcement. You will learn about:

1. Schedules of Reinforcement
  - a. Continuous Reinforcement
  - b. Partial Reinforcement
2. Types of Partial Reinforcement
  - a. Fixed Ratio
  - b. Variable Ratio
  - c. Fixed Interval
  - d. Variable Interval

## 1. Schedules of Reinforcement

You may recall that operant conditioning explains how learning occurs due to the consequences of behaviors, like reinforcement and punishment, that make behaviors more or less likely to occur over time. Remember also that learning occurs over time; it's not generally the result of a single instance of a reward or punishment. Simply because you get a piece of candy doesn't make you absolutely likely to learn and repeat that behavior again later.

When and how a behavior is rewarded can determine whether it is learned as well as the strength of that learning. A **schedule of reinforcement** is a plan that determines when a behavior will or will not be reinforced.

There are several different kinds of schedules of reinforcement under operant conditioning. They fall under two basic categories:

- Continuous reinforcement.
- Partial reinforcement.



## Schedule of Reinforcement

A pattern or timetable that determines when a behavior will be reinforced and when it will not

### 1a. Continuous Reinforcement

1. The first category is continuous reinforcement. This means giving a reinforcement every time a behavior is performed.

➦ **EXAMPLE** Every single time a child performs a behavior you're hoping for, you give them a piece of candy.

There are some pros and cons of this type of schedule:

- It is particularly useful when a behavior is first being learned.
- However, it is not necessarily realistic in the long term because there likely is not an unlimited supply of the reward or reinforcement.
- Outside or extrinsic rewards aren't necessarily continually rewarding in the same way. Eventually, for example, a child might get tired of the candy or literally sick because of it.

### 1b. Partial Reinforcement

The second category is partial reinforcement, which tends to produce more resistance to extinction. This means that the learning is less likely to go away since a subject is less likely to get tired or satiated by the reinforcer.

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## 2. Types of Partial Reinforcement

There are four basic types of partial reinforcement that are used:

- Fixed ratio
- Variable ratio
- Fixed interval
- Variable interval

### 2a. Fixed Ratio

The first kind of partial reinforcement is **fixed ratio** reinforcement or **FR**. In FR, a reinforcement is given after a specific, predetermined number of correct behaviors.

➦ **EXAMPLE** Every third or fourth time a child performs the behavior you want, you give them a reward.

This generally leads to some very quick, consistent responses; it is easy for the learner to catch on.

➦ **EXAMPLE** A rat that is placed within a box with a button that dispenses a treat will press the button many times, one after the other. It will continually press the button because it realizes that after a certain

number of times, it will get the reward.



#### TERM TO KNOW

### Fixed Ratio (FR)

Reinforcement is delivered based on the same number of responses

### 2b. Variable Ratio

In contrast, the second type of partial reinforcement is the **variable ratio (VR)** schedule of reinforcement. In VR, a reinforcement is given after a variable, unpredictable number of correct behaviors.

Usually, reinforcements are given within a range, such as between every two to five times on average. Each time the subject performs the behavior, they won't know whether or not they will receive the reward. This generally leads to very high, consistent levels of responses.



#### HINT

Think of a variable ratio schedule of reinforcement like gambling with a slot machine, where you're very likely to continue playing the slot machine because you don't know when it's going to pay off.



#### TERM TO KNOW

### Variable Ratio (VR)

Reinforcement is delivered based on a changing number of responses

### 2c. Fixed Interval

In addition to ratios, there are also intervals. A **fixed interval (FI)** is when a reinforcer is given after a specific amount of time has passed since the last reinforcement.



**EXAMPLE** A subject receives a reward after 30 seconds have passed from the last time the subject performed the desired behavior.

This leads to some very slow responses from the subject. Generally, there will be more response towards the end of the interval, because the subject begins to predict exactly when they can get the reward. Thus, they only perform the behavior when they know they're going to receive a reinforcement. Fixed interval is rarely used.



**EXAMPLE** One example of FI might be getting paid a salary at the end of every week. You don't necessarily work harder at the end of the week before you get paid. Instead, you generally tend to work harder at the beginning of the week.



#### TERM TO KNOW

### Fixed Interval (FI)

Reinforcement is delivered based on the same amount of time elapsed

## 2d. Variable Interval

A **variable interval (VI)** schedule of reinforcement is when a reinforcer is given after an unpredictable, variable amount of time has passed since the last reinforcement. It might be on average every 30 seconds, but the subject doesn't realize this, nor does the experimenter generally realize it.

This generally leads to some very slow, but also very steady responses that don't tend to go away very easily, because the subject doesn't realize when they're going to get the reward. Therefore, they have to produce the behavior at regular intervals because they need to be ready to receive the reinforcement that they desire.



### TERM TO KNOW

#### Variable Interval (VI)

Reinforcement is delivered based on a varying amount of time elapsed



### SUMMARY

There are two categories of **schedules of reinforcement**, which are plans that determine when a behavior will or will not be reinforced: continuous and partial. There are four basic **types of partial reinforcement**: **fixed ratio (FR)**, **variable ratio (VR)**, **fixed interval (FI)**, and **variable interval (VI)**.

In fixed ratio (FR), a reinforcement is given after a specific, predetermined number of correct behaviors. In variable ratio (VR) schedules of reinforcement, a reinforcement is given after a variable, unpredictable number of correct behaviors. A fixed interval (FI) refers to when a reinforcer is given after a specific amount of time has passed since the last reinforcement, while a variable interval (VI) schedule of reinforcement is when a reinforcer is given after an unpredictable, variable amount of time has passed since the last reinforcement. Each schedule of reinforcement typically has varying levels of success.

Good luck!

Source: This work is adapted from Sophia author Erick Taggart.



### TERMS TO KNOW

#### Fixed Interval (FI)

Reinforcement is delivered based on the same amount of time elapsed.

#### Fixed Ratio (FR)

Reinforcement is delivered based on the same number of responses.

#### Schedule of Reinforcement

A pattern or timetable that determines when a behavior will be reinforced and when it will not.

#### Variable Interval (VI)

Reinforcement is delivered based on a varying amount of time elapsed.

**Variable Ratio (VR)**

Reinforcement is delivered based on a changing number of responses.