

Operant conditioning (*instrumental conditioning*) involves an organism's learned response in order to obtain a reward. The response is an action not typically associated with obtaining a particular reward.

B.F. Skinner (Rats/Pigeons) pioneered the study of operant conditioning, although the phenomenon 1st was discovered by **Edward L. Thorndike** (Cats), who proposed **The Law of Effect**, which states that a behavior is more likely to recur if reinforced. Skinner ran many operant-conditioning experiments. He often used a specially designed testing apparatus known as a **Skinner Box**.

Behaviorists use various "**Schedules of Reinforcement**": Specific pattern of reinforcers over time. In a **continuous reinforcement schedule**, every correct response that is emitted results in a reward. This produces **rapid learning**, but also results in rapid extinction, where extinction is a decrease & eventual disappearance of a response once the behavior is no longer reinforced.

Schedules of reinforcement in which not all responses are reinforced are called **partial** (or *intermittent*) **reinforcement schedules**.

RATIO = After a certain **NUMBER** of responses.

INTERVAL = After a certain **TIME** period.

Fixed-Ratio schedule: Reward always occurs after a fixed number of responses.

Produces strong learning, but the learning extinguishes relatively quickly.



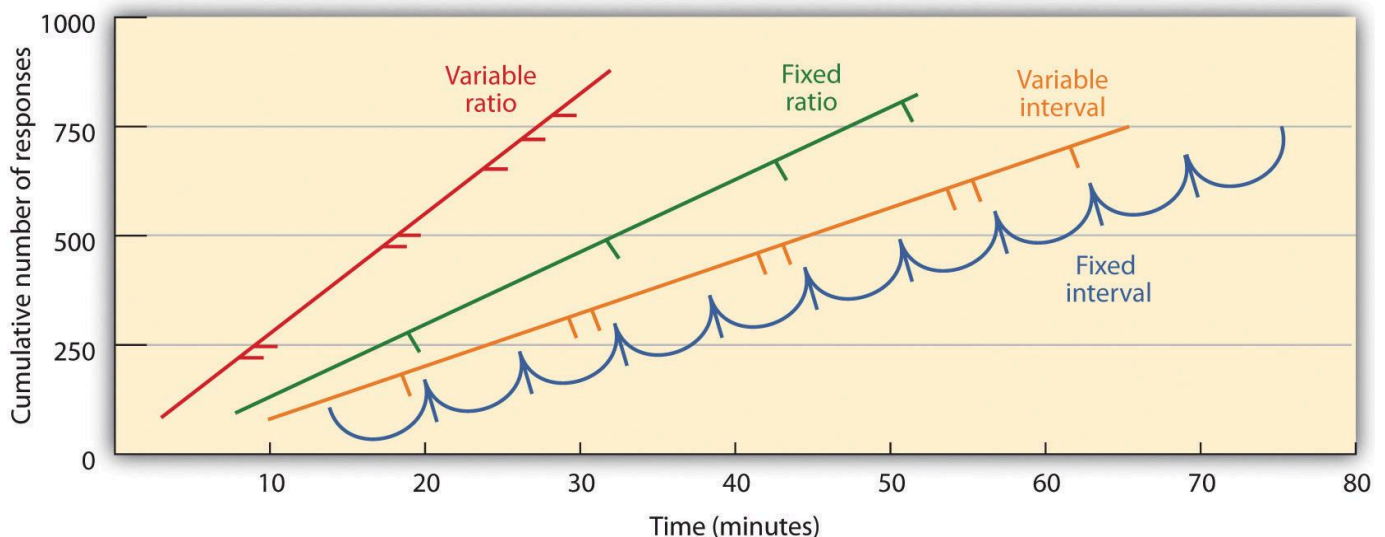
Variable-Ratio schedule: Ratio of responses to reinforcement is variable & unpredictable. Reinforcement can come at *any time*. Takes longer to condition a response; however the learning that occurs is resistant to extinction.

Fixed-Interval schedule: Reinforcement is presented as a function of **fixed periods of time**, *as long as there is at least one response*.

Variable-Interval schedule: Reinforcement is presented at **differing time intervals**, *as long as there is at least one response*. Variable-interval, like variable-ratio, is more difficult to extinguish than fixed schedules.



Chart demonstrates the **different response rate of the 4 simple schedules of reinforcement**, each hatch mark designates a reinforcer being given.



When & how often we reinforce a behavior can have a dramatic impact on the strength and rate of the response.

In real-world settings, behaviors are probably not going to be reinforced each and every time they occur. For situations where you are purposely trying to train & reinforce an action, such as in the **classroom**, in **sports** or in **animal training**, you might opt to follow a specific reinforcement schedule.

Some schedules are best suited to certain types of training situations. In some cases, training might call for starting out with one schedule & switching to another once the desired behavior has been taught.

	Schedules of Reinforcement Examples: For each example below, decide whether the situation describes fixed ratio (FR) , fixed interval (FI) or variable ratio (VR) , variable interval (VI) schedule of reinforcement situation. <i>Note: Examples are randomly ordered, & there are not equal numbers of each schedule of reinforcement.</i>	F or V	R or I
1	Getting paid \$10 for every 20 puzzles solved.		
2	Studying for a class that has surprise quizzes.		
3	Slot machines are based on this schedule.		
4	Speed traps on highways.		
5	Selling a product door to door.		
6	The boss hands out a sales bonus check every time he's in a good mood.		
7	Getting a paycheck at the end of every 2-week pay period.		
8	End of the year "Holiday Bonus" check.		
9	Angelina gives Brad a kiss after the end of every lap he swims in the pool.		
10	Torchy's Taco loyalty card: Free taco after 10 taco purchases.		
11	A child screams and cries at the candy counter--sometimes it works & mom buys him candy.		
12	Annual Black Friday Promotion: Free iPod with a purchase of an iPhone at Walmart.		
13	Getting a strike in bowling.		
14	Random drug testing in the NFL - Summer, Fall, Winter dates for random players.		

Fixed = *Specific*

Variable = *Unpredictable*

Ratio = *Number #*

Interval = *Time Period*

FR: Fixed Ratio = Specified Number # of Responses

FI: Fixed Interval = Specified Number # during Time Period

VR: Variable Ratio = Unpredictable Number # of Responses

VI: Variable Interval = Unpredictable Time Period