

Fixed vs. Variable, Ratio vs. Interval

Fixed refers to when the number of responses between reinforcements, or the amount of time between reinforcements, is set and unchanging.

Variable refers to when the number of responses or amount of time between reinforcements varies or changes.

Interval means the schedule is based on the time between reinforcements, and

Ratio means the schedule is based on the number of responses between reinforcements.

Simple intermittent schedules are a combination of these terms, creating the following four types of schedules:

- A **fixed-interval schedule** is when behavior is rewarded after a set amount of time. This type of schedule exists in payment systems when someone is paid hourly: no matter how much work that person does in one hour (behavior), they will be paid the same amount (reinforcement).
- With a **variable-interval schedule**, the subject gets the reinforcement based on varying and unpredictable amounts of time. People who like to fish experience this type of reinforcement schedule: on average, in the same location, you are likely to catch about the same number of fish in a given time period. However, you do not know exactly when those catches will occur (reinforcement) within the time period spent fishing (behavior).
- With a **fixed-ratio schedule**, there are a set number of responses that must occur before the behavior is rewarded. This can be seen in payment for work such as fruit picking: pickers are paid a certain amount (reinforcement) based on the amount they pick (behavior), which encourages them to pick faster in order to make more money. In another example, Carla earns a commission for every pair of glasses she sells at an eyeglass store. The quality of what Carla sells does not matter because her commission is not based on quality; it's only based on the number of pairs sold. This distinction in the quality of performance can help determine which reinforcement method is most appropriate for a particular situation: fixed ratios are better suited to optimize the *quantity* of output, whereas a fixed interval can lead to a higher *quality* of output.
- In a **variable-ratio schedule**, the number of responses needed for a reward varies. This is the most powerful type of intermittent reinforcement schedule. In humans, this type of schedule is used by casinos to attract gamblers: a slot machine pays out an average win ratio—say five to one—but does not guarantee that every fifth bet (behavior) will be rewarded (reinforcement) with a win.

All of these schedules have different advantages. In general, ratio schedules consistently elicit higher response rates than interval schedules because of their predictability. For example, if you are a factory worker who gets paid per item that you manufacture, you will be motivated to manufacture these items quickly and consistently. Variable schedules are categorically less-predictable so they tend to resist extinction and encourage continued behavior. Both gamblers and fishermen alike can understand the feeling that one more pull on the slot-machine lever, or one more hour on the lake, will change their luck and elicit their respective rewards. Thus, they continue to gamble and fish, regardless of previously unsuccessful feedback

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