

- Probability - a number between 0 and 1 that describes proportion of times an outcome would occur in a very long series of repetitions
 - Chance behavior is unpredictable in the short run, but has a regular and predictable pattern in the long run
 - describes the long term regularity of events
- Random - when individual outcomes are uncertain but there is a regular distribution of outcomes in a large number of repetitions
 - somewhat predictable
 - Random does not mean "haphazard"
 - random describes a kind of order that emerges ONLY IN THE LONG RUN
- How to figure the probability of something happening?
 - Empirical (or experimental):
 - Repeat experiment many times
 - Calculate proportion of each time outcome occurs
 - Theoretical:
 - Make assumptions based on a set of theories
 - Calculate probability based on this set of theories
 - Personal Probability
 - Personal judgment
 - Not necessarily based on any set of theories or previous observations
 - Not limited to repeatable settings
 - Useful because we base decisions on them
 - Can't be said to be right or wrong
 - Simply expressing individual opinion
 - What one choses to believe (personal belief)
- We can think about probability:
 - as the number of ways an outcome can happen divided by the total number of possible outcomes
 - Probability of an outcome = (# of ways for an outcome to occur) / (total number of outcomes)

- Large Law of Numbers (LLN) If a random phenomenon with numerical outcomes is repeated many times independently, the mean of observed outcomes approaches the expected value