

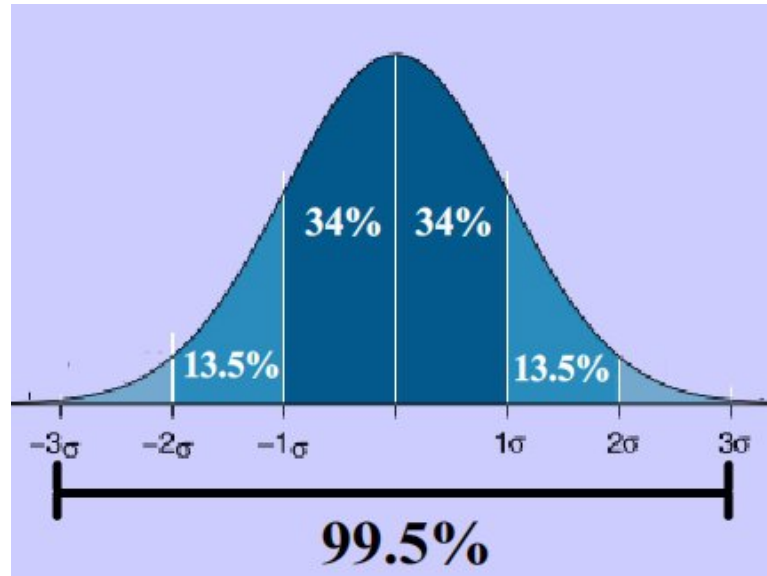
Normal Distributions

Normal Distribution

- Most common distribution in statistics and life
- Symmetric, unimodal, bell curve
- Many distributions of events are effectively normal (height, blood pressure, SAT scores)
- Critically, the distribution of any average value follows a normal distribution
 - This also applies to any expected value
- No distribution will be perfectly normal, because we live in the real world. But many will be so close that it's the most effective distribution to use in calculations.

Normal Distribution

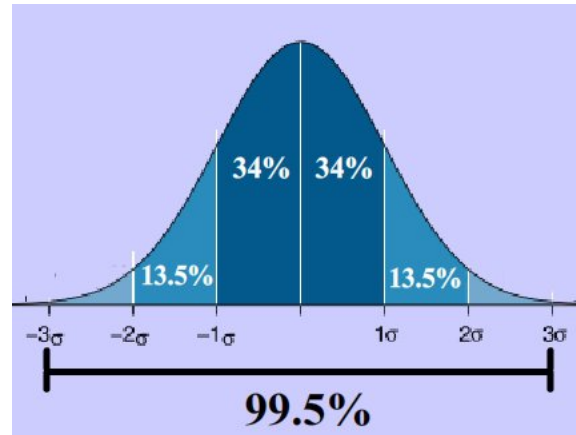
- Generic Normal Distribution



- 68% of the population falls within 1 standard deviation of the mean value, 95% falls within 1.96 standard deviations, and 99.7% falls within 3 standard deviations

95% Confidence Interval

- Generic Normal Distribution



- 90% of the population falls within 1.66 standard deviations (σ) of the mean value
- 95% of the population falls within 1.96 standard deviations (σ) of the mean value.
- 99% of the population falls within 2.58 standard deviations (σ) of the mean value.
- 99.9% of the population falls within 3.291 standard deviations (σ) of the mean value.

Normal Examples

- Normal Distribution: $\mu = 0$ and $\sigma = 1$
 - Called the standardized normal distribution, $N(0,1)$
 - Will often transform data to mimic the standardized normal

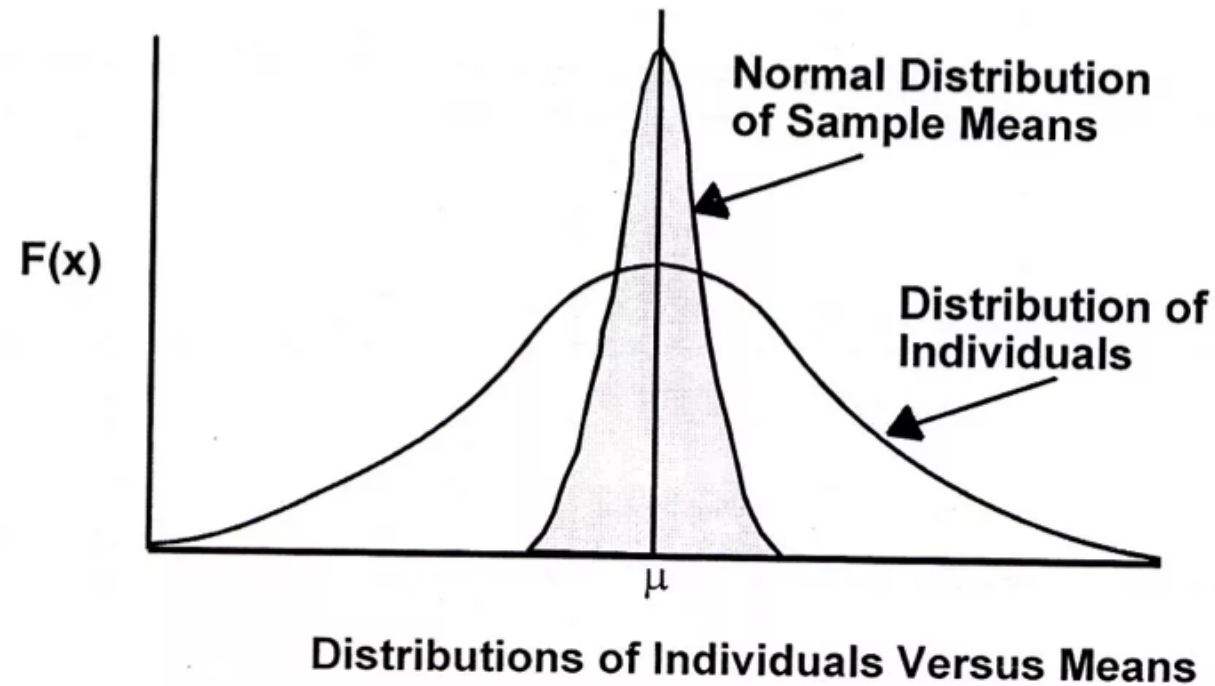


- $N(19,4) = N(\mu, \sigma)$, so $\mu = 19$ and $\sigma = 4$



Difference between distribution of observations and distribution of means

- The distribution of the individuals/observations is much wider than the distribution of the means of those observations



Difference between distribution of observations and distribution of means

- The distribution of the individuals/observations is much wider than the distribution of the means of those observations

