Inferences from Small Samples

1. The Central Limit Theorem, which describes the mean, standard deviation and shape of the sampling distribution, depends on large samples ($n \geq 30$).
2. What can be said about the mean, standard deviation and shape of the sampling distribution when n is small?
3. If the sample is drawn from approximately normal populations, the mean of the sampling distribution is the same for the sampling distribution of the means for large sample.
4. The shape is symmetric.
5. The standard deviation is not 1, it varies because the shape varies for different sample sizes.

"Student's" T scores/distribution

1. Developed by W.S. Gosset in 1908.
2. Based on a ratio of the standard normal distribution function and the square root of the χ^2 distribution.

3. Given a sample of n observations, the statistics

$$t = \frac{\bar{x} - \mu}{s/\sqrt{n}}$$

has a t distribution with n-1 degrees of freedom.

1. There are many different t distributions.
2. Every distribution resembles a standard normal distribution but each have "fatter" tails.
3. Small samples have more variability.
4. As the sample size approaches 30, the distribution becomes normal.

Degrees of Freedom

1. Number of independent units of observations in the sample relevant to estimation of a particular point estimate.
2. There are n observations as the initial units of information.
3. Only one observation is used to determine the point estimate.
4. The remaining observations are allowed to be any value, they are allowed to be "free".

Mathematica Examples

How do T scores compare to Z scores?

Here are the two - tailed values at p=0.05

Z Scores		1.96
T Scores	df=29	2.045
	df=20	2.086
	df=15	2.131
	df=10	2.228
	df= 5	2.571