# Standard Error

Error bars show the mean, and the standard deviation.

Next error bar comes from standard error, shows how mean is distributed

Next is confidence intervals, related to standard error.

If we take groups of data and plot the mean and standard deviation we will have a plot with most means falling around some value and most standard deviations some given range from their respective mean. If we then plot a mean value that is the mean of all the precalculated means this is the mean of the overall population samples. We can then calculate the standard deviation of all the sample means, this is the standard error

Standard error says the expected variation of the mean of a number of samples

Diagram

Description automatically generated

# Confidence Intervals

Bootstrapping is to randomly select n values from the series. We then calculate the mean of those n values, repeats in the n values is okay. We then calculate a lot of means, near 10,000.

A confidence interval is usually like a 95% confidence interval, this is the range that spans 95% of these bootstrapped means.

If 95% confidence interval, anything outside occurs less than 5% of the time, with a p value of less than 0.05 meaning it is statistically different. This is calculating the probability that the true mean is in the 95% confidence interval is 95%

A screenshot of a computer

Description automatically generated with low confidence