Confidence Level

- The confidence level is the probability that a statistical estimate (such as a mean or proportion) from a sample will fall within a certain interval (confidence interval) of the true population parameter.

- A 95% confidence level, for example, implies that if we were to take many samples and calculate a 95% confidence interval for each sample, we would expect about 95% of those intervals to contain the true population parameter.

- For example, if a survey reports a mean income of $50,000 with a 95% confidence interval of $48,000 to $52,000, it means the researchers are 95% confident that the true average income falls within that range.

Significance Level

- The significance level is like a decision threshold in statistical testing. It's a way to set a standard for how confident you want to be in your conclusions, taking into account the possibility of making mistakes.

- Imagine you're trying to decide whether a new medicine works. The significance level is the point at which you say, "If the confidence is beyond this level, I'll conclude the medicine is effective; otherwise, I won't."

- When conducting a hypothesis test at a 5% significance level, you are setting a threshold point to take a risk of making wrong decision on your hypothesis. By this, you are taking a chance of being wrong on making a decision up to 5%, not more than this.

P – Value

- When you're doing a statistical test (like comparing groups or measuring an effect), the p-value helps you decide whether to accept or reject a null hypothesis.

- If the p-value is small (less than your chosen significance level, often 0.05), you reject the null hypothesis and conclude on your alternative hypothesis.

- If the p-value is high (higher than your chosen significance level, often 0.05), you reject the alternative hypothesis and conclude on your null hypothesis.