

STATISTICAL SIGNIFICANCE VERSUS PRACTICAL SIGNIFICANCE

The decision to reject a null hypothesis H_0 is based on the _____. The _____ the p-value the _____ we say is the evidence against the null hypothesis H_0 _____ of the alternative hypothesis H_a .

If we have a _____ sample size n , even _____ differences will become _____. This is because as the sample size increases the sampling distribution becomes _____, and small deviations from the population mean become significant as they are associated with _____.

So, while we might observe a statistically significant difference, it may not be practical at all.

EXAMPLE: Suppose that the SAT Mathematics scores in the absence of coaching vary according to a normal distribution with mean $\mu = 515$ and $\sigma = 100$. Suppose further that coaching may change μ but does not change σ . An increase in the SAT Mathematics score from 515 to 518 is of no importance in seeking admission to college, but this unimportant change can be statistically very significant.

To see this, let's find the p-value based on a sample of size $n_1 = 100$, $n_2 = 1000$, and $n_3 = 10000$, assuming that all three samples yielded a sample mean $\bar{x} = 518$. Assume $\alpha = 0.05$.

1. State the null and alternative hypotheses:

2. Compute the value of the test statistic:

3. Find the p-value associated with the test statistic:

4. Decision:

Conclusion: Statistical Significance is not the same as practical significance. On the other hand, if we fail to reject the null hypothesis, it may be because H_0 is true or because our sample size is insufficient to detect the alternative.