New Statistics Short Course

Exercise 2: Issues with Null Hypothesis Significance Testing and *p*-values

A researcher is interested in exploring whether individuals who attend church at least once a month ("church" group) score higher than those who don't attend church regularly ("no_church" group) on the motivation to apologize (using the *Motivation to Apologize* Scale). The full sample contains 500 individuals in each group.

Question 1

a) What are the null and alternate hypotheses?

b) Is it practical to expect that the null hypothesis could be true in the population?

c) Use a *t*-test to compare the groups and observe the *p*-value. Is it expected that the *p*-value is this small? Since the *p*-value is this small can we conclude that the effect is therefore meaningful?

d) What α level is appropriate for this research question?

e) Can we describe the magnitude of the *p*-value as an estimate of the probability that H_0 is true?

f) Are there more informative hypotheses that could be evaluated? If so, evaluate a more informative set of hypotheses.

g) Is it better to make a dichotomous decision regarding the results, or to focus on the magnitude of the *p*-value?

Question 2

a) How does the *p*-value change if we run the same test on a sample of 50 cases (id numbers) from the dataset? What about a sample of 25 cases?

b) Create 5 samples of size N = 50. Run *t*-tests on all of the samples and record the *p*-values. Does it appear that the *p*-value would provide value information regarding replication?

c) For the nonsignificant *p*-values, is it okay to interpret the results as "thus, the population means are equal"?