3.2

HYPOTHESIS TESTING

Summing up hypothesis testing. Every nonparametric procedure will have these steps.

First, state the hypotheses. There are two types of hypotheses, null and alternate. The null hypothesis says that no difference exists between the conditions, groups, or variables. The alternate hypothesis, also called a research hypothesis, predicts a difference or relationship between conditions, groups, or variables.

The alternate hypothesis may be directional or nondirectional. A directional (one-tailed) hypothesis predicts a statistically significant change in a particular direction. A nondirectional (two-tailed) hypothesis predicts a statistically significant change, but in no particular direction.

We then set the risk (or level of significance) associated with the null hypothesis. Whenever we perform a test, there is always some chance that the results we get are due to chance instead of any real difference. Therefore, when we perform such tests, we state the level of risk that we are willing to accept. The two types of errors we can make are type I, where we claim that there is a difference (alternate is true and null is false) when in reality there is no difference and the null hypothesis is true, and type II, where we claim there is no difference (null is true and alternate is false) when in reality there is a real difference and the null hypothesis is false. The commonly accepted way of stating your risk levels is in terms of the probability you allow yourself to make type I errors α. Most of the time, $\alpha = 0.05$ is used, which means that when we claim our alternate hypothesis is true, we are correct 95% of the time.

We also choose a suitable test statistic based on the characteristics of the data. For example, some tests are appropriate for two sample tests, while others are more appropriate for three or more samples. Different tests may also be suitable for different measurement scales.

We then compute the test statistic. This is usually done with a computer program and the interpretation is different for each statistic so there is not much to say here.

Determine what values the test statistic can take in order to reject the null hypothesis using the appropriate table of critical values for the particular statistic. Finding this critical value may require you to use data characteristics such as the degrees of freedom, number of samples, and/or number of groups.

Compare test statistic value with critical value in the table. Interpret the results then report them.