**Overview of Hypothesis Testing**

1. State the null and alternative hypotheses
2. Carry out an experiment to get a sample statistic (e.g., sample proportion), whose distribution is known under H0.
3. Convert the sample statistic to a test statistic (e.g., convert to a z score), whose distribution is also known under H0.
4. Calculate a p-value, which is the probability that the test statistic differs from its expected value by as much as it does (or more).

If we flip a coin 100 times, and get 62 heads, the P-value is the probability that we observe at least 12 heads more or less than what is expected by chance (assuming the null hypothesis – that the coin is fair – is true)

The corresponding Z-statistic is 2.4 (or 2.3 with the continuity correction).

The p-value is the probability that a random sample from the standard normal distribution is at least 2.4 away from 0.

What is the interpretation of the Z value?

In the color-blind example, the proportion of color-blind males is about 0.098 and the proportion of color blind females is about 0.0068.

This is a difference of 0.098 – 0.0068 = 0.0912.

The p-value is the probability that the difference (in absolute value) between the sample proportions is at least 0.0912 (assuming that the null hypothesis – that there is no difference in colorblind rates between males and females – is true)

The corresponding Z-statistic is 10.9. The p-value is the probability that a normally distributed observations is 10.9 standard deviations or more from the mean.

1. Make a decision regarding H0.