



FIGURE 6.15
Categories of statistical tests

for testing the hypothesis for binary dependent variable. Table 6.11 depicts the summary of assumptions, data scale, and normality requirement for each statistical test discussed in this chapter.

6.4.3 One-Tailed and Two-Tailed Tests

In two-tailed test, the deviation of the parameter in each direction from the specified value is considered. When the hypothesis is specified in one direction, then one-tailed test is used. For example, consider the following null and alternative hypotheses for one-tailed test:

$$H_0 : \mu = \mu_0$$

$$H_a : \mu > \mu_0$$

where:

μ is the population mean

μ_0 is the sample mean

TABLE 6.11

Summary of Statistical Tests

| Test | Assumptions | Data Scale | Normality |
|----------------------------|---|--|--------------|
| One sample <i>t</i> -test | The data should not have any significant outliers. The observations should be independent. | Interval or ratio. | Required |
| Two sample <i>t</i> -test | Standard deviations of the two populations must be equal. Samples must be independent of each other. The samples are randomly drawn from respective populations. | Interval or ratio. Interval or ratio. Interval or ratio. | Required |
| Paired <i>t</i> -test | Samples must be related with each other. The data should not have any significant outliers. | Interval or ratio. | Required |
| Chi-squared test | Samples must be independent of each other. The samples are randomly drawn from respective populations. | Nominal or ordinal. | Not required |
| <i>F</i> -test | All the observations should be independent. The samples are randomly drawn from respective populations and there is no measurement error. | Interval or ratio. | Required |
| One-way ANOVA | One-way ANOVA should be used when you have three or more independent samples. The data should not have any significant outliers. The data should have homogeneity of variances. | Interval or ratio. | Required |
| Two-way ANOVA | The data should not have any significant outliers. The data should have homogeneity of variances. | Interval or ratio. | Required |
| Wilcoxon signed test | The data should consist of two "related groups" or "matched pairs." | Ordinal or continuous. | Not required |
| Wilcoxon-Mann-Whitney test | The samples must be independent. | Ordinal or continuous. | Not required |
| Kruskal-Wallis test | The test should validate three or more independent sample distributions. The samples are drawn randomly from respective populations. | Ordinal or continuous. | Not required |
| Friedman test | The samples should be drawn randomly from respective populations. | Ordinal or continuous. | Not required |