Expected Value. The long-run average of a random variable over an indefinite number of samplings. The expected value [E(*X*)] of a discrete random variable *X* is given by $E(X) = \Sigma X p(X)$ = mean of *X*. It should be noted from the above definition that an expected value may be a value that the random variable could not actually have.

Unbiased Estimator. An estimate of a parameter is said to be unbiased if its expected value is equal to the parameter.

Research Hypothesis. A tentative theory or supposition provisionally adopted to account for certain facts and to guide in the investigation of others. The terms research hypothesis and scientific hypothesis may be used interchangeably.

Statistical Hypothesis. A statement about one or more parameters of a population. Null and alternative hypotheses are two forms of a statistical hypothesis.

Null Hypothesis (H_0). A statement concerning one or more parameters that is subjected to statistical test.

Alternative Hypothesis (H_1). The hypothesis that remains tenable when the null hypothesis is rejected.

Statistical Test. A procedure whereby two mutually exclusive statistical hypotheses are evaluated in the light of sample data. The hypothesis that dictates the sampling distribution against which an obtained sample value is compared is said to be the one tested.

Level of Significance (α). Probability of rejecting the null hypothesis when it is true.

Type I Error. Error that occurs when the experimenter rejects the null hypothesis when it is true. The probability of committing a type I error is determined by the level of significance (α) that the experimenter adopts.

Type II Error. Error that occurs when the experimenter fails to reject the null hypothesis when it is false. The probability (β) of committing a type II error is determined by the magnitude of the experimental effect, size of sample, magnitude of random error, and level of significance.

Power of Test. Probability of rejecting the null hypothesis when the alternative hypothesis is true. If β is designated as the probability of committing a type II error, power is equal to $1 - \beta$.

Confidence Interval. A range of values that, considering all possible samples, has some designated probability of including the true population value.

Confidence Limits. Upper and lower boundaries of confidence interval.

Critical Region. A set of outcomes of a statistical test that leads to the rejection of the null hypothesis.

Replication. The collection of two or more observations under a set of identical experimental conditions.

Degrees of Freedom (df). The number of independent observations for a source of variation minus the number of independent parameters estimated in computing the variation.

Experimental Error. Measure that includes all uncontrolled sources of variation affecting a particular score.