1. To predict the annual salary of bank presidents, we must perform multiple regression analysis. In regression, we analyse the relation between different independent and dependent variables.

Here, the annual salary of the bank is a dependent variable and age, race and gender are independent variables.

Now, we need to perform an a priori analysis to find the sample size to prevent type – II error.

Type II error: It is the probability of accepting the null hypothesis, when it is false, and it is denoted by Beta. Preventing type two error is equivalent to maximizing power and for reducing type-II error, we can do it to increase the sample size.

Step -1

* Test Family: F-Tests
* Statistical Test: Linear multiple regression: fixed model R-squared deviation from zero.
* Type of power analysis: A priori-compute required sample size given alpha, power, and effect size.
* Effect size: 0.15
* α error prob: 0.05
* Power: 0.80
* Number of predictors: 3

Sample size = 77

Actual power = 0.80

Therefore, the required sample size is 77.

Graphical user interface, application

Description automatically generated

1. We must test the difference in growth rate between publicly traded enterprise and privately held firm we need to perform the t-test for means. To find power, we must specify the mean difference between the two population means.

Now to perform post hoc analysis to find the power of the test.

Step 1:

* Test Family: t-tests
* Statistical Test Means: Difference between two idependent means
* Type of power analysis: Post hoc: compute achieved power
* Effect size: 0.5
* α error prob: 0.01
* Sample size group 1: 100
* Sample size group 2: 100

The power is 0.82

Graphical user interface, chart, application, histogram

Description automatically generated

1. We must test the difference in self-efficacy, burnout and workload among different types of cocaches, we perform MANOVA.

In MANOVA, we analyse the difference in means when there are more than one dependent variable and an independent categorical variable.

Here, the dependent variables are self-efficacy, burnout and worload.

The independent variable is the different types of football cocahes, these are

* School Football Coaches
* College Football Coaches
* Professional Football Coaches

We now want to perform an priori analysis, and hence find the number of coaches required to conduct the analysis.

Step 1:

We first obtain a table, from which we choose the following:

* Test Family: F-tests
* Statistical Test: MANOVA Global effects
* Type of power analysis: A priori-compute required sample size
* Effect size: 0.4
* α error prob: 0.05
* Power: 0.95
* Number of groups: 3
* Response variables: 3

Total sample size is 30.

We require 10 coaches under each category.

Since we are to perform MANOVA, it is necessary to have equal sample sizes.

Graphical user interface, application

Description automatically generated