Principal Component Analysis

This guide provides instructions on performing a principal component analysis (PCA). This analysis method is often used to reduce the dimensionality of a data set (i.e., fewer variables) by creating a new set of variables that are linear combinations of the original variables statistically independent of each other and that capture the most information (i.e., variation and correlation) contained in the original variables.
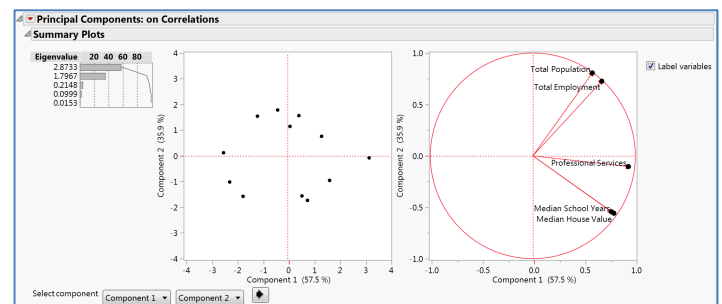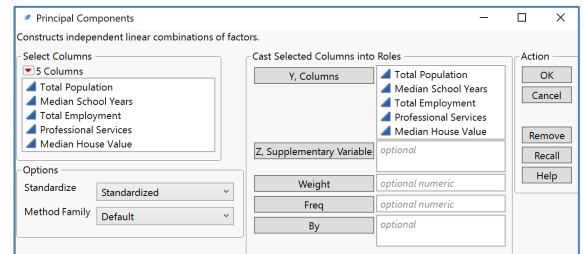
Principal Components

1. From an open JMP® data table, select **Analyze > Multivariate Methods > Principal Components**.
2. Select continuous variables from **Select Columns**, and Click **Y, Columns** (continuous variables have blue triangles).
3. Click **OK.**

    By default, JMP displays the eigenvalues and three **Summary Plots**.

Socioeconomic.jmp (Help > Sample Data Folder)

- **Eigenvalue Pareto Plot**: The percent and cumulative total percent of the variation accounted for by each principal component.
- **Score Plot** (middle): A scatterplot of the first two principal components. Use the options at the bottom to select any two components to display.
- **Loading Plot**: Correlations between the original variables and the two selected principal components. (Note: The factor loadings are unrotated.)

Interpretation:

- The first two principal components account for 93.4% (57.5 + 35.9 = 93.4) of the total variation in the data (see the Pareto Plot). These numbers are displayed on the graph axes of the Score Plot and Loading Plot.

- All of the original variables are positively correlated with the first principal component (see the Loading Plot). Total Population and Total Employment are positively correlated with the second principal component, while the other variables are negatively correlated with the second principal component.

Tips:

- By default, PCA is performed on correlations.
- Click on the **top red triangle** to change the method of calculation, view additional results, save the principal components to the data table, or view detailed information associated with the eigenvalues.
- Principal component analysis can also be accessed through the **Scatterplot 3D** platform or the **Multivariate** platform.

Visit **Multivariate Methods > Principal Components** in **JMP Help** to learn more.