

SCATTER DIAGRAM

A scatter diagram is a tool for analyzing relationships between two variables. One variable is plotted on the horizontal axis and the other is plotted on the vertical axis. The pattern of their intersecting points can graphically show relationship patterns. Most often a scatter diagram is used to prove or disprove cause-and-effect relationships. While the diagram shows relationships, it does not by itself prove that one variable *causes* the other. In addition to showing possible cause-and-effect relationships, a scatter diagram can show that two variables are from a common cause that is unknown or that one variable can be used as a surrogate for the other.

When to use it:

Use a scatter diagram to examine theories about cause-and-effect relationships and to search for root causes of an identified problem. Use a scatter diagram to design a control system to ensure that gains from quality improvement efforts are maintained.

How to use it:

Collect data. Gather 50 to 100 paired samples of data that show a possible relationship.

Draw the diagram. Draw roughly equal horizontal and vertical axes of the diagram, creating a square plotting area. Label the axes in convenient multiples (1, 2, 5, etc.) increasing on the horizontal axes from left to right and on the vertical axis from bottom to top. Label both axes.

Plot the paired data. Plot the data on the chart, using concentric circles to indicate repeated data points.

Title and label the diagram.

Interpret the data.

Scatter diagrams will generally show one of six possible correlations between the variables:

Strong Positive Correlation

The value of Y clearly increases as the value of X increases.

Strong Negative Correlation

The value of Y clearly decreases as the value of X increases.

Weak Positive Correlation

The value of Y increases slightly as the value of X increases.

Weak Negative Correlation

The value of Y decreases slightly as the value of X increases.

Complex Correlation

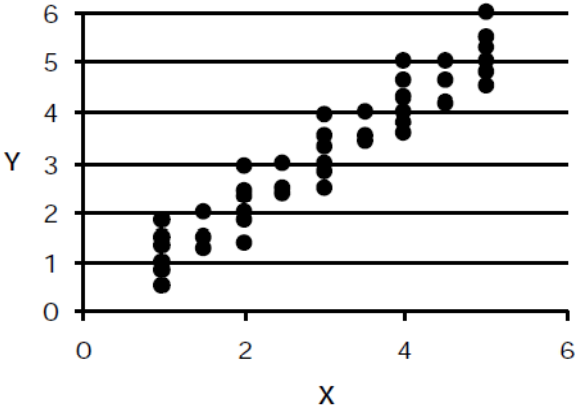
The value of Y seems to be related to the value of X, but the relationship is not easily determined.

No Correlation

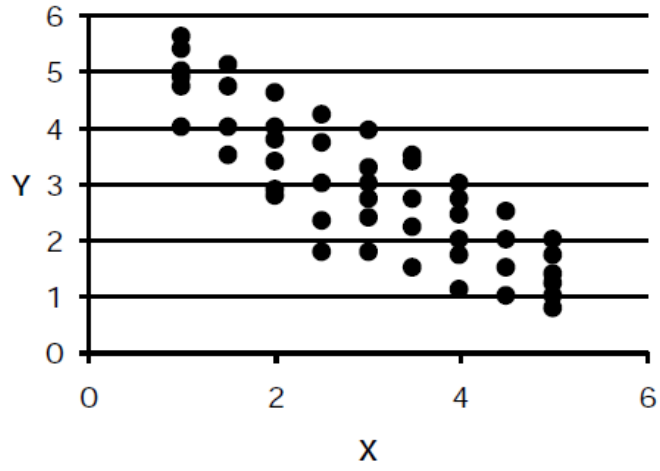
There is no demonstrated connection between the two variables.

Scatter Diagram Example

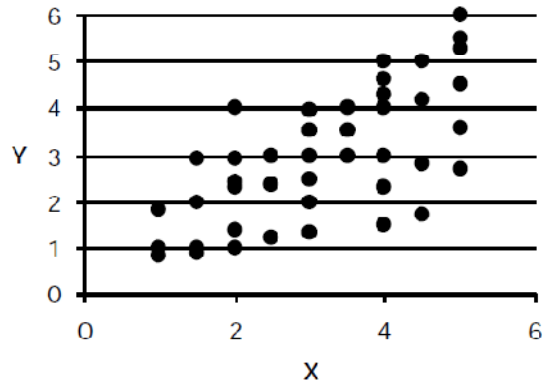
Strong Positive Correlation



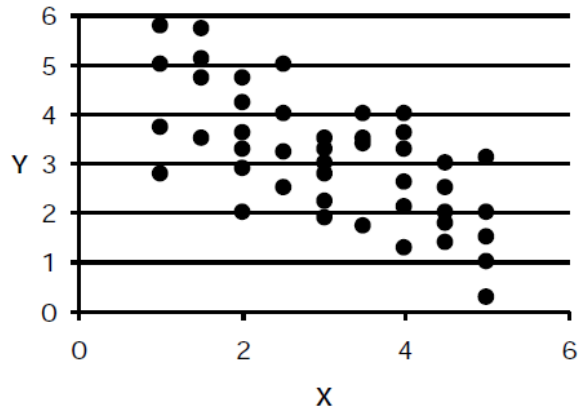
Strong Negative Correlation



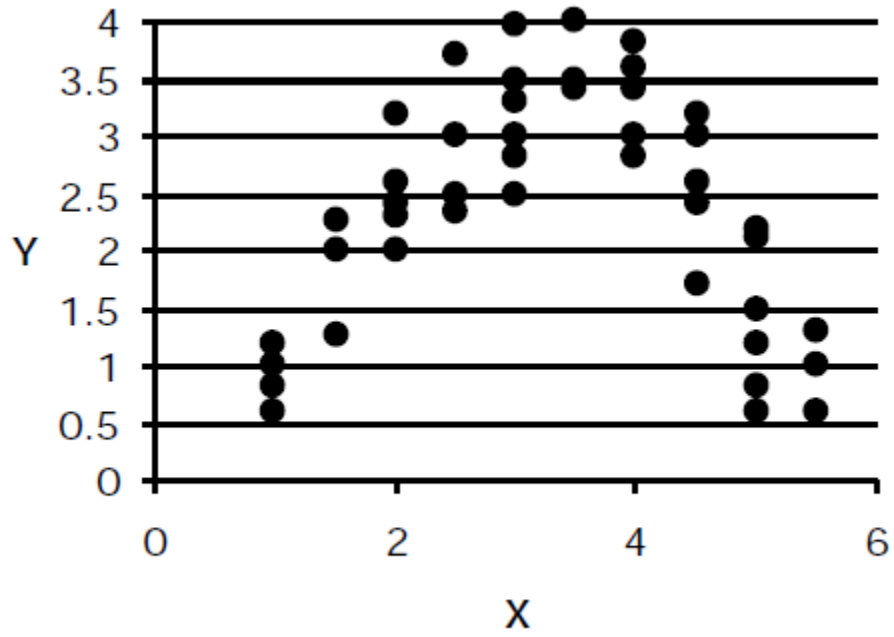
Weak Positive Correlation



Weak Negative Correlation



Complex Correlation



No Correlation

