

# Representing How Two Data Sets Are Related

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#### WHAT'S COVERED

This lesson discusses representing how two data sets are related. By the end of the lesson, you'll be able to identify and interpret the slope in a straight line model. This lesson covers:

1. Slopes of Lines

2. Slopes and Scatterplots

## **1. Slopes of Lines**

One of the goals of using the correlation coefficient is to determine if and how closely two variables are related. The two simplest ways in which two variables can be related is that as one of them increases, the other increases, or if one increases, the other decreases.

A scatterplot has two axes, the horizontal and the vertical.

### Scatterplot



### **Horizontal Axis**

The horizontal axis is called the x-axis. The values presented along this axis are the x-values of the points given in the scatterplot. The vertical axis is called the y-axis. The values presented along this axis are called the yvalues of the points given in the scatterplot.

If the data in a scatterplot closely follows a straight line, it is important to be able to describe how one variable changes due to changes in another variable. Being able to describe this relationship gives us some insight regarding the prediction of trends in the data. In the event that the data is generally spread out, our prediction will not be accurate, but if the data is clustered closely, our prediction could be plausible.

The steepness of the line is explained by what is known as the line **slope**. If the slope of a line is positive, the line rises from left to right.

## **Positive Slope**



If the slope is negative, the line falls from left to right.



**Negative Slope** 

Recall from previous lessons that there are independent and dependent variables. The slope of a line describes how much the y-variable, or the dependent variable, changes if the x-variable, which is the independent variable, increases. If the slope is positive, the y-variable increases as the x-variable increases. If the slope is negative, on the other hand, the y-variable decreases as the x-variable increases.



#### Slope

How much the y-variable changes if the x-variable increases.

## 2. Slopes and Scatterplots

Take a look at an example here of annual income of an individual and the value of their home:



## Home Value and Income

The line that you see is the line of best fit based upon the observations of the scatterplot, and the slope is positive.



What does a positive slope mean in this particular case?

It means the greater the income, the higher the value of the home.

Now take a look at a scatterplot that illustrates the amount of time an individual spends exercising per day and their body fat percentage.



Notice that there's a downward-sloping line. This makes sense because the more somebody exercises, the lower the level of body fat they usually have. That's not necessarily the only thing that could reduce body fat, but it does make sense that there would be a relationship here.

#### SUMMARY

In this lesson, you learned how to be able to identify and interpret the **slopes of lines**. You explored downward-sloping lines and upward-sloping lines, or positive slopes and negative slopes. You also saw how **slopes and scatterplots** relate.

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#### TERMS TO KNOW

Slope

How much the y-variable changes if the x-variable increases.