



Relationships between variables

Is the length of a person's foot related to his or her height?

If so, how could we describe the relationship mathematically?

The answers to these questions could be affected by the sample that you are investigating: for example, the size of the sample and the controlled and uncontrolled variables used in selecting it.

A **controlled variable** is a characteristic that you choose to be the same for all the people in your sample. For example, by only collecting data on people with brown eyes, you have controlled the variable of eye colour.

An **uncontrolled variable** is a characteristic that you allow to stay random during the sampling. For example, if you collect data on people of all eye colours, then eye colour is an uncontrolled variable.

In this activity you will select three different samples of data, then create a scatterplot for each one and see if you find a relationship between foot length and height. You will then describe how the sample used may affect the type of conclusions you can make about the data.

Part 1: Choose three different samples of *Census at School* data

From your home e-mail, request three different samples of data from the U.K. Census at school site. (Go to www.censusatschool.ca, click on "Data and results" and look under "International results".) As of February 2005, there are 9 different databases at this site: Canada, South Africa, Queensland (Australia), South Australia, New Zealand, and 4 phases (collection years) of data from the U.K.

Each database allows you to choose a sample size, and some offer certain controlled variables, such as geographic region or grade level. Once you have received the data spreadsheet, you can further refine your sample by selecting other variables to control. For example, you could choose to control gender (males only), age (14-year-olds only), or both variables (14-year-old males only).

Part 2: Describe your three samples

Once you have determined the three samples you want to use, fill in the table below.

Characteristics	Sample 1	Sample 2	Sample 3
*Controlled variables			
*Uncontrolled variables			
Sample size			
Other (i.e. country)			

Part 3: Graph each sample of data

Create a scatterplot of each sample with foot length on the x-axis and height on the y-axis.

Part 4: Analyse the scatterplots

Answer the following questions:

- Describe the samples you have chosen, and why you chose them.
Why did you choose to control the variables that you controlled?
Why did you leave some uncontrolled?
- Describe whether or not you see a relationship in the scatterplot of each of the samples of data.
Describe how you made this decision.
- For each graph that you say shows a relationship between foot length and height, draw the line of best fit.
- Based on your analysis, how would you answer the question 'Is the length of a person's foot related to his or her height?'

Contributed by Florence Glanfield and Janelle Tang, University of Saskatchewan.