

Section 3.1.10 – Response & Explanatory Variables

VCAA “Dot Points”

Investigating associations between two variables, including:

- response and explanatory variables and their role in investigating associations between variables

Response & Explanatory Variables

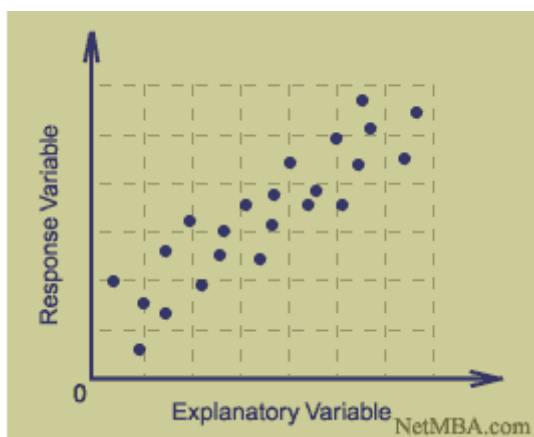
A set of data involving **two variables** where one affects the other is called **bivariate data**.

A **response variable**, also known as dependent variable, is something that responds to or depends on other factors. Often the response variable is the outcome of a study or research.

For example, a test score could be a response variable because it could respond to several factors such as how much you studied or how much sleep you have had.

An **explanatory variable**, also known as an independent variable, is a variable that **explains changes** in the response variable.

For example, someone's age might be an explanatory variable used to explain a person's salary.



NB: When graphed the explanatory variable is graphed on the **x axis**.
When graphed the response variable is graphed on the **y axis**.

An easy way to remember is to insert the names of the two variables you are using in the below sentence in the way that **makes the most sense**. Then you can figure out which is the explanatory variable and which is the response variable:

(explanatory variable) can explain a change in the (response variable) and it isn't possible that the (response variable) can explain a change in the (explanatory variable).

Example 1

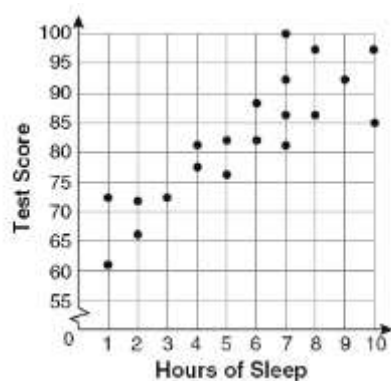
Consider the example of two variables shown in the graph to the right:

- Test Score
- Hours of sleep

Which variable is the response variable and which is the explanatory variable?

From the graph it can be seen that:

- Test score is y-axis, \therefore response variable
- Hours of sleep is x-axis, \therefore explanatory variable



Alternatively check the following sentences:

(Hours of sleep) can explain a change in (Test Scores) ☒

(Test Scores) can explain a change in (Hours of sleep) ☐

We see that "Hours of sleep" must be the explanatory variable and "Test Score" must be the response variable because the sentence doesn't make sense the other way around.

Example 2

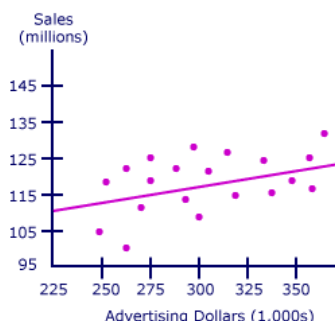
Consider the example of two variables shown in the graph to the right:

- Sales
- Advertising expenditure

Which variable is the response variable and which is the explanatory variable?

From the graph it can be seen that:

- Sales is y-axis, \therefore response variable
- Advertising expenditure is x-axis, \therefore explanatory variable



Alternatively check the following sentences:

(Advertising expenditure) can explain a change in (Sales) ☒

(Sales) can explain a change in (Advertising expenditure) ☐

We see that "Advertising expenditure" must be the explanatory variable and "Sales" must be the response variable because the sentence doesn't make sense the other way around.