

# Statistical Reports Summary

## Introduction to Statistics & Data

### What you need to know

**Statistics** – lets us analyse if **data is significant**, by making **probability statements**.

**Methods of gathering data:**

**Primary data** – data that you gather yourself

**Secondary data** – use information that has already been collected.

**Types of data:**

**Categorical Data** - data that can be divided into groups

**Discrete Data** - data that can have any whole number value

**Continuous Data** - data that can have any numerical value in a range

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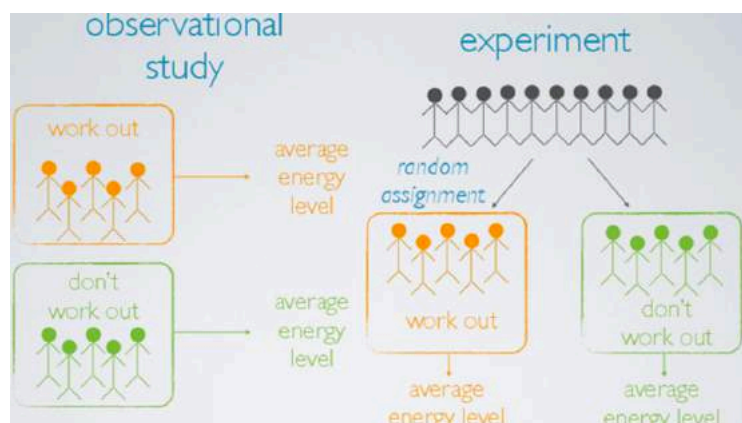
## Variables & Study Types

### What you need to know

**Independent variable** - variable which is usually being changed in the investigation.

**Dependent variable** – changes as a result of the independent variable being changed.

**Conflict of interest** – this occurs when researchers benefit either directly or indirectly from the outcome of a study.



Can't make causal claims

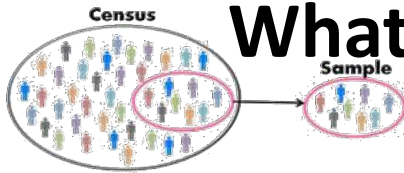
Can make causal claims

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## Sampling



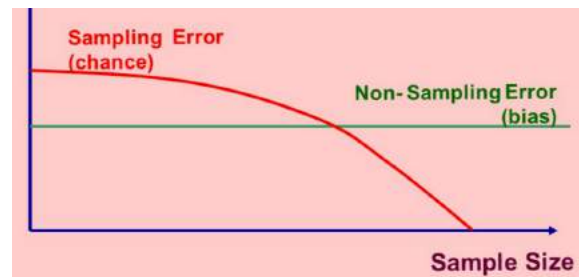
## What you need to know

<b>Random sampling</b>	List every individual in the population the use a random process to select the sample. E.g. random number generator.
<b>Cluster sampling</b>	Population contains subsets which are representative of the population.
<b>Stratified sampling</b>	The population is split into important parts called 'strata'. Numbers in the sample strata should represent that of the population.
<b>Systematic sampling</b>	List every individual in the population the use a systematic process to select the sample. E.g. every third.

**Target population** – refers to the group of individuals you want to find information about.

A **census** includes all of these individuals

A **sample** includes some of these individuals



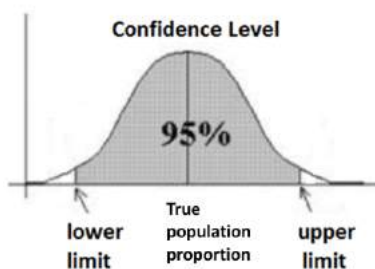
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## Confidence Intervals & Margin of Errors

### Summary

$$\text{Confidence interval using population proportions} = p \pm z \sqrt{\frac{p \times (1-p)}{n}}$$



**Margin of error**

95% CI  $z = 1.96$   
99% CI  $z = 2.576$

**Rule of thumb:** when  $0.3 \leq p \leq 0.7$ , margin of error is approx  $\frac{1}{\sqrt{n}}$



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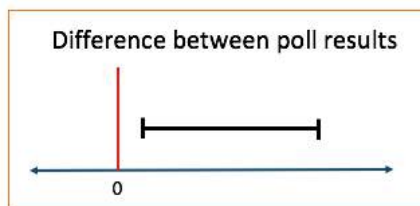
# Statistical Reports Summary

## Differences in Proportions

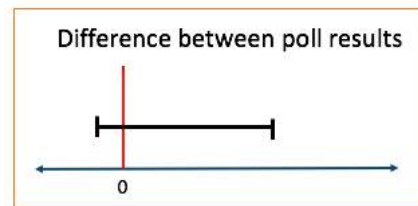
### What you need to know

For the difference between two proportions from the **same sample** margin of error is  $2 \times$  reported margin of error

For the difference between two proportions of two **independent samples** margin of error is  $1.5 \times$  average reported margin of error



Significant difference



Not significant difference

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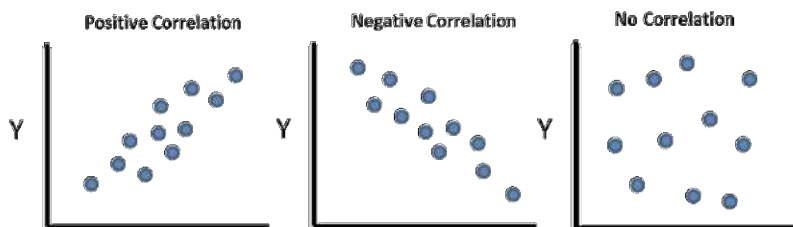
## Correlation & Causation

### What you need to know

**Correlation** – when an increase in one variable is associated with an increase or decrease in a variable.

**Causality** – when one variable is changed, this **causes** a change in another variable.

**Confounding variable** – a variable which is independently associated with both the exposure and the outcome. Makes it seem like a relationship exists when it actually does not.



**correlation**  
 $\neq$   
**causation**

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