



RESEARCH METHODS

YEAR 11 PSYCHOLOGY

There are **five** basic ways of doing research in psychology:

- **Each method is useful for a particular reason or group of reasons.**
- **Each method has benefits and limitations.**



Method 1:

Genie Wiley, who as a child was locked in a tiny room for 12 years.



When Genie was rescued, many psychologists wanted both to study her and save her. What is an intensive study of one person called?



Case Study

Advantages/Uses of Case Studies

- ❖ Intensive study of a person which can yield in-depth information
- ❖ Particularly useful for studying unusual experiences, diseases or situations which could not be studied in any other way
- ❖ By collecting a number of case studies on a particular topic, researchers can often tease out similarities in the cases or find common threads that they might never have expected.



What kind of person or situation might be appropriate for a case study?

- ❖ A person who has experienced a rare traumatic event, such as Phineas Gage (metal pole blasted through head in 1848) or Dante Autullo (shot a nail into his head, 2012)
- ❖ A person with a rare psychiatric disorder, such as dissociative identity disorder (much rarer than Hollywood would have us believe)
- ❖ People who have committed horrific crimes, e.g. men on Death Row in America



**Shot a nail into his head,
didn't realise he'd done
it, felt a bit unwell 36
hours later...
Dante Autullo**

Method 2:

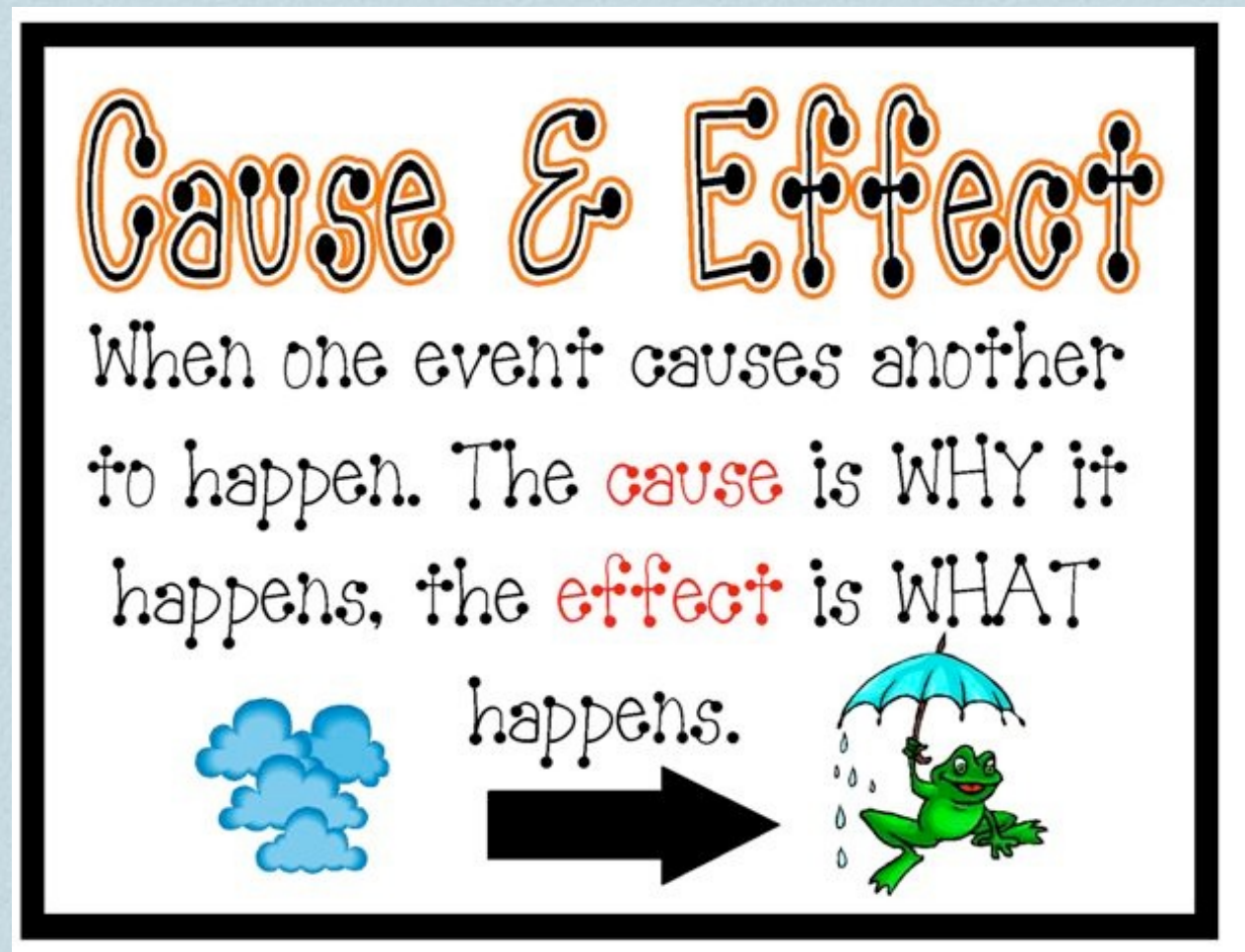
Experimentation

An experiment allows a **cause-effect relationship** to be established. In the simplest form of experiment, the researcher wants to find out how one variable (the cause) affects another (the effect) by exposing **one group** to the cause while **the other group** does not experience it.

Experiments

The **cause** in an experiment is called an **independent variable**.

The **effect** in an experiment is called the **dependent variable**.



Causes and Effects



Cause: Sleep deprivation



Effect:
Performance on boring task

Causes and Effects

Now let's be more specific:



Independent Variable:

Sleep deprivation

- total sleep deprivation
- REM sleep deprivation
- no deprivation (participant sleeps all night)



Dependent Variable:

Number of pencils
sharpened in 15
minutes

Sampling and Population

The **population** is the group of people or events that the researcher wants to investigate.

e.g. students at BHHS, parents of school-age children in Victoria, cycling accidents in Melbourne in 2011

The **sample** is the smaller group that is drawn from the larger group for study purposes. The theory is, the results gained from the sample group can then be applied to the whole population, provided that the sample is...

REPRESENTATIVE!

Three types of sampling:

- **Convenience sampling** - choosing anyone who is there!
- **Random sampling** - using a method to ensure everyone in the population has an equal chance of being chosen
- **Stratified sampling** - making sure that all relevant groups within a population are represented, e.g. gender proportions are held constant, age-groups, socioeconomic status - any aspect of the population that matters is proportionally represented in your sample

If the sample doesn't represent the population in some vital way, then the results won't be very **useful**, **valid**, **applicable**, **conclusive** or **meaningful**.

The pitfalls of non-equivalent groups...

- ❖ If you allocate participants to groups in a biased way, then whatever happens in the experiment might be caused by the differences between your groups.



Group 1



Group 2

Having non-equivalent groups means that any difference between them could be due to many factors other than the independent variable.

In a completely theoretical perfect experiment...

the only difference between the control and experimental groups would be...

...the independent variable

In reality, it is almost impossible to achieve this. But one purpose of good experimental design is get as close as you can.



Differences between participants that could affect the result of an experiment are called **participant variables.**

Participant variables might include...



intelligence



prior knowledge



motivation

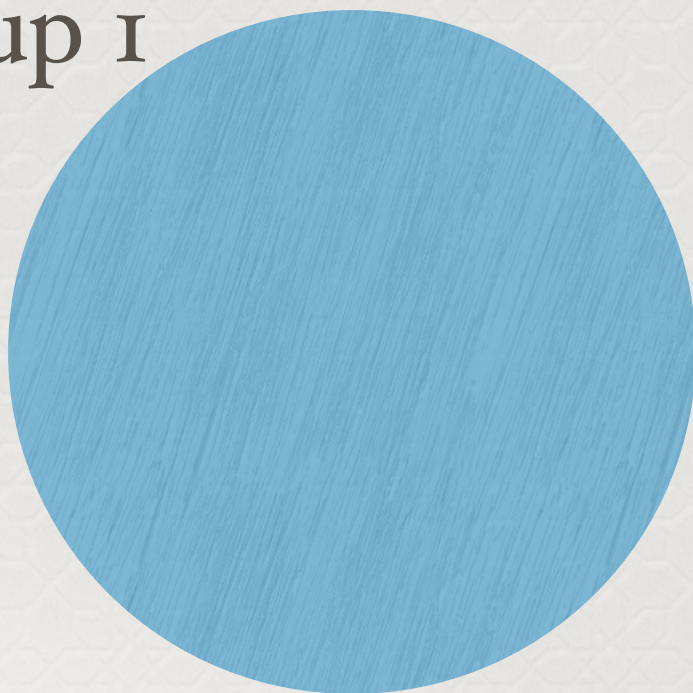


anxiety levels

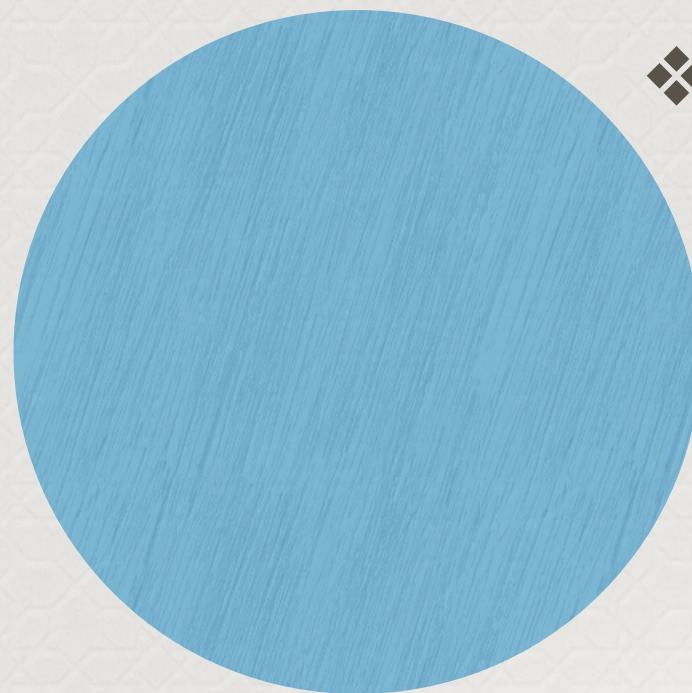
Getting (roughly) equivalent groups: three experimental designs

- ❖ Allocate your participants randomly to groups. This results in an experimental design called **INDEPENDENT GROUPS**.

❖ Group 1



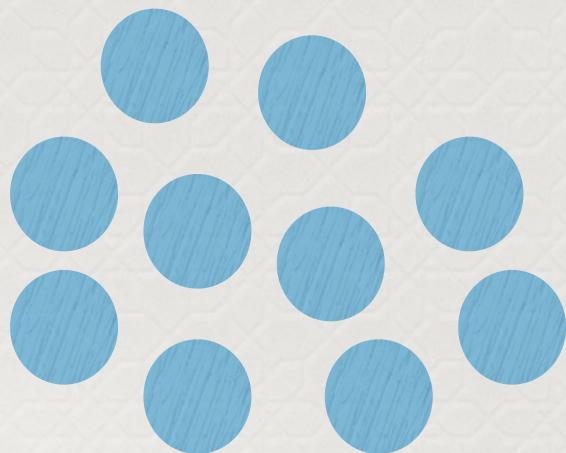
❖ Group 2



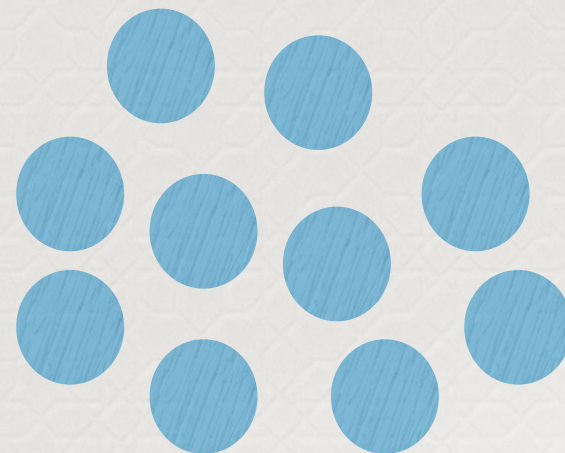
Getting (roughly) equivalent groups: three experimental designs

- ❖ Have the same participants do two activities or undertake two tasks, introducing the independent variable so that it influences them during one activity or task. This design is called **REPEATED MEASURES**.

❖ Task 1



❖ Task 2



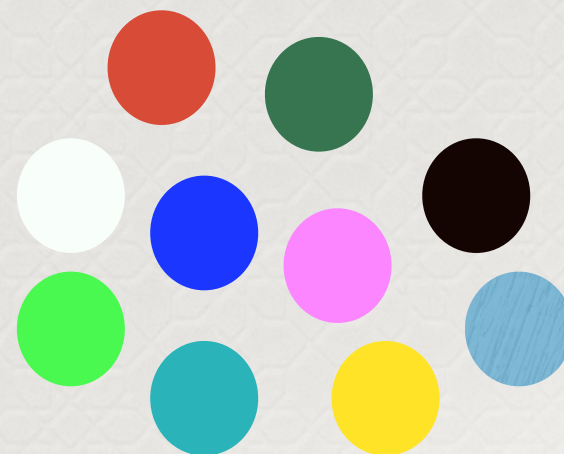
Getting (roughly) equivalent groups: three experimental designs

- ❖ Match participants on a number of important factors, such as prior knowledge, age, intelligence, driving experience, etc. Then randomly assign each pair of participants to either the control group or the experimental group. This design is called **MATCHED PARTICIPANTS**.

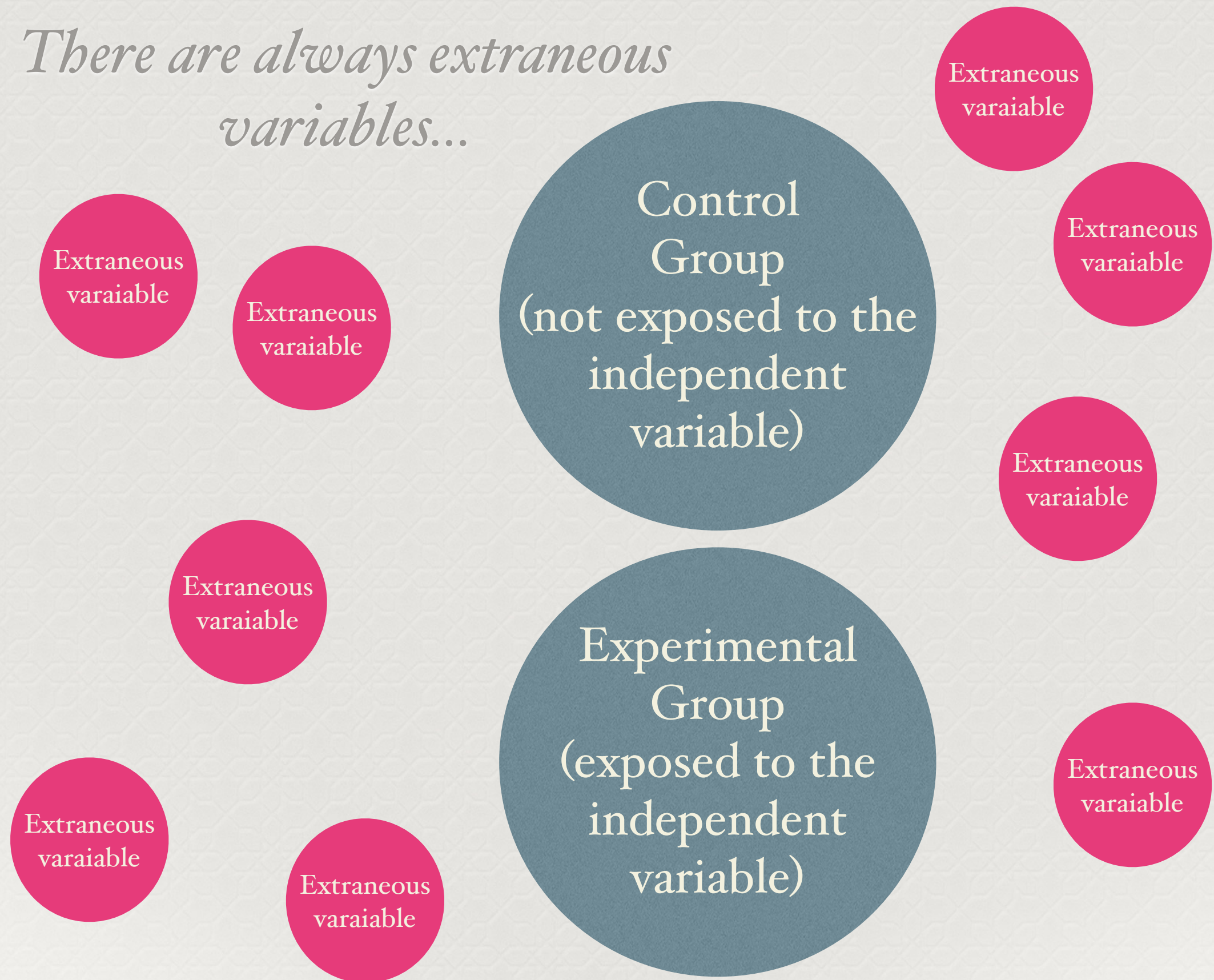
❖ Group 1



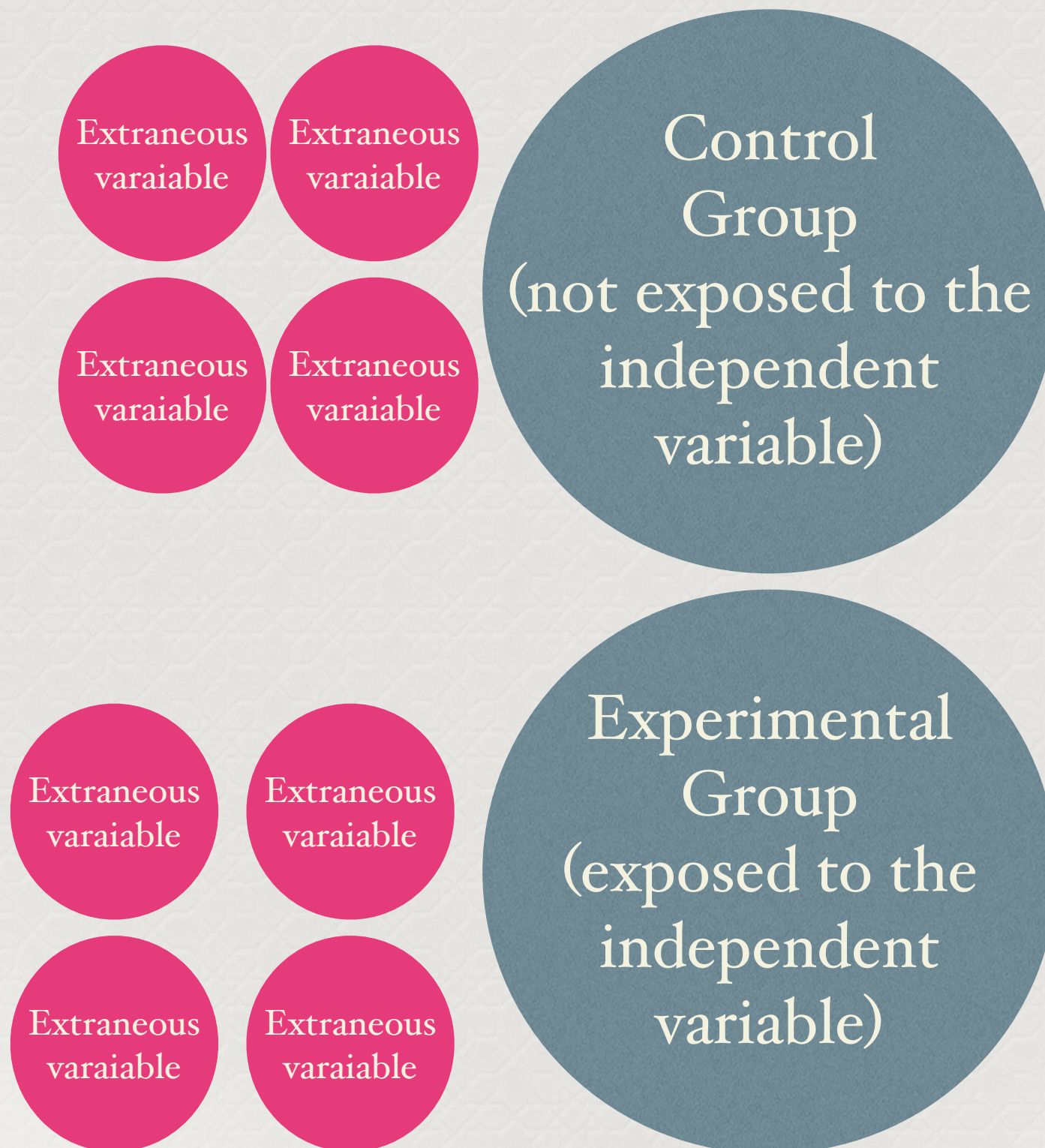
❖ Group 2



There are always extraneous variables...



The aim is to ensure they are evenly distributed.



Random assignment to groups and other standardised procedures should mean that extraneous variables affect both groups roughly evenly.

If the extraneous variables are all lined up with (or opposite) the IV, however, then they can become confounding variables.

Control
Group
(not exposed to the
independent
variable)

Confounding
variable

Confounding
variable

Confounding
variable

Confounding
variable

Experimental
Group
(exposed to the
independent
variable)

Difference between **extraneous variables** and **confounding variables**

- ◆ An **extraneous variable** is any variable other than the IV that might influence the DV.
- ◆ Extraneous variables are generally controlled by using standardised procedures and by randomly assigning participants to groups.
- ◆ A **confounding variable** is one that has become confused with the IV and therefore has made it impossible to determine what really caused the DV. A confounding variable has got in the way of the causal relationship between the IV and the DV.

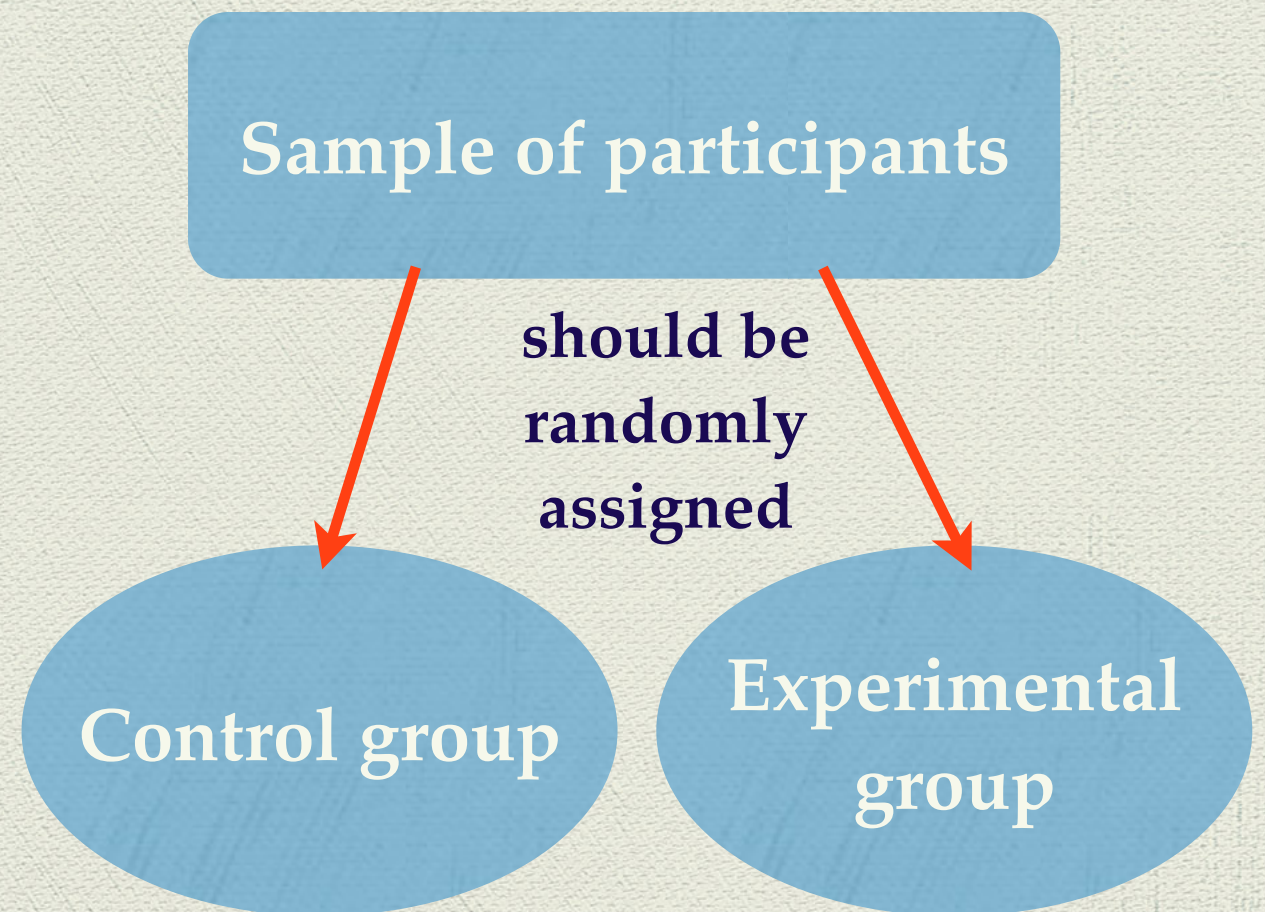
Confounding variables...

- ◆ influence one group or one condition consistently more than or differently from the other, meaning that the pure and unsullied relationship between the IV and the DV can no longer be relied upon
- ◆ make it difficult to be sure whether the IV caused the DV, or the confounding variable, or some grisly mixture of the two

Independent groups design

CHARACTERISTICS

- ◆ Also called a between participants or between subjects design
- ◆ Each participant is randomly allocated to the control or experimental groups
- ◆ That means, each participant is in one group only and experiences only one condition.

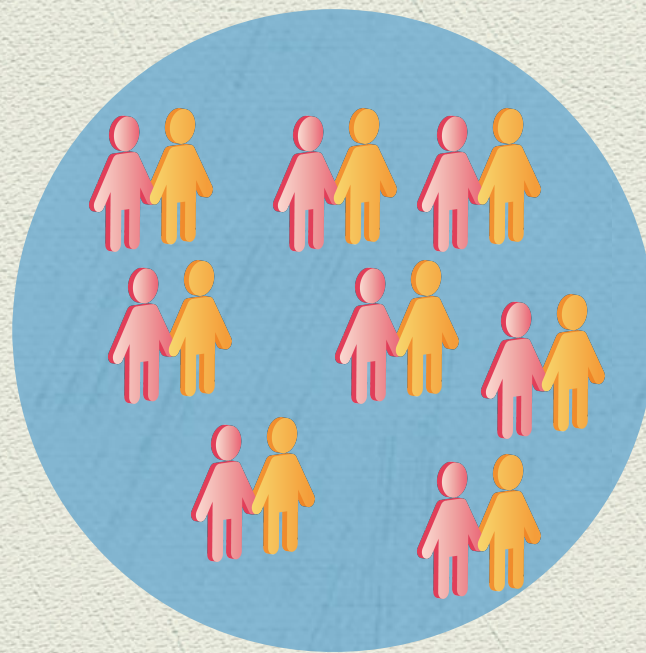


Independent groups design

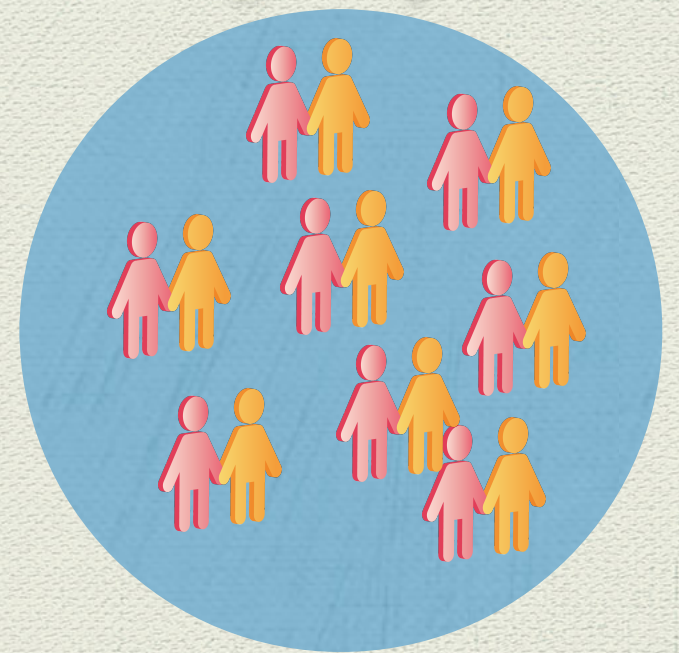
ADVANTAGES

- ◆ No order effects
- ◆ Relatively simple to organise and administer
- ◆ What are some potential disadvantages of this design?

Control Group



Experimental group



Independent groups design

DISADVANTAGES

- ◆ Potential for participant differences to lead to extraneous variables that might affect results
- ◆ There is less control over relevant differences in participants, such as... problem-solving ability, motivation, memory skills, prior knowledge, etc.
- ◆ Random allocation to groups is intended to negate or at least to minimise the influence of these variables but if there are only small groups this randomising effect may be inadequate.

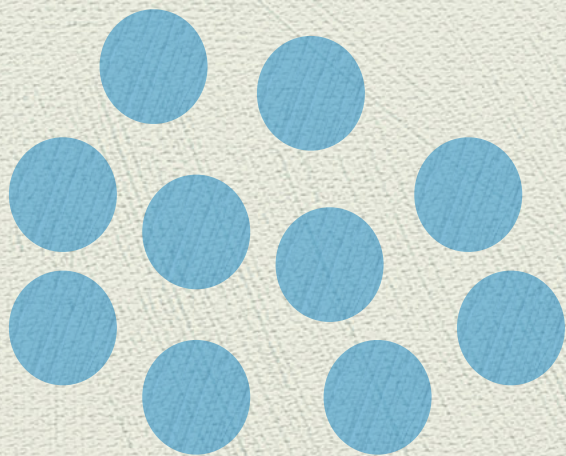
Independent groups design - OVERCOMING DISADVANTAGES

- ◆ Make sure you **randomly allocate** participants to each group
- ◆ Ensure that groups are large enough to result in roughly equivalent groups (hopefully)
- ◆ Use a **repeated measures design** or a **matched participants design** to reduce the impact of possible participant-related extraneous variables

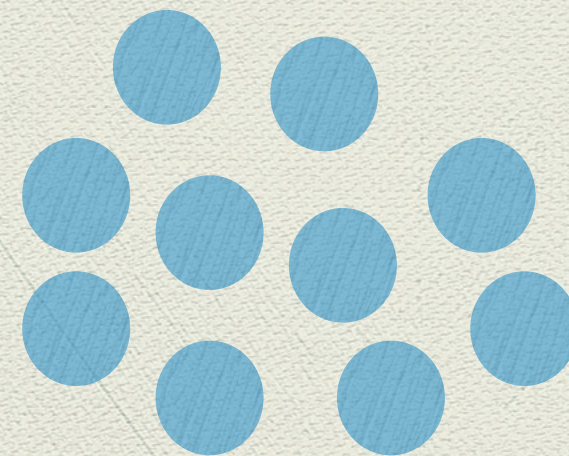
Repeated measures design

- ◆ Also called **within-participants design** or **within- subjects design**
- ◆ The same participants are used in both the control and the experimental conditions

❖ Task 1 OR Condition 1



❖ Task 2 or Condition 2



Repeated measures design

ADVANTAGES

- Allows you to control participant-related extraneous variables, e.g. variations in motivation, intelligence, prior knowledge, problem-solving ability, etc.

One group of participants

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graph TD; A[One group of participants] --> B[The whole group completes Task 1 or experiences Condition 1]; A --> C[The whole group completes Task 2 or experiences Condition 2];
```

The whole group completes Task 1 or experiences Condition 1

The whole group completes Task 2 or experiences Condition 2

Be aware...

- ◆ Using a **repeated measures design** or a **matched participants design** to reduce the impact of possible participant-related extraneous variables can have disadvantages.



Possible problems with a repeated measures design...

- ◆ A **repeated measures design** introduces the possibility of order effects
- ◆ Since the two different measures would need to be conducted at different times, **situational factors** might affect the results, e.g. time of day, room used, etc.
- ◆ A repeated measures design is more complex to administer and takes more time.

Repeated measures design

DISADVANTAGES



- ❖ **Order effects** caused by one task being completed second
- ❖ The second task may be done **better** because it has already been practised, or done **worse** because the participant is fatigued or bored



Fatigue or boredom in the second condition could be a disadvantage in the repeated measures design

Counterbalancing

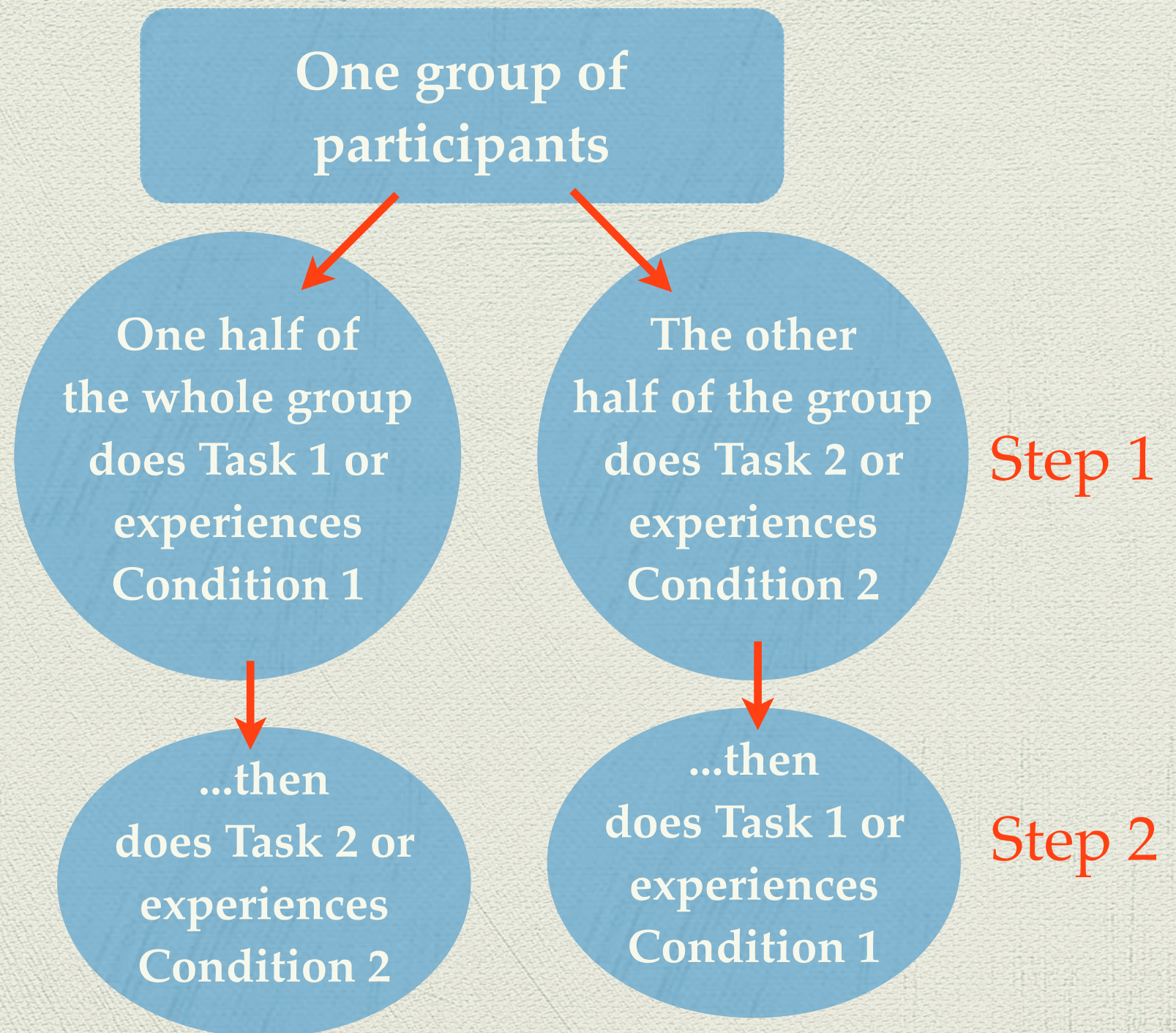


A counterbalancing design can remove **order effects** but other problems could occur.

Repeated measures design

OVERCOMING DISADVANTAGES

- Use a **counterbalancing design** by randomly allocating participants to a certain task order
- One half would do the control task/condition first, while the other half would undertake the experimental task/condition first

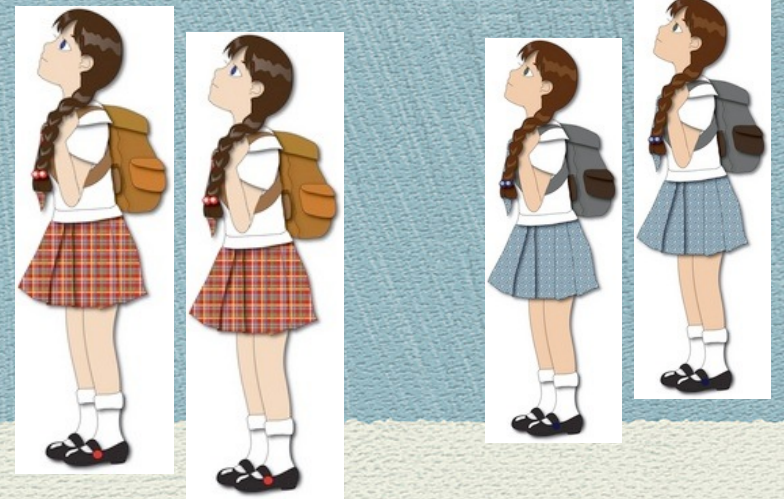


Possible problems with a repeated measures design...

- ◆ Although counterbalancing could be used to overcome order and practice effects, other problems could be caused by repeating a task.
- ◆ For instance, in a memory experiment interference effects can occur.

Matched participants design

CHARACTERISTICS



Also called a **matched subjects design** or a **matched groups design**

- ❖ Participants are paired on the basis of one or more relevant characteristics (maths skill, IQ, prior knowledge of a language, parental income, etc.)
- ❖ Each member of each pair is then randomly allocated to different groups (i.e. one to the control group, one to the experimental group)

Matched participants design

ADVANTAGES

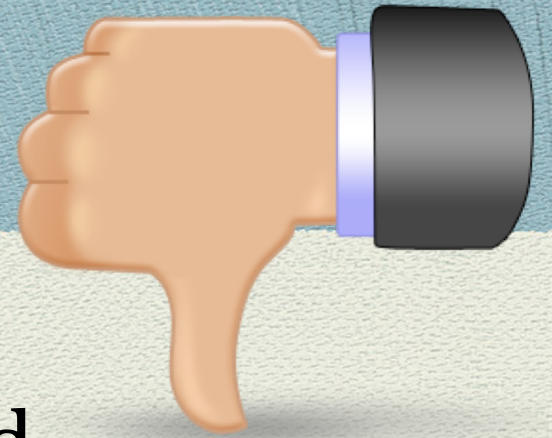


- Participant-related extraneous variables are better controlled, e.g. problem-solving ability, memory skills, prior knowledge of a language, etc – always assuming that the matching process focuses appropriately on the characteristics that matter.

(Note: This design may not overcome all participant-related variables, e.g. motivation.)

Matched participants design

DISADVANTAGES



- Potentially more difficult to organise and administer
- Requires knowledge of participants before the experiment, which is not always available or which it may not be desirable to use
- You might have to carry out pre-testing, which may be intrusive, expensive or time-consuming

Possible problems with a matched participants design...

A **matched participants design** potentially requires pretesting and/or specific knowledge about participants on several relevant variables. From both an ethical and administrative point of view, this might not be justified.

A **matched participants design** is also more complex to administer and would take more time.

