ANSWERS

This handout is intended to be worked through in conjunction with the research methods presentation, which may be downloaded at **this link**. You can also find other materials and quizzes on this topic on **this blog page**.

1 A Sceptical Approach

Suggest why it is important to be critical and skeptical when evaluating scientific studies (Slides 5-6).

The conclusions of scientists are only acceptable, valid and widely applicable if the scientists have carefully defined variables, controlled for extraneous variables, based their conclusions on a representative sample and so on. Furthermore, scientists state conclusions that are highly probable, given their results, but still open to investigation and further verification.

2 Types of Studies

Write the name of the type of study beside each description below (Slide 11).

a Investigates the relationship between 2 linear variables, without establishing causation	**correlational study**
b Isolates one variable to determine its effect in a controlled procedure – can establish a cause-effect relationship	**experiment**
c Provides an in-depth qualitative account of a single person's experience	**case study**
d Allows researchers to gain opinions from a large number of literate people	**survey/questionnaire**
e Permits researchers to study people or animal behaviour in a normal environment	**naturalistic observation**

3 Experiments

Fill the blanks (Slide 14).

cause-effect • dependent • independent • isolates

An experiment allows a probable cause-effect relationship to be established. In the simplest form of an experiment, the researcher wishes to find out how the independent variable (or the hypothesized cause) affects the dependent variable (the measured effect). The researcher exposes one group to the IV, while the other group does not experience it. The researcher isolates the IV to discover its effect.

4 Studies and Variables

The Story So Far 1 (Slides 17-18)

❶ Scientists state ⓐ the certain truth. ⓑ highly probable, evidence-based conclusions.

❷ In Psychology, an individual with an unusual experience or disorder may be investigated through ⓐ a case study. ⓑ an experiment. ⓒ correlational study.

❸ In an experiment, the variable that represents the hypothesised cause is called the ⓐ independent ⓑ dependent variable.

❹ The only type of study that can establish a probable cause-effect relationship is a/n ⓐ correlational study. ⓑ case study. ⓒ experiment.

❺ The variable that represents the effect in an experiment is the ⓐ independent ⓑ dependent variable.

❻ An outside variable that should be controlled in an experiment is ⓐ called an extraneous variable. ⓑ is called a dependent variable.

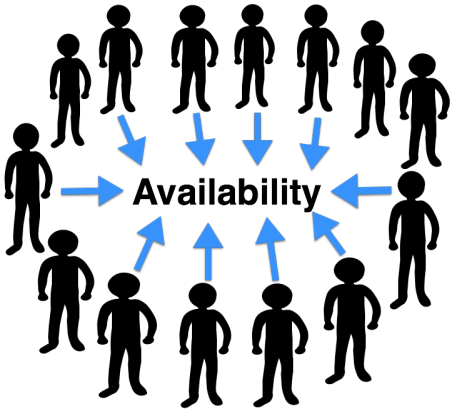
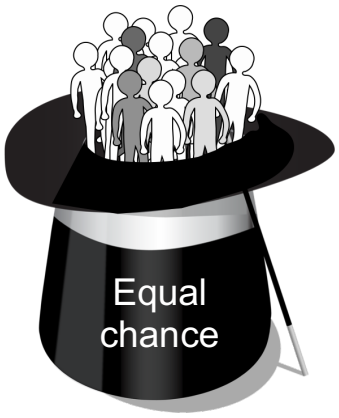
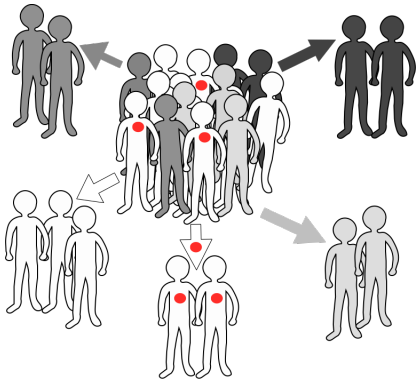
❼ A variable that clearly interferes in the IV→DV relationship is ⓐ a confounding variable ⓑ an independent variable.

❽ A case study provides largely ⓐ comparable quantitative data. ⓑ in-depth qualitative data.

❾ An operational definition of a variable ⓐ is a general indication of its meaning. ⓑ shows exactly how it is being defined and measured in the current study.

5 Sampling Techniques (Slides 18-23)

Fill in the names of each technique and draw a simple diagram in the blanks. Some parts of the table are already complete.

Name: Convenience sampling	**Name:** Random sampling	**Name:** Stratified sampling
Description: Any person who is easily available to a researcher may become a part of the sample.	**Description:** The sample is chosen by lot or by a random numbering method in order to ensure that every member of the population has an equal chance of being chosen.	**Description:** The sample is proportionately chosen to represent key aspects of the population, such as age, language background or religious affiliation.
		 **In proportion**

6 Sampling Errors (Slide 24)

What's wrong with each sample?

Problematic Sample	Identification of Problem
a You would like to study attitudes to abortion but have no Catholics in your sample.	Since Catholics tend to oppose abortion, they must form a part of the sample.
b You wish to discover how students at BHHS deal with problems but only include girls in your sample.	The experiences of boys have been completely overlooked (over 60% of our school's population!).
c You aim to gain feedback from the school community and base your conclusions on the 25 parents who responded.	Those parents are the most motivated and therefore they are not representative of the whole population.
d You hope to study people with eating disorders but draw your sample only from those admitted to hospital with this condition.	Only the most serious patients are admitted to hospital. This is therefore not a representative sample.
e You want to discover how teachers use computers but only select teachers over the age of 50.	Obviously older teachers are not representative of the whole group, especially when it comes to computer use.

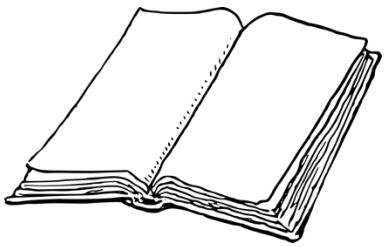
7 Allocation Errors (Slide 25)

What could go wrong if one made these allocation errors?

Problematic Allocation	Identification of Problem
a You compare the reading results of a new program at Surrey Hills Primary School with those at Footscray Primary School.	The different language and socioeconomic backgrounds of children could lead to a confounding variable.
b You have 40 participants and place all the volunteers in the experimental group.	The volunteers are more motivated; putting them all in one group might make motivation a confounding variable.
c You want to test a new teaching method for Maths and choose 7B (M) and S1z (Acc) as the two groups in your experiment.	One class is accelerated — a certain confounding variable.
d You wish to investigate the impact of an eLearning program on teachers and so you compare a group of older teachers with a group of younger teachers.	The age of teachers is likely to influence their confidence with computers and online materials. The older group is likely to find eLearning naturally more challenging.

8 Participant Variables (Slide 30)

List 3 more examples of participant variables and draw a symbol to represent each one. One example has been filled in.

Name: Motivation	Name: Prior knowledge	Name: Language skill	Name: Intelligence
Symbol: 	Symbol: 	Symbol: 	Symbol: 

9 Variables and Experimental Designs

The Story So Far – 2 (Slide 41)

Match the definitions with the terms by writing each term beside the description provided.

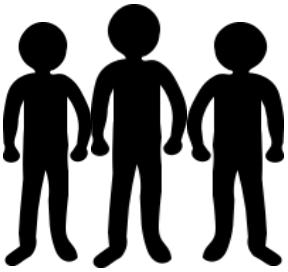
independent variable • repeated measures • independent groups
extraneous variables • confounding variable

a Outside variables that might influence an experiment if they are not controlled or minimized	**extraneous variables**
b A variable that clearly interferes in the causal relationship between the IV and the DV	**confounding variable**
c Experimental design in which there are two (+) unrelated groups	**independent groups**
d The sole factor that should be different between the control and experimental groups (in an ideal situation)	**independent variables**
e Experimental design in which all participants experience both the control and the experimental condition	**repeated measures**

Be skeptical…

Ask questions…

Are the groups really equivalent?



Are all participant variables controlled?

10 Confounding Variables – the Wrecking Balls of Experiments (Slide 42)

Identify the confounding variables in each of the following (hopefully fairly obviously faulty) scenarios.

I found this wrecking ball on Pixabay and felt slightly disturbed by how much the background looks like our school…

a Ms Green tries out 2 different types of handouts on her psych students and compares their results in the following outcome. She gives all the boys her new-style handouts and all the girls her standard handout.
Confounding variable: gender

b Ms Willshire compares the self-rated well-being of a standard Year 7 class taking the RESPECT module with the same ratings from a Year 10 class who is not taking the RESPECT module.
Confounding variable/s: age, year level

c Mr Innes compares the results of his Year 8 class (S2Z) with those of the Year 8 class in his previous school, to whom he had taught the same unit. He wants to discover whether his most recent teaching methods have been effective.
Confounding variable/s: accelerated versus mainstream class, school environment, etc.

11 Counterbalancing (Slide 48)

Fill in the missing key terms by referring to this list.

confounding • control • counterbalancing • experimental • fatigued • order • practice • randomised • repeated measures • Task 1 or Condition 1

In a repeated measures experimental design, there is only one group of participants, but that group is exposed to both the control and the experimental conditions. Since all participants experience all conditions, order effects can influence the outcome of the experiment and operate as a confounding variable. One way to overcome this problem is to introduce a counterbalancing technique.

According to this method, the order of tasks, experiences or conditions is randomised for each participant. Half of the participants experience Task 1 or Condition 1 first, while the other half complete Condition 2 first. This allows researchers to control for the potential interference of order effects.

The order in which participants complete a task or experience a condition may affect their performance because they may become better at the task after doing it once (practice effects) or conversely, feel bored or fatigued during the second condition or task.

12 Situational Variables (Slide 49)

List 2 more examples of situational variables and draw a symbol to represent each one. One example has been filled in.

Name: Light conditions	Name: Time of day	Name: Temperature	Name: Noise
Symbol: 	Symbol: 	Symbol: 	Symbol: 

13 Identify the Experimental Design (Slides 43-52)

The Story So Far – 3

Which experimental design...?

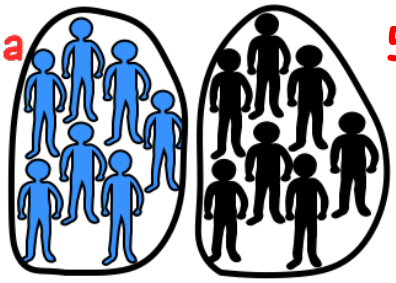
a ...is the simplest to administer? independent groups
b ...is prone to order effects? repeated measures
c ...might call on sets of identical twins? repeated measures
d ...is most likely to be affected by extraneous participant variables, particularly if groups are small? independent groups
e ...may require a counterbalancing technique? repeated measures
f ...requires pairing of participants on particular variables? matched participants
g ...requires no separate control and experimental groups? repeated measures
h ...may require pretesting of participants? matched participants

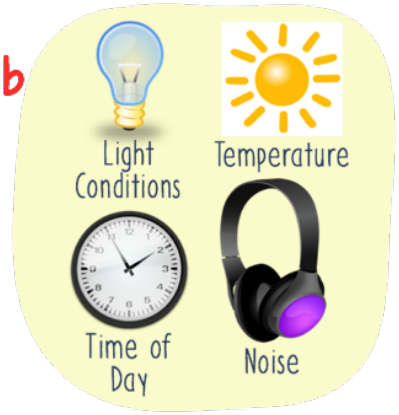
14 Experimental Designs and Variables (Slide 53)

The Story So Far – 3

Match the concepts with the appropriate symbol or image.

1 matched participants 2 independent groups 3 participant variables
4 repeated measures 5 situational variables

2a 

5b 

4c 

3d 

1e