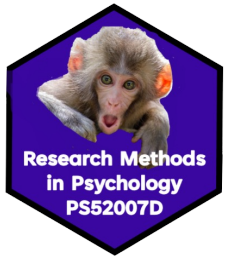


Lecture02

Asking good questions and gathering reliable evidence

Dr Gordon Wright

10, October, 2022

Key topics today

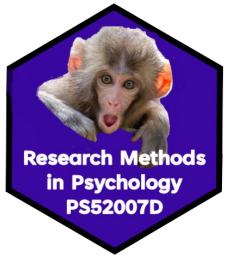
- The week ahead
- Some Induction Week Poll insights [in the lecture]
- The research process you are beginning
- A couple of CHIP topics to vote on
- Lab preview - The process, time-management and teamwork

The week ahead

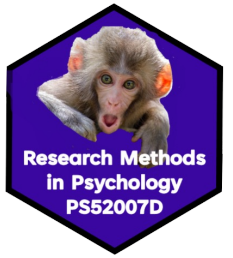
This week (week 2) you have your Social Psychology Essay Tutorial

“Sexual Economics: Theory and Patriarchy”

> “*Is sex a female commodity that women exchange for men’s resources? Advantages and disadvantages of applying social exchange theory to understanding heterosexual relationships.*”
>
> Deadline 10am Friday 21st October (end of week 3)
>
> Feedback on/by 11th November



Insert Induction Week Poll insights here

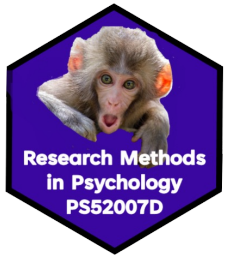


Did you break out the popcorn for the ‘Prelude’?

Did any of you enjoy my movie recommendations?

Did you pick up on the theme?

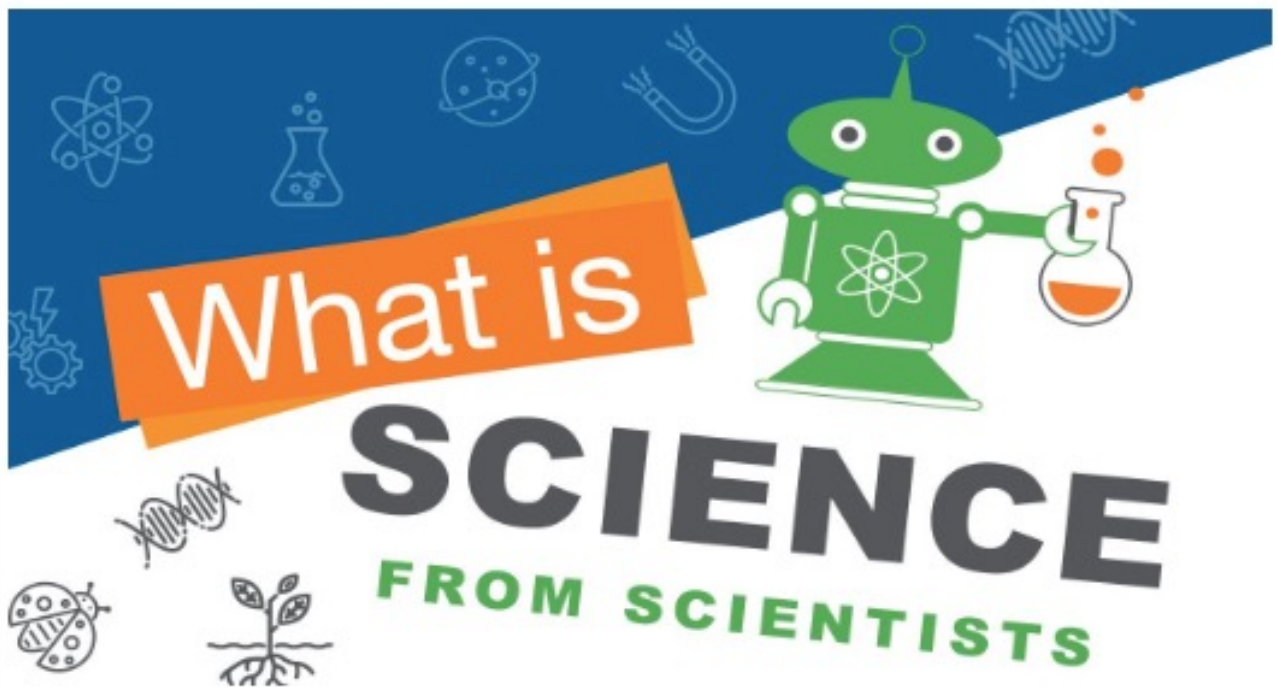
I’d actually already kinda introduced it…



from last week

What is Science?

Dr. Gordon Wright, Oct 2, 2022



A confession

- I didn’t make that article ‘I’ wrote terribly obvious
- for a reason
- it felt a bit weird
- I didn’t write it
- But there isn’t really anything stopping me claiming so…
- Or is there?

A conundrum

I’m going to be fiercely recommending the use of AI tomorrow.

And ALSO warning you against its use elsewhere

huh?

CHIP topics

I want to briefly draw your attention to the third (final) piece of coursework for this module, the so-called ‘CHIP Learning Log’

The earlier we flag topics and introduce little glimmers of content, the easier that will be.

1 - What is Science? An amazing opportunity to consider this while you do your Mini-Dissertation

(A more reliable overview from Professor Ed Diener here) **Open Educational Resource**

Diener, E. (2022). Why science?. In R. Biswas-Diener & E. Diener (Eds), *Noba textbook series: Psychology*. Champaign, IL: DEF publishers. http://noba.to/qu4abpzy

2 - Artificial Intelligence - Promise or Peril?

CHIP topic approval process

Anyone can suggest a topic, by identifying where it sprang to mind.

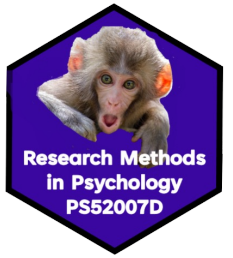
people need to approve it by confirming it is relevant, with a brief rationale.

The more you engage, the more topics you get to choose from.

- A concept or debate within Psychology
- A historical issue or controversy
- A methodology or approach and its promises or limitations
- A distinctive or divisive topic
- A modern innovation or applied challenge

https://www2.open.ac.uk/openlearn/CHIPs/

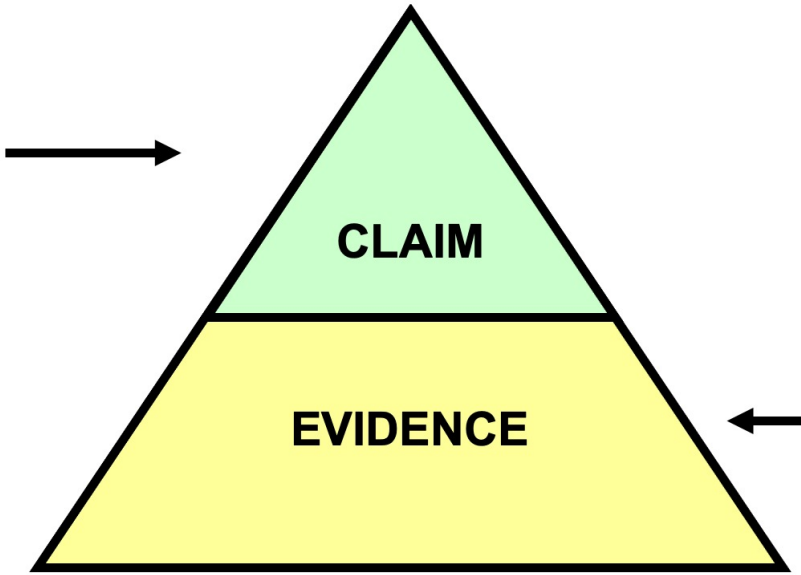
A psychologist? A scientist?

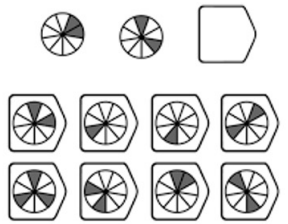


Prize for guessing my favourite Psychologist

Scientists base their ‘claims’ on EVIDENCE

Theory
e.g., “There is only one general kind of intelligence”





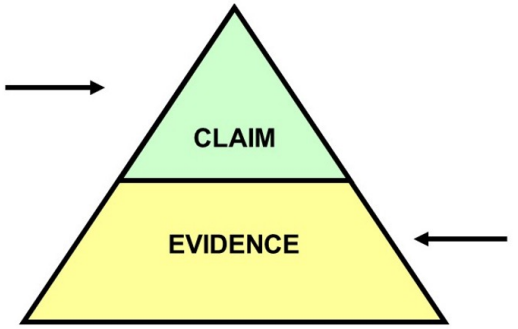
Personality and Individual Differences

Research
e.g., Do children with better spatial skills also have better reading skills?

Are people good at painting also good at maths?

Evidence quality = claim quality!

“We should spend more money on advertising!”



“How many people see these adverts?”

“Do people buy things they see online?”

“How does this compare to other kinds of advertising?”

It starts with a hypothesis

You've already been introduced to the idea of a hypothesis in stats last year.

"Coffee will improve memory scores"

(Experimental Hypothesis)

"Coffee will have no effect on memory scores"

(Null Hypothesis)

recap on hypotheses

However, two ways we can think about what a hypothesis is:

A hypothesis is a prediction about *what will happen in a study*

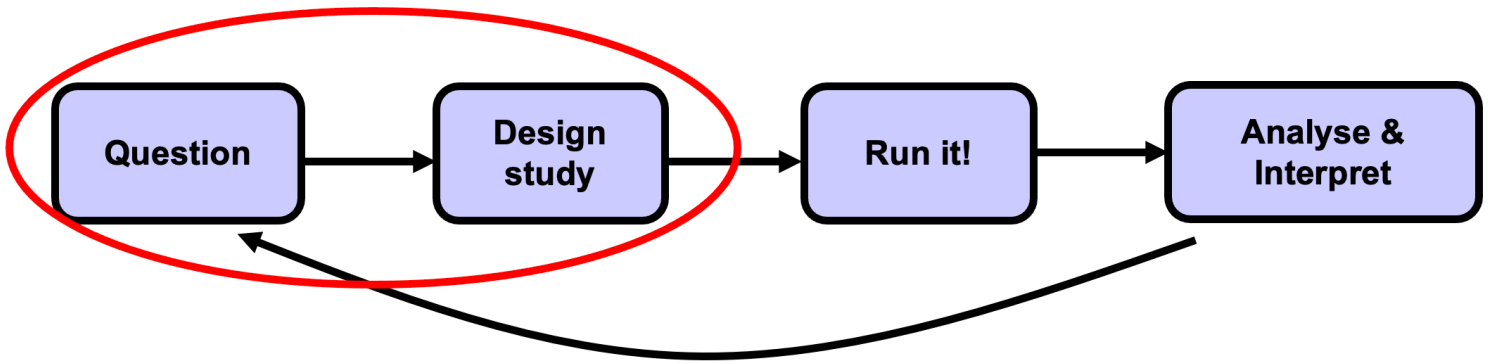
e.g., “Memory scores will be higher in the group that gets coffee”

Or a hypothesis is a claim about *how the world is*

e.g., “Caffeine improves the strength of our memories”

The research process

The research process

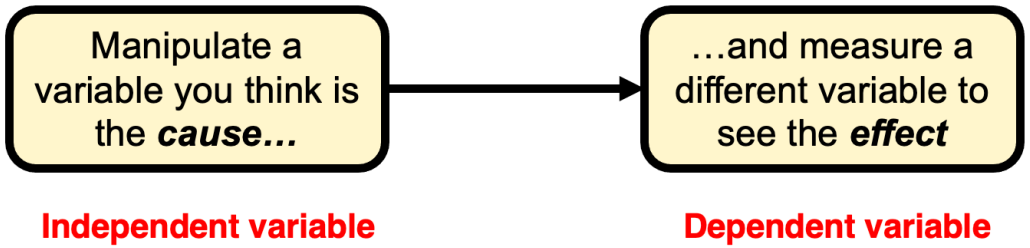


Chapter 1: Types of research and inferring causality
Chapter 2: Aims and hypotheses in research
ON THE READING LIST AND AVAILABLE ONLINE

The simplicity of an experiment

Experiments

- The word *experiment* has a very specific meaning in science
- Involves manipulating a variable to see the effect on another variable
- A way of testing claims about cause and effect



Operationalisation

Operationalisation is a key process in designing a research study. This involves translating general claims about cause and effect into specific variables to we can measure and manipulate.

"Caffeine improves the strength of our memories"

Cause: Caffeine

Effect: Memory strength

"Memory scores will be higher in the group that gets coffee"

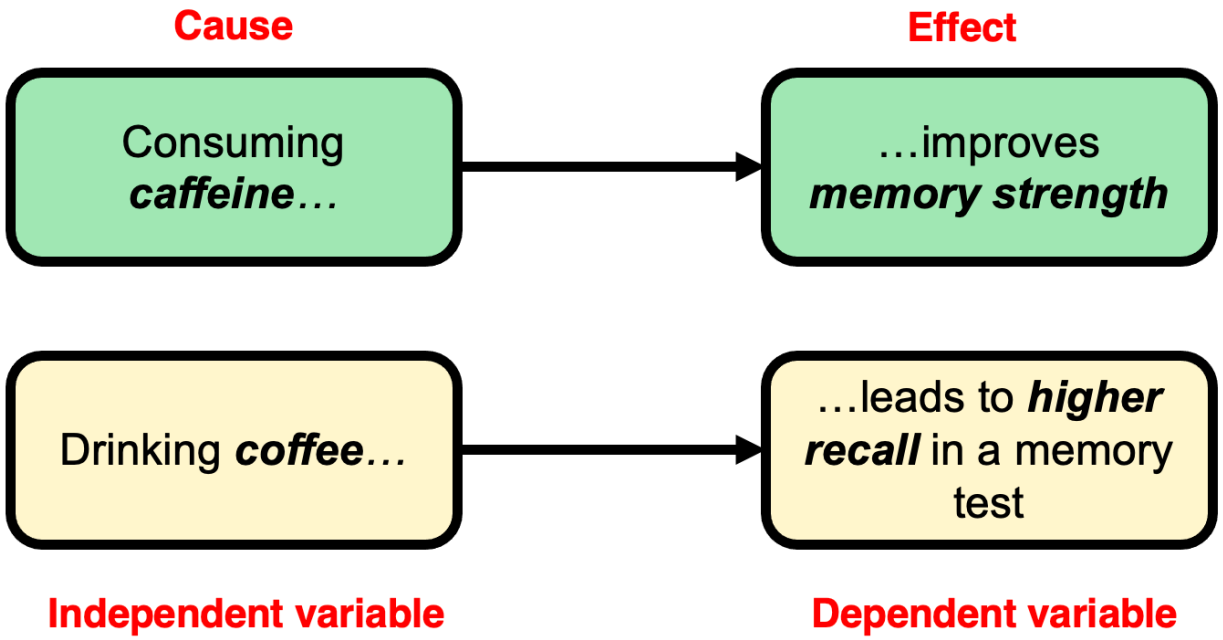
Independent variable: Coffee

Dependent variable: Memory scores

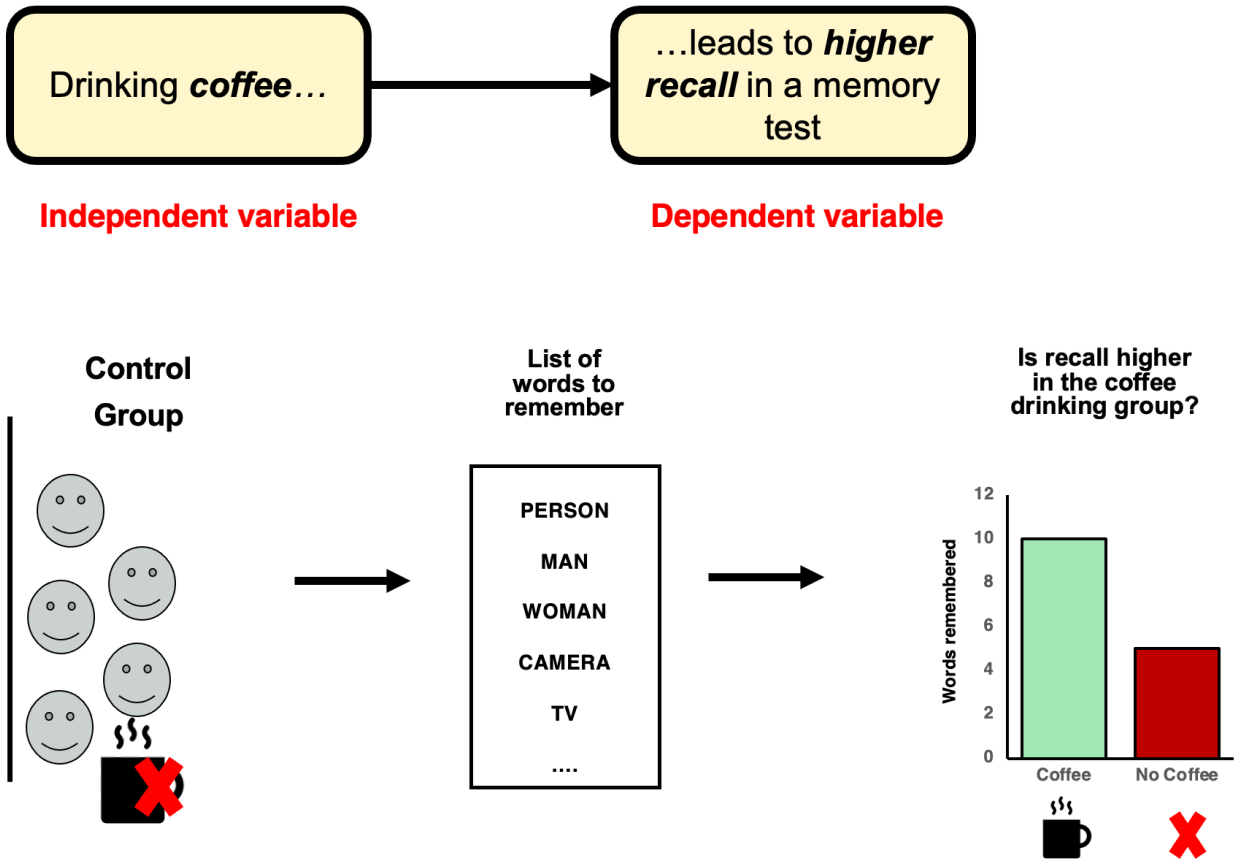
The challenge of operationalisation

Operationalisation = Translating general claims into specific IVs and DVS

e.g.,



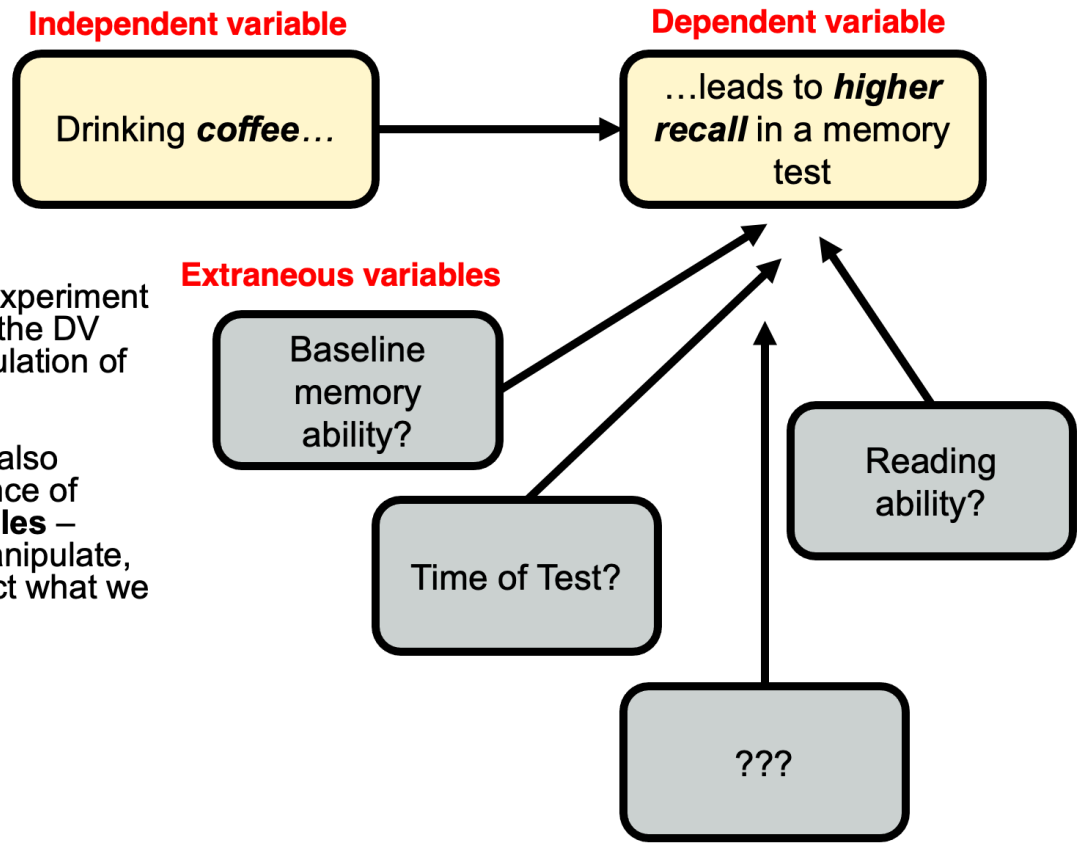
A toy example



Extraneous variables

Assumption of an experiment is that variability in the DV depends on manipulation of the IV.

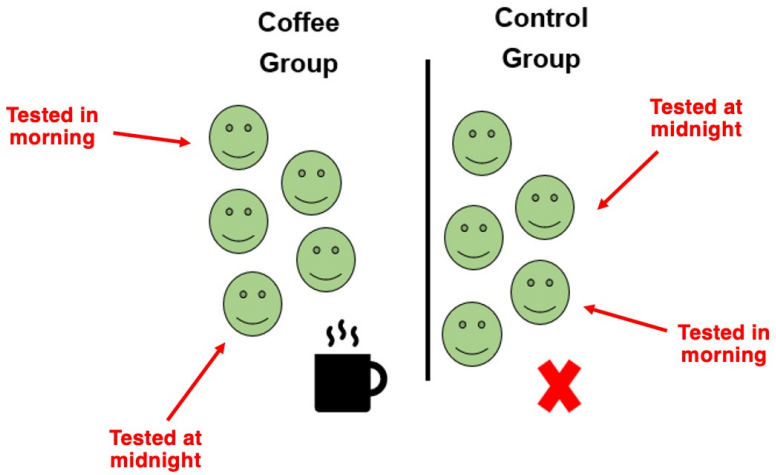
However, we must also consider the influence of **extraneous variables** – factors we don't manipulate, but which also affect what we measure

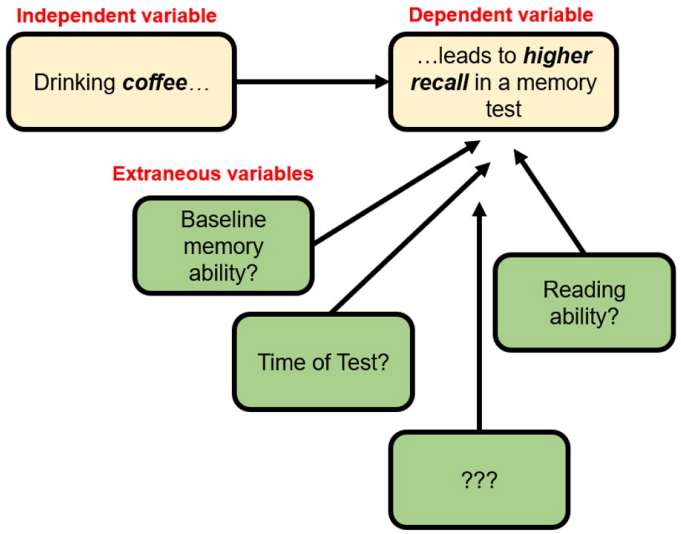


Usually…

Most **extraneous variables** just add noise to your measurements i.e. they add variability to your dependent variables that is separate from your manipulation

e.g., if time of test affects memory, and this randomly varies between groups, will make it harder to detect effect of manipulation

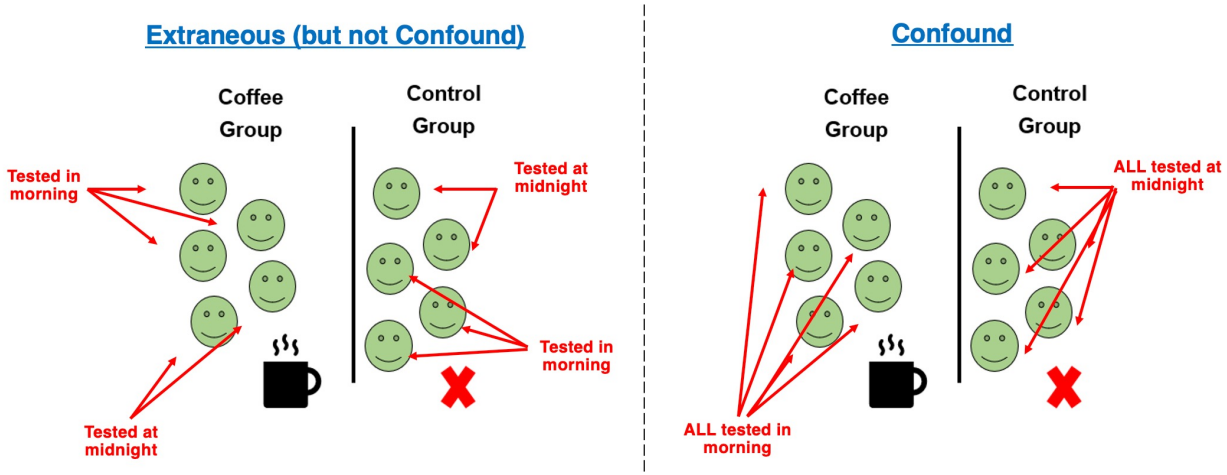




but occasionally...

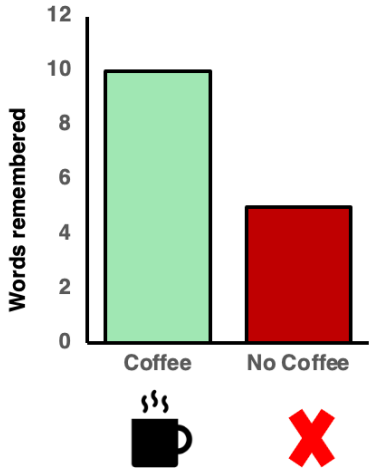
you hear of ‘confounds’ or ‘confounding variables’

A confounding variable is an extraneous variable that systematically varies with one of your independent variables. These are rare, but nothing can save the experiment.



An impossible interpretation

If things are **confounded,** and we see this pattern of results….



It could be….

Drinking ***coffee***…

Independent variable

…leads to ***higher recall*** in a memory test

Dependent variable

Or it could be….

Being ***tested in the morning***…

Confounding variable

…leads to ***higher recall*** in a memory test

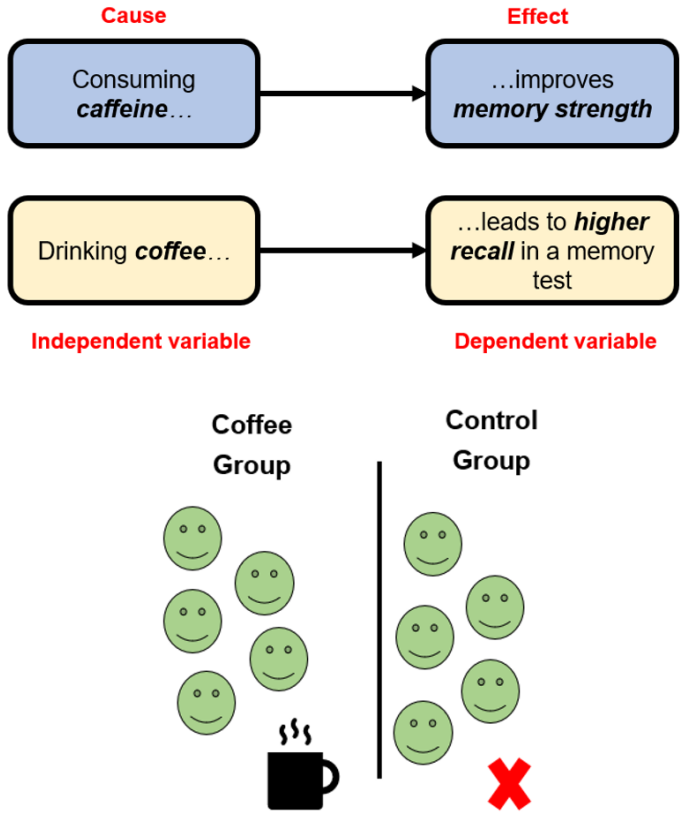
Dependent variable

<u>Confounds make results impossible to interpret!</u>

Manipulations almost always introduce potential confounds

Could be:

- ***Caffeine?***
- Drinking something warm?
- Drinking anything?
- Holding a mug?
- Brief social interaction with the experimenter?
- ???

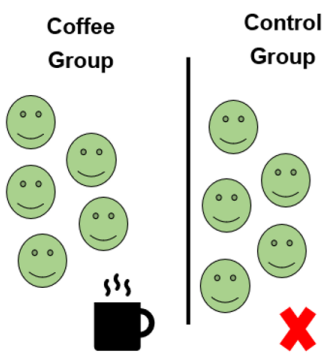


Experimental skill + careful thought + piloting + randomness!

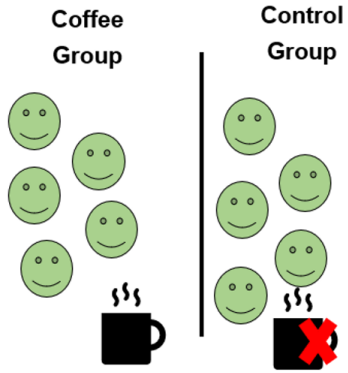
Good manipulation = fewest possible confounds

A **poor experiment** manipulates the variable of interest (caffeine) but also introduces other confounds

Poor manipulation
(Coffee vs Nothing)



Good manipulation
(Caffeinated vs Decaffeinated)

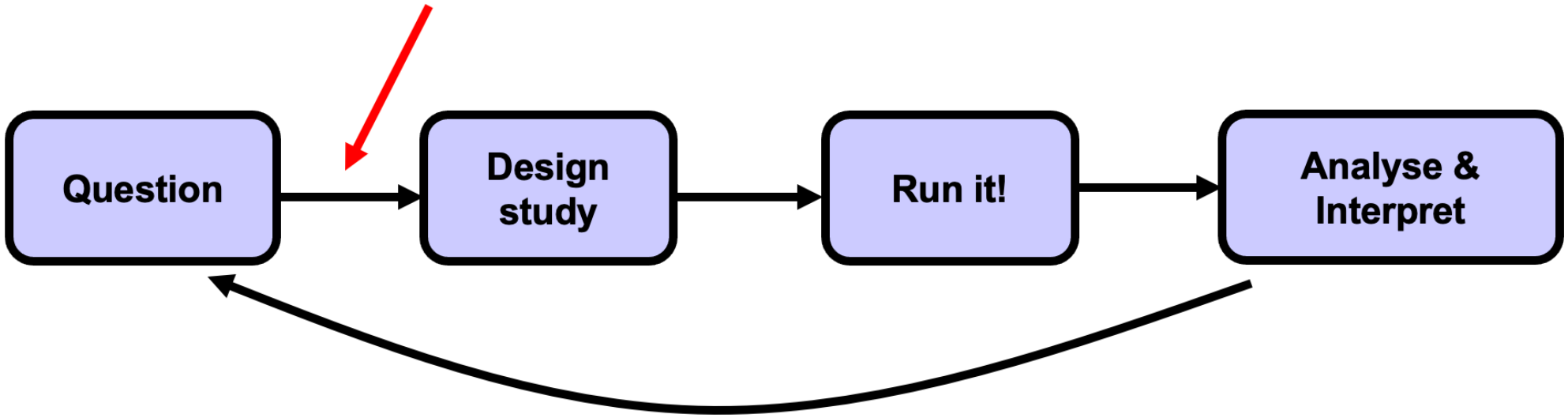


A **good experiment** manipulates the variable of interest (caffeine) but minimises other differences between conditions

Remember this when designing your projects!

The importance of operationalising your variables well

Good operationalisation is key to good study design.

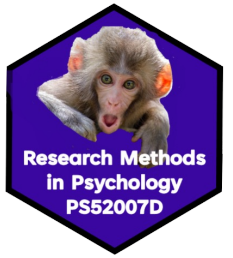


If operationalisation from broad question to specific details is bad, the study <u>can't answer</u> the question we are interested in

Reading along

I highly recommend reading along with the general topics we cover in the first few weeks.

Research Methods in Psychology by Dennis Howitt and Duncan Cramer is excellent. Chapter 2 in that book (right at the top of the module reading list and here) deals with Hypotheses and aims of research, essentially what we cover this week, and Chapter 1 deals with the basics and golden rules of research design and designing good experiments.



Lab preview

On Tuesday

We will be working on:

- How to do a literature search like a pro (based on your newly chosen topic!)
- Some ideas for group working and time management over the year
- Previewing your week 3 Personal Tutor meeting

Activities and resources will be provided

Any Questions?