



RESEARCH METHODS I

What is Research

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1. The scientific method: Overview

Importance of Research Methods

Psychology is regarded
as a science

Science (at a basic level)
attempts to answer
questions through
careful observation and
collection of data

These answers can then
be used to further our
knowledge of us
(humans) and of our
world

As well as then helping
us to predict
subsequent events and
behaviour

BUT to do this, we require
a systematic/universal
way of collecting and
understanding data



What is Research?



- ✓ Topic of interest
- ✓ Problem to be solved
- ✓ Informed by previous literature!

A systematic investigation with underlying guidelines.

Regardless of the particular area of research

What is Research?

- **Goals of research:**
 - **DESCRIBE** behaviour using systematic methods of collecting data
 - **EXPLAIN** causes of behaviour
 - **PREDICT** behaviour – allows consideration of conditions under which a behaviour will or will not occur
 - **CHANGE / CONTROL** behaviour to make lasting change

What does a psychologist research??



RESEARCH

Research is a systematic inquiry to describe, explain, predict, and control the observed phenomenon.

Research involves
inductive and **deductive** methods.



Inductive and Deductive Methods



Inductive methods are used to analyse an observed event

Associated with **Qualitative** Research

Idiographic data collection – views psychology as the study of individuals, exploration of what makes us unique/individual

Qualitative

Focuses on obtaining data through open-ended and conversational communication

Data is (often) **TEXT / WORDS**

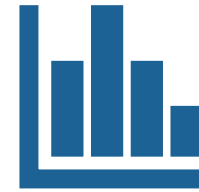


Inductive and Deductive Methods

Quantitative

Systematic investigation of phenomena by gathering numerical / quantifiable data - performance of statistical analysis.

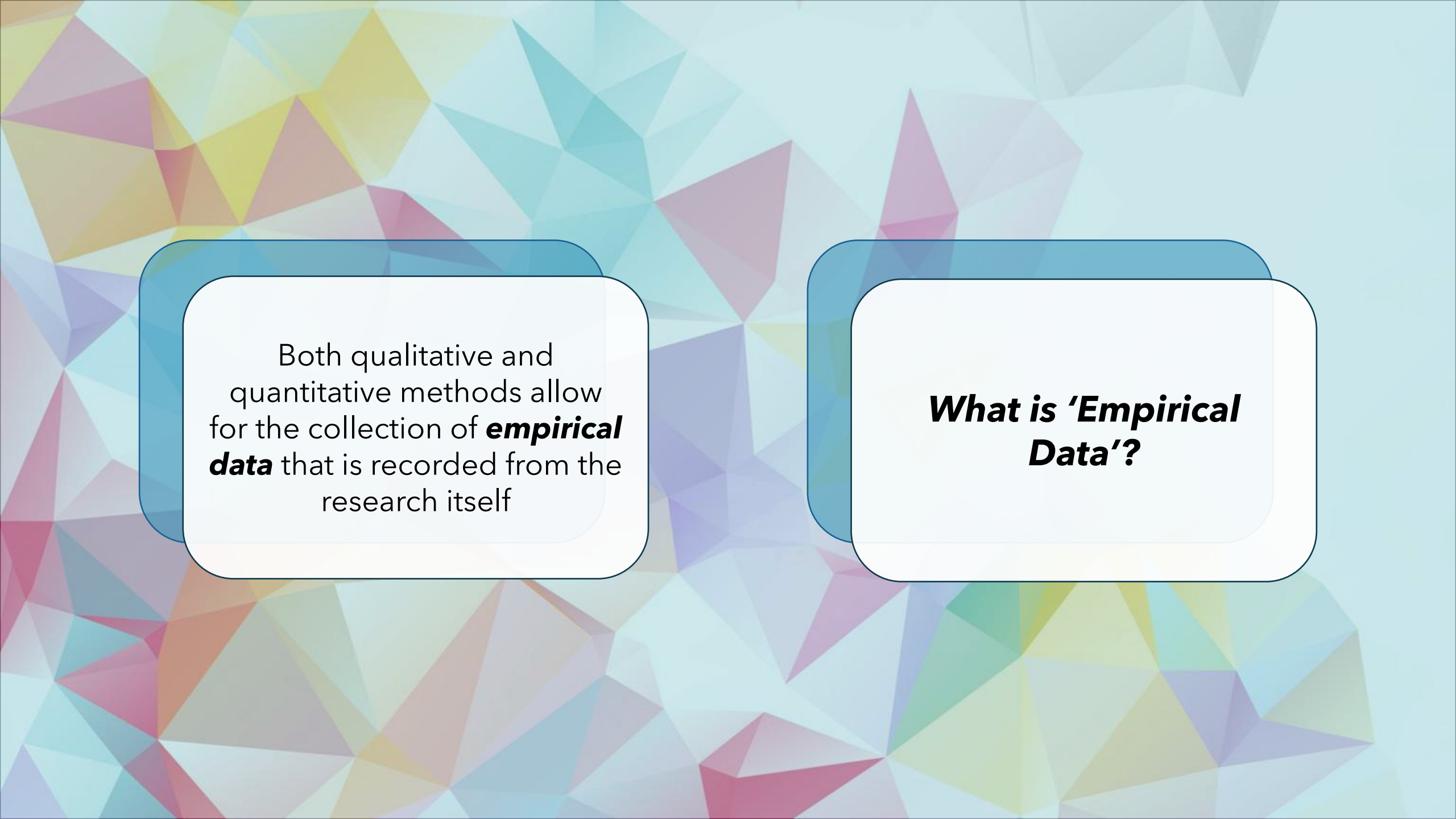
Data is **NUMBERS**



Deductive methods are used to verify the observed event

Associated with **Quantitative** Research

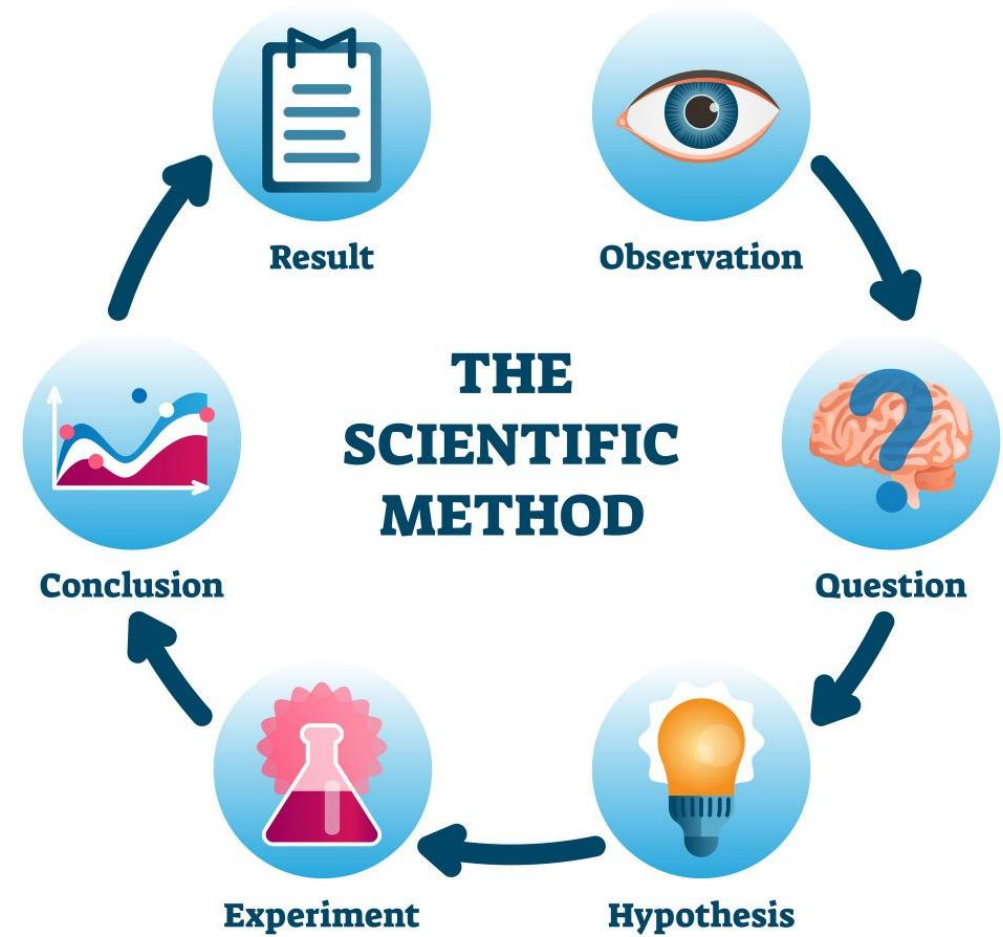
Nomothetic data collection - views psychology as the study of groups of people in order to establish norms; explores what we have in common



Both qualitative and quantitative methods allow for the collection of **empirical data** that is recorded from the research itself

What is 'Empirical Data'?

The Scientific Method



The Empirical/Scientific method

Bacon's empirical method model (17th C) advocates **observing** events and recording descriptions

- This information is then known as 'data'
 - When we organise and compare enough data, we see regularities that become laws through induction.
-
- Empirical = "*through experience*"
 - Issues?
 - It is difficult to simply record observations without asking 'why?'



Observation

The Empirical/Scientific method

- Thus, psychologists set out to test ideas about **why** something happens/is observed
 - This becomes known as a theory; a belief about how something works, or how/why a particular phenomenon occurs.
- A theory requires evidence to support it
- We **never** use the term **prove**.
 - We can only assume or infer what is happening





2. Theory and falsifiability

What is a Theory?



A theory presents a concept or idea that is testable. In science, a theory is not merely a guess.



A theory is a fact-based framework for describing a phenomenon.



A theory is based upon a hypothesis and backed by evidence.

A psychological theory has two key components:



It must describe a
behaviour



Make predictions
about future
behaviours



Falsifiability

Not only must a theory be testable, it must also be capable of being proved wrong.

This is known as *falsifiability*.

Karl Popper: no matter how many times a theory predicted result occurs – there might still be another theory that is the true one.

Thus, we can never **prove** a theory, we can only become 'more confident' of its applicability.



e.g., Black swans. Just because you see white swan after white swan after white swan, that doesn't mean that all swans are white. This theory can be **falsified** by seeing a black swan.



Research Questions

The problem being addressed in a research study should be able to be stated in the form of a **question**

- What is the effect of on?
- Is there a difference in between groups?
- Can predict behaviour?

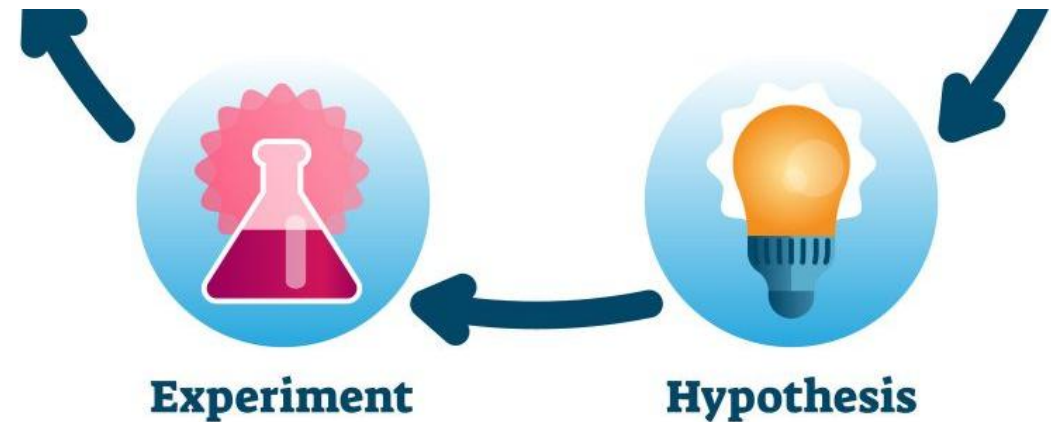
A research question defines the area of interest (but is NOT a declarative statement - this would be a hypothesis)



Question

Planning (experimental) research

1. Find an idea from the literature
2. Convert into a specific **hypothesis**



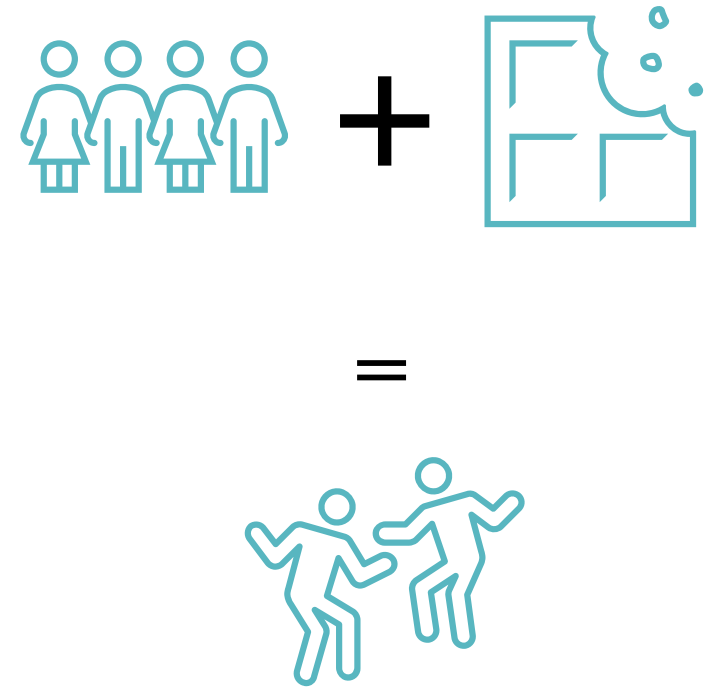
What is a Hypothesis?

Hypothesis

A claim about the world

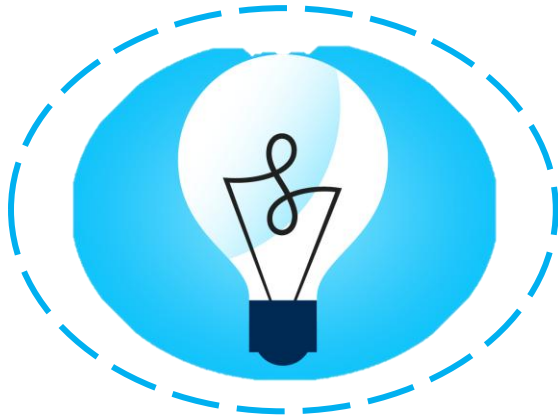
A prediction of the outcome of a study – an 'if-then' prediction

A testable statement that is precise and research-informed



Moving from ideas to hypotheses

- We use scientific reasoning every day (often without realising)





Power cut?

Turn something else on

Charger not working?

Was it plugged in properly?

Plug socket?

Plug something else in the
socket - does it work?

Fuse blown?

Change fuse

Moving from ideas to hypotheses

- Simple hypothesis testing
 - Think of a possible and logical reason for something and test it
- **... in isolation!**



Hypotheses



In research, the convention is that the hypothesis can take two forms:

1. The **null** hypothesis (H_0)

A statement of no relationship/effect amongst the variables

This is often implicit – it is always a statement of no effect

We have to determine whether to reject the null hypothesis (i.e., our results DO show an effect) or fail to reject it (i.e., there is nothing being observed)

2. The **alternative** hypothesis (or experimental hypothesis if using experimental methods – (H_1))

A statement indicating that there will be a relationship / effect, etc between the variables being studied



Hypotheses

One-tailed / Directional

- A hypothesis that makes a prediction about the direction in which results are expected

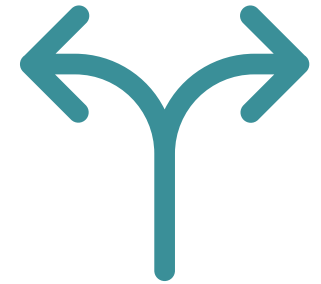
e.g., males are more aggressive than females

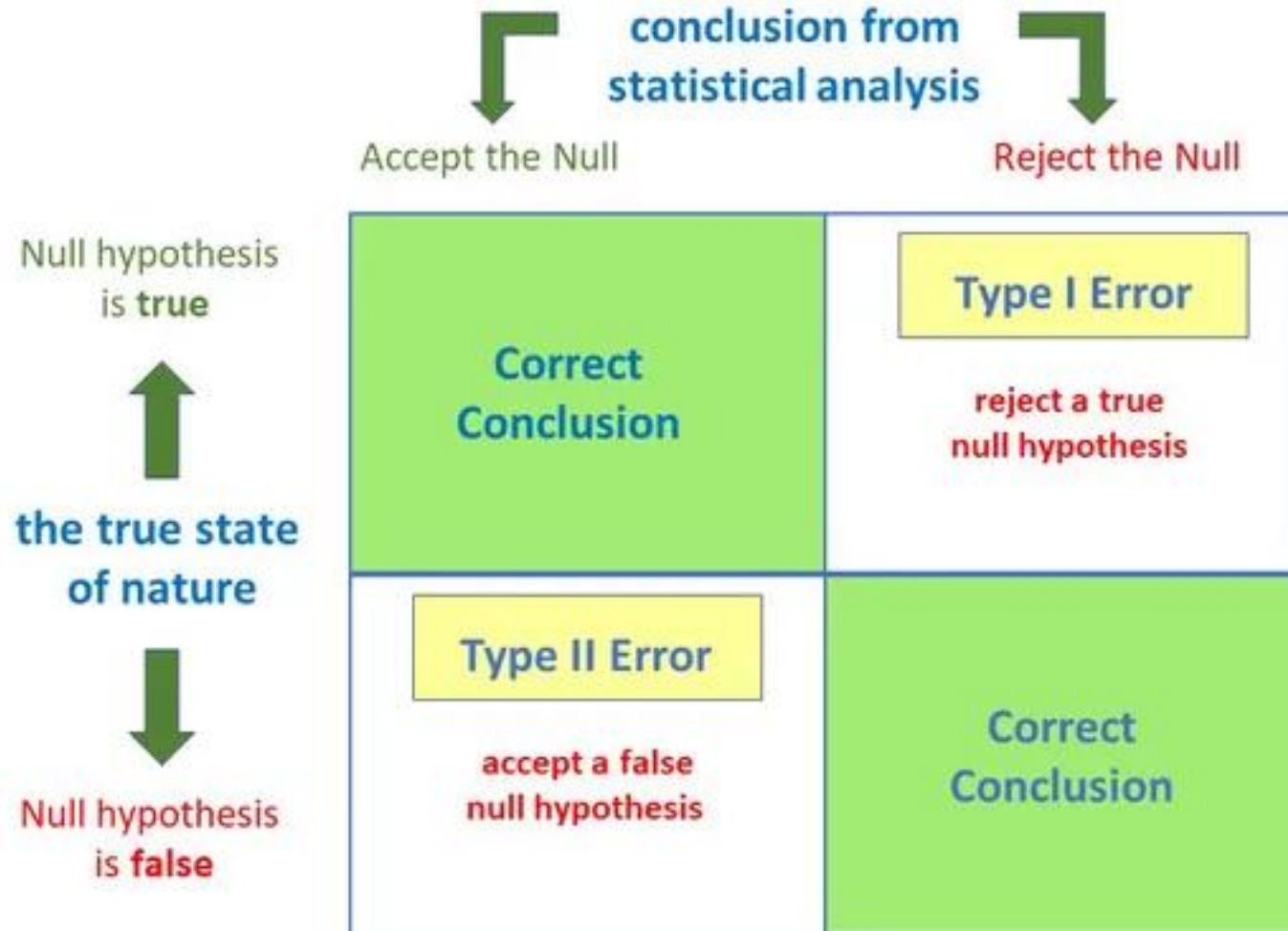


Two-tailed / Non-directional

- A statement that something will be occurring, but no statement of the direction

e.g., there will be a difference in aggression scores between males and females





Errors

- Type I error
 - Concluding that the null hypothesis is false when it is actually true
 - *Thinking we have observed an effect when we have not*
- Type II error
 - Concluding that the null hypothesis is true when it is actually false
 - *Not realising that an effect is there*

Witty ways to remember errors...

1

False (I) / False False (II)

Falsely rejecting
the null

Falsely thinking
the null is **false**

2

Vertical Lines

False **P**ositive
(**one** vertical line in P)
so Type I

False **N**egative
(**two** vertical line in N)
so Type II

3



RAAR

1. **R**eject null when we should **A**ccept (**RA**)

2. **A**ccept null when we should **R**eject (**AR**)

Operationalising

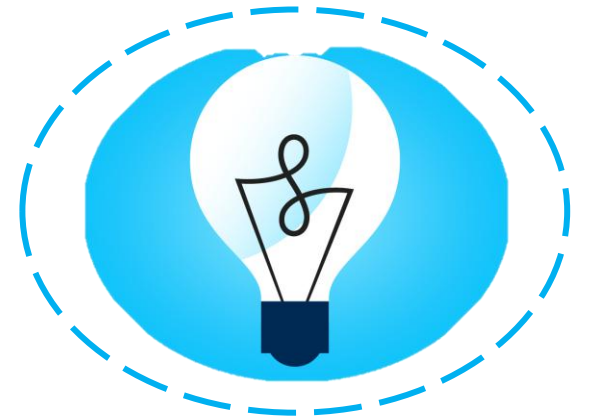
Operationalising what we are interested in exploring provides clarity and allows for objectivity

To be able to test hypotheses appropriately, we need to provide **operational definitions** (scientific concepts!)

- Definition of phenomena/variables in terms of the precise measures taken to measure it



Operationalising



Anxiety

Stress

**Memory
recall**





3. Quantitative and Qualitative Research Methods

**ONE-TO-ONE
INTERVIEW**

FOCUS GROUPS

QUALITATIVE

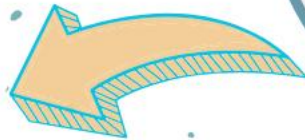
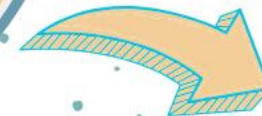
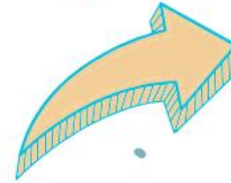
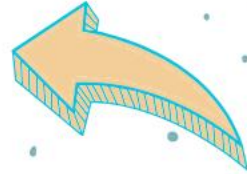
**Research
Methods**

**ETHNOGRAPHIC
RESEARCH**

OBSERVATION

RECORD KEEPING

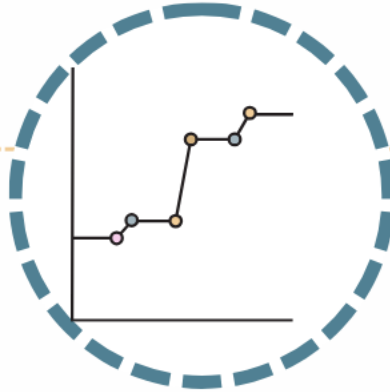
**CASE STUDY
RESEARCH**



QUANTITATIVE RESEARCH METHODS



**Survey
Research**



Correlation



Experimental

The main features of psychological investigation: Plan for answering a research question



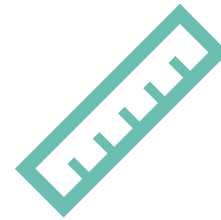
Variables

- WHAT is being measured?
- WHAT human characteristics and conditions are involved?



Samples

- WHOM shall we study?
- How will we find them?



Design

- HOW shall the question be answered?
- HOW can the research predictions be tested?



Analysis

- WHAT evidence will be collected?
- In what form will it be?





Post-session activities

Post session activities to engage in

- ① H5P on Moodle page on **types of sampling and variables**
- ② Quiz on sampling
- ③ Quiz on operational definitions and variables

