



Research Design Q&A

1. What is the primary purpose of using an experimental design in research?

*Establish **cause and effect**.*

Manipulation of one or more IV's allows for observation of changes in a DV.

2. Define the term 'independent variable' (IV) and explain their role in an experimental design.

*A variable that is **manipulated or controlled** by the researcher.*

*Role - ‘**cause**’ variable or factor that influences the outcome being measured.*

*Varying levels of an IV allow for exploration of if and how it affects a DV, helping to establish **cause and effect**.*

3. Define the term 'dependent variable' (DV) and explain their role in an experimental design.

*Variable **measured** by researchers to assess the effect of an IV (or IVs).*

*Role – ‘**effect**’ variable - outcome or response variable that is proposed to be influenced by changes in an IV.*

*By measuring the DV it can be determined whether and how an IV influences the DV, helping to establish **cause and effect**.*

4. Explain the concept of a between-subjects design.

*A between-subject design is a design whereby participants are categorised into **independent groups** (for one IV).*

*Any one participant **can only belong to one level of an IV***

5. What are the main advantages and limitations of a within-subjects design?

Advantages:

fewer participants required, control of individual differences / participant variables

Limitations:

time consuming for participants, dropout rates are usually higher, order/practice effects or fatigue

6. What is counterbalancing, and why is it important in within-subjects designs?

Randomising the order of the presentation of levels of an IV. Counterbalancing is important as it reduces the potential impact of order/practice or fatigue influencing findings (and conclusions that are made).

7. Describe a 2 x 2 between-subjects design.

Two independent variables each with two levels.

There would be four conditions (2x2) that any one participant can be part of – and they can only be included in one these conditions



Research Design Worksheet!



Non-Experimental and Quasi-Experimental Research



Non- Experimental Designs

Some research questions **do not suit** an experimental design

We can still use quantitative methods (numbers), but we can employ a non-experimental method to answer our research questions

Non-experimental methods investigate variables that exist among people irrespective of any researcher intervention

Correlation

Group differences

Non-Experimental Designs

In non-experimental studies, there is no **manipulation** of an IV

- *In the case of correlation, there is no IV!*

Group differences

Often used in practical work

A group defined by biology, demographics, personality, etc are compared with members of another group

There is no 'treatment' applied – instead, any differences are simply examined.

Can also be called 'Post-facto' research

Non-Experimental Designs

Correlation

- ✓ Looks for a relationship between variables
 - ✓ *But does not permit inferences about the cause or direction*
- ✓ Can test hypotheses
- ✓ Can establish generalisation outside the laboratory
- ✓ Can generate ideas for further laboratory study
- ✓ Allows the examination of variables that may not be practical or ethical to study in the laboratory
- ✓ Measuring not manipulating..

Non-Experimental Designs

Three components to correlational research:

1. Researcher measures one variable (X)
2. Researcher measures a second variable (Y)
3. Researcher statistically determines whether (X) and (Y) are related

More on correlational research later in the semester

Quasi-Experimental Designs

Quasi experimentation is common in many fields of psychology:
Social, Health, Education, Sports, Occupational

We sometimes face the dilemma of wishing to research in realistic, everyday settings, but recognise the lack of control this can involve
E.g., on real or therapeutic programmes

Quasi-Experimental Designs

The term **quasi-experiment** refers to well-controlled research designs that are 'almost' experiments

However, they lack many of the essential features of a true experiment – two of the most critical being:

1. Random allocation of participants to conditions
 - Without this we are far more likely to have non-equivalent groups
2. Full experimenter control over the IV

Research Example

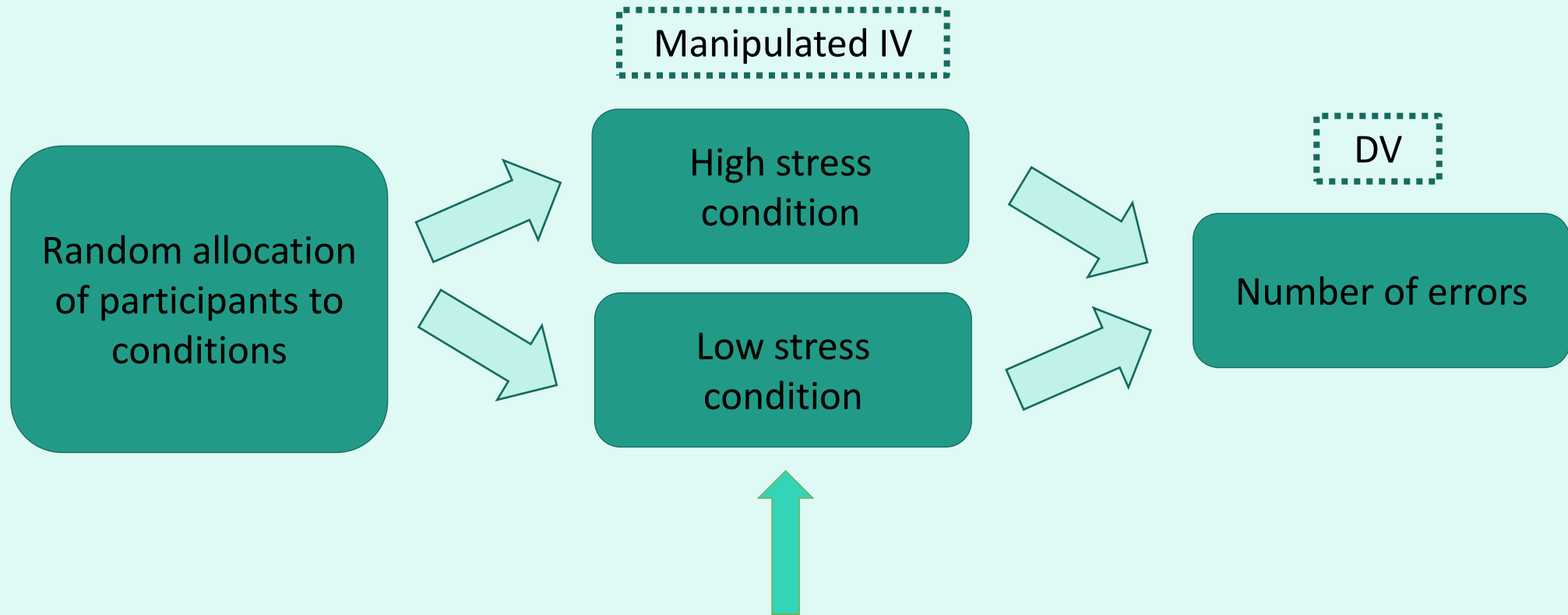
Researchers want to look at a group of workers and determine the numbers of errors they make during their work shift.

They want to include levels of stress as a variable in their study.

There are four ways they can assess this one idea...

1

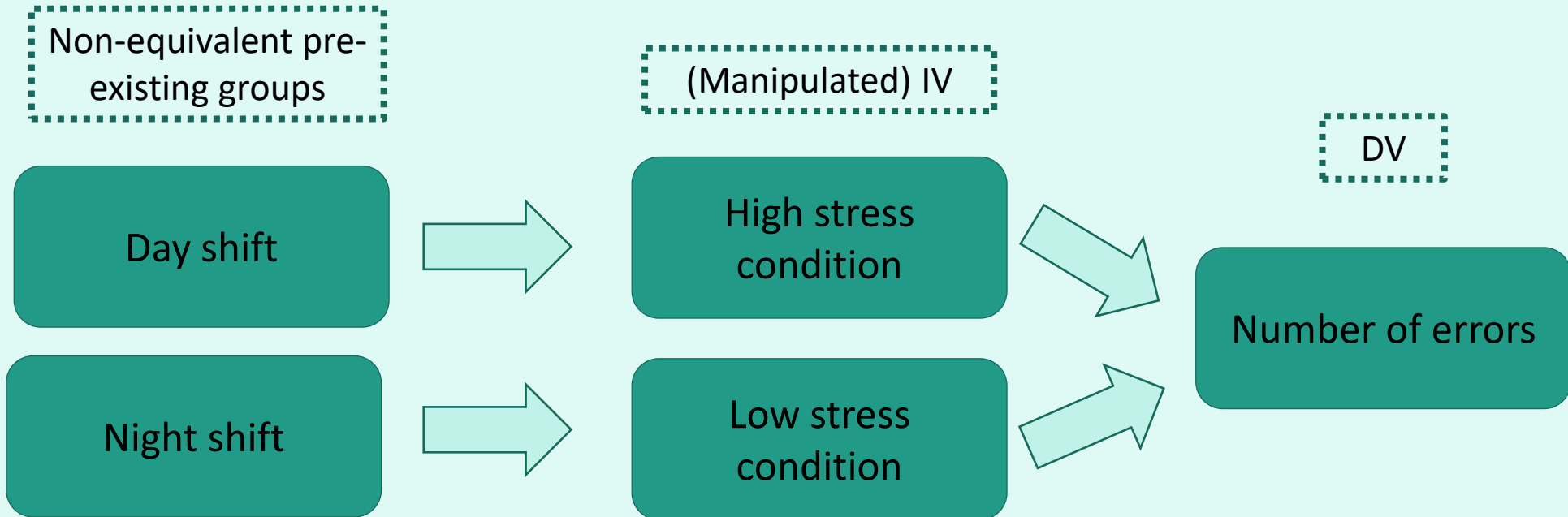
True experiment



Researcher manipulates/controls the stress groups –
high stress = high speed of production,
and low stress = low speed

2

Quasi-experiment

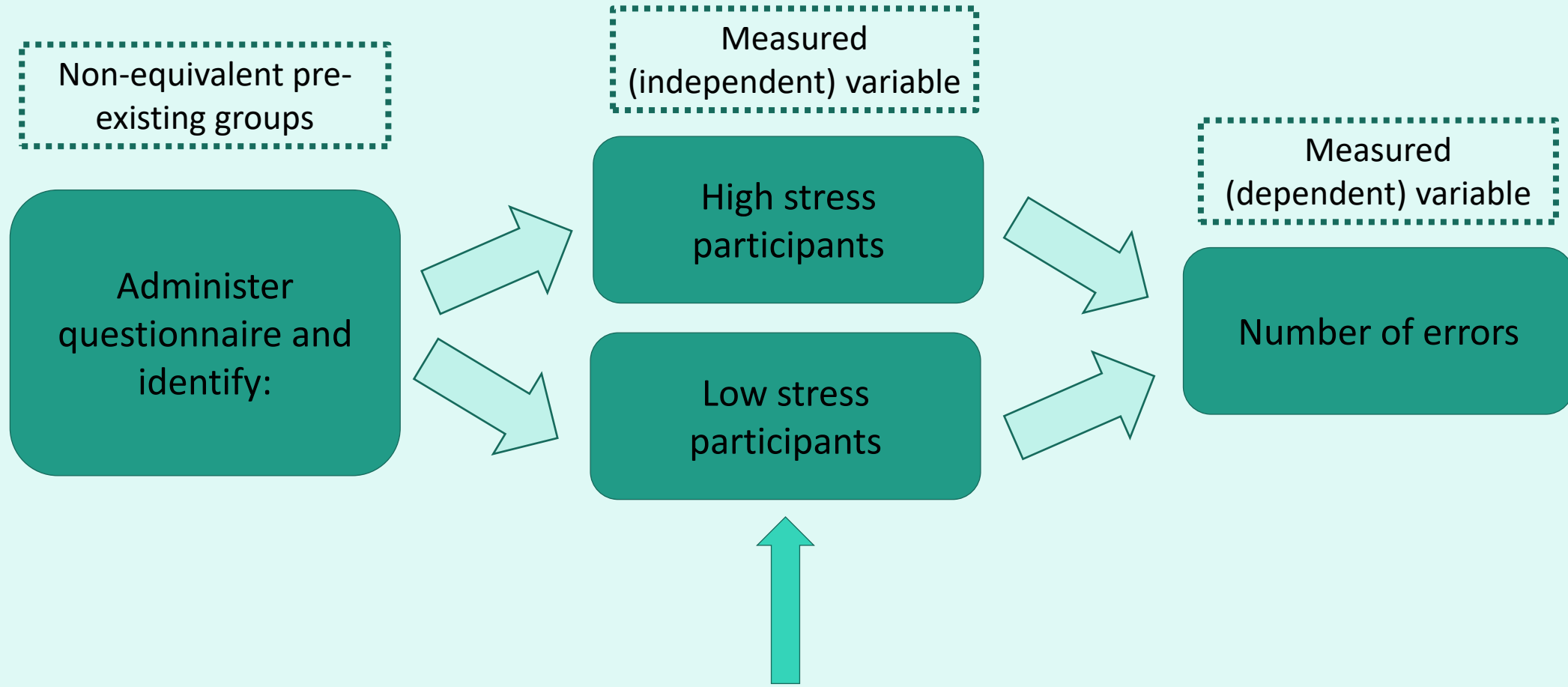


There may not be the option to allocate participants into the two stress conditions, so use pre-existing groups

Problem? Workers might already be more error prone working on the night shift, for example. Can't control for ID's

3

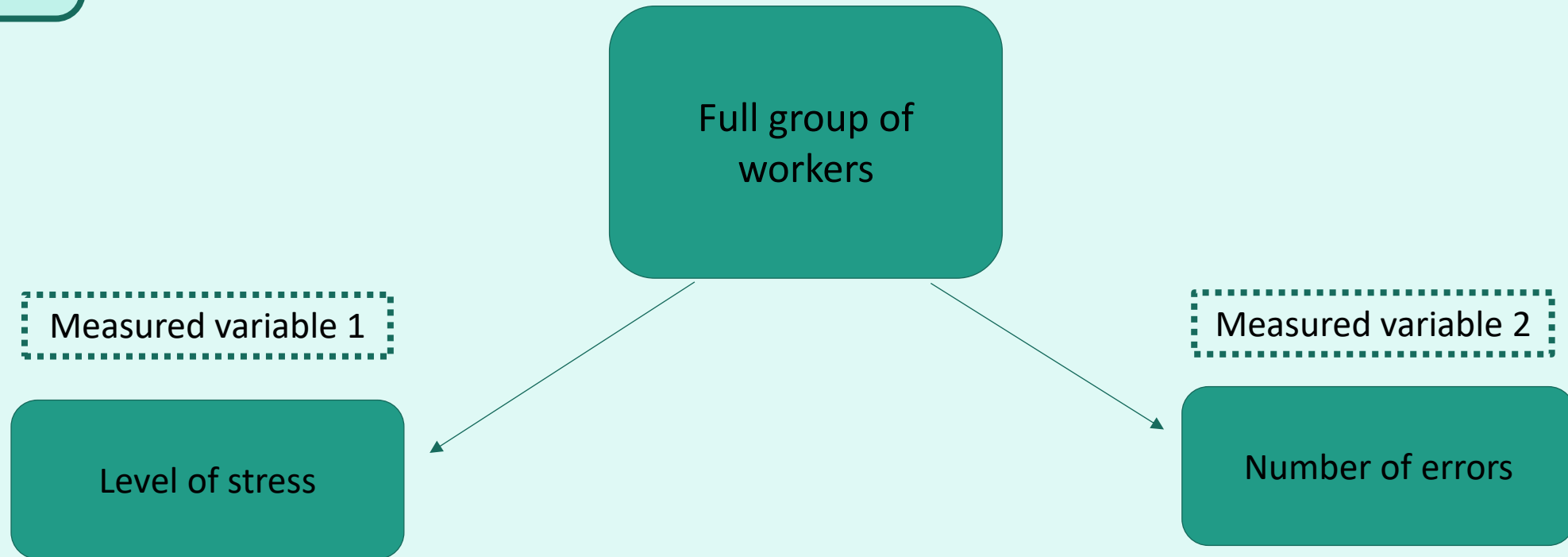
Group difference study



No manipulated conditions to produce stress – simply identifies low- and high-stress participants

4

Correlation



Simply determines whether there is a relationship between the two, and the direction of that relationship (positive or negative)



Summary

Research questions can be explored in a number of different (quantitative) ways

Experimental and non-experimental

Strengths and limitations to each

Main point is to answer the research question(s) as best you can using the most effective method!

8. Describe the key differences between a true experiment and a quasi-experiment.

True:

random allocation to groups/conditions, high level of control over the IV (can be manipulated), can provide strong evidence for causal relationships between IV's and DV's, higher validity due to level of control, not always feasible/ethical

Quasi:

Non-random allocation to groups/conditions (pre-existing groups used), less control over the IV (rely on naturally occurring conditions), more challenging to establish causation, lower internal validity due potential confounds, often used when true exps. are not feasible or ethical.

9. Explain the concept of correlational research

*Non-experimental research design.
Identify relationships between two co-occurring variables*

*Variable (x) is measured, variable (y) is measured,
statistical analysis determines whether (x) and (y) are
related*