

PYB210 Research Design and Data Analysis Final Exam Revision

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Item 2: Research Ideas and Research Approaches

Major methodological approaches to conducting research

- **Positivist or Etic**: Concerned with uncovering generalizable pattern and laws based on objective empirical data (tends to be deductive in nature) – **quantitative research**.
- **Interpretivist or Emic**: Concerned with subjective interpretation (personal or cultural meaning), context specific, not concerned with generalisability but with deep understanding in line with inductive approaches – **qualitative research**.

Categorizing Research Approaches

Quantitative versus Qualitative Research

- **Quantitative Studies** – collect numerical data.
- **Qualitative Studies** – collect non-numerical data to answer research questions.
 - o Related more to people's experiences and their understanding and personal meaning.

Quantitative methods

Variables in Quantitative Research

Independent versus Dependent Variables

- **Independent Variable (IV)**
 - o Presumed to **cause** changes in another variable.
 - o Often **manipulated** by the researcher.
- **Dependent Variable (DV)**
 - o The presumed **effect** or outcome of the study.
 - o Variable that is **measured** by the researcher and influenced by the IV.
- **Extraneous Variables**
 - o Variable/s that potentially competes with the IV in respect to explaining the outcome or DV.
 - o All the things that might impact upon a person ability to perform a task.
 - o It is important to try to control for extraneous variable.
- 1. **Confounding variable**
 - o An extraneous variable that is allowed to co-vary along with the levels of the IV.
 - Having a confound is serious because you really cannot tell whether it is the IV of the confound that is influencing the outcome.
- 2. **Noise creating**
 - o Randomly impacts the DV, not related to the IV, but potentially create extra variation in the DV not due to the IV, want to minimise this.
- **Mediating Variable/Intervening Variable**
 - o Occurs between two other variables in a causal chain.
 - E.g., anxiety causes distraction (mediating variable) which affects memory.
- **Moderating variable**
 - o Qualify a causal relationship as dependent on another variable.
 - E.g., the impact of anxiety on memory is different for men and women (sex is a moderating variable).

The research problem/question

A good theory generates **hypotheses** – these predictions that give rise to the research problem, or research question:

- **Research question** – an interrogative sentence that states the relationship between two or more variables or the key research question.
- Criteria for good research problems.
 - o Variables should express a clear relationship.
 - o Stated in question form.
 - o Capable of empirical testing.
- **Operational** – defining a concept by the operations used to represent or measure it.
 - o E.g. operationalize alcohol by standard drinks.

Some ways to answer research questions

1. Naturalistic observation
 - o Observing behaviour in the individual's natural habitat.
2. Correlational study
 - o Making measurements and asking if there's a relationship between the measurements.
3. Internet study
4. Field experiment
 - o Taking place in the natural environment but a manipulation is performed by the experimenter in the natural environment.
5. Laboratory based experiment

Causation

If one thing causes another thing they **MUST** be correlated.

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If two things are correlated there **MUST** be a causal relationship.

Causation – a condition in which one event (the cause) generates another event (the effect).

Criteria for identifying a causal relation

- Cause (IV) must be **related to** the effect (DV) (relationship condition).
- Changes in IV must **precede** changes in DV (temporal order condition).
- No other **plausible explanation** must exist for the effect.

Ethics

- Informed consent.
- Right to confidentiality.
- Right to withdraw.
- Do not cause physical or mental anguish/harm/distress.

Experimental approach

Advantages of the Experimental Approach	Disadvantages of the Experimental Approach
<ul style="list-style-type: none">- Causal inference – experimental approach is best method for inferring causation if done right.<ul style="list-style-type: none">o Causal description refers to identifying the consequences of manipulating an IV.o Causal explanation refers to explaining the mechanisms through which the relationship exists.- Ability to manipulate variables.<ul style="list-style-type: none">o Only scientific methodology in which variables are manipulated- Control<ul style="list-style-type: none">o Extraneous variables are controlled by:<ul style="list-style-type: none">▪ Holding them constant.▪ Using random assignment.▪ Matching.	<ul style="list-style-type: none">- Does not test the effects of non-manipulated variables.<ul style="list-style-type: none">o Many potential independent variables cannot be directly manipulated.o E.g., personal attributes: people's ages, gender, IQ level.- Artificiality or Generalisability.<ul style="list-style-type: none">o Refers to potential problems in generalizing findings from laboratory settings to the "real world".

Experimental Research Settings

Internet Experiments

Advantages of internet experiments	Disadvantages of internet experiments
<ul style="list-style-type: none">- Access to diverse population- Bring experiment to participant- Large sample and thus greater power- Cost savings	<ul style="list-style-type: none">- Multiple submissions- Lack of control- Self-selection- Dropout

Field experiments

- An experimental research study that is conducted in a real-life setting.
 - o **Advantages:** may be easier to generalize findings.
 - o **Disadvantages:** less control of extraneous variables.
- **Confederate** – a person who is in league with the experimenter, unbeknownst to the participant.

Laboratory experiments

- An experimental research study that is conducted in a controlled laboratory setting.
 - o **Advantages:** more control over extraneous variables.
 - o **Disadvantages:** less generalization related to artificiality.

Different ways we could manipulate Independent Variables

Experimental manipulation – experimenter determines which level of the IV a participant is tested at.

- Event manipulation (e.g. presence vs. absence).
- Instructional manipulation (e.g. complete quickly /slowly).

Individual difference manipulation – a characteristic of the participant determines the level of the IV at which they are tested.

- Male vs. female.
- Schizophrenia patient vs. healthy control.

Repeated measures (within groups) – each participant tested at each level of the IV.

- More sensitive design (easier to detect the effect of interest).
- Can't always use this design.

Between groups – each participant tested at only one level of the IV.

- Less sensitive design.
- Often forced to use this design.

Mixed Design – more than one IV with at least one IV manipulated between groups and at least one within groups.