

Research Methodology

* **Independent variable** : is the variable that is manipulated by the researcher to check its effects on the dependent variable.

* **Dependent Variable** : is the variable being measured by the researcher.

RESEARCH METHODS

EXPERIMENTS

Experiments look for a causal relationship in which an independent variable is manipulated to cause a change in the dependent variable.

Experiment types :

1. **Laboratory experiment** : the experiment is conducted in an unnatural and controlled environment. The IV is manipulated by the researcher.
2. **Field experiment** : the experiment takes place in natural settings, and the IV is manipulated by the researcher.
3. **Natural experiment** : the experiment takes place in a natural setting and the IV is NOT directly manipulated by the researcher. It happens naturally by chance.

Laboratory Experiments EVALUATION

STRENGTHS :

- Allows extraneous variables such as participant variables (individual differences) to be controlled. This helps raise validity.
- Causal relationships can be determined with the scientific data gathered since lab experiments attempt to make

studies as scientific as possible. Standardised procedures help raise reliability and allows replication.

WEAKNESSES

- Since the experiment takes place in an artificial settings, there are chances of participants exhibiting demand characteristics and social desirability bias.
- Participants could act on the demand characteristics as a response and alter their behaviour which would lead to lower validity and ecological validity.
- Furthermore, the mundane realism of any tasks involved in the lab exp. would be low.

Mundane realism: is the extent to which any tasks involved in a study represent real-world activities.

Field Experiments EVALUATION

STRENGTHS

Participants are in a natural settings showing their natural behaviour, hence they are likely to show their true behaviour. This would make the results highly valid, ecologically valid and representative.

- If participants are unaware that they are in a study, there is very less chance of participants exhibiting demand characteristics, in comparison to lab experiments.

WEAKNESSES

- There are chances of uncontrolled, extraneous variables affecting the experiment process, which could lead to

obscure results. This means the reliability and replicability of the research lowers since not all variables can be factored again.

- The researcher will be less sure that changes in the DV are caused by changes in the IV, in the comparison to lab experiments. This lowers the validity.
- The participants are unaware that they are in a study, and this raises the ethical issues of privacy, confidentiality and lack of consent.

Natural Experiments EVALUATION

STRENGTHS

- Natural experiments help to study real-world issues. When participants are in a natural settings, their behaviour is likely to be true and representative. This means that the ECOLOGICAL VAUDITY IS HIGH.
- As participants are unaware of the participation in the research, there are very less chances of demand characteristics affecting the experiment.
- They help researchers investigate variables which wouldn't be ^{practical} or ethical to manipulate.

WEAKNESSES

- Natural experiments are only possible to conduct when changes in variables occur naturally.
- Extraneous variables are often very difficult to control.
- As the researcher isn't manipulating the IV, they will be less sure about the changes in the DV, so a casual relationship cannot necessarily be established.

- They are hard to replicate as controls and standardizations are hard to implement, so the reliability may be low.

EXPERIMENTAL DESIGN

- ★ How participants are allocated to the different conditions of the study.

Experimental design types:

1. Independent measures design - different groups of participants are used for each level of the IV.
2. Repeated measures design - each participant takes part in every ~~day~~ condition of the study.
3. Matched pairs design - participants are matched in pairs according to a characteristic they have, that is similar.

Evaluation of types of exp. designs

Independent (IMD)
Measures

Repeated
measures

Matched
Pairs

STRENGTHS

- No order effects incurred.
- Reduces the chances of demand characteristics.
- Random allocation of participants to each level of IV reduces the effect of individual differences.
- Participant variables do not affect the results.
- Counterbalancing reduces order effects.
- Fewer participants required for the study.
- Participants only see one level of IV, which reduces the demand ch.
- Participant variables are less likely to ~~distort~~ ^{distort} the effect of IV than IMD.
- No order effects.

How to reduce participant variables

→ Implement the repeated measures design.

→ RANDOM ALLOCATION: participants are randomly distributed to each level of the IV to reduce the effect of individual differences (which is a confounding variable) affecting the study's result.

* Order effects occur when participants take part in more than one condition of the study.

→ Practice effect - due to familiarity or learning how to solve the task.

→ Fatigue effect - Participants performance declines when participating for too long, due to boredom or tiredness.

• Use counterbalancing to overcome the order effects from impacting the study's results, when implementing the repeated measures design.

- _/_/_
- * counterbalancing - when order in which each group attends each level of IV changes.

How to improve generalisability: use randomization to select the sample of the study.

Randomisation - when you choose your sample for the study randomly.

SELF - REPORTS

1. Questionnaires - research method using written questions.

Question types:

→ Close-ended [pre-set answers choices, quantitative data]

- Easier to analyse than interviews as it isn't affected by researcher bias when calculating results.

Simple to summarise, and derive results & conclusions

From the data

- Responses may be limited - low ^{validity} ~~ecological~~ as they can't explain them.

→ Open-ended [Qualitative data]

- produces in-depth and detailed responses.

- Difficult to quantify.

- There is a chance that researcher bias might affect the interpretation of result.

General Questionnaire Evaluations:

- Easy for participants to ignore questions - low generalisability.
- When 2 researchers interpret results there may be lack of inter-rater reliability.

2. Interviews - research method using verbal questions asked directly.

Interview types:

→ Structured (fixed questions)

→ Unstructured (questions depend on the answer of the respondent)

→ Semi-structured (fixed and unwritten questions)

Evaluation: Interpretations of self-reports by the researcher must be objective.

3. Case Studies - are detailed investigations about a single person or a small group. The maximum amount of quantitative and qualitative data is gathered.

STRENGTHS

VI. The data collected is highly valid.

The researcher builds rapport with the subject, making it likely for them to open up and provide true information.

The subject is less likely to show demand characteristics as case studies are longitudinal.

WEAKNESSES

The researcher's finding may be too close relation with the subject.

The data is low in reliability and replicability.

The data is only internally valid.

OBSERVATIONS

1. Naturalistic observation: participants behaviour is observed in their natural environment without it having any manipulations from the researcher.
2. Controlled observation: participants behaviour is observed in a setting that has been manipulated by the researcher.
3. Unstructured: researcher records all of the behaviours being exhibited by the subject.
4. Structured: researcher records only the behaviour being studied.

CORRELATION'S

A correlation is a statistical relationship that suggests the probability of a true relationship between the IV and DV of the study. A correlational relationship is not necessarily a causal relationship.

To make sure whether a correlational relationship is casual, the two variables must be investigated in a laboratory environment where extraneous variables are controlled.

RESEARCH PROCESS

HYPOTHESIS - a testable statement predicting the outcomes of a study.

→ **Non-directional hypothesis** - predicts that there will be a relationship between the variables, but does not specify the direction of the relationship.

→ **Directional hypothesis** - predicts that there will be a specific relationship between the variables.

→ **Null hypothesis** - any relationship that is found between the variables is purely due to chance.

VARIABLES

Operationalisation: defining variables to accurately manipulate, measure, quantify, and replicate.

Standardised procedures are important to ensure that all participants undergo the same procedure. This helps to increase reliability and replicability.

SAMPLING PARTICIPANTS

- **OPPORTUNITY SAMPLING**: participants are chosen because they are available.

STRENGTHS: Quicker and easier than other methods.

WEAKNESSES: Likely to be non-representative, as people from the same area may be a biased sample.

- **VOLUNTEER SAMPLING**: participants are invited to participate. Those who reply will be part of the sample.

STRENGTHS: participants are likely to stay committed and would be willing to return for repeated testing.

WEAKNESSES: The sample may be unrepresentative because people who respond may be similar.

- **RANDOM SAMPLING:** all participants are chosen randomly. Could be with a draw, or a random number

STRENGTHS: The sample is likely to be a representative of the target population as all type of people has an equal chance of being chosen.

WEAKNESSES: Everyone may not be equally chosen.

For example, there could be more girls chosen randomly than boys.

DATA & DATA ANALYSIS

Quantitative Data: data in numerical format.

Strengths - objective measure, very reliable, data can be analysed using statistical methods and data is easy to compare.

Weaknesses - limits responses of participants, so data may not be very valid.

Qualitative Data: data written in a non-numerical format that often expresses a quality or opinion.

STRENGTHS - highly valid, unrequested, but important data is incurred.

WEAKNESS - limits responses of participants, Not subjective, generalisable, or reliable.

HOW CAN DATA BE ANALYSED?

★ Measure of central tendency - a mathematical way to find the typical or average score from a data set, using the mode, median or mean.

MODE - the measure of central tendency that identifies the most frequent score(s) in a data set.

MEDIAN - the measure of central tendency that identifies the middle score of a data set which is in rank order. If there are two numbers in the middle they are added together and divided by two.

MEAN - the measure of central tendency calculated by adding up all the scores and dividing by the no. of scores in the data set.

★ Measure of spread - a mathematical way to describe the variation or dispersion within a data set.

RANGE - The difference between the biggest and smallest values in a data set.

STANDARD DEVIATION - The average difference between each score in the data set and the mean.

ETHICAL CONSIDERATIONS

FOR HUMAN PARTICIPANTS

- Informed consent
- Protection
- Deception
- Confidentiality
- Privacy
- Debriefing

FOR ANIMALS

- Replacement
- Species & strain
- The no. of animals
- Pain & distress
- Housing
- Rewards, deprivation and
- reverse stimuli

EVALUATING RESEARCH

- Reliability - the consistency of the outcome.
- Validity - to extent to which the study measures what is intended to study.
- Ecological Validity - the extent to which the results of the study represent real-life behaviour.
- Generalisability - the extent to which the results represent the behaviour of the target population.
- Test - retest - a way to measure the consistency of a test. The test is used twice and if the scores on both test are similar, then it has good reliability.
- Demand characteristics - when participants change their behaviour as they drive cues on what is expected of them.
- Inter-rater reliability - The extent to which similar conclusions are produced by two researchers interpreting the same qualitative responses.
- Inter-observer reliability - the extent to which similar observations are produced by two researchers observing the same event.