Knowledge Map: Research Methods

This topic focuses on the design of psychological research and its analysis.

Research design
How to design research which is valid, reliable and ethical.

Formulating a hypothesis

Independent variable	Deliberately changed.
Dependent variable	What is measured.
Operationalisation	Making variables clearly defined and measurable.
Hypothesis	Clear testable statement DV + two levels of the IV.

Research procedures

Standardised instructions	Giving the same information about the study to all participants.
Standardised procedures	Using the exact same methods and procedures for participants in research study, this controls EVs.
Randomisation	Using chance to control effects of bias when designing a study.

Extraneous variables

The only thing that should cause a change in the DV is the IV

Unwanted variables that could affect the DV.
Then the change in the DV is due to EV not IV.

Ethical issues

Informed consent	Participants should be told the purpose of the research and that they can leave at any time.
Deception	Participants should not be lied to or misled about aims. Mild deception can be justified.
Privacy	Participants have the right to control information about themselves.
Confidentiality	Personal data should be protected and respected.

Target population	Group being studied
Sample	Participants chosen from the target population

Sampling

Random sampling Each person has equal chance of selection.	No bias as everyone has an equal chance of selection. Takes time as need list of all members of the target population.
Opportunity sampling Selecting people who are available.	Quick and therefore cheap because participants are already available. Only represents the population from which it has been drawn.
Systematic sampling Selecting every nth person from a list of the target population.	Avoids researcher bias. May end up as an unrepresentative sample.
Stratified sample Selecting participants in proportion to their frequency in target population.	Personal data should be protected and respected.

Dealing with ethical issues

BPS guidelines A code of conduct all psychologist in the UK follow.	**Dealing with informed consent** Participants sign a form that tells them what is expected.	**Dealing with deception and protection from harm** Participants receive a full debrief to explain the true aims of study.	**Dealing with privacy and confidentiality** Participants should be anonymous (given numbers or referred to by initials.

Validity – real world

Sampling methods
Representativeness low in opportunity sampling and high in stratified sampling.

Experimental design
Repeated measures: Order effects challenge validity, overcome by counter balancing.
Independent groups: participant variables challenge validity, overcome by random allocation.

Quantitative methods
Laboratory experiments: Task, setting, participant awareness challenge validity. High control.
Field experiments: Task and control challenge validity. More natural.
Methods producing numerical data (e.g., questionnaires) lack validity as they reduce behaviour to a score.

Qualitative methods
Case studies have greater validity as they give deeper insight into behaviour.
Difficult to analyse, which reduces validity.

Reliability - consistency

Quantitative methods
Tend to be the most reliable.
Laboratory experiment: Controlled and easy to repeat.
Interviews/questionnaires: Same person should answer same questions in the same way. Closed questions are more reliable.
Observations: One observer should produce the same observations. Two observers need to establish interobserver reliability.

Qualitative methods
Less reliable.
Case studies and unstructured interviews are difficult to repeat in the same way.

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Memory	Perception	Development	Research methods	Social influence	Language thought and communication	Brain and neuropsychology	Psychological problems

Research methods

Quantitative data is data that can be counted. Qualitative is data that can be expressed in words.

Correlations – how things are linked together

Co-variables	Correlations are quantitative-continuous numerical data.
Scatter diagram	A special graph used to plot correlation data. One co-variable on the x-axis another on y-axis.
Types of correlation	Positive: As one co-variable increases the other increases. Negative: As one co-variable increases the other decreases. Zero: No relationship between co-variables.

Strengths	Good starting point for research. Can be used to research variables that would be unethical.
Weaknesses	Don't show cause and effect. No control of extraneous variables so conclusion drawn may be wrong. May not take account of third variables.

Experiments

Laboratory Experimenter has high control over what happens.	S – EV can be controlled, so cause and effect can be established. Use standardised procedures permits replication, can demonstrate validity.
	W – Behaviour in lab is less normal/natural so difficult to generalise. Participants may change their behaviour because aware of being watched.
Field Take place in a natural setting. IV manipulated by experimenter.	S – More realistic than lab experiments as they are conducted in a natural environment. Can use standardised procedures so some control.
	W – May lose control of EV's so difficult to show cause and effect. Ethical issues because participants may not be aware of study.
Natural Takes place in a natural or lab setting. IV is not changed by experimenter. It varies naturally.	S – May have high validity because real-world variables. Can standardised procedures so some control over EV's.
	W – Few opportunities to do this kind of research as behaviours may be rare. May be EV's because participants not randomly allocated to conditions.

Design / Evaluation

Design	Evaluation
Independent groups Different groups of participants for each level of the IV. Control and experimenter groups.	S – Order effects are not a problem because participants only do experiments once.
	W – Different participants in each group. Participant variables can act as EVs.
Repeated measures All participants take in all levels of the IV.	S – No participant variables. Fewer participants needed, so less expensive.
	W – Order effects reduce validity, e.g. practice effect.
Matched pairs Participants tested on variables relevant to the study. Participants then matched and one member of each pair goes into each condition.	S – No order effects. Fewer participant variables.
	W – Takes time to match participants. Doesn't control all participant variables.

Observation

Observation
Natural/controlled. Natural: Record behaviour where it would normally occur. Controlled: Researcher manipulates aspects of environment.
Covert/Overt Covert: Participants not aware behaviour is being recorded Overt: Told in advance
Participant/Non-participant Participant: Researcher is part of the group Non-participant: Researcher remains separate
Categories of behaviour Target behaviour broken into separate observable categories.
Interobserver reliability Two observers should produce the same record of behaviour. Researchers watch at the same time and correlate data.
S – Greater validity because based on what people do. Real-life behaviour when participants not aware of being observed.
W – Ethical issues as can't gain consent if observing in a public place. Observer bias – Observers expectations affect validity.

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Interviews

Structured interviews
Interviewer reads a list of preprepared questions.
Can have prepared follow-up questions.

Unstructured interviews
Some questions prepared before.
New questions created depending on what interviewee says.

Semi structured interviews
Some questions decided before, but follow-up questions emerge.

Strength
Produce a lot of information.
Insight gained into thoughts and feelings.
May be helpful if participants cannot read or write.

Weaknesses
Data can be difficult to analyse.
People feel uncomfortable talking face to face.

Questionnaires

Open and closed.
Open questions produce qualitative data.
Closed questions have a fixed range of answers, e.g. rating scale or yes/no

Strength
Can gather information from many people.
Easy to analyse as often use closed questions.

Weaknesses
Social desirability bias.
Questions may be leading, lack validity

Case studies

Qualitative
Collect information about people's experiences in words.
May include quantitative data, e.g. IQ scores.

Longitudinal
Often carried out over a long period so can see how behaviour changes.
May also collect retroactive case history.

Strength
Research lacks specific aims so researcher more open-minded.
Best way of studying rare behaviours.

Weaknesses
Focus on one individual or event, so often can't be generalised.
Subjective interpretation of events.

Data handling
The aim of research is to produce and then analyse data.

Data

Quantitative	Easy to analyse and draw conclusions.
Quantities (number) but can measure thoughts/feelings	Lacks depth , not reflecting real-world complexity.
Qualitative	More depth and detail.
Data in words but can be turned into numbers by counting themes.	Difficult to analyse and summarise.
Primary data	Suits the aims of research, so more useful.
Data that as been obtained first hand.	It takes time and effort to collect.
Secondary data	Easy and convenient to use, saving expense.
Second hand data from other studies or government statistics.	It may not fit what the researcher s investigating.

Descriptive statistics

Range	Easy to calculate.
Spread of data. Arrange data in order and subtract lowest from highest score.	Can be distorted by extreme scores.
Mean	Uses all the data, so most sensitive measure.
Mathematical average. Add up all scores and divide by the number of scores.	Can be distorted by extreme scores.
Median	Not effected by extreme scores. Less sensitive than the mean to variation in values.
Middle value. Data put in order from lowest to highest.	
Mode	Very easy to calculate.
Most common score/s	Can be unrepresentative.

Display
Scatter diagrams
To display correlation.
One co-variable on x-axis and the other on y-axis.

Frequency tables
Frequency means the number of times it occurs.
Frequency tables are a systematic way to organise data in rows and columns.

Frequency diagrams
Histogram: continuous categories, no spaces between bars.
Bar chart: Bars can be in any order.

Display
Normal distribution: Symmetrical spread forms a bell shape with mean, median and mode at peak.