



Considerations in research design

Hypothesis and variables	Sampling	Ethical issues	Reliability	Validity
<p>Start with a theory of behaviour, tested using objective research methods</p> <p><b>Aim</b> – general statement explaining the purpose of the study</p> <p><b>Variables</b> – anything that can change or vary</p> <p><b>IV</b> – changed</p> <p><b>DV</b> – measured</p> <p><b>Operationalisation</b> – making variables clearly defined and measurable</p> <p><b>Hypotheses</b> – clear testable, precise statement</p> <p><b>Alternative hypothesis</b> – predicts relationship between variables</p> <p><b>Null</b> – predicts no relationship</p> <p><b>Extraneous variables</b> – unwanted variables that could affect the DV</p> <p><b>Research procedures</b></p> <p><b>Instructions to p's</b> – all p's must be given the same info</p> <p><b>Standardised procedures</b> – exact same methods, to try and control EV's</p> <p><b>Randomisation</b> – using chance when designing a study to control the effects of bias</p>	<p><b>Target population</b> – group of people being studied</p> <p>Sample is chosen from the target population and should represent target population</p> <p>Sampling methods aim to avoid bias</p> <p><b>Random sampling</b> – each person has an equal chance of being selected, all people in the target population put in a hat or random name generator</p> <p>Evaluation - no bias as everyone has equal chance, takes time as need all members of the target population, sample may still not represent target pop</p> <p><b>Opportunity sampling</b> – taking the people who happen to be there</p> <p>Evaluation – quick and cheap, yet only represents the population from which it was drawn</p> <p><b>Systematic sampling</b> – selecting every nth person from a list of the target population</p> <p>Evaluation – avoids researcher bias, may end up with an unrepresentative sample</p> <p><b>Stratified sampling</b> – selecting p's in the proportion to frequency in the target population</p> <p>Evaluation – most representative, very time-consuming to sort sub-groups</p>	<p>Conflict between p's rights and well-being and the need to gain valuable results</p> <p><b>Informed consent</b> – p's should be told the purpose of research and that they can leave at any time</p> <p><b>Deception</b> – p's should not be misled about the aims, mild deception can be justified</p> <p><b>Privacy</b> – p's have the right to control information about themselves</p> <p><b>Confidentiality</b> – personal data must be protected and respected</p> <p><b>Ways of dealing with ethical issues</b></p> <p><b>BPS guidelines</b> – which all professional psychologists must follow</p> <p><b>Dealing with informed consent</b> – p's (guardians) sign a form</p> <p><b>Dealing with deception and protection from harm</b> – full debrief at the end to reduce distress</p> <p><b>Dealing with privacy and confidentiality</b> – p's should be anonymous</p>	<p>Measure of <b>consistency</b></p> <p><b>Quantitative methods</b> – tend to be most reliable.</p> <p><b>Lab exp's</b> – controlled and easy to replicate</p> <p><b>Interviews/ questionnaires</b> – same person should answer the q's in the same way, closed questions better for this</p> <p><b>Observations</b> - one observer should produce same observations if repeated or two observers (interobserver reliability)</p> <p><b>Qualitative methods</b> – less reliable</p> <p>Case studies and unstructured interviews – difficult to repeat in the same way</p>	<p>Related to whether a result is a <b>true reflection of 'real-world' behaviour</b></p> <p><b>Sampling methods</b> – sample may not represent target population. Opportunity sample – lowest in representativeness, high in stratified sampling</p> <p><b>Experimental design</b> –</p> <p><b>Repeated measures</b> – order effects challenge validity, overcome by counterbalancing</p> <p><b>Independent groups</b> – p's variables challenge validity, overcome by random allocation</p> <p><b>Quantitative methods</b></p> <p><b>Lab exp</b> – task, setting, participant awareness challenge validity, high control.</p> <p><b>Field exp</b> – task and control challenge validity, more natural</p> <p>Methods producing numerical data lack validity as they reduce behaviour to a score</p> <p><b>Qualitative methods</b> – case studies have greater validity as they give a deeper insight into behaviour</p> <p>Difficult to analyse which reduces validity</p>

Data Handling

Types of data	Descriptive statistics – express numbers in a way to show the overall pattern	Interpretation and display of quantitative data	Computation
<p><b>Quantitative data</b> – numbers but can measure through thoughts and feelings</p> <p>Easy to analyse and draw conclusions, lacks depth</p> <p><b>Qualitative data</b> – words but can be turned to numbers when counting</p> <p>More depth and detail, difficult to analyse and summarise</p> <p><b>Primary data</b> – obtained first hand</p> <p>Suits the aims of the research, takes time and effort</p> <p><b>Secondary data</b> – data from other studies of government stats</p> <p>Easy and convenient to use, may not be fit for what is investigated</p>	<p><b>Range</b> Easy to calculate, can be distorted by extreme scores</p> <p><b>Mean</b> Uses all data so is the most sensitive measure, can be distorted by extreme values</p> <p><b>Median</b> Not effected by extreme scores, less sensitive than the mean to variation in values</p> <p><b>Mode</b> Very easy to calculate, can be unrepresentative</p>	<p><b>Scatter diagrams</b></p> <p><b>Frequency tables</b></p> <p><b>Histogram</b></p> <p><b>Bar chart</b></p> <p><b>Normal distribution</b></p>	<p><b>Decimals</b></p> <p><b>Fractions</b> – reduced to simplest form</p> <p><b>Ratios</b> – way to express fractions 8:4</p> <p><b>Percentages</b> – fractions out of 100</p> <p><b>Standard form</b> – mathematical shorthand to represent very large or small numbers</p> <p><b>Significant figures</b> – two significant figures</p> <p>32,462 = 32,000</p> <p><b>Estimate results</b> – rough calculation</p>



# Y10 HT1 Research Methods Knowledge Organiser



## Quantitative and qualitative research methods

Method	Description	Strengths	Weaknesses
<b>Correlations</b>	Show how things are linked together, associations <b>Co-variables</b> – correlations are quantitative, continuous numerical data <b>Scatter diagrams</b> used to plot <b>Positive</b> – as one variable increases so does the other <b>Negative</b> – as one variable increases the other decreases <b>Zero</b> – no relationship	Good starting point for research Can be used to investigate curvilinear relationships	Does not show cause and effect No controls of EV's so conclusions drawn may be wrong
<b>Experiments</b>	<b>Look at a measurable change in the DV caused by a change to the IV</b>		
	<b>Lab</b> experiments – high control over what happens, takes place in a lab	EV's can be controlled, so cause and effect can be established Used of standardised procedures permits replication, can demonstrate validity	Behaviour in a lab is less normal so difficult to generalise P's may change their behaviour because they are aware they are being watched
	<b>Field</b> experiments – take place in a natural setting, IV manipulated by experimenter	More realistic than lab exp's as in a natural environment Can use standardised procedures so some control	May lose control of EV's so difficult to show cause and effect Ethical issues because p's not aware of the study
	<b>Natural</b> experiments - natural or lab setting, IV is not changed by the experimenter it varies naturally e.g. age, race	May have high validity because of real-world variables Can standardise procedures so some control over EV	Few opportunities to do this kind of research as behaviours may be rare May be EV's because p's not randomly allocated to conditions
<b>Experimental design</b>	<b>The different ways p's can be organised in relation to IVs/conditions of the experiment</b>		
	<b>Independent groups</b> – 2 groups, different p's in each condition	Order effects not a problem because p's only do the experiment once	Different p's in each group, participant variables can act as EVs To deal with participant variables, try to allocate p's to conditions using chance or systematic method
	<b>Repeated measures</b> – 1 group of p's which do both conditions	No participant variables, fewer p's needed so less expensive	Order effects reduce validity To deal with order effects, use counterbalancing so half the p's do condition A first and then condition B, the others do B and then A
	<b>Matched pairs</b> – p's tested on variables relevant to the study, p's then matched to and one member of each pair goes in each condition	No order effects, fewer participant variables	Takes time to match participants, doesn't control all participant variables
<b>Interviews</b>	Face to face, real-time contact, though also on phone / text <b>Structured</b> – interviewer reads list of questions, can have prepared follow-up questions <b>Unstructured</b> – some questions prepared before, new questions created depending on what interviewee says <b>Semi-structured</b> – some questions decided before but follow-up questions emerge	Produce lots of information Insight gained into thoughts / feelings	Data can be difficult to analyse People may be uncomfortable talking face to face
<b>Questionnaires</b>	Prepared list of questions which can be answered in writing, over the phone, internet etc. <b>Open questions</b> – tend to produce qualitative data <b>Closed questions</b> have a fixed range of answers, e.g. rating scales, yes/no etc.	Can gather lots of information from many people Easy to analyse as often used closed questions	Social desirability bias Questions may be leading so lack validity
<b>Case studies</b>	An in-depth investigation of an individual, group, event or institution Qualitative method – collect information about people's experiences in words. May have quantitative data e.g. IQ scores Longitudinal – often carried out over a long period of time so can see how behaviour changes, may also collect retrospective case history	Research lacks specific aims so researcher more open-minded Best way of studying rare behaviours	Focus on one individual or event, so often cannot be generalised Subjective interpretation of events
<b>Observations</b>	Researcher watches or listens to ps' and records data <b>Natural vs controlled</b> – natural (where it would normally occur), controlled (researcher manipulates env) <b>Covert vs overt</b> – covert (under cover so p's not aware) overt (p's told in advance) <b>Participant vs non-participant</b> – participant (researcher part of the group), non-participant (researcher remains separate) <b>Categories of behaviour</b> – target behaviour broken into separate observable categories <b>Interobserver reliability</b> – two researchers should watch the behaviour at the same time, record and the correlate behaviour	Greater validity because based on what people do Real –life behaviour when p's not aware of being observed	Ethical issues as can't gain consent if observing in a public place Observer bias – observer's expectations affect validity



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Key Term	Definition	Key Term	Definition
Alternative hypothesis	States a relationship between variables, it is called alternative as it is an alternative to the null	Scatter diagram	Type of graph that represents the strength and direction of a relationship between co-variables in a correlation
Dependent variable (DV)	The variable the researcher measures	Case study	An in-depth investigation of a single individual, group, institution or event
Hypothesis	Clear, precise, testable statement	Reliability	Concerns the consistency of measurement
Independent variable (IV)	The variable that is varied (changed) in the experiment	Validity	Concerns whether a result is true, valid research represents something that is real
Null hypothesis	Statement of no relationship	Primary data	Information obtained first hand by the researcher
Variable	Any 'thing' which can vary or change within an investigation	Qualitative data	Information expressed in words and not numbers
Extraneous variable (EV)	Any variable except the IV which could have an effect on the DV – they need to be controlled!	Quantitative data	Information expressed in numbers
Randomisation	Using chance such as tossing a coin or picking names from a hat – to control for effects of bias when designing a study	Secondary data	Info gathered by someone other than the researcher before the current investigation
Standardised procedures	Using exactly the same methods and instructions for all participants in a research study	Descriptive statistics	Use of graphs, tables and summary statistics to identify trends
Field experiment	Experiment which takes place in a natural setting	Mean	Mathematical average – add all numbers in a data set up and divide by the number of scores in the data set
Lab experiment	Experiment which takes place in a controlled environment	Median	Middle value in a data set
Natural experiment	IV occurs naturally (e.g. age, ethnicity etc.) and therefore is not manipulated by the researcher	Mode	Most common value in a data set
Qualitative method	Data expressed in words	Range	Simple measure of dispersion in a set of data, lowest score is subtracted from the highest score
Quantitative method	Data expressed in numbers	Bar chart	Type of graph in which the frequency of each variable is represented by the height of the bar
Counterbalancing	ABBA used in repeated measures design, half p's do condition A and then B, the others do B and then A	Frequency table	A table is a systematic way of representing data so it is organised in rows and columns
Experimental design	Different ways p's can be organised in relation to the conditions	Histogram	A type of graph where the frequency of each category of continuous data is represented by the height of the bar
Independent groups	2 groups, different p's in each	Normal distribution	A symmetrical spread of frequency data that forms a bell-shaped curve. The mean, median and mode are all the same point – the highest peak
Matched pairs	2 groups, Pairs of p's matched in terms of variable relevant to the study e.g. IQ, age, gender, one of each pair takes part in a condition each		
Repeated measures	1 group, all p's take part in both conditions		
Order effects	In a repeated measures design, an EV arising from the order in which conditions are presented		
Opportunity sample	Taking p's who happen to be there at the time		
Random sample	Produced by using a random technique in which every member of the target population has an equal chance of being selected		
Sample	A subset of the target population which aims to be representative of that population		
Sampling method	Method used to produce a sample		
Stratified sample	Selecting p's in a proportion to their frequency in the target population		
Systematic sample	Selecting every nth person		
Target population	Group that the researcher is interested in studying		
British Psychological Society (BPS)	Code of conduct every professional psychologist in the UK has to follow		
Ethical issue	Where there is conflict between the rights of p's to be safe and the goals of the research to produce valid data		
Closed question	One that has a fixed range of responses e.g. yes / no		
Interview	Interaction between interviewee and interviewer – usually done face to face		
Open question	Respondents can provide their own answer rather than selecting from a list		
Questionnaire	Set of written questions		