Psychology: Knowledge Organiser. Paper 2: Research Methods

Statistical Testing

- Significance: difference/association due to chance?
- Probability: the likelihood of an event. Accepted level p = 0.05 to accept/reject null hypothesis.
- Calculated value: outcome of test.
- Critical value: look up in table.
- Statistical tables: used to check significance.
- Finding critical value: significance level, N of df, one or two tailed test (directional or non-directional hypothesis).
- Use table of critical values and compared calculated and critical value, if calculated value is significant then reject null hypothesis.
- $p \leq 0.05$ means there is a 5% chance that the results of a particular sample occurred even if there was no real difference in the population (i.e. the null hypothesis is true).
- The rule of R: statistical tests with the letter 'R' on their name are those where the calculated value must be equal to or less than the critical value.
- Type I error: null hypothesis rejected when 'true' - optimistic. More likely if significant level is too lenient e.g. p = 0.10).
- Type II error: null hypothesis accepted when 'false', pessimistic. More likely if significance level is too stringent (e.g. p = 0.01.
- Criteria for parametric tests: unrelated and related t-tests, Pearsons r, Interval level data, normal distribution and homogeneity of variance (standard deviation).

	Test of Difference		Test of Association or correlation
	Unrelated Design	Related Design	
Nominal Data	Chi-Squared	Sign test	Chi-squared
Ordinal Data	Mann-Whitney	Wilcoxon	Spearman's rho
Interval Data	Unrelated t-test (parametric)	Related t-test (parametric)	Pearson's r (parametric)

Levels of measurement

- Quantitative data can be divided into different levels of measurement.
- Nominal: frequency data in categories
- Ordinal: data in order, intervals subjective (e.g. rate on 1 o 10 scale).
- Interval: data measured on units of equal size (e.g. metres or minutes).

Calculating the sign test

1. Sign of difference between condition A and B
2. Calculate total + and -
3. Ignore participants with the same score in condition A and B and ensure you take this off N (number of participants).
4. Total of less frequent sign (S).
5. Calculated S equal to or less than the critical value for calculated value to be significant.

Reporting psychological investigations

- Abstract: short summary, main parts.
- Introduction: review of literature, logical progression to hypothesis.
- Method: design, sample, materials, procedure, ethics, detailed replication.
- Results: descriptive and inferential statistics (tests), raw data in appendix.
- Discussion: summary, links to earlier research, limitations, implications.
- Referencing: use standard format for books, journals and websites.

Writing a consent form

- Must contain sufficient information for the participant to make an informed decision about whether to take part or not.
- A consent form must include both procedural issues and ethical issues.
- Format: requires participants agreement: include a space to print or sign name.

Writing standardised instructions

- Ensure each participant has exactly the same instructions.
- Must be clear & succinct and written using formal language.
- Explain procedures.
- Check understanding of instructions: finish with 'do you have any questions?'.
- No ethics required in this document.

Writing a debrief

- Debriefing: all is explained to the participant who is thanked at the end of his/her contribution. Happens at end of study.
- Must be written in verbatim format.
- Start your debrief with: thank you. Then the aim of the study, refer to ethical guidelines: right to withdraw data & confidentiality. Experimental design: if IGD explain other condition. Finish with: do you have any questions?

Psychology and the economy

- Findings of research benefit financial prosperity.
- Attachment: promotes role of father, parents then both more able to contribute to economy.
- Treatment of mental disorders: work days lost from depression, effective treatments (e.g. drugs, CBT) contribute to economy.

Case studies

- Detailed in-depth study of individual/group/institution/event, longitudinal.
- Unusual cases (e.g. rare disorder), typical cases (e.g. childhood memories).
- Qualitative (e.g. interviews) and quantitative data (e.g. psychological tests).

☺ Can provide new insights & allows study of both unusual and typical behaviour.
☹ Small, unique sample, low generalisability.

Content analysis

- Indirect study of communications.
- Form of observation: of spoken interaction and/or written communications, examples from media.

☺ High ecological validity & easy to replicate and check reliability.
☹ May lack objectivity and communication studied out of context—reduces validity.

Reliability

- Reliability: measuring consistency.
- Ways of assessing reliability: test-retest (test same people twice), inter-observer (compare observations from different observers) and correlation coefficient (two sets of scores should correlate at least +.80 for reliability).
- Improving reliability: questionnaires: rewrite questions. Interviews: improve training avoid leading questions. Observations: operationalise behavioural categories, training. Experiments: standardise procedures.

Validity

- Validity: measure of legitimacy (genuine effect).
- Internal validity: control within a study e.g. reduce CVs/EVs, demand characteristics.
- External validity: ecological validity, temporal validity.
- Ways of assessing validity: face validity (test looks like it measures what it should) & concurrent validity (findings similar to well established test: correlation coefficient > +.80).
- Improving validity: experiments: use control group & standardised procedure, single and double blind design. Questionnaires: make anonymous. Observations: covert, operationalised behavioural categories. Gather qualitative data: and use triangulation (different sources).

Analysis of qualitative data

- Content analysis and coding: categorise information into meaningful units and then count number of words or phrases. Qualitative data after analysis is converted into quantitative data.
- Thematic analysis and themes: Familiarisation with data, initial coding, searching for themes – that are descriptive. Data stays qualitative.

Features of science

- Objectivity: researcher maintains distance, unbiased.
- Empirical method: data collected through direct experience.
- Replicability: findings repeatable across contexts, shows validity.
- Falsifiability: possibility of being proved false, theories must be testable.
- Theory of construction: create general law, derive and test hypothesis.
- Hypothesis testing: theories generate hypotheses to assess theory's validity.
- Paradigms/shifts: shared set of assumptions (which may change), psychology lacks a paradigm.
- **Popper & Kuhn.**

Peer review

- Peer review: assessment of scientific work by others who are specialists. Happens before publication—independent scrutiny that considers: validity, significance and originality.
- Purpose: quality assurance.
- Strengths: aims to protect quality of research.
- Limitations: anonymous checkers, so may criticise rival research. Publication bias and groundbreaking research buried.

Writing a hypothesis

Experimental hypothesis: 'difference'
- Directional: 'There will be more/less'
- Non-directional: 'There will be a difference in'.
- Null hypothesis 'there will be no difference'

Correlational hypothesis: 'relationship'.
- Directional: 'There will be a positive/negative correlation'.
- Non-directional: 'There will be a correlation between'.
- Null hypothesis: 'There will be no correlation'.
- Ensure you write a clear and testable hypothesis that is operationalised.