Research & Program Evaluation

Research questions describe a study and ask you to name the design, the variable or the right statistic. Read the stem for three clues: how many groups, what kind of data, and whether people were randomly assigned.

> **Where it shows up on the NCE:** Professional Practice & Ethics (research ethics, evidence-based practice); Treatment Planning (evaluating outcomes).

Research designs

Design	Defining feature
Experimental	Random assignment to conditions; manipulates the independent variable
Quasi-experimental	Manipulates the IV but no random assignment (intact groups)
Correlational	Measures relationships; cannot show cause
Descriptive / survey	Describes a population or phenomenon
Single-subject	Repeated measures with one person or group (e.g., AB, ABAB)
Qualitative	Phenomenology, grounded theory, ethnography, case study, narrative
Action research	Practitioners study and improve their own practice

Choosing a statistic

Situation	Test
Compare two group means	t-test
Compare three or more group means (one IV)	One-way ANOVA
Two or more IVs	Factorial ANOVA
Control for a covariate	ANCOVA
More than one DV	MANOVA
Frequencies of nominal data	Chi-square
Relationship between two interval variables	Pearson r
Relationship between ranked (ordinal) data	Spearman rho
Nonparametric alternatives	Mann-Whitney U, Wilcoxon, Kruskal-Wallis

Core terms

Variables	Independent (manipulated), dependent (measured), confounding (uncontrolled influence).

Levels of measurement	NOIR: nominal, ordinal, interval, ratio (true zero).
Hypotheses	Null (no effect) vs. alternative (an effect exists).
Type I error	Rejecting a true null (false positive); probability = alpha (often .05).
Type II error	Failing to reject a false null (false negative); probability = beta. Power = 1 – beta.
Effect size	How big the difference is. Cohen's d: about .2 small, .5 medium, .8 large.
Sampling	Random, stratified, cluster, systematic (probability); convenience, purposive, snowball (nonprobability).

Validity of a study

Internal validity threats	History, maturation, testing, instrumentation, statistical regression, selection, attrition (mortality).
External validity threats	Hawthorne effect, experimenter effect, placebo effect, unrepresentative samples.
Qualitative trustworthiness	Lincoln & Guba: credibility, transferability, dependability, confirmability. Strategies: triangulation, member checking, audit trail.

Program evaluation and ethics

Needs assessment	Identifies the gap between what exists and what is needed, before a program starts.
Formative vs. summative	Formative improves a program while it runs; summative judges overall effectiveness at the end.
Process vs. outcome	Process: was it delivered as planned? Outcome: did it work?
Research ethics	IRB review, informed consent, right to withdraw, debriefing after deception; Belmont Report principles: respect for persons, beneficence, justice.

Exam traps

- No random assignment means quasi-experimental, even if there is a control group.
- Correlation does not prove causation.
- Count the groups and the DVs before choosing between a t-test, ANOVA and MANOVA.
- Lowering alpha reduces Type I error but increases the chance of Type II error.

Quick self-check

1. Which statistic compares three or more group means?
2. What is a Type I error?
3. Which level of measurement has a true zero?
4. Evaluation that improves a program while it runs is called?
5. Which test analyzes frequencies of categories?

Answers: 1. ANOVA. · 2. Rejecting a true null hypothesis. · 3. Ratio. · 4. Formative evaluation. · 5. Chi-square.

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