

Exercise walk-through

11.1

Research designs and statistical interpretation: evidence and transfer

GRE · GRE Subject Test · GRE Psychology

Concepts 1 (1)

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A true experiment manipulates an independent variable with random assignment of participants to conditions; between-subjects designs give different people to each condition, within-subjects designs measure the same people in every condition and need counterbalancing. A quasi-experiment lacks full assignment, and a correlational study does not manipulate an independent variable. Correlation alone does not establish causation or temporal order. Random assignment supports internal validity (causal inference); random sampling supports external validity (generalisability). They answer different questions. Match analysis to design, measurement scale and assumptions.

Check the transfer argument

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Scores within a person are related. Ignoring pairing uses an inappropriate independence assumption and loses information about within-person differences. For suitable quantitative difference data and assumptions, a paired t-test may fit; a justified non-parametric alternative may be appropriate otherwise. Randomized or counterbalanced order also addresses sequence effects.

Accept a different explanation when its evidence and limits are justified.

Check yourself

Independent retrieval

A small p-value accompanies a tiny estimated effect. Separate the statistical claim from practical importance.

Write your reasoning before comparing it with the methods and limits taught in this lesson.

Exercises 2.1·2.2

2.1 Each participant learns a list using exactly one of three rehearsal strategies. The design is: [1]

A. within-subjects B. between-subjects C. correlational D. longitudinal E. quasi-experiment

2.2 Counts of students choosing each of three majors, broken down by gender, are best analysed with: [1]

A. an independent-samples t-test B. one-way analysis of variance C. a chi-square test D. a Pearson correlation E. linear regression

Exercises 2.1·2.2

2.1 Each participant learns a list using exactly one of three rehearsal strategies. The design is: [1]

A. within-subjects B. between-subjects C. correlational D. longitudinal E. quasi-experiment

2.1 Answer: B. Different participants serve in each condition, with the strategy manipulated between them. The other options do not satisfy the stated defining conditions.

2.2 Counts of students choosing each of three majors, broken down by gender, are best analysed with: [1]

A. an independent-samples t-test B. one-way analysis of variance C. a chi-square test D. a Pearson correlation E. linear regression

2.2 Answer: C. The data are categorical counts in a 2×3 table, $df = (2-1)(3-1) = 2$. Compare the exact process, design or evidence, rather than an associated keyword.

Exercises 2.3-3.1

2.3 Revisit the worked case. State one conclusion its evidence supports and one stronger conclusion it does not support. Explain the difference. [2]

3.1 The same 24 people complete two tasks. Another analyst treats the 48 scores as independent. Explain the problem and a suitable analysis family. Give the interpretation, supporting reasoning, a relevant alternative or limitation, and an appropriate check. [4]

Exercises 2.3-3.1

2.3 Revisit the worked case. State one conclusion its evidence supports and one stronger conclusion it does not support. Explain the difference. [2]

2.3 Use the worked case evidence to support a bounded claim and explain why a causal, universal or stronger claim needs additional evidence. The claim must fit the specific design and observed process.

3.1 The same 24 people complete two tasks. Another analyst treats the 48 scores as independent. Explain the problem and a suitable analysis family. Give the interpretation, supporting reasoning, a relevant alternative or limitation, and an appropriate check. [4]

3.1 Scores within a person are related. Ignoring pairing uses an inappropriate independence assumption and loses information about within-person differences. For suitable quantitative difference data and assumptions, a paired t-test may fit; a justified non-parametric alternative may be appropriate otherwise. Randomized or counterbalanced order also addresses sequence effects. Award B1 each (authored) for the interpretation, its reasoning, a relevant limitation/alternative and an appropriate check, up to four points. Accept a different justified answer satisfying these demands.