

5.4 Fix the comparison and outcome before collecting data

Name: _____ Class: _____ Date: _____

Total: 24 marks**KEY WORDS** independent variable 自变量 • outcome 结果指标 • denominator 分母

Objective

Fix the comparison and outcome before collecting data. This is original GAC033-aligned practice, not an official assessment. All people, cards, records and instructions are fictional; no main study has been conducted.

1 Key knowledge and worked examples

■ Key knowledge: define better rather than assume it

The **independent variable** 自变量 is the condition deliberately changed. The **outcome** 结果指标 is what is measured. Define it before collection. The **denominator** 分母 identifies how many attempts or participants a count is out of.

A combined spacing-and-alignment comparison cannot isolate each feature separately. Random assignment within volunteers differs from a representative sample. If actual group sizes differ, report each denominator and compare proportions as well as counts; do not invent the intended twelve-per-group recruitment.

■ Source A: proposal and task record

The fictional question proposes twenty-four willing classmates, twelve per layout assigned by shuffled slips. Each sees one layout. A and B use the same words and tray names; B changes spacing and alignment together. Both use the same four-item paper task, fixed key and two-minute limit, without coaching.

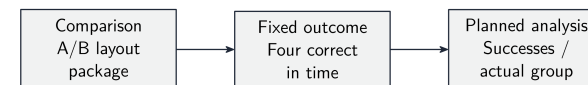
One complete success means all four placements match the key within the limit. A wrong or blank placement means no complete success. Teacher approval is still pending and no main data exist. The question concerns this paper task, not all everyday tray returns.

■ Source B: draft and current evidence

Three teaching examples, not participant results, are supplied: J has all four placements correct within two minutes; K has three correct and one wrong; L has three correct and one blank.

A teammate proposes allowing B readers extra help, counting partial placements as main successes if B has few complete sheets, and reporting twelve participants in A even if only ten consent. Another drafts an open question about whether complete-success proportions differ between the two layouts under the stated task conditions.

■ Worked example: keep the same rule for both conditions



Known: spacing and alignment change together; wording and the task are held constant. Why name the package? A later difference could concern that layout package, not prove that spacing alone caused it. Under the fixed rule J is one success, K and L are zero.

Restore equal no-coaching instructions and preserve the original outcome even if the preferred layout performs poorly. Report actual consenting group sizes. Finish question, procedure and permission checks before collection, and limit any eventual conclusion to the measured task and sample.

2 Practice

2.1 Identify the deliberately changed condition and one feature held the same. [2]

2.2 State the measured outcome and its time limit. [2]

2.3 Score teaching examples J, K and L under the fixed rule. [3]

2.4 Correct THREE proposed departures from the planned comparison in Source B. [3]

3 Exam-style questions

3.1 Evaluate THREE claims: “A difference isolates spacing alone”; “Shuffled volunteers represent all students”; “Correct paper sorting proves correct real returns all term”. Give a correction and reason for each. [6]

3.2 Write an 80–110 word pre-collection question-and-analysis note. Specify layouts, outcome, sample and conditions; retain actual denominators, approval and the package/task limits. Do not state a result. [8]

Solutions

2.1 Layout A versus B, combining spacing and alignment. Same words/tray names, items/key, clock or no-coaching instructions.

2.2 A completely correct four-placement sheet within two minutes. Preference is not the primary measure.

2.3 J: one complete success; K: zero; L: zero. A blank prevents complete success.

2.4 No extra help for B; retain complete-success scoring rather than change to partial marks after results; report actual consenting group size rather than invented twelve.

3.1 Award 2 per claim: correction, reason. Spacing and alignment form a package, so their separate effects are not isolated. Within-class assignment is not representative school-wide sampling. The controlled paper task does not measure real returns over a term. No main result is available yet.

3.2 Local analytic rubric, $8 \times B1$: named A/B package; complete-success rule; willing local sample/one condition; same task/time/no coaching; actual denominators/unequal-size analysis; pending approval/no result; package and real-world limits; coherent truthful 80–110 word response. Example: “We propose comparing layouts A and B among willing classmates, with one layout assigned by shuffled slips to each person. B changes spacing and alignment together, while wording, item choices, the fixed key and the two-minute task remain the same. Our outcome is a completely correct four-item sheet; any wrong or blank placement prevents one complete success. We will report successes out of the actual participants in each group and compare proportions if sizes differ. Approval is pending and no main data exist. The comparison will concern the layout package in this paper task, not spacing alone or every real return.”