

CER mini-report

Your goal: Write a CER conclusion that states limitations of your physiology analysis.

One product: Problem 2 CER analysis mini-report: specific claim, statistical evidence with values, reasoning, and at least two honest limitations.

Question: Which claim answers the research question without exceeding the statistical evidence?

Start the work

1. State a claim answering your research question.
2. Cite your statistical evidence to support the claim.
3. Explain your reasoning linking evidence to claim.
4. List at least two limitations of your study.
5. Submit the Problem 2 analysis mini-report.

If the route or actual inputs are missing, save the same mini-report preparation and list the missing items. Complete actual-analysis submission and official Activity 2.1.3 separately before saying they are done.

Words you will use

CER

Claim, Evidence, Reasoning: a conclusion, its support and the explanation connecting them.

claim

A direct answer to the research question within the evidence available.

evidence

Specific recorded results or clearly labeled instructional values used to support a claim.

reasoning

The explanation of why the evidence supports the claim.

limitation

A feature or missing input that restricts what a study can establish.

physiology

How living bodies function.

mean

The sum of values divided by their count.

sample standard deviation / SD

A measure of spread around the sample mean; it has the original measurement units.

sample size / n

The number of independent units specified for the analysis; paired measurements on one unit do not create extra people.

paired data

Two measurements linked to the same person or object.

independent pairs

Pairs whose results do not depend on other pairs.

bpm

Beats per minute, the unit of pulse rate.

mean difference

Here, the average of matched B-minus-A values, in bpm.

t-test

A comparison method that relates an estimated mean difference to its uncertainty under stated assumptions.

null hypothesis

The model claim tested; here the population mean paired difference is zero.

two-sided test

A test that considers differences in either direction.

degrees of freedom / df

A value used in the test distribution; for this paired test it is n minus one.

p-value

Under the null and model assumptions, the probability of a test statistic at least as extreme as the calculated statistic.

alpha

The cutoff chosen for the test before inspecting the result; the practice uses 0.05.

statistically significant

A result meeting the chosen p-value cutoff under its model; this alone proves neither importance nor causation.

effect size

How large a difference is; report it in the measurement units here.

assumption

A condition a method relies on; a computed result does not verify it.

normal distribution

A symmetric bell-shaped probability model.

generalization

Applying a result beyond the studied units or conditions.

causation

One factor producing an outcome; an association or low p-value alone does not establish it.

bias

A systematic influence that can distort a result.

measurement error

A difference between a recorded measurement and its target value; it can be systematic or random.

confounding

Two explanations changing together so their effects cannot be separated by the comparison.

replication

A new investigation checking a finding with new observations.

reproducibility

Obtaining the same calculation from the same inputs and documented methods.

E1: separate claim, evidence and reasoning

A claim answers the research question. Evidence gives the actual values and their source. Reasoning explains why those values support that answer. A list of procedures alone does not make a conclusion.

For a statistical claim, name the conditions, mean and SD for each, count, test type and result. State the mean difference with units. Explain the p-value decision under its assumptions rather than calling it proof.

The ASA warns that a p-value does not measure the probability that a hypothesis is true or the size of an effect. It also calls for full reporting. A small p-value does not establish a useful clinical change.

D1: complete original recovery evidence

This repeats March 12's invented instructional evidence, not actual participant data. Question: within the stipulated paired model, do neutral conditions A and B have different mean pulse rates? No intervention or real clinical protocol is supplied.

Six fictional pairs in bpm: P1: A 60 / B 62; P2: A 62 / B 65; P3: A 64 / B 65; P4: A 66 / B 70; P5: A 68 / B 70; P6: A 70 / B 73. There are six pairs, not twelve independent people. No missing values or exclusions occur in this practice.

Use your March 12 spreadsheet values: the mean and sample SD for each condition, each condition count and the matched B-minus-A differences. Your teacher will confirm the class values at the start of class.

Also bring your March 12 mean difference, SD of differences, paired two-sided t statistic, df and p-value. Alpha is 0.05. State your own decision about the zero-mean-difference null under the stipulated model.

Independence of pairs and a normal population of differences were assumed for arithmetic practice. They were not demonstrated by these six invented rows. No actual future population, causal effect or health benefit is established.

E2: interpret the numbers without overstating them

NIST paired analysis works with one-to-one differences and their mean and SD. Here the difference is B minus A. The sign of the mean difference describes its direction in this supplied example.

For D1, compare your p-value with alpha. Explain this as a statistical decision under the stated null model and assumptions. Do not write that p gives the chance the effect is real, or that every person would change by the mean difference.

MedlinePlus recommends asking who was studied, how many people were included and what type of study was used when evaluating a health story. Those questions help a reader judge the reach of a conclusion. They do not supply missing facts about your study.

L1: two limitations with consequences

Name a concrete limitation, then say what conclusion it restricts. For D1, ask where the values came from and what that origin can and cannot establish.

Also check the assumptions the paired test relied on. Ask what six constructed pairs can and cannot verify, and which conclusion that restricts.

For actual work, use the actual collection record. A narrow volunteer sample may limit generalization; an uncontrolled timing difference may leave a competing explanation. These are possibilities to check, not facts to invent.

A limitation can narrow or sometimes defeat a proposed inference. Do not preserve an unsupported claim merely to sound confident. Keep only the claim that the evidence supports after the limitation is considered.

R1: mini-report frame and independent route

Prepare four labeled parts in one mini-report. Claim: answer the question and identify actual versus recovery work. Evidence: give means, SDs, counts, test/result and mean difference with units.

Reasoning: explain how the comparison and statistical model support that claim. Limitations: name at least two and explain the consequence of each. Use separate short paragraphs or clear labels; follow the teacher-confirmed official format when supplied.

Start with two separate sentences: a claim and one supporting number. Answer the second warmup by naming one actual collection concern, or a D1 limitation if recovering. Then expand the evidence section to all required statistics.

If absent, recover your Friday, March 12 statistics output. Use this frame for a claim, evidence, reasoning sentence and two limitations, then complete the full mini-report.

If that output is missing, use the complete D1 evidence for labeled original practice. Ask for the actual analysis before completing its mini-report. No classmate or external search is needed for the practice frame.

P1: actual graph, workbook and official dependencies

For your actual report, recover the real research question, source table, March 11 graph, March 12 spreadsheet output and collection record locally. Verify that conditions, values, units and design agree across them.

March 11 S1 graph recovery used separate unpaired records. March 12 D1 used six paired records. Do not combine their means, graphs or p-values. Today's D1 mini-report uses only the paired March 12 evidence.

The worked recovery workbook can help inspect March 12 formulas. A completed recovery workbook is not proof that your actual analysis was performed. If actual inputs are absent, save practice and list which records need recovery.

Your teacher may ask you to finish Activity 2.1.3 Making Results Meaningful. Obtain the official CER format, evidence standards, assigned screens and stop point before marking that activity or tracker complete.

Today is Tuesday, March 16, 2027. Submit through the linked BI assignment; ask for any missing due time. No homework is due before this class.

Ask your teacher which other tasks are due this week.

The physiology unit still requires actual bias/error analysis, labeled spreadsheet graph, statistical analysis and a data-based CER with replication limitation. Keep missing actual inputs and official requirements separate. March 15 is catch-up; March 17 begins an innovation-criteria discussion.

C1: self-check, extension and restart

Fictional self-check about a separate hypothetical study of twelve people: a peer says the small sample means the whole conclusion must be wrong. Sample size alone does not settle that claim. Inspect the design and results, report the supported conclusion, and explain its limits.

For the extension, propose one specific next study or design change and explain why it addresses your biggest limitation.

Actual research would need teacher-approved design, participation and privacy procedures. This sentence authorizes no collection. Replication may test a result but does not guarantee the same outcome.

Restart at the first missing part: claim, numerical evidence, reasoning, two limitations, then submission. If a limitation breaks your claim, revise the claim before submitting.

M1: different-question worked mini-report, two rulers

Original fictional example: four strips are read by two rulers. A values are 10, 12, 14, 16 cm. Matched B values are 10, 17, 12, 22 cm. No measurements occurred.

Claim: within this stipulated paired model, these readings do not show a mean difference between the rulers. Evidence: A mean = 13.00 cm, SD = 2.58 cm; B mean = 15.25 cm, SD = 5.38 cm. There are 4 pairs. Mean B-minus-A difference = 2.25 cm. The paired two-sided test gives $t = 1.165136$, $df = 3$, $p = 0.328185$, with $\alpha = 0.05$.

Reasoning: the differences point in both directions, and p above α gives insufficient evidence to reject the zero-mean-difference null under the assumed model. That does not prove the rulers agree, and it does not show which ruler is accurate.

Limitations: invented values establish no observed instrument result. Also, no known-length reference is supplied, so neither ruler can be judged against truth. A future approved comparison with a known reference would address that second limitation.

Transfer the structure, not these ruler numbers. Use D1 or your verified actual output for the physiology mini-report.

Try the decision

Which claim fits the supplied D1 evidence?

- Under the stipulated paired model, report the direction of the mean difference and the test decision; the invented values establish no actual physiological effect.
- A p -value below α would prove everyone's pulse rises by exactly the mean difference.

- Six pairs means every calculation is wrong, so no model result can be described.

Explain your choice using the reading. Discuss it or say it to yourself. This practice does not add another submission.

Your 80-minute flow

0–10 minutes	Read E1/R1 and separate the claim from one evidence sentence; answer both warmups.
10–25 minutes	Review D1 or actual outputs and write the claim.
25–45 minutes	Build the numerical evidence section using D1/E2 or verified output.
45–60 minutes	Use M1 to write reasoning and the p-value boundary.
60–75 minutes	Use L1/C1 for two explained limitations, self-check and optional next study.
75–80 minutes	Submit the same mini-report or save it and name the input you still need.

Your response record

Use these labels on paper or in your document. The space below also works when this page is printed.

Separate claim and evidence

Write a claim and one supporting number as two separate sentences. Name one actual collection concern, or label a D1 recovery limitation.

R1 supplies the frame. Do not invent actual collection details.

Use this space or the same labeled section in your existing document. Add paper when your table, graph or drawing needs more room.

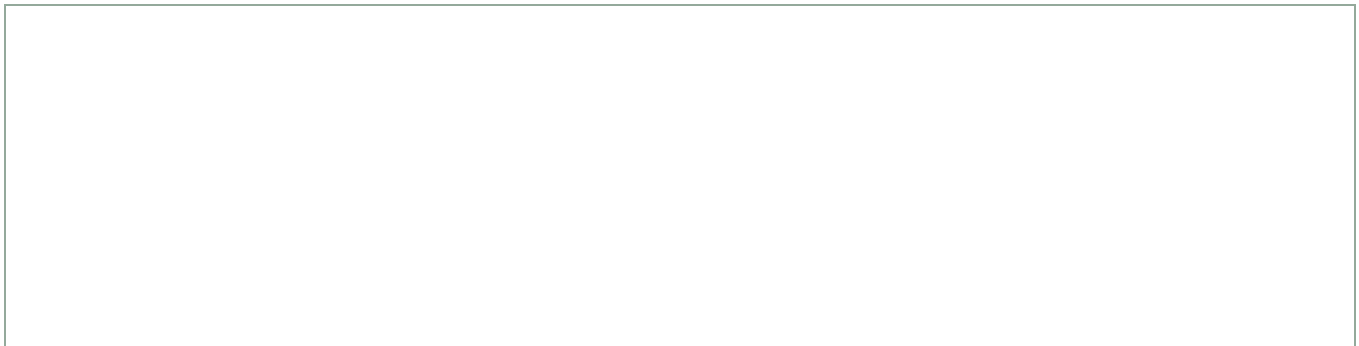


Answer the research question

State a specific claim for your verified actual question or D1. Identify recovery if used.

A limited model claim is acceptable. Do not turn invented values into observations.

Use this space or the same labeled section in your existing document. Add paper when your table, graph or drawing needs more room.



Statistical evidence with values

Cite both condition means and SDs, counts, test type, t/df/p when supplied, alpha and mean difference with units. Name the output or D1 source.

D1 provides the full paired record. Never mix it with the separate March 11 unpaired graph values.

Use this space or the same labeled section in your existing document. Add paper when your table, graph or drawing needs more room.

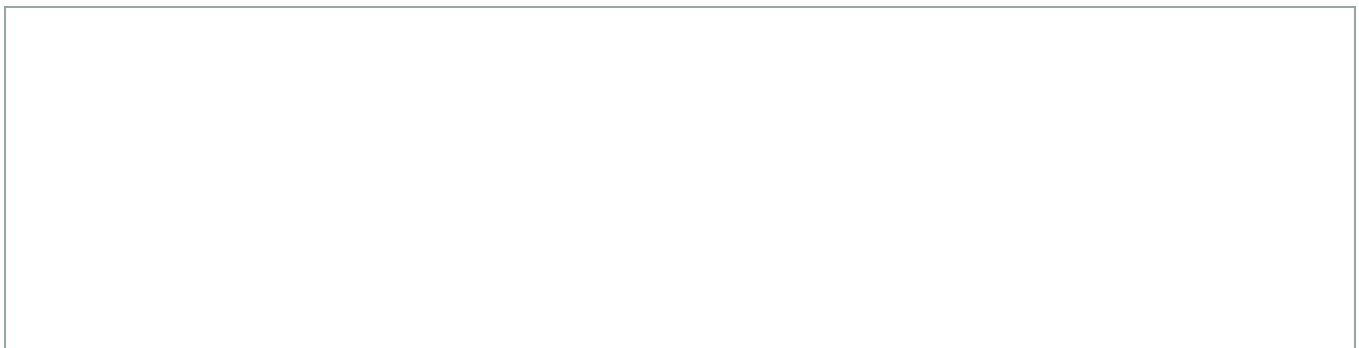


Connect evidence to the claim

Explain the mean difference and statistical decision under the stated model. State what p does not prove.

E1/E2 and M1 show the connection. Procedure lists alone do not explain support.

Use this space or the same labeled section in your existing document. Add paper when your table, graph or drawing needs more room.



Two limitations and their consequences

Name at least two honest limitations and explain why each matters for the claim. Answer C1's twelve-person self-check. Add the specific next-study extension if ready.

L1 supplies D1 limits and conditional actual examples. Revise any claim that exceeds the evidence.

Use this space or the same labeled section in your existing document. Add paper when your table, graph or drawing needs more room.

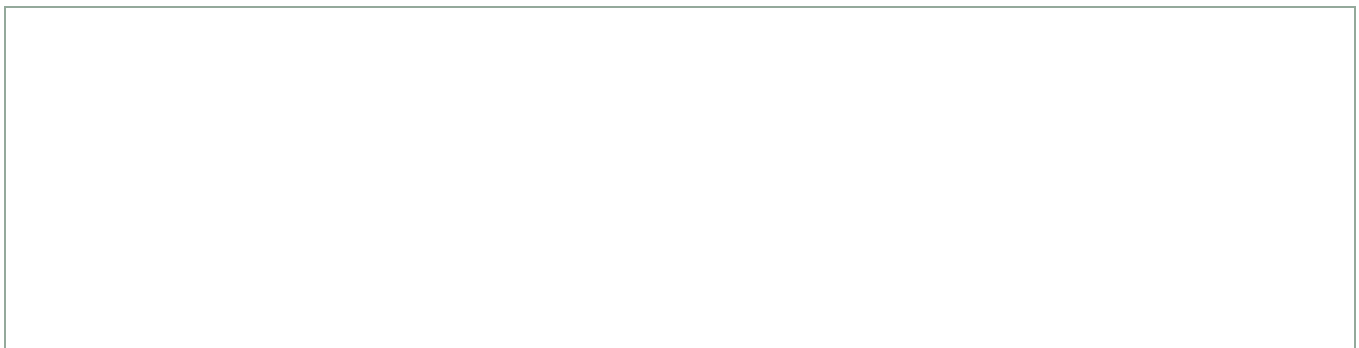


Submit the Problem 2 analysis mini-report

Keep claim, evidence, reasoning and both explained limitations in one mini-report. Submit through the confirmed route and record missing actual or official inputs.

Use the deadline on the linked assignment. Recovery remains labeled and does not complete the actual-analysis branch.

Use this space or the same labeled section in your existing document. Add paper when your table, graph or drawing needs more room.



Check your product

- My specific claim answers the question and labels recovery when used.
- I cite consistent statistical values and explain their support.
- I explain at least two honest limitations and adjust my claim if needed.
- I keep actual records, recovery examples and official completion distinct.

Keep the limit: D1 and M1 are invented instructional values. Their calculated results cannot establish any real physiological or instrument effect. Actual claims require actual data, verified methods and appropriately bounded conclusions.

Turn in your work

Submit the Problem 2 analysis mini-report through the linked BI assignment: claim, statistical evidence with values, reasoning and at least two explained limitations. Clearly label recovery. After uploading, check that Schoology shows Submitted.

If the route or actual inputs are missing, save the same mini-report preparation and list the missing items. Complete actual-analysis submission and official Activity 2.1.3 separately before saying they are done.

[Open this assignment in Schoology.](#)

Carry forward

Tie the claim to the numbers, then explain exactly what each limitation prevents you from concluding.

Use this evidence-boundary habit in the March 17 innovation-criteria discussion. Keep unfinished actual analysis and official work separate. Which innovation criterion can your current evidence justify?

Sources and resources

[Open today's page](#)

NIST-PAIR · Analysis of paired observations

NIST/SEMATECH

<https://www.itl.nist.gov/div898/handbook/prc/section3/prc311.htm>

ASA · Statement on Statistical Significance and P-Values

American Statistical Association, 2016

<https://www.amstat.org/asa/files/pdfs/p-valuestatement.pdf>

MED-EVAL · Evaluating Health Information

MedlinePlus, National Library of Medicine; updated February 26, 2024

<https://medlineplus.gov/evaluatinghealthinformation.html>