

Replication Assignment

Level	Advanced Quantitative Methods or Statistics Courses
Project Type	Individual project

Overview

In this assignment, students will select a study from the replicatED database that includes at least one statistical technique covered in the course. They will use this study as a foundation for a full replication project, aiming to understand both the technical and conceptual aspects of the original work. The assignment will culminate in a replication paper that details their methods, results, and any challenges they encountered throughout the process. Additionally, each student will synthesize their findings into a visual format, presenting their work in a poster session that encourages clear communication of their analysis, results, and insights into the replication process. This approach gives students hands-on experience in applying statistical methods to real research questions while refining their scientific communication skills.

Assess the Replicability of the Study

- 1** Summarize the Theoretical Argument and Hypotheses (500 words)
Provide a concise summary of the study's theoretical argument. What is the primary question the study seeks to address, and how do the authors justify their research in the context of existing literature? Identify the key hypotheses the study tests. If no explicit argument or testable hypotheses are present, discuss how this absence may interfere with the study's replicability. Consider how a lack of clear hypotheses could challenge the ability to determine whether a replication is successful or meaningful.
- 2** Critically Discuss the Transparency of the Study
Critically evaluate the transparency of the study, making specific references to the text. Focus on the following aspects:
 1. Sampling Technique: How was the sample selected? Was the sampling method clearly explained, and were any potential biases addressed?
 2. Sample Characteristics: What are the key characteristics of the sample, such as demographics or other relevant factors? Were these characteristics described in enough detail to allow for proper replication?
 3. Measurement Instrument: Assess how clearly the measurement instruments (e.g., surveys, questionnaires) were described. Were the constructs operationalized in a way that is understandable and replicable?
 4. Statistical Methods: Evaluate the clarity and appropriateness of the statistical methods used in the study. Were the statistical procedures adequately explained? Did the authors provide enough information for replicators to follow their analysis exactly?

Tip

When being critical, also try to understand why the authors might have chosen specific methods or designs. Consider the possibility that certain decisions were made intentionally, even if they are not fully explained. Put yourself in the shoes of the researchers and reflect on their potential reasoning.

3 Choose the Type of Replication Design

Select one of the following basic replication designs. Briefly justify your choice based on the study's context, its methodological rigor, and what aspect of the study you aim to focus on in your replication.

Type of replication	Estimates	Std. errors	Model fit	Sample	Model spec.
Reproduction: same research protocol, same sample	same	same	same	same	same
Robustness check: same research protocol, different samples	similar	similar	similar	different	same
Robustness check: different research protocol, same sample	similar	similar	similar	same	different

Choose the type that best suits your goals for the replication and justify why this approach is appropriate for the specific aspects of the study you aim to replicate.

4 Select a Portion or Entire Study to Replicate

Decide if you want to replicate the entire study or just a portion of it. If you choose a portion, clearly identify the part of the study you will focus on and explain why you find this part particularly useful or interesting to replicate.

5 Replicate the Findings

Replicate the results using the same or comparable methods and tools. After completing the replication, summarize your findings in a table, placing the original findings side by side for easy comparison.

6 Discuss Your Findings in Comparison with the Original Study

In your discussion, compare the results of your replication to the original findings. Focus on both the similarities and differences. Be specific about the nature of any discrepancies, including:

1. **Negative Results:** If the main effects in your replication show the opposite direction or null results (i.e., no statistically significant findings at a 95% confidence level), discuss the implications of these findings.
2. **Validity of Conclusions:** Were the conclusions in the original study justified based on the results? How do your replication results inform or alter these conclusions? Be transparent about how your replication might challenge or support the original claims.

Final Reflection

After completing the replication process, reflect on your overall experience and the insights gained through the exercise. In this section, you will discuss the following:

1

Challenges in Replication

Reflect on the difficulties you faced while attempting to replicate the results of the original study. Were there any aspects of the data, analysis, or research design that made it difficult to replicate the results exactly? Discuss any discrepancies in the replication process, whether they were due to data availability, differences in statistical software versions, or other unanticipated issues.

2

Transparency of the Original Study

Critically assess how transparent the original study was in terms of its methodology, data, and analysis. Were there areas where the authors provided insufficient detail, leading to challenges in replicating the study? Conversely, were there any aspects of the study that were particularly well-documented or easy to follow? Reflect on the importance of clear reporting in ensuring the reproducibility of research findings.

3

Effect of Model Specification and Sample Differences

If your replication differs from the original study in terms of model specification or sample, reflect on why these differences might exist. Were changes in the model specification justified by a different conceptual understanding, or did they reveal flaws or limitations in the original model? How did differences in sample (if applicable) affect the results? Did the change in sample lead to divergent findings, or did it simply reinforce the original conclusions?

4

Impact on Conclusions

Reflect on whether your replication study changed the conclusions of the original paper. Did you find evidence that supports the original conclusions, or did the replication highlight issues that might call into question the validity of those conclusions? Were there new insights or issues discovered during the replication process that were not addressed in the original study? Discuss any negative or null results you encountered and how they contrast with the original study's conclusions.

5

Learning Experience

Discuss how the process of replication has deepened your understanding of quantitative research methods. Did it affect your view of the reliability of scientific findings? Reflect on how replication has influenced your understanding of the importance of transparency, rigor, and robustness in research design.

6

Suggestions for Future Replications

Based on your experience, what suggestions would you make for future replications of this study? How could the original study be improved in terms of its methodology, data collection, or analysis? What changes would you recommend for replicating this study in a different context or with an updated dataset?

How to Prepare a Poster Presentation

1. Structure the Poster Clearly

- **Title and Authors:** Clearly display the title of the replication study along with your name and any collaborators.
- **Introduction and Background:** Provide a brief overview of the original study, including its hypotheses, purpose, and significance. Mention why replication is important for this specific study.
- **Methods:** Include key details about the methods used in the replication. Highlight any changes or adjustments made compared to the original study.
- **Results:** Use graphs, tables, or charts to display your findings. Visuals should focus on the main comparison points between the original study and your replication.
- **Discussion and Conclusion:** Summarize what the replication reveals about the robustness of the original findings, and briefly mention limitations or implications for future research.

2. Emphasize Key Replication Insights

- Use bullet points or bold text to make critical points stand out, like discrepancies in results or new insights gained.
- Include a section or subsection comparing your results to those of the original study, specifically addressing whether the replication succeeded and why.

3. Simplify Complex Information

- Use simple language to describe statistical methods, especially if they are advanced techniques. Assume viewers have some familiarity but not deep expertise.
- Present statistical information (like confidence intervals, effect sizes, etc.) visually where possible, using charts or summary tables.

4. Use Visual Aids Wisely

- **Graphs and Tables:** These are ideal for illustrating comparative results. Make sure each visual is large enough to be readable from a distance.
- **Flowcharts or Diagrams:** A flowchart can be helpful to show the study design, replication process, or any adjustments made.
- **Color Coding:** Use color to highlight differences between the original study and the replication or to distinguish between different datasets or statistical outcomes.

5. Address Challenges and Reflection

- Dedicate a small section to challenges encountered in replicating the study, such as data limitations or methodological differences.
- Briefly reflect on what you learned through the replication process and what it taught you about research reliability.

6. Practice Clear Communication

- Since posters are intended for brief presentations, practice summarizing the study in a few sentences. This will help you discuss the most important points efficiently.
- Use headings and subheadings to guide viewers easily through each section of your poster.

7. Prepare for Questions

- Think about questions viewers might ask, such as why certain methods were chosen or what implications the findings have for the field. Being prepared to discuss these will add depth to your presentation.