

Comparing Groups using Bivariate and Multivariate Analysis

Level	Intermediate
Theme	Comparing groups using Bivariate and Multivariate Analysis
Subthemes	t-test, ANOVA, Confidence Intervals, OLS Regression, and Interaction Effects

REPLICATED ARTICLE

Bressan, Paola, and Debora Stranieri. "The Best Men Are (Not Always) Already Taken: Female Preferences for Single Versus Attached Males Depends on Conception of Risk." Psychological Science 19.2 (2008): 145–151.

SECTION 1

Research Design

- 1** Study Review
Carefully read and analyze the assigned study.
- 2** Variable Identification Table
Create a table that lists and categorizes all dependent and independent variables used in the study's analyses. Ensure each variable is clearly defined.
- 3** Theoretical Arguments and Hypotheses
Summarize the main theoretical argument(s) of the study. Document all related hypotheses, if available, for a clear overview.
- 4** Variable Measurement Discussion
Discuss the measurement of each variable, noting the type (e.g., discrete—ordinal, nominal, dummy—or continuous—interval, ratio). Highlight their theoretical and practical measurement approaches to provide a comprehensive understanding.

SECTION 2

Comparison of Groups

- 1** Data Type Identification
Identify the type(s) of data used in the study (e.g., survey, experimental, observational). If the study utilizes multiple data types, list and describe each one.

2

Level of Analysis

Determine the level of analysis for the variables in the dataset (e.g., individual, group, country). If there are multiple levels of analysis, identify and describe all of them.

3

Replication of Table 1

Use your preferred statistical software to replicate the original Table 1 from the study. Present the replicated table in a clear format and highlight any differences observed compared to the original Table 1 in the study.

TABLE 1
Mean Attractiveness Ratings of Male Faces by Female Participants

Category of men	Partnered – Fertile	Partnered – Nonfertile	Unpartnered – Fertile	Unpartnered – Nonfertile
Masculine				
Single	5.99	5.17	6.38	6.16
Married	5.63	5.34	6.66	6.46
In love	5.34	5.72	6.18	6.16
With a girlfriend	5.43	5.65	5.90	6.32
Feminine				
Single	4.26	3.91	4.59	4.83
Married	4.33	4.36	4.85	4.93
In love	4.76	4.23	4.54	4.42
With a girlfriend	3.57	4.86	4.84	5.03
All men				
Single	5.37	4.67	5.50	5.63
Attached	4.87	5.08	5.56	5.63
Preference for single men	0.50	–0.41	–0.05	0.00

Note. The last row shows the average preference for single men (for each participant, this preference was computed as the mean rating given to single men minus the mean rating given to attached men).

Source: Bressan & Stranieri (2008), pg. 148.

4

Replicate the Text Snippet

Replicate the results presented in the specified text snippet from Bressan & Stranieri (2008, p. 148) using your chosen statistical software. Display your results in a clear table format and highlight any discrepancies between your replication and the original findings in the study.

Across conditions, male faces were rated as more attractive by women without a partner ($M = 5.6$) than by women with a partner ($M = 5.0$), $F(1, 194) = 10.10$, $p = .002$, $prep = .98$. More interestingly, man's availability and participant's conception risk did not have significant main effects (both $F_s < 1$), but were...

Text Snippet 1

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Replicate Figure 1

Replicate the findings in Figure 1 comparing the preference of fertile versus non-fertile women for single versus attached males (differentiated by their level of perceived masculinity).

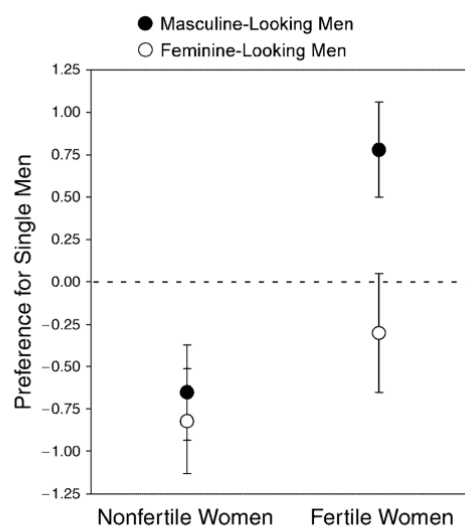


Fig. 1. Mean preference for single (vs. attached) men among nonfertile and fertile women with partners. Positive values indicate a preference for single men, and negative values indicate a preference for attached men. Error bars correspond to 1 SEM.

Source: Bressan & Stranieri (2008), pg. 149.

6 Discussion of Differences and Analytical Choices

If any differences exist between your replicated results and the original findings, provide a discussion on possible explanations. Address the analytical choices made in the original study, such as:

- a. The statistical techniques used (e.g., error bars, t-tests, regression models).
- b. The transparency and clarity of the methods described.
- c. Measurement decisions (e.g., how specific constructs like masculinity were operationalized).
- d. Any assumptions or methodological factors that could have impacted the outcomes.

SECTION 3

Robustness Check: Multivariate OLS Regression

Note for Instructors

To conduct the robustness check, the dataset may need to be reshaped from a wide to long format. Depending on the students' proficiency, this can be included as part of the assignment or prepared in advance by the instructor.

1 Robustness Check Using Multivariate OLS Regression

Perform a robustness check on the study's findings by running a multivariate OLS regression. Estimate the effects of:

- a. Men's availability (categorized as single, married, in love, with a girlfriend)
 - b. Women's fertility (high conception risk, low conception risk)
 - c. Women's availability (with or without a partner)
- on their perceptions of men's attractiveness (measured as average attractiveness ratings).

2 Variable Recoding and Interaction Analysis

Recode the variable for men's availability into two categories: single and attached (combining married and with a girlfriend). Interact this recoded variable with the women's fertility variable to estimate the differential effect on perceptions of attractiveness. Compare your new results with the original Figure 1 and discuss any differences observed, providing insights into potential reasons for the discrepancies.

SECTION 4

Final Reflection

Reflect on what you learned throughout the process of replicating the findings from this article. Use the following prompts to guide your reflection:

- **Comparison of Findings:** How did your replicated results align or differ from the original study's findings? What might explain any observed discrepancies? Consider factors such as data quality, analysis methods, and sample characteristics.
- **Clarity and Transparency of Research Design:** Was the original study's research design described in a way that was easy to follow for replication? Identify any areas where the clarity of design impacted your ability to replicate the results.
- **Measurement Challenges:** Discuss any issues you encountered related to the definition and measurement of variables. Were there any ambiguities or complexities that required additional interpretation?
- **Insights into the Scientific Process:** Reflect on the overall process of conducting a replication study. What did this experience reveal about the robustness and reproducibility of scientific research?
- **Sample Bias and Limitations:** Consider any potential biases or limitations within the sample used in your replication. How might these have influenced your results compared to the original study?

Conclude with any key takeaways or broader insights you gained about the practice and importance of replication in research.

INSTRUCTOR'S SUPPLEMENT

Pre-Replication Discussion and Preparation

Before beginning the replication process, the instructor and students will engage in a guided discussion to clarify the differences between an exact replication and a robustness check. This stage sets expectations for the replication work and highlights the purpose of each approach.

1 Exact Replication vs. Robustness Check

- Exact Replication: The goal is to reproduce the original results using the same data and methods as closely as possible to confirm the reliability of findings.
- Robustness Check: Involves applying alternative analytical techniques or variations in the model to assess the consistency and stability of the results.

2 Goals of the Exercise

- Replicate the original findings as outlined in Section 2.
- Conduct a robustness check in Section 3, exploring how changes in methodology affect outcomes.

Stage 1 – Initial Replication

Students will replicate the findings presented in Section 2 of the study, aiming to match the original results as closely as possible. This includes:

- Identifying dependent and independent variables.
- Confirming that data input matches the original methodology.
- Performing the analyses (e.g., *t*-tests, ANOVA, OLS regression) using statistical software.

Stage 2 – Conducting the Robustness Check

Students will then perform a robustness analysis, applying variations such as:

- Modifying sample selection criteria.
- Introducing or removing control variables.
- Employing different statistical techniques or handling missing data differently.

Analytical Comparisons

- Students will compare group findings using ANOVA, OLS regression, and other relevant statistical tests.
- They will assess how these techniques handle data nuances and differences in assumptions.
- Each student will document and discuss the trade-offs of using these techniques, explaining which analytical approaches are most suitable for different research questions or data structures.

Handling Discrepancies

Students should:

- Identify specific reasons for discrepancies between their results and the original findings.
- Examine issues such as sample characteristics, measurement clarity, and transparency in the research design.
- Avoid vague statements; provide precise details when discussing sources of bias or data representativeness (e.g., “data are systematically missing for countries below the UN poverty line, such as ...”).

Dataset Preparation

- The instructor will decide the level of dataset preparation required. Multiple datasets are available, and depending on the course level, students may be tasked with varying levels of data manipulation and pre-processing.
- In introductory courses, it is recommended that the instructor prepares the dataset to focus more on analytical techniques. Advanced courses may incorporate more “detective” work by students for deeper data handling experience.

Learning Outcomes

- Identify dependent and independent variables in a study.
- Assess theoretical arguments and hypotheses.
- Understand theoretical versus sample measurements of variables.
- Conduct t-tests, ANOVA, and OLS regression using statistical software.
- Recognize types of data and levels of analysis.
- Evaluate the implications of analytical choices.