

How to Evaluate Scientific Research

Evaluating scientific research can be a daunting task. Especially if you are unfamiliar with how research is conducted. First, **research** is the process of collecting, analyzing, and interpreting data. In order to successfully evaluate scientific research, you must use **critical thinking** skills. Critical thinking is a way of questioning and evaluating information from a reliable source.



Step 1: Find a Reliable Source

The first and most crucial step is finding a reliable source. For example, if you were wanting to do research on the effectiveness of the COVID-19 vaccine, the Center of Disease Control and Prevention would be a great place to look.



Step 2: Question Information

Once you've found a reliable source, question the information provided. Here are some questions you can ask yourself:

- Is the source biased?
- What kind of evidence was presented?
- Does this evidence support the claim?

Step 3: Evaluate the Research Method

The third step is to look at how the research was conducted. Referring back to research regarding the COVID-19 vaccine, **experiments** were used to determine vaccine efficiency. It is important to understand the method that was used in order to correctly evaluate the information.



Step 4: Evaluate the Data

A few things to consider when looking at **data** are:

- **Construct validity**- How well variables measure what they are supposed to measure.
- **External validity**- Whether or not the findings from a study can be generalized to other people or situations.
- **Internal validity**- Whether the effects observed in an experiment can be directly tied to the **independent variable**, which is the variable that is being manipulated.
- **Reliability**- Whether a measure can stay stable and consistent or not.
- **Accuracy**- The degree to which the measure is free of error.
- **Descriptive Statistics**- Statistics that summarize the information



Step 5: Form a Conclusion

After examining the source, research method, and data conclusions about the research can be made.



Glossary

- **Accuracy (Ch 2.13):** The degree to which the measure is free of error.
- **Construct validity (Ch 2.13):** How well variables measure what they are supposed to measure.
- **Critical thinking (Ch 2.4):** A skill that requires questioning and evaluating information while looking at reliable evidence.
- **Data (Ch 2.1):** Information gathered during the research process.
- **Descriptive statistics (Ch 2.13):** Statistics that summarize the information found from a study.
- **Experiment (Ch 2.8):** A research method that tests hypotheses by manipulating and controlling different variables.
- **External validity (Ch 2.13):** Whether or not the findings from a study can be generalized to other people or situations.
- **Independent variable (Ch 2.8)-** The variable being manipulated during the research process.
- **Internal validity (Ch 2.13):** Whether the effects observed in an experiment can be directly tied to the independent variable.
- **Reliability (Ch 2.13):** Whether a measure can stay stable and consistent or not.
- **Research (Ch 2.1):** A process that involves collecting, analyzing, and interpreting data.

References

Center of Disease Control and Prevention. (2021, August 11). *Vaccine effectiveness research*. <https://www.cdc.gov/vaccines/covid-19/effectiveness-research/protocols.html>

Gazzaniga, M. (2018) Research Methodology. In S. L. Snavely (Ed.), *Evaluating scientific findings requires critical thinking* (pp. 37-39). W. W. Norton & Company.

Gazzaniga, M. (2018) Research Methodology. In S. L. Snavely (Ed.), *Good research requires valid, reliable, and accurate data* (pp. 56-59). W. W. Norton & Company.