

PRIMARY RESOURCES/ RESEARCH: IMPORTANCE

Jessica Wang

In writing scientific research, facts propel your paper, but where should these facts come from? Other than being credible and relevant, the sources should be primary.

WHAT ARE PRIMARY SOURCES?

Primary sources in **scientific literature** are “first-hand knowledge” or original research and papers that provide new data, information. This can be generated by conducting experiments and **observational studies**.

This is compared to secondary sources which summarizes or synthesizes information from primary resources. These include review articles, commentaries on articles, newspaper articles (mostly), dictionaries, encyclopaedias, and textbooks.

Tip: To determine if an article is primary research, look at the methods! If the authors used other author’s research, then it is a secondary source; if they collected their own data then it is a primary source.

PRIMARY SOURCES VS SECONDARY SOURCES

“Textbooks are secondary sources?” you might exclaim since they are often very credible. This speaks to the fact that credibility is not the main reason we prefer primary sources, as secondary sources could be more reliable and useful in some cases. Indeed, textbooks and review articles are a great way to get a basic understanding of a topic, especially since primary articles are filled with complex jargon and vocabulary and there are so many it is impossible to go through all of them. However, review articles often cite sources to fit a narrative and these reflect the author’s own interpretation, which can distort the information. Like a game of telephone, context and nuanced results of the primary source might be omitted or in worse cases, the review might even say the opposite of the primary source!

As such, the problem with secondary sources lies in interpretation and biases. These include **publication bias** and **citation bias**. For example, in literature, there is a tendency for papers with significant results (i.e. an association between two factors) to be published and cited, while papers that find no association or results against leading hypotheses are more likely ignored. For instance, a study by Greenberg found the presence of citation bias against papers that refuted a hypothesis about where plaques in Alzheimer’s disease comes from.¹

Beware: Just like not all secondary sources are subject to biases, not all primary sources are credible, because some study designs, data collection, and analysis methods are full of flaws. There is no absolute best type of source, so it is important to be critical.

Overall, the benefit to primary sources is you are less likely to miss the context and nuances of results, and it is less likely to be biased to fit a story or hypothesis. Bottom line: **you can check over the methods and data in primary sources yourself to ensure they make sense.**

GLOSSARY

Scientific Literature- the collection of written scientific research and theoretical articles

Observational studies- “natural experiments” where the researcher watches the effect of an intervention/ independent variable without interfering or manipulating it

Publication bias- bias that occurs during publishing process, such as the results of the study influencing if it gets published

Citation bias- various biases involved when authors prefer to cite a particular type of paper. Most commonly, statistically significant results are more likely to be cited

FURTHER READINGS:

1. Unintended Consequences: The Perils of Publication and Citation Bias:
<https://thereader.mitpress.mit.edu/perils-of-publication-and-citation-bias/>
2. The bad science scandal: how fact-fabrication is damaging UK's global name for research:
<https://www.independent.co.uk/news/science/bad-science-scandal-how-fact-fabrication-damaging-uk-s-global-name-research-8660929.html>

REFERENCES

1. Greenberg, S. A. (2009). How citation distortions create unfounded authority: Analysis of a citation network. *BMJ*, 339(jul20 3), b2680–b2680. <https://doi.org/10.1136/bmj.b2680>