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Week 2 writing

Misconceptions in data analysis

Even in the field of biomedical science journals, many published findings are reproducible, in fact, many of these reproduced findings are being questioned. This is due to the fact that there are misconceptions in the data analysis and statistics from the beginning. In the article by *Motulsky(2014),* five of the misconceptions are being stated and explained. Out of the five misconceptions, I was largely inspired by two points which inspires me to check my past work and re-think some of the definitions.

The first misconception is that the p-value shows the size of the effect. P-value helps identify whether the effect is larger or smaller than observed given that the null hypothesis is true but does not actually tell the size of the effect. When there is a large p-value, we can declare the statistical term is insignificant, but this does not mean that there is literally no effect at all. The suggestion given is that when reporting p-values, do not go over the line of what it represents, or omit the report if can not tell its true meanings. When I was explaining the meaning of p-values, I usually only uses it to show whether or not the null-hypothesis can be rejected or not.

Another misconception is that it is necessary to report the statistical significance of a statistical term. This is not true, as the term "significant" can be misunderstood in most cases. The p-value = 0.05 threshold is used when the null hypothesis testing is assumed true and people would like to see whether there is an effect or not. It should only be reported if a decision is made on one analysis. Otherwise, the usage of "significant" can confuse people of other fields. Even as a university student and the papers were mainly written for peers and professors to read, I should always consider whether or not the p-value should be included before writing it on.

The last misconception noted in the article is whether or not to report the details of the research. Motulsky gives many suggestions on what to report and what degrees of detail you would like to report considering your case. For example, the software used to do analysis, the sample size, and the digits of the p-value. Some papers have a word limit while other papers require a more detailed explanation for certain parts. Therefore, it is important to write the number of details in the correct place.

Overall, the writing of a statistical report is a study itself. There are many things to be considered when writing a report, and the most important part is to keep your words true and not mislead the readers. Always keep in mind when writing a paper, it is more important to not confuse self and others than writing a lot of nonsense.

Reference

Motulsky, H. J. (2014). Common misconceptions about data analysis and statistics. *Naunyn-Schmiedeberg's Archives of Pharmacology*, *387*(11), 1017–1023. https://doi.org/10.1007/s00210-014-1037-6