Module 6.2: Learn - Coding

Methods Section

When you are confident that the figures and results you have composed address the research aims you are proposing, you can start to fill in the methods section with how you derived those figures and conclusions. This will include all the tools you used and the data you generated, citing the papers that first introduced those tools and datasets wherever possible. Stick to only what is needed for the figures you chose.

Details and reproducibility of your work

There are two main goals of the Methods section: full disclosure of the important details of your work and reproducibility.

First, full disclosure. In the Methods section, you are giving the reader a chance to understand the important details of how you generated your data and results. When your paper is published, the main way that it gets circulated in the world is through other scientists in the field searching for it for use in their own research. You want to give enough detail for another scientist to determine if the approach you used is relevant to the problem they are trying to solve and if they agree with the conclusions you make after using the approach you did. If you do a really good job describing your approaches, you might get questions and calls for collaborations from people that want to do the same analysis in a different research setting. Describing the methods in detail is also important for your own future work as it creates a time capsule for the details you are bound to forget over time.

This brings us to the second goal, reproducibility. You want to give enough details in your Methods section for an intermediate user to be able to reproduce your results. That is, you don't have to lay out the basics about how to use a computer, but you should include all the major parts of your analysis with important details of each. In Module 4's Professional Development section, we went over all the things you should include to have reproducible code, here's your chance to write that all out in a clear and concise way.

Here is a **guide that gives more tips for how to write your Methods section (https://www.kolabtree.com/blo methods-section-of-your-research-paper/)** .

R functions and packages

In all of the Rmds we made for you in this class, we use the `sessionInfo` function to list all the packages that a time you run this code. You don't have to include all of these in the Methods section, just the ones that were use that you are featuring in your paper. You will want to include the package name and version, function(s) you are u in your analysis, and any important parameters and input you used to generate the figures and results. If the pac has a lot of functionality and it is critical to your work, you can consider looking at the help page on the package t paper the authors ask you to cite when using their algorithm.

Your own code

When writing about coding solutions that you have come up with, describe the steps you took in words and includ necessary for those steps. For example, you can say that you used `ggplot` to view the distribution of the expres DDX3X in female versus male placentas as a box plot. You don't have to list every single parameter you used w configure the size of the axis labels and center the title etc, but just have to include enough information that some `ggplot` and use your description to get a figure similar to yours.

If you have uploaded any of your code to a public repository like GitHub, write in the Methods that you have done URL of the GitHub repository so people can look it up. All journals look more favorably on your work if you are pr others to apply your methods.