Comparison of Two Different Lab Reports

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Lab reports are pieces of literature that are primarily aimed towards professionals in a certain field that is most often related to S.T.E.M. Lab Reports are used to communicate information concisely and clearly to the reader for a handful of purposes such as giving technical descriptions, providing specific procedures to an experiment as well as properly conveying results for scrutiny by others in their respected field . In order to accomplish this task nearly, all lab reports follow a similar pattern for how the structure is created. There are eight main parts in a lab report with the parts labeled as sections throughout the report. The parts that are common in nearly all lab reports are as followed; the “Title”, the “Abstract”, the “introduction”, the “Materials and Methods”, the “Results”, the “Discussion”, the “Conclusion”, and the “References”. The aforementioned are the most common elements of nearly all Lab reports and should be written first.

Additionally, there can be more sections dependent on the Lab and some Lab Reports include sections such as an acknowledgment and Appendix section. The acknowledgments section is used to recognize important members of your research team or colleagues that have helped the experimenter during the way of either writing the report or helping with conducting or researching for the experiment being written about. The content for the appendix section on the other hand is up to the experimenter. Usually, the appendix contains information that is not necessary for the reader to look at in order for them to understand the full list of the lab itself. This can include items such as long tables and charts or hundreds of strings of raw data such as numbers or organized text. Lab reports contain all of these sections as a means to easily

communicate the given information in a concise and concrete manner for the other individuals in the field, the two labs titled, “Are gamers better laparoscopic surgeons? Impact of gaming skills on laparoscopic performance in “Generation Y” students.” and “Molecular classification of the placebo effect in nausea” will be used to compare common and different elements in both reports.

The first section of any well-sectioned lab report is the “Title”. The title is the first thing that readers will be able to see in the lab report from before the report is even found. When Lab Reports are found initially often in our modern age, they are located in large online databases and are actively searched and sought out by professionals in a field looking to do research for their own or a colleague’s studies. When looking for a lab the search bar is used to find relevant information through the use of keywords or key phrases. An example of this would come from an electrical engineer searching up the phrase, “New transistor construction” and having a lab appear that is titled, “The engineering of atom-sized electrical transistors in the use of biomechanics”. In the above example, a person looking for new information related to transistors will have this pop-up due to the keyword transistor which is included in this lab reports titling. Using two actual labs as an example to demonstrate the importance of a title can prove useful in this situation. The first lab is titled, “Molecular classification of the placebo effect in nausea”. The keywords in this title could be, “molecular”, “classification”, “placebo effect”, or “nausea”. These are the primary focus of this paper and as such are located in the title in order to increase the chances a person in this medical field will be searching for one of these keywords when looking for a paper. The second lab report title that can be looked at is called, “Are gamers better laparoscopic surgeons? Impact of gaming skills on laparoscopic performance in “Generation Y” students”. In this title, keywords are used as well but additionally, a question is invoked in the title. “Are gamers better laparoscopic surgeons?” followed by the statement of, “Impact of gaming skills on laparoscopic performance in “Generation Y” students”. In this title, a demographic is presented followed by the event in a question that implies that this is the primary driving force in the report and this question will be answered. The statement that follows this question shows more of the specifics of the experiment and

what they are looking at. In this case, the specifics surround generation Y students and the impact of gaming on their surgical performance rather than applying for any group of people. These two lab report titles are similarly set up, however, the second lab report makes it more concise to the reader to what question is being answered as well as the group that is being studied while the first lab report makes a general statement that does not contain any specifics that a person would immediately see when they search in a database. Based on these reasons the second lab can be considered having a better and easier search title than the first lab report.

The abstract is arguably the most important aspect of writing a good lab report. The abstract is often a short section that holds a generic description of the events that have occurred during the entire lab. There are two methods in which the abstract is written, the descriptive and the informative. The descriptive structure of an abstract goes over which general ideas or topics are occurring in the lab and what might be discussed without giving away any data, results, or conclusions about the actual contents of said lab. On the other hand, an informative abstract allows the reader to understand and overview the whole lab without actually going through every page that the lab report has to offer. Using the two labs as a comparison let's analyze how they structured their abstracts. In the first lab report titled, “Molecular classification of the placebo effect in nausea” the abstract can be defined as an informative abstract type. Although the abstract is only one paragraph in length, the abstract contains an overview of all the information found in the lab. It begins by discussing how they performed their experiment and goes on to list the methods as well as the results and a little bit of discussion referencing possible future implications of their research. In the second lab report titled, “Are gamers better laparoscopic surgeons? Impact of gaming skills on laparoscopic performance in “Generation Y” students” the abstract can be defined as having an informative structure as well. However, this abstract goes about it a little bit differently. Underneath the main section labeled, “abstract”, there are subsections with the labels, “Background”, “aim”, “methods", “results”, and “Conclusion”. Underneath each of these subsections, a small explanation of each main section in the lab report is given in a concise and easy to understand manner. The longest subsection here was the results as this lab report listed the important data

from final calculations here along with some statistical analysis of the results. The differences in these two abstracts come from the format rather than the type, while they are both informational abstracts the second lab has subsections with a short summary of each section while the first lab only had a short paragraph summarizing the whole lab together. Neither format for the abstract is superior as they are both informational as well concise and to the point.

The introduction is often the third section of a lab report and is designed to go from a general sense in which the abstract lies into a more specific area in which the lab report is planning on covering. In this section, the lab report should contain information that can be pertinent to the relevant audience. In most cases, the audience includes fellow peers who understand the research being done and have found the report for use in their own studies, however, the report can also be read by those who are outside this subject field and have little to no idea on some terms that are used. For an audience such as this, terms and concepts can be defined and explained here in order for that demographic of the reader to understand the importance and relevance of the whole report. In this area along with establishing concepts and ideas, the purpose and background information on the lab can be given. These include any questions that the lab is aiming to answer or any past studies that were done. In the first lab titled, “Molecular classification of the placebo effect in nausea” the writers describe the impact of their lab as well as some prior studies that are relevant to understanding the lab, however, they do not mention any definitions or define any concepts that are used. This entails that the demographic of readers for this lab are fellow professionals in the medical field and not a general audience. In the second lab report titled, “Are gamers better laparoscopic surgeons? Impact of gaming skills on laparoscopic performance in “Generation Y” students” the definitions and concepts related to medicine are excluded with the term, “laparoscopic” not being defined anywhere. However, unlike the first lab report in this report, there are definitions given when talking about anything in the videogame field. This is important information to consider as it allows the target demographic to be understood. Medical professionals who do not play video games are the target demographic here as only video game terms are

defined assuming the audience is unaware of these concepts. Overall, in both reports definitions that the target audience being medical professionals are aware of are not redefined and instead, concepts that would be unknown to them are defined thoroughly.

The materials and methods section can be considered the most important aspect when looked at from a professional lens. In this section, "how" is discussed in detail. The goal of this section is to be as thorough and open to the procedures that occurred as well as the experimental setup in order for anyone to be able to recreate the experiment step for step and arrive at the same results that the experimenter arrived at. This is arguably the most important aspect of publishing a lab report. The idea that anyone can replicate your results is paramount for conducting a good experiment. In the first lab titled, "Molecular classification of the placebo effect in nausea" the lab contains a description of the participants that will be used for the experiment in great detail and includes graphics of them. Additionally, when explaining the procedure used to test them another graphic is used as a visual to how the test is done and to which group it is being done. In the second lab titled, "Are gamers better laparoscopic surgeons? Impact of gaming skills on laparoscopic performance in "Generation Y" students" the testing method is thoroughly explained followed by the division of groups along with the procedures used when interacting with the participants, a graphic is included here as well for the demographics of the lab. Both labs one and two are similar in the fact that they represented the demographic of their test groups in a graphic which is not a common practice to do when writing a lab report.

The results section is another important scientific aspect of any lab report. Here, all of the data that was gathered throughout the process of experimentation should be listed as both texts and graphical means that are simple enough to understand by eye. In this section, the results can be compared to other experimenters who followed the same procedures of the lab and can see if the same results were arrived at by both parties. In the first lab titled, "Molecular classification of the placebo effect in nausea" the data that was obtained is broken down into subsections labeled with the molecule that is being identified and the quantities

in which everything was measured in. Throughout giving the data there are very detailed graphics included. However, these graphics are too compact to read without zooming in many times over as there is too much information being represented in too little of a space as seen below.

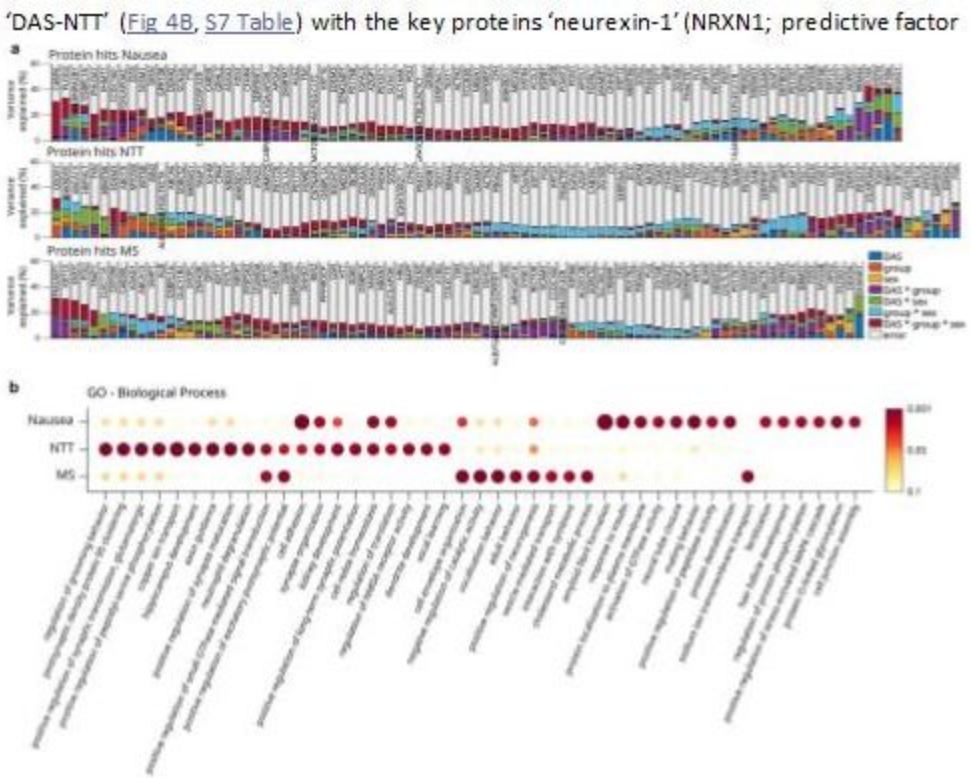
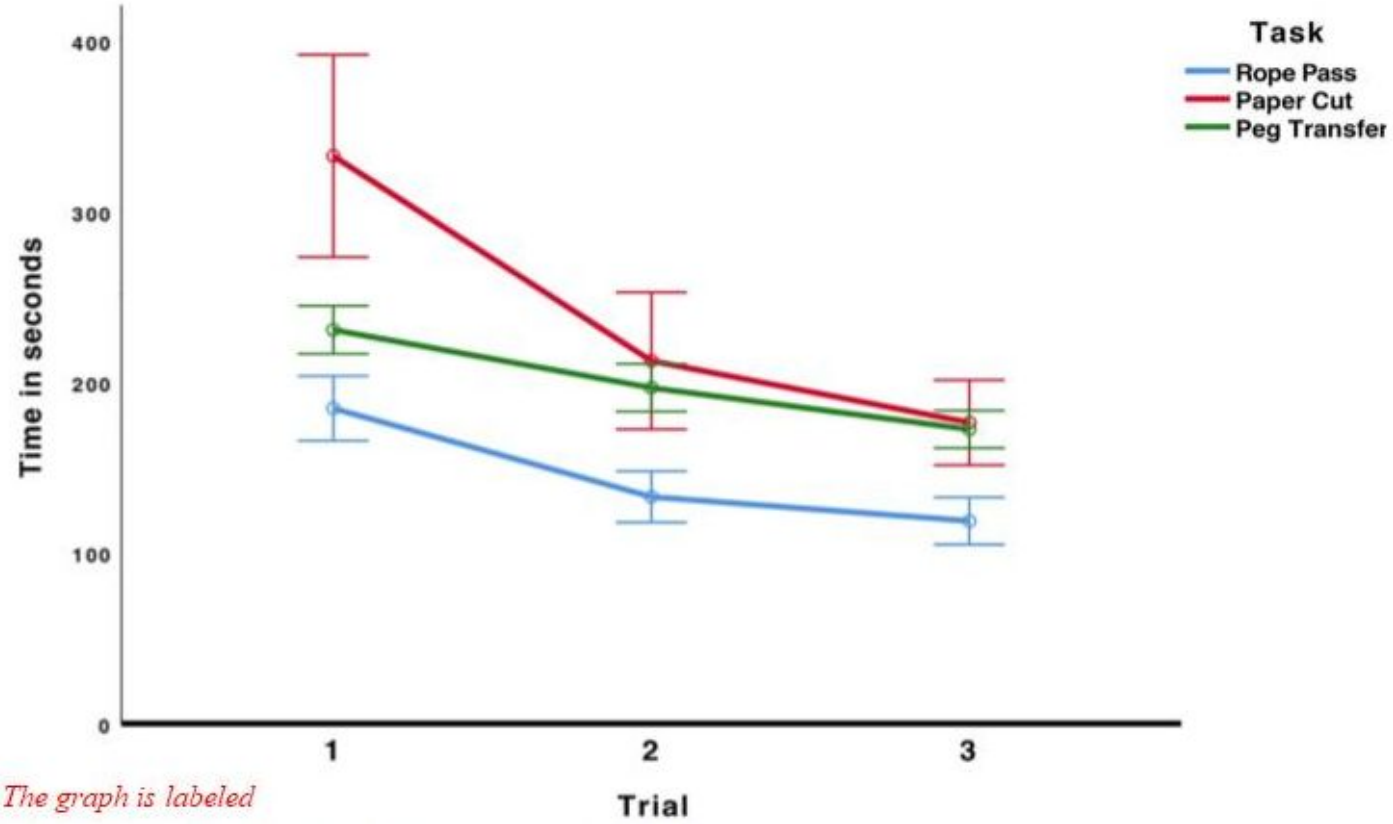


Fig 4. Variance composition of protein changes on Day 2. (a) The amount of variance explained was estimated using linear multiple regression models to predict protein fold change variance by different experimental factors (DAS, sex, group) and their interactions (predictor variables). Models were generated independently for each protein and type of nausea measure: Nausea, NTT and MS. Barplot histograms depict variance composition for all proteins significantly affected ($p < 0.05$) by at least one predictor variable. Multiple protein labels arise from non-uniquely mapped peptides. (b) GO enrichment for each group of significantly regulated proteins ($p < 0.05$). Dot color and size refer to FDRcorrected enrichment -log10 (p-value).[1]

In the second lab report titled, "Are gamers better laparoscopic surgeons? The impact of gaming skills on laparoscopic performance in "Generation Y" students" the subsections are bolded inside of each explanation of data obtained and graphics for the obtained data is easily visible and clear to read as seen below.

[1] "Molecular classification of the placebo effect in nausea." 2020



The graph is labeled

Fig 4. Time to complete each laparoscopic task. Error bars represent 95%-CI of the mean.

[2]

Overall, the second lab report had better formatting of the data used as both represented their data properly and thoroughly in writing, however, when it came to showing them in a graphical format the first lab failed in its purpose. There was too much information crammed into too little of a space making it difficult to see the graphical representations in the first place.

The discussion section is the subjective portion of a lab report. It is used to interpret the results obtained from the data in a way in which it can be understood by both the experimenter and readers as well. The discussion section can contain information and reasoning on why these particular results were obtained as well as include talk on the future of such research or how the lab could be improved next time or even

[2] "Are gamers better laparoscopic surgeons?" 2020

justifying some potential inaccuracies in the data resulting from scientific error or influences outside of the experimenter's control. In the first lab report titled, "Molecular classification of the placebo effect in nausea" the discussion is around a page in length and addresses why each result occurred in the manner that it did including references to different parts of the methods section to point out at which step a certain activity occurred in. Additionally, future implications were implied at the end of the analysis. In the second lab report titled, "Are gamers better laparoscopic surgeons? The impact of gaming skills on laparoscopic performance in "Generation Y" students" the discussion is about two pages in length and initially focuses on any misgiving that the results may imply such as not applying this information to all gamers, etc. Throughout the rest of the discussion, the impact of the data is interpreted as well as implying that future endeavors may be able to use this study in their own research later down the road. In both lab reports, the discussion sections contain the same content in different orders depending on the writer's preference.

The last section that is included in the body of most lab reports is the conclusion. This section is meant to summarize the whole lab report by including only the most important details as well as displaying to the reader the importance or significance of the results found, in a small paragraph. In the first lab titled, "Molecular classification of the placebo effect in nausea" at the end of the discussion section they include the phrase, "in conclusion," to indicate the beginning of the lab conclusion and proceed to restate the importance of their data and imply that future studies will be necessary. For the second lab report titled, "Are gamers better laparoscopic surgeons? The impact of gaming skills on laparoscopic performance in "Generation Y" the conclusion is not indicated with a clear section or line, instead, it can be read since the author heavily implies to where the beginning is. In this conclusion, they restate some of the impacts that the data has on their understanding and end off by stating the need for further study on the matter. Both of these lab reports did not indicate the conclusion with a section however, both did include the elements of a conclusion at the end of their respective discussion sections.

In conclusion, the two lab reports that were used as examples for this paper proved to be good models for what a structure of a lab report looks like in a practical setting. A majority of the report contains the data and procedure but the aspects which are most important to the reader lie in the abstract and the conclusion of the reports. Before committing time to read a report that might not have the information that is being looked for, the abstract and conclusion can be a large part of getting your report in the limelight.

References

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