How to Write a Scientific Report

In most of the physical and social sciences, there is a method for how scientific writing is published. The goal of scientific writing is to be as clear, concise, and objective as possible. To keep everything uniform between different academic disciplines, there are some simple and general guidelines that one must follow. All lab reports must be typed in APA style. There are separate guides (a short and long version) on my website.

There are five parts to a scientific paper: an introduction of the experiment, a method section, a reporting of the results (including statistics), a discussion of the findings, and a references section of cited literature. These sections are described in greater detail below:

The introduction section is not labeled as “Introduction” and allows the writer to prepare the reader to understand the background and purpose for conducting the research. The introduction should start with a brief description of previous literature on the subject to provide the reader with some background knowledge. For our course, you will occasionally have current published papers to include in your introduction. You may also use information from your textbook remembering to cite either the text or any research/articles cited by your text or you may use & cite my lecture notes. The last paragraph of the introduction should include a brief one or two sentence description of the experiment, followed by a hypothesis of the expected results. For example:

This experiment sought to identify the relationship of color discrimination and angle of light presentation. It was hypothesized that the ability to discriminate colors will degrade with increasing angles of presentation due to the decreasing concentration of color-coding cones in the peripheral retina.

Method

The method section is a straightforward description of the materials and procedures of the experiment. It should include a participants, materials and procedure sub-section. There is no commentary in this section only directions on how the experiment was carried out. USE COMPLETE SENTENCES. This section should be written like a recipe for a cookbook except it should be in past tense since it describe the method for your experiment. The last sentences of the method should describe how the data was measured and the statistical analyses performed. For example:

Participants
Participants were two undergraduate students at Wofford College, age 19 and 20.

Materials
A wavelength generator was used to stimulate the retina of each subject at varied angles from a distance of 12 feet.

Procedure
The subject was instructed to sit on a stool and focus their eyesight on a fixed point directly in front of them. The subjects were instructed to answer "Yes" or "No" when prompted if the color of the light had changed. The wavelength and angle were randomly selected for each trial. The wavelengths utilized were 400, 500, and 600 nm. The angles of presentation varied from $0^\circ$ to $180^\circ$.
in 10° increments. The percent correct for each wavelength and angle were calculated. Mixed factorial ANOVA tests were employed to measure statistical significance. A p-value < 0.05 defined a statistically significant result.

**Results**

The results section is an objective description of the data that you have collected for a given experiment. You typically do not report raw data only means and standard errors from your data analysis. For most labs, the results section will include a graph or table of the data which is appended to the end of the report. Do not use speculation, commentary, or interpretation of the results in this section, that text belongs in the discussion section. You should include the statistical citation after you report significant differences and then describe how the variables significantly differ. For example:

There was a significant main effect for stimulus concentration, \( F(4, 84) = 72.341, p = 0.043 \), meaning that licking increased as the concentration increased. Additionally, there was a significant main effect, \( F(1, 21) = 29.404, p < 0.001 \), of adding linoleic acid to the sucrose concentration series and no interaction between sucrose concentration and presence of linoleic acid meaning that linoleic acid increased licking across all the concentrations. Post-hoc tests revealed significant increases in licking at the 15 mM, \( p = 0.013 \), 31 mM, \( p = 0.023 \), 62 mM, \( p < 0.001 \), and 250 mM, \( p = 0.005 \), sucrose concentrations when 88 \( \mu \)M linoleic acid was added to the solutions.

**Discussion**

The last section involves a written discussion of the data. This is the section where you interpret what the results mean. You should clarify whether or not you observed the results expected (i.e. was the hypothesis confirmed or not and why). You should include commentary to interpret why you observed the expected results or why you did not observe the expected results. Follow my grading criteria to know what results are important to interpret. Be intelligible in your comments! Relate your results to the concepts tested by the lab. Include a paragraph discussing any improvements that could be made in the future and any ideas for related future experiments.

**References**

Any information from research articles, textbooks, or lecture notes in the body of the report needs to be cited with a reference. Follow the APA style guidelines for in-text citations and formatting the references section (see APA Style – long version for examples).

Reference my lecture slides and / or lab handouts as an *Internet source* in the following manner:

Last Name, Initials (YEAR) TITLE OF LECTURE, COURSE, INSTITUTE, DATE RETRIEVED, WEB ADDRESS.

*EXAMPLE:*

http://webs.wofford.edu/pittmandw/psy230/pdfs/04PSY230A.pdf

Append tables and figures to the end of the lab report. Tables have titles above the table and figures have captions below the figure.