Turning analysis into paper

Data fellowship program

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Turning analysis into paper – an overview

- Effective, concise, and clear writing can help provide a deeper understanding to the research topic that you are presenting and lead to a compelling, evidence-based story. While turning an analysis into paper may feel overwhelming, it is imperative to do so to present your research and communicate your findings to the scientific community.

- Turning your analysis into a scientific paper requires you to structure your writing with a **clear introduction** outlining your research question and hypothesis, **detail your methods** in a dedicated section, present your results with **supporting data and visualizations**, and then thoroughly **discuss the implications** of your findings in relation to existing knowledge within the field, ensuring a logical flow and appropriate scientific language throughout[1]

- This guide will take you through an overview of where to begin, structuring your paper, writing the paper, and submission.

- Additional resources will also be provided to further this guidance.

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Step 1: Where to begin?

- **Understand where your work fits into existing literature.** Successful writing begins with understanding where your study or analysis fits in the existing landscape.
    - **Research** how your work fits into existing literature by **conducting a literature review**. This will not only help you provide critical insight into your own work, but it will also help support successful storytelling as you use your work to build on previous research as opposed to duplicating existing research. (*Questions to consider: What do we know about this topic? What questions do we not know yet? Does the analysis we are presenting fill a gap in knowledge? Why is this information important?)*
- Ensure appropriate **research ethics processes and approvals** are met.
    - Before beginning your paper, make sure that you are following the appropriate research ethics processes. At PATH, as with any research involving human subjects, you must make sure to follow our office of research affairs **research reviews process**, which requires you to submit the details of your study for review to ensure appropriate ethics reviews are held.
- Use **checklists to help outline your reporting plan**
    - Use checklists that are already developed. A multitude of checklists have been created for different study types. Decide on a checklist that would be best for your work and make sure that you understand the key components for the paper before diving in. Examples of checklists can be found on slide 8.
- Create an outline
    - Make a plan that identifies what **data and information** you will need to present in your paper, including specific tables and figures, and which other collaborators will be key authors in the writing process.
    - Ensure that you **develop a timeline** incorporating the key steps and any **key deadlines** that you need to be aware and that may impact your work.
    - Understand your **audience**. When you craft your paper, it is important to understand both who you are writing for and what you want them to understanding from your work. *(Questions to consider: What is the goal for the audience in reading my writing? What messages do I want them to take away?)*
    - Review other articles in the peer reviewed literature that address similar issues, see how they present their findings, and in what journals. Consider using similar formats to high impact publications.

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Step 2: Structuring your paper

- Develop an **outline** for your paper. Use **checklists** that follow scientific standards that are best for your paper.
- Prior to outlining your paper, you should consider **identifying a journal in advance** to make sure you are aware of formatting requirements and word limits before spending too much time on the outline or draft paper.
- Review the checklists on slide 8 for more detailed information on what sections to include
- Scientific writing made easy: A step-by-step guide to undergraduate writing in the Biological Sciences (Turbek et al., 2016) is a good article to read to learn more about structuring and writing your paper.

Abstract

A concise summary of the study's purpose, methods, key findings, and conclusions

Introduction

Provide background information on the topic, explain the research gap, and clearly state your research question, hypothesis, and purpose.

Methods/Study design

Describe the data collection process, analytical techniques used, and any statistical methods employed.

Results

Present your findings in a logical order, using tables, figures, and descriptive statistics to effectively communicate your data.

Discussion

Interpret your results in the context of existing literature, highlight limitations, and discuss potential implications and future research directions.

Abstract and introduction

The **abstract** is a concise summary of the study's purpose, methods, key findings, and conclusions. This section is typically only 300 words or less, so a maximum of only a few sentences for each of those components. Present key quantitative findings in the results or key findings section. The conclusion should be written in a maximum of 2-3 sentences.

The **introduction** sets the stage for your research: what is already known about the topic, why your research is important and what specific question it seeks to answer. Keep the introduction short and concise: try to write it using only three short paragraphs. These paragraphs should include the following: 1. High-level (big view) background on the topic; 2. What is already known about the issue and what are the key gaps in knowledge?; 3. What is the purpose of the analysis presented and how does it help fill a specific gap in knowledge? Include a few key references in the introduction, but do not include a long drawn out discussion of the topic: that is for the discussion section at the end.

Methods and results

The **methods** section should include a short description of the study setting and population, definition of the primary outcomes and explanatory variables or factors evaluated, and other key and potential confounding variables or factors considered. It should also include a description of the data collection methods, data preparation and analysis steps, and specific statistical methods employed.

The **results** section presents the key findings of the analysis or evaluation. This should include a few key tables and figures: usually this is limited to 2-3 tables and 2-3 figures. Any additional tables or figures can go in an appendix, if they are essential. Make sure that your tables and figures are clear and can tell a specific story about your data and analysis. Include additional descriptive statistics in the text, but do not make the text section overly long. Do not include in-depth discussion of the meaning of the results in the results: this can be done in the discussion section.

Discussion

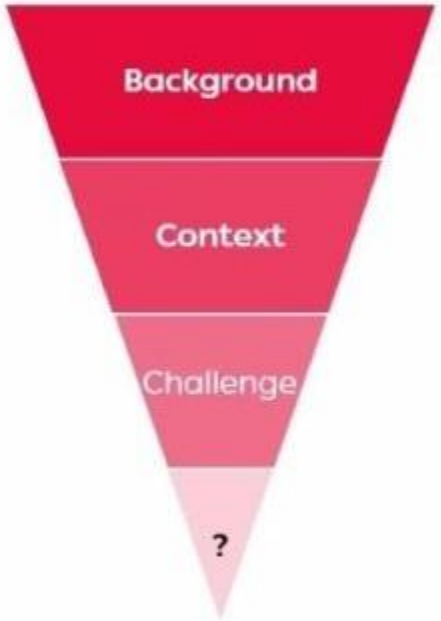
The **discussion** section is a critical piece of the paper that brings everything together. In the first paragraph, it should restate the most important findings of the analysis. In following paragraphs, the findings should be discussed in the context previous research and literature on the topic, highlighting how your findings fit in with other studies (are your findings similar? Different? Why might this be?) and fill in specific gaps in knowledge. This section should also include a limitations section describing transparently issues that may influence interpretation of the results and how they should be viewed in the context of the question you are answering. The discussion section should close with a conclusion of the implications of the research findings and potential future research directions.

Educational Fund
IAS

In summary

JIAS
JOURNAL OF THE INTERNATIONAL AIDS SOCIETY

Introduction



?: Question

Methods

- Who
- Where
- What
- How
- When

Results

"Findings in a logical fashion"

Do not discuss your findings or speculate on their meaning!

Discussion and conclusions

- Intro paragraph
- Findings and context/comparison
- Strengths & limitations
- Conclusions

Introduction, methods and results in the past tense!
(They have **already** happened)

Discussion and conclusions in present tense
(This is what happens)

Step 3: Considerations for writing your paper

- ✓ Use **concise language**. Avoid unnecessary descriptors and complex sentences wherever possible.
- ✓ **Cite your sources** appropriately. When citing previous research, it is best to state specific findings and their importance, rather than calling out researchers directly such as “Smith et al found…”. Make sure that you reference authors when citing specific findings.
- ✓ Stay **objective** and **note uncertainties**. Highlight confidence intervals that include the null hypothesis, state assumptions, and discuss limitations. When describing your findings, talk about associations in your data. Do not state relationships as causal unless your study design allows causal inference.
- ✓ Use **graphs** and **tables**. Visual aids should be used to present complex data and trends. Make sure that any figures, tables, or graphs have **succinct captions** that provide a clear explanation of takeaways from the visuals.
- ✓ Incorporate adequate time for **proofreading** and **revisions**. Take time to carefully review your paper and ensure there are no inconsistencies or grammatical errors. Ask your colleagues for feedback.
- ✓ Ensure your research adheres to **ethical guidelines** and **protocols.** Make sure that your study has been submitted for Human Subjects Research (HSR) determination and adheres to the appropriate ethical considerations of stakeholders. For more information, please visit PATH’s Office of Research Affairs website.
- ✓ Ensure that the **statistical methods** are appropriate given the research question and that the interpretation of results is consistent with the methods used.
- ✓ Review **journal guidelines** to ensure you’re meeting the specific requirements.

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Step 4: Submitting your paper

- Choose an **appropriate journal**.
    - Do your due diligence and make sure that you understand the best journal to submit your work to based on the category of research
    - Ask colleagues that you work closely with for suggestions
    - Consider publishing your work as Open Access (required at PATH)
- Review **submission guidelines** carefully. These guidelines will provide key information on formats, templates, and figures.
- Understand the **editorial and peer review process**. The process may include the following sequence of events:
    - **Preliminary editorial screening** – the paper is reviewed to ensure that it meets the purpose of the journal. If an editor determines that the paper does not fall within the journal's purpose, it may be recommended to go to another journal or be rejected.
    - **Peer review** – reviewers will evaluate the paper and submit their feedback to the editor with a recommendation of either (1) accept without changes (2) accept with revisions or (3) reject.
    - **Editorial decision** – editor will make the final call on the paper acceptance or recommendation which would include (1) accept without changes (2) conditional acceptance (minor or major revisions) (3) return for resubmission or (4) rejection

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Key takeaways

- Effective writers are familiar with the background information of their research and incorporate this into their story that they want to communicate. Take time to make sure that you thoughtfully **consider, review, and incorporate published literature**.
- Use **existing checklists** when you develop your outline to ensure that you include all the key elements of your paper.
- Create and maintain a submission timeline that includes all key deliverables, with relevant stakeholders noted for each step.
- As you write your paper, ensure that you are **communicating concisely** and do not use unnecessary descriptors or information.
- Be sure to **cite your sources** appropriately to give credit.
- **Review** your work carefully and ask for **feedback** from colleagues.
- Ensure you understand **journal submission guidelines and processes**.

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Checklists and guidelines

Observational studies

- The Strengthening the Reporting of Observational Studies in Epidemiology (STROBE)Statement: guidelines for reporting observational studies
- The Reporting of studies Conducted using Observational Routinely-collected health Data (RECORD)Statement

Systematic reviews

- The PRISMA2020 statement: An updated guideline for reporting systematic reviews

Randomized trials

- CONSORT2010 Statement: updated guidelines for reporting parallel group randomized trials

Quality improvement in health care

- SQUIRE2.0 (Standardsfor QUalityImprovement Reporting Excellence): revised publication guidelines from a detailed consensus process

Development of prediction models or evaluation of their performance

- https://www.equator-network.org/reporting-guidelines/tripod-statement/

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References

1. Turbek, S. P., Chock, T. M., Donahue, K., Havrilla, C. A., Oliverio, A. M., Polutchko, S. K., Shoemaker, L. G., & Vimercati, L. (2016). Scientific writing made easy: A step-by-step guide to undergraduate writing in the Biological Sciences. *The Bulletin of the Ecological Society of America*, *97*(4), 417–426. https://doi.org/10.1002/bes2.1258

2. *Library guides: How to publish a scientific paper: Submitting the manuscript*. Submitting the manuscript - How to publish a scientific paper - Library Guides at UC Berkeley. (2024, August 6). https://guides.lib.berkeley.edu/publish/submitting


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