A Practical Guide to Academic Writing and Publishing

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1.0 Introduction

If you are enrolled in a research-based graduate degree program, you will need to produce a scholarly work, whether that is a thesis, doctoral dissertation, or a series of journal articles. Students frequently find that the academic writing process is one of the most daunting parts of the research process. Effectively communicating your findings is also one of the most important aspects of research. For many students, learning to write in the academic style is marked by a steep and often difficult learning curve.

The following guide is intended to help you with the writing process and is based on own my experiences developing as a publishing scholar as well as from advising graduate students. Please understand that while you may feel that you are an excellent writer, and may well be, academic writing is not like other styles of communication and you have likely received little practice in your undergraduate studies. Truly the best way to become a better academic writer is to *read academic papers in vast numbers* and to practice. However, I offer the following as a series of explicit goals for which the academic writer should strive as well as a listing of helpful tips. Please note that the informal style of writing in this document is not in itself an example of scholarly writing because that is not the intent.

This document assumes that you aim to publish scholarly work. Even if this is not your intent, it is the standard to which you will be assessed.

2.0 The Pillars of Academic Writing

1. *Academic writing must be clear, concise, and terse*. Effective academic communication is not English literature. We do not use flowery or overly ornate ways of saying things. Students frequently use redundant phrases in their writing because they feel it sounds more authoritative. The researcher may say, "In order to best target sites for remediation, the model…" The common phrase '*in order to*' is redundant and only serves to make the author sound more authoritative. The researcher could easily have stated, "To best target…" instead. There are countless examples of similar ways that writers clutter their work and collectively these errors result in unclear, wordy and therefore less effective communication. Longer is not better in academic writing. It is not a race to a 100+ page thesis. You must be thorough, yes, but not long-winded. Your advisor is not concerned that your thesis is too short. Instead, they're looking for concise and effective reporting of your research. You don't win if you have the longest thesis; you probably need to relay the same concepts more tersely if this is the case.

2. *Academic writing must be direct, literal, and explicit*. The audience of an academic paper is very different than that of a newspaper article, magazine article, or web blog. The group of academics that are reading your published work are likely far more diverse in terms of their backgrounds and cultures, the countries they live in, and the languages they speak. Modern academic writing is largely published in English, but English is often a second/third language for the readers of academic works. Colloquialism, euphemisms, indirect statements, similes, metaphors, and similar constructs have no place in academic writing because they only serve to confuse the readership. Remember, we're striving for clarity of meaning. While academics are usually aware of this rule, it often enters writing in subtle ways. For example, the researcher may say, "To test how the new data-loggers stacked up against previous designs…" But can data-logger designs literally be *stacked up* against one another? The act of placing cats that participated in a study into corrals cannot be described as '*hard work*' because hardness is not a physical property of effort. Can you see how these statements might be confusing for an intelligent reader, familiar with the research area, but for whom English is their second language, which perhaps they learned in a culture outside of North America where this phrase is common. As another example, the title *'Pillars of Academic Writing'* above is an expression that may be apparent in its meaning to you, but cannot be interpreted literally. If a sentence, or part of a sentence, cannot be interpreted in its **literal meaning** by someone with a moderate understanding of English and no cultural familiarity overlapping with that of the author, it must be revised. We are restricted to the sub-set of the English language that cannot be 'lost in translation' for which there can be no confusion over meaning.

3. *Academic writing must be logically consistent*. How do you develop the logical foundation of your study, based on previous research and the perceived gaps therein, to arrive at your research statement, objectives, aims, or hypotheses? The introduction/review section of your paper must contain an argument based in logic. This is often what is referred to as the 'Story' of your work, or the 'Big Picture'. The logical progression of your study may sound, at a very high level, something like this: 1) A better understanding of *A* is necessary for reasons *B*, *C*, and *D*. 2) Recent research into *A* has shown this, *E*, progress in the field. 3) However, there is *F* deficiency in *E*, and therefore our understanding of *A* is currently limited, as evidenced by *G*. 4) I therefore will attempt to resolve these issues in this way (research statement/objectives fit in here). If you cannot express your research in this sort of four-to-five sentence fashion, you don't have a good enough handle on the logic that serves as your research study's foundation.

3.0 Writing Tips

The following is a list, in no particular order, of things that can improve your scholarly writing:

Tip 1: Paragraphs are not arbitrary divisions of your writing. A paragraph must contain one topic or theme, usually set out in the introductory sentence. Furthermore, paragraphs are not just randomly placed throughout a paper or literature review. When there are seemingly unrelated paragraphs within your introductory or literature review sections it is a sign that you are missing the story of the work, i.e. you do not have a clear logical consistency in your argument (See Point 3 above). Use linking concluding sentences in a paragraph to guide the reader through the logical progression of the argument. This way the following paragraph is never a surprise and never appears random in placement. Within a paragraph,

sentences must also follow a logical progression. They are not randomly ordered within their containing paragraphs.

Tip 2: Paragraphs are not a page and a half long. If this is the case, it's a sign that you 1) aren't being concise, or 2) have lost the plot on your *big picture story*.

Tip 3: Results sections present your findings whereas discussion sections place the findings within the context of your research objectives and the findings of previous work. Students most often struggle with reporting results. You must report the findings, as they are presented in the figures and tables, in written form. You may highlight important findings that you will later focus on in the discussion. You may tell us what factors were found to be statistically significant and which were not. You may guide the reader to better interpret a trend that is perhaps not immediately evident in the data contained in a figure or table. But do not discuss the significance of these findings in the results. That's a discussion section activity. One of the most common requests of reviewers and editors is to separate the results and discussion sections of a submitted manuscript. Why not plan ahead and start off that way?

Tip 4: Use an active voice.

Tip 5: Contractions have no place outside of direct quotations in academic writing. Ours is a formal style of writing.

Tip 6: Direct quotations have no place in (most) academic writing. Obviously for those disciplines where textual information is the data, this won't be the case. But even then, quotations are generally restricted to the results and are not presented in the literature review. Remember, a literature review is a *synthesis* of a body of scholarly literature. A direct quotation tells your reader that you didn't understand what the scholar was saying well enough to synthesize the material and relay the meaning of the work in your review.

Tip 7: Use a consistent tense within a section. This is important and one of the most common mistakes in student academic writing. You do not need to, nor do you usually, use the same tense throughout a paper/thesis, but the same tense is always used within a section (e.g. the methods, results, and discussion sections). The three most common tenses used in academic writing include the present simple tense, the past simple tense, and the present perfect tense. If you don't know what these are, you should read the resource at this link http://writingcenter.unc.edu/handouts/verb-tenses/. The exact usage of tense within a paper is dependent on the discipline and even the journal. However, in general, methods are usually referred to using the past simple tense because methods are things that *were* completed previously to carry out the research. Your findings, and in fact other researcher's findings, are *still* valid in the present and should therefore be reported on in a present tense. It would be awkward to refer to the data contained in a figure that the reader is currently looking at in the past tense.

Tip 8: Avoid using *I* or *we*, i.e. writing in the first person, although in some disciplines and under certain conditions this may be acceptable. It may seem strange, but prefer 'The authors did not corral the cats…' over 'We did not corral the cats…' unless you have a very good reason otherwise.

Tip 9: Academic writing must adopt a neutral tone. Be mindful of the need to use gender-neutral language. Also, don't add unnecessary value-laden qualifiers. For example, something isn't 'very important' it's simply 'important'. Prefer 'relatively large' to 'big', or worse, 'huge'.

Tip 10: Set a rhythm in your writing to help the reader pace themselves. It doesn't matter how brilliant

you may be, reading your writing, like all writing, is hard work. How many times have you read a paper that you were interested in but by the end you felt that your eyelids where getting heavy? Pace your reader with rhythmic variation in sentence length. Personally, I find that using a combination of two long sentences (not run-ons though) followed by a short sentence and repeated in this order sets a good pace. Communicate fine details and dense material in the longer sentences and have punchier statements in your short sentence. It's subconscious for the reader but greatly improves readability. (See what I did there?)

Tip 11: If your sentence is four or more lines long it's likely a run-on sentence. Your reader is at high risk of getting lost in the sentence. Have you ever had that experience where you needed to go back to the beginning of a sentence and try to figure out what the author was saying?

Tip 12: Number your sections 1.0, 1.1, 1.2, etc. Avoid too many levels of sub-sections. More than three (e.g. Section 4.1.2) is rarely, if ever, necessary. Section 2.10 is the tenth sub-section of section 2.

Tip 13: Double space all of your paper/thesis. It is awkward when sub-titles have no space between them and a double-spaced paragraph below. I've seen this increasingly in student writing and I think it is often a result of Microsoft Word's styles. Make Word succumb to your vision of the layout of your document and not the other way around.

Tip 14: Number your thesis pages; this is usually done in the upper righthand corner although not always.

Tip 15: Use semicolons sparingly and appropriately. Should you never use an interobang?! That's right. Of course, you should know what an interobang is so that you look intelligent at gatherings of punctuation aficionados.

Tip 16: Italics are often used in informal writing to show emphasis. This document is a good example of that. Academic writing doesn't convey emphasis because we adopt a neutral tone (sorry interobang, but that's why you're out) so italics are only used in rare circumstances. For example, italics are used for specifying the latin name of species and other latin things (e.g. *et alia*).

Tip 17: Every citation in your text must be accompanied by a corresponding reference in your reference list and every reference that appears in the list must be cited in the text. Check this then double-check this. Check this three times before submitting your draft to your advisor.

Tip 18: Citations generally take one of two forms. First, there is the in-line citation format, e.g. *Lindsay et al. (2016) found that cats could be corralled more effectively…* Secondly, there is the appended citation format, e.g. *Cats are not natural herding animals (Lindsay et al., 2016).* The brackets around the year in the inline style, and around the whole citation in the appended format, are not optional. Neither is the '.' after *al* in 'et al.'–it's short for *et alia*, meaning 'and others'. The comma after the 'et al.' is however optional, depending on the referencing style you are using. The appended citation style, which places the citation within brackets either within or at the end of the sentence, has the major advantage that you are able to have multiple citations within a single set of brackets, usually separated with a semi-colon, if the comma is used to separate the name and year, or a comma otherwise. (Did you notice that that last sentence is a run-on? It's tough to read, right? To repair this, I'd remove the second clause, which isn't necessary because I've previously explained the meaning of the appended citation style. I'd also add a period between the third and fourth clauses to form a second sentence.)

Tip 19: Use a consistent reference style. It is not as important which style you use as it is the consistency

with which you use it. Reference managers can make working with references and citations in academic writing far easier. Nevertheless, you must be mindful that reference managers can still format references improperly, particularly when data are incorrectly entered into their databases.

Tip 20: Reference appropriate materials. This means several things. First, reference the original source material. If you read in Lindsay (2016) that Smith (2008) said *ice-age pigs had evolved wings*, download and read Smith (2008) and reference that source; don't attribute *flying pigs* to Lindsay (2016) if it was Smith (2008) that originally stated it. Secondly, if you are in a fast developing discipline and your latest reference is 2005, you're not reading and citing extensively enough. Lastly, you need to base your literature review on the scholarly literature of peer-reviewed journal articles. I commonly see students heavily referencing textbooks. This is a poor basis for your survey of the literature for the same reason made in the second statement above.

Tip 21: Avoid non-evidence based assertions at all costs. Do not draw conclusions from your work that cannot be explicitly supported by your results. Also, do not make blanket statements in your review of the literature without providing the support of previous studies. In fact generalities are best avoided all together. This naturally means that nearly every sentence in your literature review has one or often more citations. This may seem odd at first but it is necessary to avoid the appearance that you are making assertions. **Assertions are very bad** and reviewers will almost always flag them when they occur in a paper (notice how I started off with a bold and general statement that I then justified with evidence?). Students will often ask me, "when do I not need to reference something", to which I usually reply, "you can assert that the sky is blue but most everything else should be based on evidence and citations to previous work." That's the standard.

Tip 22: Avoid unnecessary negation. For example, 'not important' is 'unimportant'. Words like unimportant, discontinuous, unacceptable, and antonyms more generally, exist so that you can write in a positive way what you would otherwise have to write in a negative way. "Cats cannot be confined to a pen" is a negative statement while "cats must be allowed to roam freely" is positive. It's never good to be negative. (See what I did there?)

Tip 23: Be very careful with jargon. Each discipline has its own jargon but unless you are absolutely sure that the target audience is familiar with the term, avoid jargon.

Tip 24: Acronyms and abbreviations (the distinction is whether it is pronounced as a word, e.g. radar) should be provided **at first usage** and should follow the format, "The application of light detection and ranging (LiDAR) technology for terrain mapping…" Notice that the long-form appears outside of the brackets and the acronym appears within brackets. Once you've introduced an acronym/abbreviation never use the long form again in the document. There is no abbreviation, no matter how commonly used in your discipline, that doesn't require the full form at first usage. The one exception to the first usage rule can be the abstract, although this will depend on the journal.

Tip 25: When you have a large number of abbreviations, consider including a list of abbreviations for your poor, lost readers. "I'm sorry, what was the difference between a DEM, DSM, and a DTM again?!"

Tip 26: The short-form of 'for example' is e.g., not ex. 'That is' is written in short-form as 'i.e.', which stands for *id est*. Both of these short-forms are common in academic writing so get familiar with how they are written and how they are used.

Tip 27: Don't refer to a section of your paper/thesis in the section itself. You probably know someone that

always refers to themselves in the third-person. "John is going to write his thesis tonight!" said John as he sat at his desk, coffee in hand. Well, writing "Two other models noted in this review are Model X and Model Y…" is just about as tasteless. It's as though you're serving as author and narrator and an academic work does not need a narrator, unless of course you're writing the movie script version of your thesis.

Tip 28: Avoid statements such as, "***As can be seen from Table 2***, most relations were statistically significant." This is an an indirect way of saying, "Most relations contained in Table 2 were statistically significant." It's also another example of conversational tone and needless narration: 'The reader now looks at Table 2 and sees…The reader now turns the page.' Remember, your thesis is not a screenplay.

Tip 29: You need not avoid pronouns but do be careful to always avoid *ambiguous pronouns*. Try to spot the mistake in the following: "All of the cats were herded into the five mobile corrals. They were then left there for three hours." Does the 'they' refer to the cats or the corrals or both? It's ambiguous. I see this occur very often in student writing. 'It', 'they', and 'these' are the most common risky words in academic writing. Remember, we strive to be explicit and these pronouns, without the aid of qualifiers, are inherently implicit. Use them with care. (See what I did there? Does 'them' refer to the pronouns or their qualifiers?)

Tip 30: You are writing your thesis in Canada so use Canadian spelling consistently throughout the document. If, like me, you were raised on Sesame Street and are often unsure of our spellings, examine this link http://www.lukemastin.com/testing/spelling/cgi-bin/database.cgi?action=view_category&database=spelling&category=A. You can't rely on Microsoft Word to know what Canadian spelling is. The language of a manuscript submitted to a journal for publication should follow the language requirements of the journal. Most journals request manuscripts be prepared using either British or US English and this will be specified in the *Guide for Authors* associated with the journal.

Tip 31: Things that are obvious to you as the researcher will not necessarily be obvious to the reader and will require clarification. The standard here is that someone reading your paper/thesis should be able to replicate the study from your description alone. If that isn't possible, further clarification is needed. A good proportion of questions at most thesis defenses center around the need to clarify some aspect of the work.

Tip 32: You are a scientist, so use SI units for everything.

Tip 33: There is a space between a numerical value and its unit symbol. I frequently read 1m or 3.5°C in student writing instead of the correctly expressed 1 m and 3.5 °C. I suspect that this is because of a need to ensure that the number and unit symbol are not separated by a line break. While it is essential that a number and its unit are on the same line, it is equally important that appropriate SI unit and style conventions are followed. Use a manual line break if your word processing software separates a number and its unit. In most word processing software packages, including Microsoft Word, this is achieved by pressing **shift+enter** before the point of the break, which will insert a newline character without formatting for a new paragraph.

Tip 34: Either a solidus (/) or negative exponent can be used to indicate division of units and a space or an interpunct (·), without spaces, indicates multiplication of units. For example, the units of acceleration can be written either as m / s^2 or m·s^{-2}.

Tip 35: Unit symbols are never pluralized. It is improper to write, "each cat was corralled for 5 mins" or "the cat responsible for the greatest number of scratches was 15.4 cms in length."

Tip 36: The word 'significant' holds a special place in academic writing. It implies a statistical test has been applied and a statistically significant difference or relation has been identified. If this is not the case, then you probably want to use another word, such as 'substantial', instead. For example, "Herding cats is *substantially* more difficult than herding cows."

Tip 37: Avoid unintentional rhyming, which can distract from what you are trying to say. As an example, read the second sentence of the previous paragraph again. Excessive word repetition within a single paragraph can have the same effect. This is why there are thesauri. (I just couldn't help myself there!)

Tip 38: Conclusion sections do not present anything new. Everything stated in the conclusions must have originated from the findings and discussion. A good conclusion section outlines the 2-5 major findings of the work in an organized and explicit manner. Numbered lists of findings can be useful for this purpose.

Tip 39: Integer numbers less than ten should be written in long-form unless they are measurements with associated units or are within a range (e.g. 2-5). For example, you shouldn't write, "There were 4 cats that scratched the researchers more than all others." For those of us that are old enough to recall life before we started publicly broadcasting 140-character reports on the nuances of our breakfasts (*Forget my diet; I'm having 2 bowls of cornflakes this morning!*), these low-integer numerals are particularly grating. As an aside, use a full-sized keyboard to write your thesis. Your mobile phone is not a good platform for this sort of activity.

Tip 40: In a list of two items, the first item is the *former* and the second item is the *latter*.

Tip 41: Listen to your adviser when they provide revision suggestions. Your advisor has had a career's worth of experience publishing scholarly works and has participated in numerous thesis defenses. They know what effective scholarly communication is. So when your adviser asks for revisions to a draft, you should heed their advice.

Tip 42: Being a good academic writer is more about being an excellent editor. Edit your draft multiple times before you let any colleague or advisor read it. Become familiar with your weaknesses as a writer. For example, I know that I overuse brackets to create compound sentences. When I edit my writing I'm always mindful of needless brackets. (I've also been told that my writing carries a deeply sarcastic tone, but surely that's untrue.)

Tip 43: Acknowledgements are important. You may be unaware of this, but your research project very likely is a component of your advisors larger career-long research program. In fact, part or all of your funding has been provided by a research grant that your advisor received, which contained a component that broadly outlines your project. Sometimes this grant proposal was written a year or more before you started in your degree program. It is a common requirement of publishing that you **acknowledge all of the sources of funding that contributed to your work**. Speak with your advisor if you are unsure about the various grants and funding sources that have contributed to your funding package and that have allowed for your research data collection.

Tip 44: The abstract of your thesis/article will be the most widely read part of your study. It is the basis for which many people will decide whether or not to read your thesis/article. Unfortunately many scholars write the abstract almost as an afterthought and put insufficient effort into crafting this important summary of the work. Editors understand the importance of an article's abstract and so specifically request the reviewers' opinion on the quality of this summary. A good abstract will outline the scope of the study, summarize salient methods, report findings, and highlight the major contributions. The most common

deficiency of weak abstracts is insufficient focus on the study's findings with an unbalanced emphasis on the contextual and methodological aspects of the work. Be mindful that the abstract must also be terse and held within the specific length requirements of the journal. Some journals may also request that the author's create a graphical abstract that visually summarizes the major contribution of the study.

Tip 45: Don't reference the current study in the literture review. It's not the purpose of a literature review to make reference to what your currently doing. Instead, the literature review should focus on what has been accomplished in previously published studies.

4.0 Figures, Tables, and Equations

There are entire books that focus on the topic of effective data visualization and this topic is well worth investigating in detail. The following is a short list of common issues related to the integration of graphical and tabular data in scholarly works:

Tip 46: Academic papers have figures and tables and that's it. There are no graphs, charts, schematics, diagrams, plots etc. Everything is referred to as either a figure or a table. This is an aside to my main point but to a geographer a *chart* is a map of an ocean/coastline.

Tip 47: Tables are used when you need the reader to see the raw data values; figures are useful when you need to relay information about the relations, trends, or patterns within the data. When you have a very large table, ask yourself if it would be better to use a figure to summarize the information instead.

Tip 48: Microsoft Excel, like most spreadsheet packages, does not naturally produce publication-quality figures. I have seen Excel used to create some graphical atrocities that have been submitted for publication. If you don't have access to quality commercial software for scientific visualization then I'd suggest using either *R* or Matplotlib with the Python programming language. These software packages can be used to produce figures that can be embedded into your work or submitted for publication. If you insist on using Microsoft Excel, then don't use the default styling and you will in all likelihood need to export the figure in a vector format and edit the figure using a vector line art program like Adobe Illustrator or Inkscape. Be mindful of consistent line thicknesses. Figure 1 is an example of a simple figure produced using Matplotlib. This open-source scientific visualization library can be used to create a wide variety of plot types and is very flexible in styling.

Tip 49: Number your figures/tables (e.g. Figure 1, Table 2) and refer to them in the text as Figure 1, Figure 2, etc. In a thesis, the chapter that a figure or table is embedded in is reflected in the numbering scheme, e.g. Figure 3.1 and Table 4.10, which refer to the first figure of Chapter 3 and the tenth table in Chapter 4. Every figure and table presented in your work must be referred to in the text, most commonly somewhere in the results section. Methods sections also frequently have figures and tables, although they are rarely used in discussion sections and are almost never present in introductions. Conclusions and abstracts should never have figures or tables.

Tip 50: Do not refer to the positions of tables/figures in the document, e.g. "Figure 1, *shown below*, illustrates this trend." The positioning of figures and tables is the job of the copy editor and is usually out of the author's control.

Tip 51: Figure captions belong below the figure and table captions belong above the table. Captions

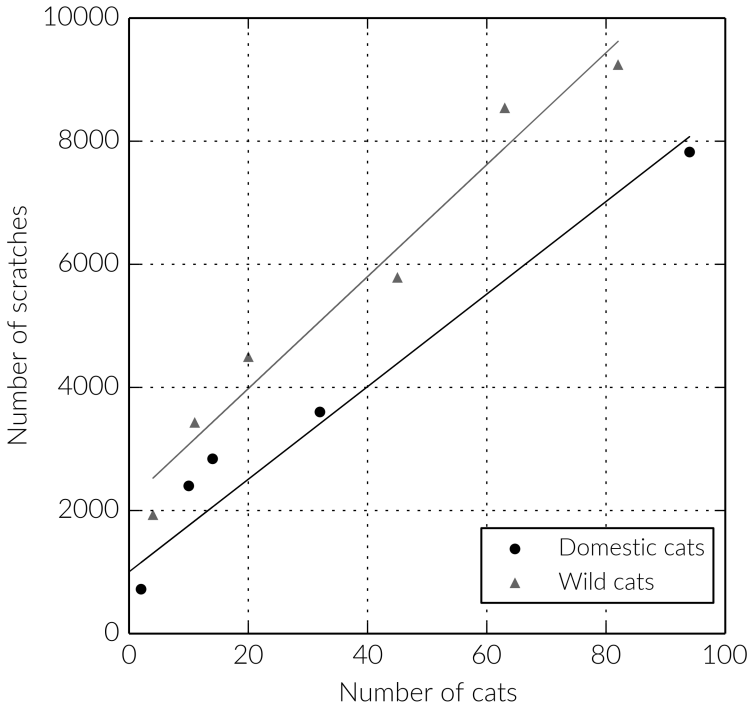

Figure 1: The numbers of cats corralled versus the number of scratches suffered by the researchers.

should describe everything needed for the reader to interpret the figure/table. If you have a multi-part figure, each part must have a letter designation and the caption must also have a corresponding sub-section for each part. Refer to the specific figure part, e.g. Figure 1B, in the text. Every figure and table must be accompanied by a caption without exception.

Tip 52: Use colour in your figures sparingly and only when it aids in the interpretation of the work. Do not use it simply because you feel it looks nicer. Many journals charge hefty publication fees for colour figures. Are those blue data points on your scattergram really worth $1000 of research funding?

Tip 53: Label all of your axes and tell us what units you are using.

Tip 54: In Geography, figures that include **maps must be of very high quality**. Screen grabs of Google Earth will simply not suffice. You didn't spend all that time in Grade 8 Geography class colouring maps of South America for nothing. You've developed some keen cartographic skills and it's time to let them shine. Use a geographical information system (GIS) to initially prepare maps but you may have to further edit the figure in a vector line drawing package like Inkscape or Adobe Illustrator to make the map publication quality.

Tip 55: Most theses in the natural sciences that involve a field site should include a figure that is a study site map. These figures usually include an inset that describes the broad location of the site (e.g. southern Ontario) and a more detailed site map. Because the description of the study site usually occurs early in the methods section of a thesis/paper, this study site map is usually one of the first figured contained in the work.

Tip 56: Avoid multi-page tables and figures. Try to break them into multiple figures/tables instead. These

multi-page monsters would undoubtedly be difficult for the reader to interpret anyhow. Sometimes a table that can easily be fit to a single page ends up being split over two simply as a result of the layout. Use a page-break and leave empty space at the bottom of the prior page when this happens.

Tip 57: If you include a figure from another source, you usually want to redraw the original and it is essential that you include a 'modified from Lindsay (2016)' credit in the figure caption. Remember, copyright belongs to the publisher of the original work. You certainly cannot embed the figure from another work directly into your thesis/paper without prior consent.

Tip 58: Avoid unnecessary dimensions in your figures. Have you ever seen those three-dimensional bar charts, usually made in Microsoft Excel and often used in business presentations? These are perfect examples of unnecessary dimensions. Three-dimensional plots should be reserved for three-dimensional data. Gratuitous dimensions only serve to make the figure more difficult to interpret, which I suppose if you're trying to hide the fact that you've funneled millions in venture capital funds into your private bank account, you just might be aiming to do.

Tip 59: Tables in scholarly literature have no vertical lines, only horizontal lines. I suppose the closed cells formed by vertical lines in tables are an affront to the academic freedom that we hold so dear. Horizontal-line-only tables can be achieved in Microsoft Word or other word processors but there is no default style that will do this for you. Speak with your advisor about how this is achieved. Table 1 is an example of the academic table format.

Table 1: The number of cats contained in each study corral, the duration in minutes of their containment, and the number of scratches suffered by the researchers.

Corral Name	Cats	Duration	Scratches
West Ranch	10	1.0	10,824
Cat Wrangler	32	1.3	3,601
Jimmy's Pen	104	2.6	1,442
Dodson Farm	2	5.1	722

Tip 60: Figures/tables and their captions should be on the same page.

Tip 61: Particularly in a thesis, figures and tables that are embedded as near as possible to their citation are best. It can be difficult for the reader if they need to constantly refer to a grouping of figures at the end of a chapter. When reading the PDF version, this can be downright tiring. Manuscripts submitted for publication will frequently include groupings of figures and tables at the end of the document, separate from the text, but this depends on the journal. This is for the convenience of the copy editor, not the readers.

Tip 62: Clearly identify *all* variable contained within the equations that you present. Just as with figures and tables, you must number each equation, usually at the end of the line containing the equation and within brackets. Also like figures and tables, equations must be referenced somewhere in the text of the document. That is, if *Equation 1* is not referred to at some point in the your thesis, then it likely doesn't belong in the document.

5.0 Publishing

I still recall my first experience with academic publishing. Back then, authors needed to mail three or four printed hard-copies of their manuscript to the editors of journals. Afterwards, you would check your mail each day keenly awaiting the editor's response and the reviews of the work. We had email during this time but academic publishers were shockingly slow to adopt online systems and most communication was through the postal service! The process of publishing a study could easily take a year or more. Academic publishing has certainly changed considerably since then and is far more expedient now, particularly with the advent of online submission and widespread adoption of manuscript management systems. What hasn't changed, however, is the feeling of uncertainty about the process that young scholars experience when they submit their first manuscript for peer review. Truth be told, academic publishing can be daunting even to well-established scholars. But for young scholars who are venturing into the world of academic publishing for the first time, the process of preparing and submitting a manuscript for peer review and the steps involved in responding to the reviewers' comments can be particularly unnerving.

However, publishing the results of your study also offers exciting moments and is at times very rewarding. Every time that you receive the final proofs of an article from a copy editor, or when one of your articles is cited by another scholar, you will be filled with a well-deserved sense of accomplishment. These are the very impacts on the discipline that as a graduate student you have been striving for. It has been said by some scholars that *no study is complete until it has been published*. The following tips are intended to help you navigate the convoluted process of academic publishing, from the initial submission of the manuscript to the things that occur after the article has been published.

Tip 63: *Articles* are published research papers and *journals* are the outlet for their publication. Researchers are responsible for writing articles while publishers are responsible for running the journals in which articles are published. I frequently hear young scholars inadvertently confuse these two by saying things like, "I've read five *journals* on the topic." I think this happens because what a journal *is* is not as obvious now as it was in the past when researchers had to go to the university library to read the hard-copy version of the monthly annals in their disciplines. Nowadays, a journal is effectively a website run by an academic publisher (e.g. Elsevier, Springer, Wiley-Blackwell, Taylor & Francis, and Sage) or scholarly society (e.g. the American Association of Geographers). Issues of a journal are now simply collections of articles released in final form and published online at the same time. I frequently refer to a *manuscript*, which is merely an unpublished draft of an article that is undergoing peer review.

Tip 64: Each journal has its own set of specific rules that dictate the format of submitted manuscripts, usually contained within a document called *Guide for Authors*, or something similar. This document contains important information about the required structure, format, referencing style, and the figure and table requirements of submitted manuscripts. This guide will indicate the acceptable file formats for documents and figures. You must read over the author's guide very carefully and ensure that your manuscript follows each of the specified guidelines. Failure to do so is likely to result in your manuscript being rejected before it is sent out for peer review.

Tip 65: Determine author order ahead of time and make sure that all co-authors are in agreement. This can be a surprisingly contentious issue and so it is important that it is discussed with your advisor and any other potential co-authors early in the publishing process. Each discipline has its own standards for co-authorship, however, generally co-authors need to contribute to the work in a meaningful way. This may

include contributions to the project's conceptualization, initial design and set-up of the study, acquisition of research funding, data collection, data analysis, and the writing and/or editing of major sections of the draft manuscript. Author order is usually indicative of the degree to which each author has contributed to the final article. Theses and dissertations are never co-authored but journal articles that are derived from work based on a masters thesis or doctoral dissertation are very often co-authored works.

Tip 66: The corresponding author is generally the person responsible for submitting the paper and for drafting the response to the reviewers' comments when the reviews are completed. The corresponding author should also communicate with all other authors when revising the manuscript and preparing the response. This author is often the first author, but is not always, particularly when the first author is a student. It is important that the corresponding author have stable contact information, and is therefore usually the author that is least likely to change institutional affiliations during the years immediately following the article's publication. As such, it is common for the advisor to serve in this role. It is also important that the corresponding author have an institutional email address; a Gmail or Yahoo email account will unfortunately look very unprofessional if provided as the author's contact.

Tip 67: Submission of manuscripts usually involves an online author's portal for most major academic publishers. You will be required to set-up an account with the publisher. Be sure to remember or save your account information because you will need that information some time later when you are working on the revisions after the manuscript has come back from review.

Tip 68: Choose and appropriate title for your study. Shorter titles tend to be better but the title must sufficiently describe the content of the work. Reviewers will be asked to comment on the appropriateness of the title. Some journals ask authors to provide a shortened 'running title', with a specified maximum number of characters, that is printed at the top of each published page of the article.

Tip 69: Choose appropriate keywords for your article. Along with the title and abstract, these keywords are an important component of the materials forming the first impression that potential readers will have of your article. The keywords must accurately reflect the content of the paper and need not be single words. Use phrases are likely to be used for querying academic databases, which may include the wider subject area, sub-discipline, or methods. You may want to avoid words that are already contained within the article's title, since these titular phrases will also be visible in database searches.

Tip 70: You will likely be asked to come up with a list of potential reviewers when you first submit your manuscript to a journal. How do you come up with this list? You want to choose potential reviewers that are knowledgable, even expert, in the area of the research and that have institutional contact information that you can readily provide to the associate editor. Reviewers must not have a conflict of interest with any of the co-authors. Conflicts include having previously co-authored an article or research grant as well student-advisor relationships. While the list of people with whom you share these kinds of professional relationships may be small, your more experienced co-authors may have far more extensive networks that restrict the list of potential reviewers substantially. In fact, it can be quite challenging to come up with a list of five potential reviewers in smaller and highly collaborative disciplines. You may start by identifying active authors within the reference list of your manuscript, but be sure to discuss this short-list with all co-authors beforehand. Ultimately, the associate editor may or may not solicit peer reviews from your list. For most academic journals, peer review is anonymous and you will not know who the selected reviewers are.

Tip 71: The review process can be quite slow so be patient. Associate editors and reviewers are busy

people. Associate editors of journals have the undesirable task of ensuring that reviews are completed within a reasonable period. Academics are known for ignoring deadlines and any associate editor will likely tell you that managing a group academics is not unlike herding cats (now do you understand the running joke?!). While getting an article accepted for publication in time for a job interview or performance evaluation may be a high priority for you, the speed with which you progress through the publishing process is clearly less of a priority for editors and reviewers, particularly if they are managing a large number of submissions simultaneously.

Tip 72: Manuscript submission is only the beginning of the process. Once you've submitted your paper, the associate editor will attempt to identify 2-5 reviewers for the work. This stage may take several weeks depending on the size of your research field, the willingness of reviewers, and the time of year. If the associate editor is unable to identify a satisfactory number of willing reviewers, you manuscript will likely be rejected at this stage. Assuming that the associate editor is able to find willing reviewers, the reviewers will each be given a specific deadline (often 4-8 weeks) to provide their detailed review. Reviewers will commonly ask for, and be granted, extensions beyond this review period. After all of the reviews, or an acceptable number of reviews, have been received, the associate editor will compile the information and submit a decision letter to the corresponding author. This stage often takes 1-2 weeks, depending on how many manuscripts the associate editor is managing at the time. The author must then make revisions according to the reviewers' comments and draft a response to each reviewer. The associate editor will also communicate a deadline for re-submission of a revised manuscript within the decision letter. Once the revised manuscript is resubmitted, the associate editor may send the revised work back to the initial reviewers, depending on the severity of modifications requested in the initial review. In fact, articles frequently go through two or more rounds of reviews before the final acceptance for publication. Many publishers allow authors to view the progress of the submission as it moves through each stage of the process.

Tip 73: You usually need to include a cover letter with your manuscript submission. This letter is addressed to the editor and is not generally seen by the reviewers. It is important that this letter be brief and clearly identifies the goals of the research, as well as the major findings and their significance to the academic field. Explicitly tell the editor what the *novel contribution* of the study is in the cover letter.

Tip 74: In selecting a journal to submit your manuscript to, ensure that the focus of the journal is a good fit for the research. There are more academic journals today than any other time in history. Some journals, like *Science* and *Nature*, publish research from a broad range of disciplines while other journals focus on a much more specific research area. Each journal has a publishing goal, usually indicated in a statement of aim on the journal's homepage. Journals also have a ranking that determines their standing in their respective academic communities. Although there are several metrics that are used to determine this journal ranking, the *Impact Factor* is the most common ranking method in use today. A journal usually advertises their impact factor, which is essentially an indication of the average number of citations that their published articles accrue following publication, on the front of their home page. Not surprisingly, higher ranked journals tend to publish the most novel and impactful research in their fields. Submitting your manuscript to a journal that is either not a good fit for the topic of your research or that is at too high a ranking for the level of novelty of the work will likely result in rejection. You want to submit your manuscript to a journal that will have a large readership of researchers and practitioners that are interested in the topic of your study. This will ensure that your work will have the greatest possible impact on the discipline.

Tip 75: Open-access journal can be a good option for publishing your research. Today's crowded aca-

demic publishing landscape includes numerous open-access journals, that are distinguished by the fact that anyone is able to read the published articles without incurring an access fee. Most of the journals that are run by the major commercial academic publishers have expensive subscription fees that naturally restrict readership to members of universities and colleges with the financial resources needed to maintain access. Therefore, publishing your research in an open-access journal can increase the size of the audience, and therefore the potential impact, of your work. Many research grant agencies insist that funded researchers publish the outputs of their research in open-access venues. However, caution is needed in this respect. Unfortunately, there are currently many 'predatory open-access journal' that have been set-up to extract large administrative/publication fees from authors, offer shortened but often dubious peer-review of articles, and can have surprisingly small readerships despite their open-access nature. Updated lists of these predatory journals and conference meetings are maintained on the Internet and you should be consulted before submitting your manuscript. Not all open-access journals are considered predatory however. Many scholarly organizations operate excellent and respected open-access journals. Generally, most open-access journals charge an administrative fee, and so this cannot be used as a sole indicator of whether or not a journal is predatory, although the size of this fee is an important sign. In fact, most traditional journals managed by commercial academic publishers now offer open-access publishing options that are also associated with a one-time publication charge incurred by the author. Many of the open-access requirements for publication that many national granting agencies now have can be satisfied by publishing your paper in a publicly accessible database or repository. Many such repositories, often associated with specific disciplines, have been created. If the article has been published by a commercial academic publisher, such inclusion in public repositories by violate certain copyright requirements that the author signed at the time of acceptance for publication. Most publishers now have specific embargo periods, often 12 to 18 months, after which the author may post their article to repositories or personal websites. Also, many publishers allow immediate posting of a pre-print version, i.e. the initial manuscript submission. It is important to read these rules carefully. Since these matters will greatly impact the decision of where you are able to publish the study, it is important to discuss this with your co-authors beforehand.

Tip 76: You cannot submit a manuscript for review to more than one journal at a time. If your manuscript has been rejected for publication by the editor of a journal, you are free to submit the article for review to another journal. If you decide after submitting a manuscript for peer review that you would prefer to publish the study elsewhere, you must formally withdraw your manuscript from the initial journal before submitting it to the second journal. Sometimes an author, for various reasons, will decide to seek publication elsewhere after receiving the reviews. In such cases, you must inform the editor of your intent to withdraw the paper rather than eventual resubmission. Usually the editor will provide the author with a deadline for resubmission of a revised manuscript along with reviews. Past this deadline the paper is automatically considered to be withdrawn from consideration.

Tip 77: The result of a round of reviews, and the associate editor's decision on the publication of the manuscript, will be summarized as one of several possible categories:

1. *Accept without change.* This is usually the end point after one or more round of revisions and is very rarely the outcome after the initial submission.
2. *Minor revisions.* This indicates that there is need for clarification but that no re-writing or re-analysis is required. In some cases, the associate editor is able to make the decision on the eventual acceptance of the revised manuscript for publication without need for an additional round of reviews if

the revisions are minor.

3. *Moderate revisions.* An intermediate category between major and minor revisions. This usually implies the need to send the revised manuscript back to the reviewers for an additional round of reviews.
4. *Major revisions.* One or more sections need rewriting and possibly there is need for re-analysis. The associate editor may invite additional reviewers for the subsequent round of reviews.
5. *Reject.* All is lost and you must abandon hope. Prepare to be be publicly mocked by colleagues in the hallways for the shame that you have brought upon your institution. No, I'm joking! See **Tip 78**.

Tip 78: Manuscripts do get rejected so don't take it personally when this occurs. It happens to every researcher once in a while. The rejection of a manuscript is often a sign that the journal you submitted the manuscript to was not a good fit for the research. Consider the reviewers' comments, make the revisions and then either re-submit the improved work or submit it to a more appropriate journal. Remember, the rejection of a manuscript for publication is an indication that our peer-review system is healthy and is performing its function well.

Tip 79: You will be given a deadline to submit a revised manuscript after you have received the reviewers' feedback. In addition to the revised manuscript, you will be asked to prepare a *response to the reviewers' comments*. This author's response is commonly longer than the manuscript itself, particularly for the first round of reviews. You must respond to each individual comment directly. State whether you agree or disagree with the reviewer's comment. If you agreed with a comment and it resulted in a modification to the revised manuscript, you must indicate where the manuscript was changed. Journals will often require a 'track-changes' version of the revised manuscript so that the editor can easily identify where modifications have been made. Here is an example of a typical response to a reviewer's comment,

> "The authors agree with Reviewer 2 that the description of the sensor design in the original manuscript was unclear. As a result, a paragraph was added to the revised manuscript (lines 436 to 445) to further clarify the sensor construction method and the deployment strategy used in the study."

Tip 80: You do not need to agree with all of the reviewers' comments. Disagreement is fine so long as you can provide a detailed justification in the author's response for why you disagree with the reviewer on the matter and why no modification of the revised manuscript was warranted. Be aware, however, that if you disagree with a comment and fail to provide the reviewer/editor with a sufficient and justifiable rationale for your position, the reviewer may insist that the author(s) readdress the issue in a subsequent round of reviews. If the matter is viewed as a critical aspect of the study, this may lead to eventual rejection of the manuscript. You cannot disagree with a reviewer's comment simply because you don't feel like making a particularly challenging revision to the work. Admittedly, preparing the author's response to the reviewers comment is often one of the more frustrating hurdles in the publication process; it may not be anyone's favourite aspect of publishing but it is one of the most important. Some open-access journals now publish the reviewer's comments and the author's responses alongside the article itself.

Tip 81: Reviewers are volunteers and are an essential part of the scientific method. Their reviews serve to highlight weaknesses in the study, limitations of chosen methods, and points that require further clarification before the study is published. In other words, reviewers provide rigour to the publishing process. Some people are naturally defensive when critiques of their work are provided. However, academics is an inherently critical endevour; you will eventually come to accept the fact that reviews, like the comments

that your advisor provides on a draft of your thesis, are intended to improve the work. They are not personal attacks.

Tip 82: After your article has been accepted by the associate editor for eventual publication, you will likely be contacted by the journal's copy editor regarding the submission of the final documents, including figures. The requirements for the final submission of your manuscript and figures may be different from those outlined in the author's guide for the initial submission. It is important that the manuscript is clean and that the resolution of figures is appropriate at this stage because it will be difficult to make any further changes. At some point after this final submission, the corresponding author will likely be forwarded a pre-print version (i.e. 'proofs'), formatted to the journal's style, along with a list of queries that the copy editor made during preparation of the article. These usually include minor points of clarification, often with the reference list (e.g. what the volume number or page range of an article is). This is the last opportunity for the authors to make changes to the article before publication. Substantial modifications are usually not permitted at this stage and would result in long delays in publication. The corresponding author is normally also given a relatively short deadline to provide the final responses to the editor's queries.

Tip 83: Critiques of your study will not necessarily end when the peer-review process is completed. Even after your article has been published, readers may challenge your work by submitting critiques of your study to the journal for publication. Generally the journal's editor will contact the original author to provide an opportunity for rebuttal. Your rebuttal will then be published alongside the critique. In some disciplines this is a very common practice. If errors are found in the original study, the author may be required to publish an *erratum*.

Tip 84: The publisher will advertise your article on the journal's website using the title, abstract, graphical abstract, and keywords. After your paper is published, you should also try to increase the visibility of the published research. The vastly increased number of journals in today's academic landscape implies that every published article is competing for readership. Frankly, scholars these days do not have time to read every article that is published in every journal in their disciplines. Ultimately the impact of the research will be limited by the number of people who read the article. Many researchers now use social networking platforms and media releases to advertise their published articles more broadly than the journal's publisher is able to do. If your research has the potential to impact practice (i.e. its contributions extend beyond academics with the potential to affect practitioners) then broadcasting these methods may be a useful approach to engage with the relevant community.

6.0 Concluding Remarks

A graduate degree in any academic discipline trains you to perform research. You are being trained in many aspects of research, including the framing of research problems, development of conceptual frameworks, experimental design and methods, data collection and analysis, and the proper interpretation of findings. No matter how novel and valuable your graduate research is, unless you are able to effectively communicate the details of your work, other scholars and practitioners will not fully benefit from your efforts. This is why the outputs of research, including theses, journal articles, conference presentations, etc., are so highly valued in academics.

Like all cultures, academics has its own set of norms that its members are expected to adhere to. Most often, these rules are in place to ensure clarity and more effective communication. If you follow the guide-

lines and tips provided here you will surely save yourself frustration and perhaps even a few tears. Now that you better understand the language of academics, you can enjoy the fun part–conducting your research!