7-Step Guide:
Writing a research article for journal publication

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Overview

This is a concise guide to assist students in writing up their work for journal publication. Although much detailed literature on this already exists (Chernick, 2012; Rosenfeldt et al., 2000; Williams, 2003), this guide is especially tailored to meet individual students' needs. Although specifically aimed to assist PhD students and postdoctoral researchers, this guide should be helpful to anyone who wishes to write a journal paper and get it published (Bourne, 2005). Similarly, although focused on the area of behavioural neuroscience, its suggestions should be applicable to other research fields.

There are many reasons to publish (Axtell, 1997). Generating publications strongly affects future job and promotion prospects for PhD students, researchers and faculty members (Kaufmann, Annis & Griggs, 2010). Indeed faculty members are increasingly under pressure to justify their research output in the REF (Council, 2009) and for internal reviews. Also research shows that educational guides are helpful to students and their development (Bloom, 1971).

On a more philosophical note, there is really no point in doing research if it isn't published; unpublished work effectively doesn't exist and is findings are certainly not available to the wider research community.

1. Think about the research process

Writing should be considered as part of research process (Bordens, & Abbott, 2002), and it is helpful to contemplate implications of publication as early as possible. Thinking about publication while actually performing research provides important insights into how and what experiments need to be run. To get work published in good journals, it must be of a high standard. Although quick pilot studies can insightful, it is often better to make research rigorous early on to avoid having to redo experiments later to meet publication criteria. Indeed, It is often useful to write a preliminary report on the proposed work even before it starts. This can also form the basis for valuable discussion and lead to useful feedback early on that can improve experimental design before experimentation has even started.

Work is often done with collaborators and choosing them depends upon many factors (Kaufmann, Annis & Griggs, 2010; Vicens & Bourne, 2007) - although this

is typically out of the hands of PhD students and postdoctoral researchers. However, if possible, choose collaborators who can contribute, are fair, keep you motivated, add complementary expertise, and can help write up the research. Collaborators will often end up as co-authors. Authorship is a contentious issue, and should be agreed early on to avoid arguments later. Justification for authorship is usually explained by the journal, but it is important to be fair and avoid free riders. Generally, the first author probably did most of the work, was involved in running the study and getting it written-up and submitted. Middle authors should have contributed to some aspect of the work (idea, design, methods, experiments, writing). The last author(s) are often senior members of the lab and may be the Principal Investigator (PI). The author(s) named as corresponding will be recipients of enquiries and further highlights their high importance in the work. One should acknowledge anyone who assisted who isn't on the author list, and naming funding sources is very important, since otherwise you might not get any more funding in the future.

2. Decide where to publish

Selecting the appropriate journal is important (Katz, 2009). Many journals exist and the decision as where to publish work depends on the field as well as its novelty, impact and significance of the findings. One tip to select a journal is by looking where studies similar to your own have been published.

Journal impact factor is related to how many citations it generates on average over the past two years (Garfield, 2006). For higher impact journals, the work must be perceived as outstanding, novel and truly innovative. If the work is only incremental and extends a previous idea, it probably won't be accepted. In all cases, the work must be rigorously carried out otherwise the manuscript will be rejected.

In some fields, e.g., machine learning, conference proceedings represent a large proportion of published work. However even in these fields, journal publications are seen as more desirable.

Open access (OA) journals offer unrestricted online access to a publication and is has been shown that OA articles are more cited than non-OA articles (Eysenbach, 2006). Indeed journals in general are moving towards electronic formats, which also makes context more accessible (Odlyzko, 2002). Some journals demand additional fees are paid. OA publishing has increased substantially in the last few years (Bjork et al., 2010). In the US, it is already a requirement of government funding (Van 2013). More recently, OA is a requirement for submission included in the REF (Council, 2009).

3. Explain your work and tell a story

Before starting the writing process, it is helpful to think about how to explain the work to others. A good article needs to tell a compelling story that is both accessible and exciting (Sand Jensen, 2007).

Identify the key ideas of your work. If you have already run experiments and analysed data, it is often helpful first to make figures to illustrate the methods and results. This will make clear what you are trying to show. Figures should distinguish schematics from data plots, be uncluttered and have readable legends. If you don't know what to show in a figure, you probably don't understand what you are trying to say. Sometimes you may be able to modify an old figure – and collaborators may already have one you can use or modify – but do not plagiarize or infringe copyright (Hoorn & Van der Graaf, 2006).

Figures can immediately be used as the basis for poster presentations of the work (Erren & Bourne, 2007). This is a useful exercise because it forces the author to think of the presentation structure, how to explain it, and what suitable section titles should be. It also requires a brief introduction and discussion. Presentations provide a valuable opportunity to receive early feedback before you start writing your paper.

Writing habits differ from person to person. Some like to do an hour per day, others like long bursts of activity. Some find it helpful to write when they are especially alert and energetic; some people find it helpful to go somewhere quiet, whereas others can work anywhere. The main thing is to get started and get something written down. Many suggestions to assist effective writing are available (e.g., Kotur, 2002; Silvia, 2007).

One method for getting started is to jot down an outline of key point, e.g., provide short answers to some simple questions, such as: 1. What is the problem? 2. Why is it interesting? 3. Why is it as of yet unsolved? 4. What is the new idea? 5. How does the new idea compare to previous ideas and work? 6. What are its implications?

Publication needs to be done in a timely fashion, as credit and citations generally only goes to first person that publishes an idea or experiment, so it's important not to delay. This is especially true in industry (Parchomovsky, 2000).

4. Write the manuscript

Writing style is journal-dependent and journal choice affects structure and manuscript length. Therefore it is useful to have a journal in mind before writing commences (see step 2). However, there is generally similarity between journal formats and most journals have similar sections (Day, 1975).

1. **Title.** One line description of the work**.**
2. **Abstract**. A very brief overview of the manuscript.
3. **Introduction.** Introduce the problem and work in terms of previous studies. Briefly explains the problem and former ideas on which you are building.
4. **Methods.** Provides details of how experiments are carried out. An Ethics statement must be included for animal or human studies.
5. **Results**. Gives details of the experimental results and their interpretation.

6. **Discussion.** Summarizes the important findings, states their implications and relates them to other work.
7. **Acknowledgement.** Indicates assistance and funding.
8. **References.** List of citations.

All sections are important, but the title and abstract especially so, since they are the selling point for the work and needs to catch the reader's attention (see Koopman, (1997) for some specific advice).

High impact journals are often aimed at more general audiences than more specialized journals, making it particularly important to write clearly and without jargon, so non-experts can understand. Such journals generally place substantial limits on section lengths, whereas specialized journals can permit more description and discussion of the results.

Writing is an iterative process and going through the manuscript many times is not uncommon. Apart from correcting syntax and spelling, iterations should be used to check and justify assumptions, experimental design, analysis and interpretation. Sections that don't read well should be rewritten.

5. Use appropriate citations

The contribution of other researchers' work should never be downplayed. In general, the more credit you give to others, the more they will give to you. A journal paper must sufficiently cite and credit previous work published by other researchers. Ignoring appropriate previous publications may be interpreted as dishonest behaviour, and reviewers will probably pick this up. This will cast the manuscript in a bad light, possibly leading to outright rejection.

However, one should always be sincere and never be sycophantic. This means only using relevant and appropriate citations, which help, introduce the current work, places it in perspective, and make its novel contribution clear.

Researchers should already know the relevant key papers in their field, which should be cited. However other relevant citations can be found by examining the recent literature (Randolph, 2009). The search engine Google is a good first source (Noruzi, 2005), but more reliable databases are available e.g. Scopus and PubMed. Adding citations can be done any time during the writing process, but sometimes it may help just to write "REF" after a statement or discussion, and fill-in in the citations in a later iteration. Citations should ideally be made to articles in respectable journals, and online Encyclopaedias (e.g., Wikipedia), are generally considered too unreliable to cite (Waters, 2007).

The format of citations is journal dependent, so read their style guide and adopt the appropriate conventions. Using a reference manager program can facilitate this process, greatly reduce the workload and also permit rapid automatic changes between referencing styles (Muldrow & Yoder, 2009).

6. Finalize the manuscript

There is a set of tasks to perform before manuscript submission (Publication manual of the American psychological association, 2001), and there is normally a journal checklist to ensure submission format is appropriate (e.g. file format, font, line spacing, margins, word limits, figure formats, etc.).

All authors should proof read the manuscript and give permission to submit. If possible, other colleges should proof read it too, as they can offer a fresh perspective on the work.

Most journals require a cover letter, which is read by the editor before deciding if the manuscript should be sent to review. It should state the context for work, why is it novel, interesting, important, and why it should be published.

In refereed journals, the peer review process plays a strong role by either weeding out poor manuscripts or improving others, although the process can have its limitations (Bohannon, 2013).

It is often necessary to suggest peer reviewers (Hames, 2008). These should be qualified experts in the field and enthusiastic about their subject (Evans, McNutt, Fletcher & Fletcher, 1993). They should not be coauthors, at the same institution, collaborators, or friends, as this will violate the journal's conflict of interest requirements. Unsuitable reviewers can also be listed and these are typically individuals who might not give an unbiased critique. One should only politely mention reasons for unsuitability in case it gets back to them.

Manuscript submission is normally performed online. All necessary files need to be uploaded and forms filled in appropriately. The submission system normally builds a composite file, which should be examined and saved. If everything is correct then submit. You will probably then get asked to fill out a copyright form and sometimes make necessary payments on acceptance.

After submission, one has to wait. If the editors decide not to send a manuscript to review and reject it, a response may be received in a few days. Similarly if there are formatting problems, this may generate a quick response and will need correction before the submission proceeds.

7. Deal with reviews

Provided the manuscript is sent to reviewers, it may take a couple of months to hear back. Based on the reviews, you may be informed:

1) Of rejection, so you need to submit somewhere else. Appeal is possible, but generally a bad idea, as it will aggravate the editors.

2) To undertake major revisions, so you need to deal will the list of concerns, and typically this is what happens.

3) To undertake minor revision, so you need to make small changes.

4) Of acceptance, but unusual on initial submission.

If invited to resubmit a revised manuscript, you have to deal with the review in a professional manner (Hames, 2008). This will involve uploading a version that highlights alterations using track changes, and also submitting a response directly to address the concerns made by the reviewers. Feedback is valuable and whatever the reviewers write, don't take it personally. Be nice and polite and do not blame them for not understanding. One should always endeavour to write clearly so that someone with limited understanding of the field can follow.

After acceptance, you should market the work on your homepage (Thelwall, 2002), and publicize it further by giving talks and presentations, which is another skill to master (Bulska, 2006).

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