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How to Write a Scientific Paper

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Abstract

We (meaning I) present observations on the scientific publishing process which (meaning that) are important and timely in that unless I have more published papers soon, I will never get another job. These observations are consistent with the theory that it is difficult to do good science, write good scientific papers, and have enough publications to get future jobs.

1. Introduction

Scientific papers (e.g., Schulman 1988; Schulman & Fomalont 1992; Schulman, Bregman, & Roberts 1994; Schulman & Bregman 1995; Schulman 1996) are an important--though poorly understood--method of publication. They are important because without them scientists cannot get money from the government or from universities. They are poorly understood because they are not written very well (see, for example, Schulman 1995 and selected references therein). An excellent example of the latter phenomenon occurs in most introductions, which are supposed to introduce the reader to the subject so that the paper will be comprehensible even if the reader has not done any work in the field.

The real purpose of introductions, of course, is to cite your own work (e.g., Schulman *et al.* 1993a), the work of your advisor (e.g., Bregman, Schulman, & Tomisaka 1995), the work of your spouse (e.g., Cox, Schulman, & Bregman 1993), the work of a friend from college (e.g., Taylor, Morris, & Schulman 1993), or even the work of someone you've never met, as long as your name happens to be on the paper (e.g., Richmond *et al.* 1994). Note that these citations should not be limited to refereed journal articles (e.g., Collura *et al.* 1994), but should also include conference proceedings (e.g., Schulman *et al.* 1993b), and other published or unpublished work (e.g., Schulman 1990).

At the end of the introduction you must summarize the paper by reciting the section headings. In this paper, we discuss scientific research (section 2), scientific writing (section 3), scientific publication (section 4), and draw some conclusions (section 5).

2. Scientific Research

The purpose of science is to get paid for doing fun stuff (Schulman *et al.* 1991). Nominally, science involves discovering something new about the Universe, but this isn't really necessary. What **is** really necessary is a grant. In order to obtain a grant, your application must state that the research will discover something incredibly fundamental. The grant agency must also believe that you are the best person to do this particular research, so you should cite yourself both early (Schulman 1994) and often (Schulman *et al.* 1993c). Feel free to cite other papers as well (e.g., Blakeslee *et al.* 1993; Levine *et al.* 1993), so long as you are on the author list.

Once you get the grant, your university, company, or government agency will immediately take 30 to 70% of it so that they can heat the building, pay for Internet, and purchase large yachts.

Now it's time for the actual research. You will quickly find out that (a) your project is not as simple as you thought it would be and (b) you can't actually solve the problem. However -- and this is very important -- you must publish anyway (Schulman & Bregman 1994).

3. Scientific Writing

You've spent years on a project and have finally discovered that you can't solve the problem you set out to solve. Nonetheless, you have a responsibility to present your research to the scientific community (Schulman *et al.* 1993d). Be aware that negative results can be just as important as positive results, and also that if you don't publish enough you'll never be able to stay in science.

While writing a scientific paper, the most important thing to remember is that the word "which" should almost never be used. Be sure to spend at least 50% of your time (i.e., 12 hours a day) typesetting the paper so that all the tables look nice (Schulman & Bregman 1992).

4. Scientific Publishing

You've written the paper, and now it's time to submit it to a scientific journal. The journal editor will pick the referee most likely to be offended by your paper, because then at least the referee will read it and get a report back within the lifetime of the editor. Referees who don't care one way or the other about a paper have a tendency to leave manuscripts under a growing pile of paper until the floor collapses, killing the 27 English graduate students who share the office below (Schulman, Cox, & Williams 1993).

Be aware that every scientific paper contains serious errors. If your errors are not caught before publication, you'll eventually have to write an erratum to the paper explaining (a) how and why you messed up and (b) that even though your experimental results are now totally different, your conclusions need not be changed. Errata can be good for your career. They are easy to write, and the convention is to reference them as if they were real papers, leading the casual reader--and perhaps also the Science Citation Index--to think that you've published more papers than you really have (Schulman *et al.* 1994).

5. Conclusions

The conclusion section is very easy to write: all you have to do is to take your abstract and change the tense from present to past. It's considered good form to mention at least one relevant theory only in the abstract and conclusion. By doing this, you don't have to say why your experiment does (or does not) agree with the theory, you merely have to state that it does (or does not).

We (meaning I) presented observations on the scientific publishing process which (meaning that) are important and timely in that unless I have more published papers soon, I will never get another job. These observations are consistent with the theory that it is difficult to do good science, write good scientific papers, and have enough publications to get future jobs.

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