

Writing Papers on “Sequential” Research: Sources of Guidance Sought

Over the last few years, more and more participants in my scientific-writing workshops are reporting biochemistry and molecular-biology research. Such reports usually describe a sequence of experiments in which the design of one experiment depends on the findings of the preceding experiment. As those of you who write or edit such papers know, the overall organization is the typical IMRAD format, but the content of the sections differs somewhat from that of a report of research completely planned before the research is begun (such as a clinical trial). I have been looking for resources about writing papers about sequential research to pass along to the participants in my workshops, but without success.

The one resource I've found so far is the excellent text by Mimi Zeiger, *Essentials of Writing Biomedical Research Papers* (2nd edition, McGraw-Hill; 2000). This book points out the two types of papers and gives helpful advice about writing both. It is an excellent resource but it is a more expensive and detailed book than most of my workshop participants would consider buying for themselves. So, in addition to recommending that they consult their library's copy of the book, I would like to have some articles, editorials, or advice, such as in instructions for authors, that I can pass along.

For those of you who may be wondering what differences I have found between papers describing completely preplanned and sequential research, here are the main points. The sequential-research papers usually end the introduction with an overall conclusion (thank goodness, in view of the complexity of the topic and the research); this practice is usually not recommended for preplanned-research reports. The methods section is usually a collection of “recipes” for techniques used in the individual experiments. There is no attempt in this section to give an overview of the research design, as is recommended for papers describing preplanned research.

The results section is a series of minireports each consisting of a subheading and one or two paragraphs describing one of the experiments. The subheading often describes the conclusion of that experiment.

The minireport begins with a rationale for doing that experiment, which often is based on the findings of the experiment described just before it. The minireport continues with statements identifying the techniques used (described in detail in the methods section) and the immediate conclusions of the experiment. The supporting data are almost always presented only in the tables and figures, often without comment in the text. The minireport may end with a statement that sets the stage for the next experiment to be described. In contrast, the results section describing a preplanned study focuses on presenting the data and observations about the data with few if any statements of rationale or conclusion. The discussion section is similar to that of a preplanned-research paper. It ties all the conclusions together, integrates them with findings from other work, and relates all the new information to the overall purpose or research question, which had been posed in the introduction.

The organization of a report describing a sequence of experiments reflects the research process and is an efficient means of communicating the often complex information. Trying to force this information into the (to me) more familiar format recommended for reports of preplanned research seems futile and counterproductive. So where are the resources to help authors of biochemistry and molecular-biology papers?

Because so much information is available on writing about preplanned research, I was quite surprised when my search on the Internet and in a few biochemistry and molecular-biology journals did not result in anything on writing about sequential research. I decided I must be looking in the wrong places or using the wrong search terms. So I decided to ask the readers of *Science Editor* to help me out. If you know of such information, I would be grateful if you would let me know.

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