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The Thrill of the Paper, the Agony of the Review: Part One



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Although your exchanges with reviewers may become collegial, it is still the caliber of your paper that determines its fate.

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DOUGLAS CURRAN-EVERETT
ASSISTANT PROFESSOR OF PEDIATRICS
UNIVERSITY OF COLORADO HEALTH SCIENCES CENTER
DENVER, COLORADO 80262

AHA! After months of daily tedium, you've done the last experiment. You thought you'd never finish. Now all you have to do is write the paper. How hard can that be? The experiment went flawlessly. Besides, you like to write. You chuckle. And you thought this science thing was going to be hard. You write the paper. You send it to the journal. You celebrate. You can't wait to get the reviews. You are *pumped*.

You've got mail. It's the reviews. Your heart pounds. Your palms sweat. Should you read them later? Are you kidding? You'll never make it. You read them now.

You should have read them later. Your spirits plummet. The editor has rejected your paper. The reviewers didn't understand your analysis, and they challenged your conclusions. And there are pages and pages of comments! Your head begins to spin. This science thing is harder than you ever imagined.

Before you abandon science in favor of your backup plan--that beer and pizza parlor in

New Zealand--you need to know that almost everyone suffers this kind of despair at one time or another. Regardless of your reaction to manuscript reviews, successful responses to reviewer comments often require careful thought and hard work. If you remember that

- reviewers are people too, and
- think of the process of peer review as a game,

then you can enjoy the thrill of the paper and escape the agony of the review.

Experiences of One Author

I have been writing for nearly 15 years, but I still get revved up when I read comments from the reviewers. Why? Because I am never certain how reviewers will react to a paper.

If pressed, I would say that the process of publication--writing the paper and satisfying the reviewers--gets easier as you gain experience and build a reputation. This reluctant statement is a simplistic generalization. In truth, it depends on the paper.

It was as a graduate student that I wrote my first scientific paper. Its publication was a piece of cake: The two reviewers offered helpful comments, I revised the paper in 2 to 3 days, and the editor accepted the revision. I felt pretty smug about the whole science thing.

Five years later, I thought my career in science was headed down the toilet. I was in the middle of a postdoctoral fellowship, and I had written my fifth paper. One journal had already rejected the manuscript because the reviewers were unimpressed. When I read the reviews from the second journal, I wondered why I had accepted the postdoc in the first place. One reviewer argued that the findings merely duplicated published results. The second reviewer, if nothing else, was thorough and creative: He wrote three pages of trivial, misguided comments, and he criticized the paper for advocating a concept it didn't even mention. In the end, the editor enlisted a third reviewer to decide the scientific importance of the paper, and I revised the manuscript three times.

Last year, I wanted to describe how children have reacted to an educational exercise I gave them to get them involved in the process of scientific inquiry and discover the wonder of real hearts and lungs. Before beginning the paper, I

consulted with the editor, a person I consider both friend and colleague. She raved about the idea, and she encouraged me to proceed. The reviewers did not share her enthusiasm. As a result, the journal published my manuscript, not as a regular paper but as a letter to the editor.

Without doubt, experience and reputation do simplify your interactions with reviewers and editors: They know who you are. Although your exchanges with reviewers and editors may become collegial--perhaps quite familiar--it is still the caliber, and sometimes the very nature, of your paper that determines its fate in peer review.

The Life of One Reviewer

As an author, it is great sport to trash comments made by a reviewer. But believe it or not, the life of a reviewer is not all fun and games. In fact, nothing about it is fun and games. Why not? Because it takes time and effort to do a thoughtful review. Chances are the people who reviewed your paper share your pain. I do. My heart sinks whenever I am asked to review a manuscript. Why do I keep doing it? Two reasons:

- the opportunity to influence, in some small way, the caliber of the science that gets published, and
- professional obligation.

I have reviewed manuscripts submitted to the *American Journal of Physiology* and the *Mathematics Teacher*, among others. For not one journal have I belonged to its editorial board. How did I become an ad hoc reviewer? Serendipity or bad luck. How I look at it depends on my mood. Sometimes I have reviewed a manuscript at the request of a colleague who lacked either the time or the expertise to review a particular paper. But most of the time, I have reviewed a manuscript at the request of a journal editor who is familiar with my own scientific publications.

How do I review a manuscript? First, because it is usually related in only a general way to my scientific expertise, I skim the manuscript to get a feel for the experiment: its goals, methods, results, and conclusions. When I need to familiarize myself with concepts or methodology, I identify and read crucial references cited in the manuscript. Next, I read the paper, and I jot down notes and questions on the manuscript itself. Finally, I begin to draft comments to the authors. I read the paper three to five more times; each time, I generate more comments and questions. After a break of several days, I make final revisions to my formal written comments to the authors. From start to finish, this process can consume the better part of a week.

The Game of Publication

The publication of a scientific manuscript contributes to the accumulation of scientific knowledge. In reality, the process of publication is a game. A game of meaning to be sure, but a game nevertheless. And like other games, the game of publication comes with its own goal, players, and rules.

- *Goal:* Publication of a manuscript of valuable, credible, defensible, and comprehensible science.
- *Players:* You, the reviewers, and the journal editor.
- *Rules:* You write the manuscript. The reviewers evaluate the science in your paper. You address comments from the reviewers. The reviewers decide whether you have satisfied their concerns. The editor supervises the process of review and determines the fate of your manuscript.

It will come as no surprise that the reviewers provide confidential feedback about your manuscript to the editor. The reviewers recommend--and they must justify--a decision about the fate of your manuscript: accept as is, accept after revision, accept only if revised sufficiently, reject with the opportunity to resubmit, reject. The reviewers also rank your manuscript, relative to papers in the same discipline, in categories similar to these:

- importance of the research,
- originality and importance of the results, and
- experimental design and quality of the data.

Last, the reviewers relay any other confidential comments they may wish to make.

Your odds of winning at the game of publication--your chances of getting your manuscript published--go up if you rely on trusted strategies.

(Part two of this article will be published on 24 September 1999.)

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