The Chance Manifesto

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2 June 2004

What is to be done?

Suppose I undertake an investigation of the link between aspirin and batting averages, and I obtain what I regard to be significant results. Suppose that, to try to convey my excitement to you, I direct your attention to a permanent public archive, where you can find not only the data and results of my experiment, but a previously archived announcement I made of my intended experiment, laying out beforehand precisely what data I intended to collect, and precisely how I planned to analyze it. And suppose you are able to verify from this archive that what I said I was going to do was no more and no less than what I said I did. Now you are in a position that begins to approximate where you would be if you had done the study yourself.

This is not to say that you will wind up convinced of this putative link between aspirin and batting averages. You may feel that, while there could conceivably be a connection between aspirin and batting averages, the results I found are likely to have arisen by chance, even though my analysis establishes to your satisfaction that the probability of this is as small as 1 in 100. You may find your suspicions growing when you look through this publicly searchable, publicly accessible, permanent, indelible archive, and discover that this particular study is one of a whole raft of studies that I or others you consider comparably reliable have registered, designed to test for possible links between aspirin and slugging percentage; aspirin and on-base percentage; aspirin and earned-run average; aspirin and bowling score; aspirin and GPA; aspirin and colon cancer; aspirin and academy awards; aspirin and ...—and there is no evidence that any of these other studies have amounted to a beanrow of anything. These other studies are just as deserving as this one to be treated as studies that you effectively ‘did yourself
without realizing it’. And of course when you do hundreds of studies, some will erroneously appear significant just by chance, even if the null hypothesis is true in every single case.

Of course, an even better way to win me over, and make it really as if I had done the study myself, would have been to attract my attention to the study as soon as you registered with the archive your intention of carrying it out. But it’s too late for that, now, isn’t it?

Now the interesting thing is that there is already a mechanism in place for registering in advance of a study what data are to be collected and how the data is to be analyzed. This mechanism is mandated by the federal government for any studies involving human subjects funded by the US Department of Health and Human Services, and separately, for studies of any drugs, medical devices, etc. regulated by the Food and Drug Administration. This means that investigators are already being forced to commit themselves in advance to how they are going to run their experiments. Well, at least in principle. Until we’ve had a look at a good sample of these applications, and taken some care to check how well what was planned agrees with what was actually done and reported, we may be inclined to doubt just how well this mechanism works.

But never mind that. The point is that experimenters are already forced to commit in advance to what they are planning to do. Now all we must do is try to figure out how to get them to divulge this information in advance.

So, who would want to lay out their experiments in advance, and why? Obviously, no one whose scientific career is predicated on fishing expeditions, or as we may now be tempted to call it, ‘phishing’, is going to want to have anything to do with a scheme like this. But reputable investigators have nothing to lose by making their intentions known in advance.

Archiving your plans in advance of the investigation would be a good way of signaling your scientific integrity. This could make it easier to get funding, get results published, etc.

If I were a funding agency, or a reviewer for a funding agency, I would look kindly on investigators who have an established policy of archiving the plans of their investigations in advance. Such a policy would impress me as a sign of honorable intent, and just as important, it would give me a way to check over their track record. Turning from the investigator to the particular investigation, I would look kindly on proposals whose study plans were either already archived, or (more likely) where there was a commitment to archive the plans before the start of the study. In fact, if I were in a position to do
so, I would make funding contingent on pre-archiving any study paid for in whole or in part with the funds being allocated.

Other parties who could benefit from a pre-archiving scheme would be the journals where results of studies are published. If I were a medical journal, I would look kindly on studies that were archived in advance. In fact, if I were an editor, I would consider for publication only studies archived in advance, and if I were a reviewer, I would consent to review only studies that had been archived in advance.

Using the word ‘archive’ makes this all sound too formal, like another layer of red tape added to what is already an onerous process. Really it could be as simple as inaugurating a website, and inviting investigators to contribute study plans beforehand, and results afterwards. In the case of studies involving human subjects, they will already have had to complete these study plans, and of course the will be compiling final reports for publication. All it would take would be a few mouse clicks to make these study plans permanently, publicly accessible.

Other benefits of this proposal will suggest themselves. With investigators announcing their plans beforehand, in a publicly searchable forum, there would be an opportunity for others to scrutinize the plans, suggest possible improvements to study design and/or statistical technique (to be adopted before the study begins!).

In fact, one can imagine the development of ‘contingent studies’. I may examine your study plan; discover possible improvements to the statistical analysis; and announce beforehand my intention of submitting your results to an alternative analysis.

One can also imagine that such public scrutiny might not appeal to certain parties. Not everyone is ready for the rough-and-tumble of free debate. Someone might steal my research plan, or swipe my data and make better use of it than I. Such parties could be given the option of having the precise details of their study kept secret until the study is completed, revealing only the general nature of the study (so that it will still be possible to determine just how many aspirin-and-batting-average studies are in the works). I don’t see why any funding agency would want to allow this kind of nonsense, but we want to maximize the incentive for individual researchers to take the plunge and start doing at least an approximation real science.

Our motto (cribbed from Garrison Keillor: ‘REAL SCIENCE: Why not pretty soon?’)

I’m about to rest my case, for now, and you’re probably wondering what
if anything this proposal has to do with my complaints about flawed statistical tests, specifically the analysis of survival statistics. Well, hmm. See, my original idea was that in addition to archiving before and after reports on studies, we could provide tools for analyzing study data, specifically simulation tools. But this is starting to seem to me to be kind of orthogonal to the task of archiving study plans. So I suspect that before long, that excellent Oscar analysis will wind up getting lifted out of the present discussion.