

I am tired, therefore who cares? Disenchantment in the age of information overload

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Introduction: the problem of information fatigue

In keeping with the theme of COSAC 2011, I intend to explore the idea of disenchantment. In particular, I shall explore that disenchantment with science which arises when people are overwhelmed by the sheer volume of available information. This problem stems from the way in which our culture encourages individuals to take responsibility for their own beliefs. We place great value on making our own informed decisions, to which end we emphasise the need to gather enough information to allow us to make a decision for which we alone take responsibility.

This approach breaks down when we are unable to gather sufficient information on a particular issue either because the issue is very complex or because other issues compete for our attention. Then we have the problem of *information overload* and, when the sheer volume of information becomes overwhelming, *information fatigue*. A person suffering the latter simply gives up on the process of informed decision making and, more often than not, simply adopts whatever opinion holds within their peer group.

In this paper I will briefly examine this phenomenon of information fatigue particularly as it relates to disenchantment with science. I will suggest that the remedy to such disenchantment is not to bombard people with more and more scientific information—a response which serves only to compound the problem. Rather, what is needed is a sea-change in the way people think about knowledge. In particular, we must recognize that the idea of the autonomous individual knower cannot be realized in practice. Rather we must depend upon others for a great deal of what we know. I will argue that a model for such an approach is provided by the natural sciences themselves.

Information overload: the scope of the problem

I begin by giving some indication of the scope of the problem. By almost any measure, the sheer amount of data available to the average person is mind-boggling, although, in a delightfully self-referential irony, I have more information on this point than I can hope to convey in this paper! Let us then consider only a few of the possible metrics.

In 2007 the world's data storage was estimated at 2.9×10^{20} optimally compressed bytes (Hilbert & López 2011, p. 60). In rough terms, this is the equivalent of the 92,000 articles of the Encyclopedia Britannica for every man, woman, and child on the planet.

In 2009 the United States Library of Congress catalogued 350,000 items under the mandatory-deposit provisions of US copyright law (Librarian of Congress, 2010, p. 11). I don't know what proportion of this number were books, but if 10% may be adjudged a conservative estimate, then this gives us roughly 100 books per day. Clearly no person can keep track of such an overwhelming amount of information.

It does not even help much to confine oneself to a particular field of expertise. Take the field of medicine, for instance. There are over 11,000 known diseases, so a person who updated their learning on one disease every day would take over 30 years to review current knowledge just once (Glasziou 2008, p. 84).

In 2006 the US National Library of Medicine had on index 10 million references (Bastian, Glasziou & Chalmers 2010, p. 1). In 2008 MEDLINE was adding over 12,000 articles to its database per week (Glasziou 2008, p. 84). In 2010 the medical literature published 75 trials, and 11 systematic reviews of trials per day (Bastian, Glasziou & Chalmers 2010, p. 1).

This is not atypical of the state of research in any complex field. The foreword to the 2007 report of the Intergovernmental Panel on Climate Change, for example, states that the report involved the work of 152 coordinating lead authors, plus lead authors from over 30 countries, plus review by over 600 experts (Intergovernmental Panel on Climate Change 2007, p. v).

Now, I'm sure those who work in other fields could contribute further examples but already we can see the significant point: there is simply too much information for any one individual to master.

How this constitutes a problem

So far, the problem is serious enough. It becomes acute, however, when we combine it with our culture's antipathy toward authority (Stout 1981) and emphasis upon the autonomous individual knower (Fricker 2006). Such issues are widely discussed and I need not enter into them here except to say that in the present context the problem they present is two-fold: on the one hand, people reject that authority which scientists might wish to claim by virtue of their familiarity with their particular field of inquiry. On the other hand, people imagine that they themselves must retrace the entire line of inquiry which underlies any scientific claim. The consequence is that people with neither education nor experience in scientific inquiry seek to enter into discussion on an equal footing not just with individual scientists but with the entire collaborative enterprise of modern science.

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But what hope have such people of any success when even specialists who devote themselves to a particular field are victims of information overload? It is for precisely this reason that large scale collaborative projects have become increasingly common in the sciences. Such endeavours no one individual, not even the most qualified, can possibly hope to replicate.

Here there is a critically important point to be made, and in making it I will appeal to no less an authority than Sir Paul Nurse, Nobel Laureate and current President of the Royal Society. In a recent BBC documentary (BBC Two, Jan. 2011) he inquired as to why science appears to be under attack, and why public trust in key scientific theories has been eroded. He had particularly in mind three areas of scientific inquiry—anthropogenic climate change, genetically modified foods, and the causal link between HIV and AIDS—and in discussing them he observed that the fundamental issue in the modern market place of ideas is one of trust. Nurse makes this telling comment:

In this new world of information overload we look to people we trust to find those answers. And these days it's not necessarily the scientists.

(40:05)

Sir Paul's conclusion is that science has a credibility problem, deserved or not, the solution to which is not to throw out more and more information, but to establish trust. This point Sir Paul himself notes:

Scientists had forgotten that we don't operate in isolated bubble. We cannot take the public for granted. We have to talk to them. We have to communicate the issues. We have to earn their trust if science really is going to benefit society.

(53:56)

But note that trust is by and large anathema to the Enlightenment way of knowing. Here we are specifically urged NOT to trust the word of others, but to 'think for ourselves'.

Let us inquire as to the way forward.

Focus on the method, not the findings of the sciences

In very simple terms, my suggested response is that we ought to place far greater emphasis upon scientific method, than upon scientific findings, so as to show that science is a reliable, thus trustworthy, enterprise.

We should begin by emphasizing that the tremendous achievements of modern science have been gained precisely because science, although often regarded as the paradigm of Enlightenment rationality, has actually served more convincingly than any other field to demonstrate the hubris of the idea of the autonomous individual knower.

Richard Dawkins has referred to the contemporary backlash against science as 'the great betrayal of the Enlightenment' (Millar 2007), but I would suggest that the situation is more complex. It is really science which has shown the folly of the person who takes with seriousness Kant's challenge: 'dare to think for yourself'. And it is the person who takes Kant's challenge with seriousness who is fated—I don't think it too strong a term—to distrust even the most well-grounded scientific hypotheses, advanced by even the most well-informed scientific authorities. 'Dare to think for yourself' is, as it turns out, very much a two-edged sword.

As far as I can see, the central problem here is a fundamental misunderstanding of the way in which science actually goes about its task. No philosopher of science could, in the present age, deny that the pursuit of scientific knowledge is a communal activity which relies heavily upon a considered recognition of appropriate authority. I emphasise the qualifications 'considered' and 'appropriate' because whilst scientists recognise authority, they do not do so uncritically. But note that even this critical appraisal is dependent upon trust in the estimations of the broader scientific community, for just as no person can individually assess the merits of every scientific theory, so no person can individually appraise the competence of every scientist whom they might encounter.

Here we may say that scientists have simply been true to their own convictions in snorting in the face of a priori philosophical speculations. The philosophers may have challenged us to use our own reason, but scientists in their own pragmatic way have found that if one takes such challenges too seriously, nothing gets done. The dictum of Kant, *sapere aude*, is a fine sentiment and one to which scientists assent: the motto of the Royal Society is, after all, *Nullis in Verba*—loosely 'take nobody's word for it'. And clearly, taking nobody's word for it is a fine ideal. But the reality of how scientists go about their business was better expressed by Sir Isaac Newton: 'If I have been able to see further than others, it is because I have stood on the shoulders of giants'.

Newton's dependence upon the work of others did not, of course, involve a naïve or foolish trust. Nor is the trust that the average scientist places in other scientists, or in the scientific community as a whole, a naïve or foolish one. It is, rather, a trust well-seasoned with sufficient critical reserve that it maximises scientific progress. In their characteristically pragmatic way scientists show just as much trust, and, conversely, just as much scepticism, as is necessary to get the job done.

And this, I think, is what scientists should be labouring to make known for it is this informed trust which allows scientists to escape the overwhelming burden of information overload which proves problematic for so many others. When confronted with contemporary issues such as anthropogenic climate change, genetically modified foods, the causal link between HIV and AIDS, and so on, a scientist neither accepts uncritically such theories as are being advanced, nor engages in a futile attempt to retrace individually the entire underlying research project. Rather they trust that science, in its rather chaotic yet amazingly effective manner, will

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eventually tend toward ever more reliable descriptions of the way things actually are.

Conclusion

To conclude, then, I believe that much of what passes as a rejection of science arises not from any real antipathy toward science, but more as the consequence of two factors: an epistemology which lays emphasis upon the individual autonomous knower, and the problem of information overload. There is simply too much information bombarding people for them as individuals to make informed choices on every matter. The solution is not to increase the amount of information they are required to process, but to show that science actually rejects the ideal of the autonomous individual knower. Not because the idea of thinking things through for oneself is a bad idea, but because it is not achievable in practice. To the problem of information overload science offers a pragmatic solution: one which does not claim to be one hundred percent right one hundred percent of the time, but one which does in the long run, on the average, manage to press closer and closer to an explanation of the way things really are. We should, in short, be focusing upon the tremendous success of the scientific method rather than appealing to philosophical abstractions as to how knowledge ought to be acquired. Only by showing that science, in the long run, on the average, actually works, may we demonstrate that science is worthy of trust. Only in this way can we hope to answer the problem of disenchantment in the age of information overload.

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