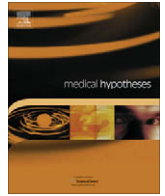


Contents lists available at [ScienceDirect](http://www.elsevier.com/locate/mehy)

# Medical Hypotheses

journal homepage: [www.elsevier.com/locate/mehy](http://www.elsevier.com/locate/mehy)

## Editorial

# Are you an honest scientist? Truthfulness in science should be an iron law, not a vague aspiration

## S U M M A R Y

Anyone who has been a scientist for more than a couple of decades will realize that there has been a progressive and pervasive decline in the honesty of scientific communications. Yet real science simply *must* be an arena where truth is the rule; or else the activity simply stops being science and becomes something else: Zombie science. Although all humans ought to be truthful at all times; science is the one area of social functioning in which truth is the primary value, and truthfulness the core evaluation. Truth-telling and truth-seeking should not, therefore, be regarded as unattainable aspirations for scientists, but as *iron laws*, continually and universally operative. Yet such is the endemic state of corruption that an insistence on truthfulness in science seems perverse, aggressive, dangerous, or simply utopian. Not so: truthfulness in science is not utopian and was indeed taken for granted (albeit subject to normal human imperfections) just a few decades ago. Furthermore, as Jacob Bronowski argued, humans cannot be honest only in important matters while being expedient in minor matters: truth is all of a piece. There are always so many incentives to lie that truthfulness is either a habit or else it declines. This means that in order to be truthful in the face of opposition, scientists need to find a philosophical basis which will sustain a life of habitual truth and support them through the pressure to be expedient (or agreeable) rather than honest. The best hope of saving science from a progressive descent into Zombiedom seems to be a moral Great Awakening: an ethical revolution focused on re-establishing the primary purpose of science: which is the pursuit of truth. Such an Awakening would necessarily begin with individual commitment, but to have any impact it would need to progress rapidly to institutional forms. The most realistic prospect is that some sub-specialties of science might self-identify as being engaged primarily in the pursuit of truth, might form invisible colleges, and (supported by strong ethical systems to which their participants subscribe) impose on their members a stricter and more honest standard of behaviour. From such seeds of truth, real science might again re-grow. However, at present, I can detect no sign of any such thing as a principled adherence to perfect truthfulness among our complacent, arrogant and ever-more-powerful scientific leadership – and that is the group of which a Great Awakening would need to take-hold even if the movement were originated elsewhere.

© 2009 Published by Elsevier Ltd.

## The decline of honesty in science

Anyone who has been a scientist for more than 20 years will realize that there has been a progressive decline in the honesty of communications between scientists, between scientists and their institutions, and between scientists and their institutions and the outside world.

Yet real science must be an arena where truth is the rule; or else the activity simply stops being science and becomes something else: Zombie science. Zombie science is a science that is dead, but is artificially kept moving by a continual infusion of funding. From a distance Zombie science looks like the real thing, the surface features of a science are in place – white coats, laboratories, computer programming, Ph.D's, papers, conferences, prizes, etc. But the Zombie is not interested in the pursuit of truth – its actions are externally-controlled and directed at non-scientific goals, and inside the Zombie everything is rotten.

The most egregious domain of untruthfulness is probably where scientists comment or write about their own work. Indeed, so pervasive are the petty misrepresentations and cautious lies, that it is likely that many scientists are now dishonest even with themselves, in the privacy of their own thoughts. Such things can happen to initially honest people either by force of habit, or because they know no better; and because lies breed lies in order to explain the discrepancies between predictions and observations.

Lying to oneself may be one cause of the remarkable incoherence of so much modern scientific thinking. It is much easier to

be coherent, and to recognize incoherence, when discourse is uncontaminated by deliberate misrepresentations. There is less to cover-up. Most scientists can think-straight only by being completely honest. If scientists are not honest even with themselves, then their work will be a mess.

Scientists are usually too careful and clever to risk telling outright lies, but instead they push the envelope of exaggeration, selectivity and distortion as far as possible. And tolerance for this kind of untruthfulness has greatly increased over recent years. So it is now routine for scientists deliberately to 'hype' the significance of their status and performance, and 'spin' the importance of their research.

Furthermore, it is entirely normal and unremarkable for scientists to spend their entire professional life doing work they know in their hearts to be trivial or bogus – preferring that which promotes their career over that which has the best chance of advancing science. Indeed, such misapplication of effort is positively encouraged in many places, including some of what were the very best places, because careerism is a more reliable route to high productivity than real science – and because senior scientists in the best places are expert at hyping mundane research to create a misleading impression of revolutionary importance.

What is going on? How have matters reached this state? Everyone should be honest at all times and about everything, but especially scientists. Everyone should seriously aim for truthfulness – yet scientists, of all people, must not just aim but actually be truthful: otherwise the very *raison d'être* of science is subverted.

So although truthfulness is a basic, universal moral rule; science is the one area of social functioning in which truth is the *primary* value, and truthfulness the core evaluation. Truth-telling and truth-seeking should not, therefore, be regarded as unattainable ideals within science, but as *iron laws*, continually and universally operative.

### Causes of dishonesty in science

Although some scientists are selfishly dishonest simply in order to promote their own careers, for most people quasi-altruistic arguments for lying (dishonesty in a good cause of helping others, or to be an agreeable colleague) are likely to be a more powerful inducement to routine untruthfulness than is the gaining of personal advantage.

For example, scientists are pressured to be less-than-wholly-truthful for the benefit of their colleagues or institutions, or for official/political reasons. Often, scientists are unable to opt-out of administrative or managerial exercises which almost insist-upon dishonest responses – and for which colleagues expect dishonesty in order to promote the interests of the group. Project leaders may feel responsible for raising money to support their junior team members; and feel obliged to do whatever type of research is most generously funded, and to say or write whatever is necessary to obtain that funding.

So, in a bureaucratic context where cautious dishonesty is rewarded, strict truthfulness is taboo and will cause trouble for colleagues, for teams, for institutions – there may be a serious risk that funding is removed, status damaged, or worse. When everyone else is exaggerating their achievement then any precisely accurate person will, *de facto*, be judged as even worse than their already modest claims. In this kind of situation, individual truthfulness may be interpreted as an irresponsible indulgence.

Clearly then, even in the absence of the sort of direct coercion which prevails in many un-free societies, scientists may be subjected to such pressure that they are more-or-less forced to be dishonest; and this situation can (in decent people) lead to feelings of regret, or to shame and remorse. Unfortunately, regret and shame may not lead to remorse but instead to rationalization, to the elaborate construction of excuses, and eventually a denial of dishonesty.

Yet, whatever are the motivations and reasons for dishonesty, it has been by such means that modern scientists have become inculcated into habitual falsity; until we have become used-to dishonesty, don't notice dishonesty, eventually come to expect dishonesty.

### Roots of dishonesty in science

My belief is that science has rotted from the head down – and the blame mostly lies with senior scientists in combination with the massive expansion and influence of peer review until it has become the core process of scientific evaluation.

Overall, senior scientists have set a bad example of untruthfulness and self-seeking in their own behaviour, and they have also tended to administer science in such a way as to reward hype and careful-dishonesty, and punish modesty and strict truth-telling. And although some senior scientists have laudably refused to compromise their honesty, they have done this largely by quietly 'opting out', and not much by using their power and influence to create and advertise alternative processes and systems in which honest scientists might work.

The corruption of science has been (mostly unintentionally) amplified by the replacement of 'peer usage' with peer review as the major mechanism of scientific evaluation. Peer review (of ever greater complexity) has been applied everywhere: to job appoint-

ments and promotions, to scientific publications and conferences, to ethical review and funding, to prizes and awards. And peer review processes are set-up and dominated by senior scientists.

Peer usage was the traditional process of scientific evaluation during the Golden Age of science (extending up to about the mid-1960s). Peer usage means that the validity of science is judged *retrospectively* by whether or not it has been used by peers, i.e. whether ideas or facts turned-out to be useful in further science done by researchers in the same field. For example, a piece of research might be evaluated by its validity in predicting future observations or as a basis for making effective interventions. Peer usage is distinctive to science, probably almost definitive of science.

Peer review, by contrast, means that science is judged by the *opinion* of other scientists in the same field. Peer review is *not* distinctive to science, but is found in all academic subjects and in many formal bureaucracies. When peer usage was replaced by peer review, then all the major scientific evaluation processes – their measurement metrics, their rewards and their sanctions – were brought under the direct control of senior scientists whose opinions thereby became the ultimate arbiter of validity. By making its validity a mere matter of professional opinion, the crucial link between science and the natural world was broken, and the door opened to unrestrained error as well as to corruption.

The over-expansion and domination of peer review in science is therefore a sign of scientific decline and decadence, not (as so commonly asserted) a sign of increased rigour. Peer review as the ultimate arbiter represents the conversion of science to generic bureaucracy; a replacement of testing by opinion; a replacement of objectivity by subjectivity. And the increased role for subjectivity in science has created space into which dishonesty has expanded.

In a nutshell, the inducements to dishonesty have come from outside of science – from politics, government administration and the media (for example) all of whom are continually attempting to distort science to the needs of their own agendas and covert real science to Zombie science. But whatever the origin of the pressures to corrupt science, it is sadly obvious that scientific leaders have mostly themselves been corrupted by these pressures rather than courageously resisting them. And these same leaders have degraded hypothesis-testing real science into an elaborate expression of professional opinion ('peer review') that is formally indistinguishable from bureaucratic power-games.

### Is there a future for honesty?

Such is our state of pervasive corruption that an insistence on truthfulness in science seems perverse, aggressive, dangerous, or simply utopian. Not so. Truthfulness in science is not utopian. Indeed it was mundane reality, taken for granted (albeit subject to normal human imperfections) just a few decades ago. Old-style science had many faults, but deliberate and systematic misrepresentation was not one of them.

To become systematically truthful in a modern scientific environment would be to inflict damage on one's own career; on one's chances of getting jobs, promotions, publications, grants and so on. And in a world of dishonesty, of hype, spin and inflated estimations – the occasional truthful individual will be judged by the prevailing corrupt standards. To be truthful would also be to risk becoming exceedingly unpopular with colleagues and employers – since a strictly honest scientist would be perceived as endangering the status and security of those around them.

Nonetheless, science *must* be honest, and the only answer to dishonesty is honesty; and this is up to individuals. The necessary first step is for scientists who are concerned about truth to acknowledge the prevailing state of corruption, and then to make

a personal resolution to be truthful in all things at all times: to become both truth-tellers and truth-seekers.

Honest individuals are clearly necessary for an honest system of science – they are the basis of all that is good in science. However, honest individuals do not necessarily create an honest system. Individual honesty is not sufficient but needs to be supported by new social structures. Scientific truth cannot, over the long stretch, be a product of solitary activity. A solitary truth-seeker who is unsupported either by tradition or community will degenerate into mere eccentricity, eventually to be intimidated and crushed by the organized power of untruthfulness.

Furthermore, as Jacob Bronowski argued, humans cannot be honest only in important matters while being expedient in minor matters: truth is all of a piece. There are so many incentives to be untruthful that truthfulness is either a habit, or else truthfulness declines. This means that in order to retain their principles in the face of opposition, scientists need to find a philosophical basis which will sustain a life of habitual truth and support them through the pressure to be expedient (or agreeable) rather than honest.

### A Great Awakening to truth in science

The best hope of saving science from a progressive descent into complete Zombiedom seems to be a moral Great Awakening: an ethical revolution focused on re-establishing the primary purpose of science: the pursuit of truth.

In using the phrase, I am thinking of something akin to the periodic evangelical Great Awakenings which have swept the USA throughout its history, and have (arguably) served periodically to roll-back the advance of societal corruption, and generate improved ethical behaviour.

Such an Awakening would necessarily begin with individual commitment, but to have any impact it would need to progress rapidly to institutional forms. In effect there would need to be a 'Church' of truth; or, rather, many such Churches – especially in the different scientific fields or invisible colleges of active scholars and researchers.

I use the word 'Church' because nothing less morally-potent than a Church would suffice to overcome the many immediate incentives for seeking status, power, wealth and security. Nothing less powerfully-motivating could, I feel, nurture and sustain the requisite individual commitment. If truth-pursuing groups were not actually religiously-based (and, given the high proportion of

atheists in science, this is probable), then such groups would need to be sustained by secular ethical systems of at least equal strength to religion, equally devoted to transcendental ideals, equally capable of eliciting courage, self-sacrifice and adherence to principle.

The most realistic prospect is that some sub-specialties of science might self-identify as being engaged primarily in the pursuit of truth and (supported by strong ethical systems to which their participants subscribe) impose on their members a stricter and more honest standard of behaviour. Since science *must* be truthful in order to thrive *qua* science, any such truthful sub-specialties would be expected to thrive over the long term (this is assuming they can attract scientists of sufficient calibre backed-up with sufficient resources). From such seeds of truth, real science might again re-grow.

Could it happen? – could there really be a Great Awakening to truth in science in which scientists in specific disciplines or *en masse* would simply start being truthful about all things great and small, and would swiftly organize to support each other in this principle? I am *hopeful* that some kind of moral renewal might potentially occur in science, but I am not optimistic. I am hopeful – or else I would not be writing this. But I am not optimistic, because there appears to be little awareness of the endemic state of corruption – presumably because the relentless but incremental expansion of dishonesty has been so gradual that it failed to cause sufficient alarm; and at each step in the decline scientists quickly habituated to the new situation.

At present, I can detect no sign of anything like a principled adherence to perfect truthfulness among our complacent, arrogant and ever-more-powerful scientific leadership – and that is the group among which a Great Awakening would need to take-hold; even if, as seems likely, the movement originated elsewhere.

*Further reading:* The above polemical essay builds upon the argument of several of my previous publications including: 'Peer usage versus peer review' (BMJ 2007; 335:451); 'Zombie science' (Medical Hypotheses 2008; 71:327–329); 'The vital role of transcendental truth in science' (Medical Hypotheses 2009; 72:373–376); and 'Are you an honest academic?' (Oxford Magazine 2009; 287:8–10).

Bruce G. Charlton

Editor-in-Chief – Medical Hypotheses,  
Professor of Theoretical Medicine,  
University of Buckingham, UK

E-mail address: [bruce.charlton@buckingham.ac.uk](mailto:bruce.charlton@buckingham.ac.uk)