

At Issue: Bridge Over a Philosophical Divide

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Introduction

Each new generation of scientists debates the role that science should play in society (van der Vink, 1997; Myers, 1999; Ehrlich, 2003). This debate is often reduced to a passionate conflict between two apparently irreconcilable philosophical views. The 'strictly objective' scientists shun civic engagement out of concern that scientists remain objective and free from external influence (Wooster, 1998; Hsu and Agoramoorthy, 2004), while 'citizen' scientists encourage civic engagement to ensure that society can benefit from scientific understanding (Bazzaz et al, 1998; Ehrlich, 2003; Terborgh, 2004). There is a middle ground, but it is generally restricted to informing policy makers and the public about scientific findings through expert advisory panels and the activities of our most venerated institutions such as the Royal Society and the National Academy of Sciences. Here we suggest that the threat posed to scientific objectivity by the escalating politicisation of science provides a much larger, although limited, bridge between these competing philosophical views: a commitment to scientific objectivity requires a greater civic presence.

All scientists recognise the need for researchers to strive for objectivity, and to state assumptions clearly and openly. The pursuit of unbiased research is a cornerstone of the scientific method and a basic requirement for confidence in experimental results. Most scientists also recognise that our values, hopes and beliefs, our individual backgrounds and our societal context all influence our choice of research questions and hinder our efforts to achieve complete objectivity. Nevertheless, striving for objectivity in our experiments ensures that results and analysis remain as unbiased, replicable and credible as possible. Beyond this broad agreement over objectivity in research, however, a polarised disagreement rages between those who shun engagement in policy debates and those who embrace it.

The 'strictly objective' scientists consider the commitment to objectivity in research to include objectivity in the public domain. According to this view, knowledge need not lead to technological advancement or alter the policies that we as a society adopt. Instead, knowledge is valued inherently because it pushes back the darkness of ignorance. When scientific knowledge can more directly benefit society, the responsibility for exploiting the results and reaping the rewards lies with non-scientists. Furthermore, by remaining apolitical and as free from external influence as possible, the scientific community builds credibility with the general population and thereby increases the potential for widespread acceptance of scientific findings (Pielke, 2004). As a result, 'strictly objective' scientists eschew advocacy (Wooster, 1998; Hsu and Agoramoorthy, 2004).

At the other end of the philosophical spectrum, 'citizen scientists' believe that societal membership confers the right – and at times the responsibility – to engage in civic debate. Since the vast majority of policy makers and the general population lack scientific training, scientists are uniquely qualified to help promote policies that capitalise on scientific understanding. While citizen scientists acknowledge the need to strive for objectivity in research, they also encourage scientists to help society reap the gains and avoid the disasters that science reveals.

Citizen scientists also see an obligation to society that stems from the funding of research. The vast majority of 'objective' research – that which is pursued and published freely and without pressure from political or economic stakeholders – is funded through taxes paid by the public. Scientists therefore have a responsibility to ensure that society accurately understands and benefits from research as a reasonable return on the investment of its tax revenue (Lubchenco, 1998).

Politicisation of science

The debate between the 'strictly objective' and 'citizen' camps leaves many scientists unwilling to engage in civic discourse. Some are convinced by the argument for strict objectivity. Others recognise that it is professionally safe to focus solely on research and dangerous to advocate on behalf of anything, even science. The risk is especially paralysing for young researchers, who must consider the judgments of those who will influence decisions over hiring, tenure, publication and funding. Yet this professionally safe alternative may be the most dangerous for science and society because the resulting lack of civically engaged scientists creates a vacuum in social discourse that allows politicians and interest groups to abuse science with relative ease and impunity.

In the US, for example, the media largely ignored instances of scientific abuse by the Bush administration until scientists began speaking out (Association of Reproductive Health Professionals, 2004; Union of Concerned Scientists, 2004a; Chan et al, 2005). Increased public awareness and the response of some administration officials to the problem of scientific abuse (Marburger, 2004) following this relatively minimal civic engagement, demonstrate the potential power of scientific engagement. These are small victories, however, and the politicisation of science remains a problem (Union of Concerned Scientists, 2004b), as exemplified by the administration's approach to climate change and its championing of abstinence-only sex education. In the case of climate change, the administration has cited unrepresentative and poorly supported findings that contradict more widely accepted research. There is also a notable asymmetry between the administration's stress on scientific uncertainty in relation to climate change and its practice of ignoring scientific evidence that questions the plausibility of policies the President favours, such as missile defence (Barton et al, 2004; Gronlund et al, 2004). Similarly, the administration has gone beyond moral and ethical arguments for abstinence-only sex education, with claims of greater effectiveness relative to comprehensive sex education programmes. While morality lies outside the scientific realm, the empirical claim is contradicted by objective scientific research (Brückner and Bearman, 2005).

Scientific abuse for political, corporate or personal gain is certainly not unique to the US or its current administration and is generally not a partisan issue. There have always been advocacy groups, business interests and politicians on all sides who misrepresent science, either deliberately or through ignorance. Some policy makers, irrespective of political party, also champion science in the face of powerful political and economic pressure. Nevertheless, the current abuse of science for political gain is ubiquitous among fields as diverse as

public health, atmospheric chemistry, forestry, fisheries management and climate science, and increasingly occurs at the highest levels of government (Association of Reproductive Health Professionals, 2004; Union of Concerned Scientists, 2004a; Chan et al, 2005).

At times, scientists themselves contribute directly to the problem of abuse by overstating the certainty or implications of research findings or by downplaying contrary views that are also supported by research. Likewise, scientists can sometimes overreach by using their professional credibility to promote policy choices that depend upon ethical values and personal beliefs. Nor do scientists always recognise the knowledge and values found among non-scientific groups, which appropriately contribute to the processes of developing well-informed policy.

Therefore, concern over how scientists engage the public is legitimate. Unfortunately, when scientists recoil too far from the policy implications of research, they also contribute to the misuse of science. In their efforts to avoid making value judgments, scientists often avoid interpreting their results fully, because to do so would place their words in a policy context. In order to eschew value judgments, they avoid *technical* judgements that they are uniquely qualified to make (Failing and Gregory, 2003). Into this vacuum step politically motivated parties who offer their own interpretations of scientific results and, without credible opposition, mislead the public towards their own desired goals.

Recognising the need for scientists to guard against scientific abuse in their own actions, the misuse of scientific results by political partisans represents a great threat to both science and society. Science has historically been a source of objective information for policy making. Now, its pervasive misrepresentation through a biased selection of results and the suppression of unwelcome findings threatens to convert science into a subjective tool for advancing narrow political, corporate or personal interests.

Bridge over the divide

The politicisation of science creates a need for advocacy that differs fundamentally from the advocacy that occurs over policy on issues such as climate change and stem cell research. In this unique case, advocacy seeks only to restore scientific integrity and promote objectivity by exposing and ending abuse. Thus, politicisation links the commitment to unbiased science with limited civic involvement, and thereby bridges the philosophical divide between 'strictly objective' and 'citizen' scientists.

This bridge cannot fully reconcile the two competing philosophical views, however. Some researchers will never be comfortable with scientists advocating policy, which necessarily involves ethical, moral and value judgements. Others, who are eager to help society make wise decisions, may view those unwilling to do so as shirking responsibility. Broad agreement between the citizen and strictly objective philosophies is therefore unlikely, rendering this bridge a limited and conditional coalition that applies only to the abuse of science.

Even when faced with the politicisation of science, some may argue against civic engagement, believing that scientists are most effective when pursuing research exclusively (Hsu and Agoramorthy, 2004). After all, we are trained to discover, not to engage in civic debates. But the politicisation of science – such as political litmus tests for funding reproductive health research and making appointments to

panels on bioethics (Union of Concerned Scientists, 2004a, 2004b) – hinders our capacity to pursue research freely. It also denigrates science in the eyes of the public and thereby threatens funding and the value society places on scientific research. As a consequence, an exclusive focus on research fosters the politicisation that undermines science and limits our future research options.

A sizable fraction of the scientific community in the US is beginning to recognise the need to engage in public discourse. Recent efforts to characterise and criticise the politicisation of science by the Union of Concerned Scientists (UCS) (2004a, 2004b) and ScienceinPolicy have received significant support within the scientific community. For example, over 5,500 scientists endorsed a UCS statement calling for an end to the Bush administration's abuse of science, among them many of the world's top scientists including 48 Nobel laureates, 62 National Medal of Science recipients and 129 members of the National Academy of Sciences. Similarly, over 1,800 researchers endorsed a ScienceinPolicy statement criticising the administration's misuse of environmental science (Porder, 2004). Beyond these grassroots efforts by individual scientists and advocacy organisations, it is time for our traditional scientific institutions and reward structures to encourage responsible civic engagement (Chan et al, 2005). This willingness to publicly defend the integrity of science reflects a coming together of the 'citizen' scientists' desire for civic engagement with the 'strictly objective' scientists' wish to protect objectivity. But even the impressive number of scientists engaging on this issue constitutes a relatively small fraction of the scientific community, and many who endorsed these efforts will probably take no additional actions to directly engage with the broader society. Without an expansion of these efforts, the objective use of science in civic debates remains gravely threatened.

Conclusion

The pursuit of objectivity is a cornerstone of scientific research. Ironically, uncritical pursuit of objectivity leads to reticence among scientists to engage in civic debates. This allows less knowledgeable, more politically motivated individuals and organisations to become the voice for science in the public domain, which is in the interest of neither scientists nor the public. Scientists' weak public presence results in anaemic or non-existent challenges to scientific abuse and a lack of public accountability for the abusers. As a result, the politicisation of science has proven an effective tool for advancing narrow political, business and personal interests.

Solving this problem will depend on scientists' willingness to champion objectivity in civic debates and will not require inappropriate partiality. Scientists must be careful to maintain their own integrity when engaging in civic debates, but educating the public and policy makers – in this case about scientific abuse – differs from advocating policy options by promoting rather than undermining objectivity. Thus, 'strictly objective' and 'citizen' scientists can agree to champion scientific integrity in public discourse. In this coherence of goals, the abuse of science bridges the apparently irreconcilable philosophical views of 'strictly objective' and 'citizen' scientists. While there remains disagreement over the appropriate scope of scientist advocacy, we can protect the role of science in society by setting aside that philosophical debate whenever science gets politicised.

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