



Commentary

Time to step up: defending basic science and animal behaviour

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In 1975, Wisconsin's Democratic Senator, William Proxmire, awarded the first of his Golden Fleece Awards to the National Science Foundation (NSF) for 'funding a study on why people fall in love'. The award was designed to expose public officials who were judged to be squandering money ('fleecing' the public purse), and it included mostly examples of wasteful bureaucracy. However, several research initiatives also fell under Proxmire's scrutiny. The senator had a way of talking about research projects that made them sound truly outrageous. He routinely latched onto one isolated but memorable bit of information and distorted its background to make these projects sound laughable. Although he awarded NSF only a few of his 159 Golden Fleece Awards (<http://content.wisconsinhistory.org/cdm/ref/collection/tp/id/70852>), he made it politically fashionable to scorn basic scientific research. Proxmire's strategy provided him with short-term political gains at the expense of the national wellbeing. In 1988, Joel Widder, senior analyst for legislative affairs at NSF commented in response to Proxmire's awards that: 'Making fun of science in general, especially when it's taken out of context, seems detrimental to what might be a long-term national goal: To try to develop, educate, and train additional people in scientific fields' (Irion, 1988). Yet here we

are, 25 years later, still faced with many of the same attacks, plus some new challenges.

In recent years, the vitriolic partisan environment in Washington has resulted in bitter fights over budget appropriations. Research projects are often highlighted as wasteful spending, not only by members of the House and Senate, but also by politically vested groups and organizations. Senator Tom Coburn, a Republican from Oklahoma, regularly highlights NSF and National Institutes of Health (NIH) projects he deems wasteful. Studies of organismal biology seem particularly vulnerable to these attacks because they involve unusual subject matter that can be easily understood by most people: duck penises, robotic squirrels, shrimp in a treadmill, snail sex and so forth (Brennan, Irschick, Johnson, & Albertson, 2014). Several active members of the Animal Behavior Society have been victims of media and/or political attacks including the authors of this commentary. Because these attacks are unlikely to cease on their own, we propose increased proactive effort towards discounting their impact. Therefore, we are writing this piece to outline our suggestions for dealing with unwanted media and political attention in a way that promotes the importance of our discipline, and a greater understanding of science among the general public, perhaps belatedly following advice from a Golden Fleece Awardee (Emlen, 1998). Although our arguments are based on experience in the United States, our recommendations may have wider implications in our field for improving science education and helping battle the arguments of science detractors elsewhere.

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BEFORE ANY ATTACKS HAPPEN

As soon as you receive government funds there are three things you can do immediately that will help you in the event that your research gets targeted as wasteful. First, we recommend setting up an online alert system (e.g. Google Alert), so that you are quickly aware of who is discussing your research online. The alert will inform you if any stories are negative. Second, prepare a summary document that explains the value of your research in terms that would make sense to a nonscientist. Highlight the big question your research is addressing, along with how many people are involved, and any papers you have already published on the topic. Third, consider creating a detailed Web site about the sponsored project, with layman descriptions and photographs that highlight both the intellectual merit and broader impacts of the research. Information from your summary document can be incorporated into this site. One of us (R.W.C.) created such a Web site and added quotes from undergraduate students on how participating in this project was a positive, sometimes life-changing experience (http://www.bio.sdsu.edu/pub/clark/Site_3/Project_Homepage.html). Such Web sites can be used to direct media outlets quickly to an in-depth description of the science behind the story. In addition, if any aspects of your project are subsequently misrepresented, you can use the Web site to point out that accurate information was readily available, but ignored by your attacker.

IF YOU ARE TARGETED

In the early days of the Golden Fleece Awards, scientists were directly affected by the negative attention, to the point where a lawsuit against Senator Proxmire for defamation, loss of income and invasion of privacy was settled out of court after ending up in the U.S. Supreme Court (Hutchinson, 2006; Irion, 1988). One consequence of this settlement was that Senator Proxmire had to write directly to grant-funding agencies promising 'not to interfere in the executive deliberation of grant proposals nor attempt to intercede in opposition to them' (Hutchinson, 2006). Other scientists like Hutchinson who responded immediately to the attacks were able to obtain retractions, and helped to bring media attention to the fact that their projects had been misrepresented (Benson, 2006). In subsequent years, scientists and much of the press became desensitized to the political targeting, and the impact of the awards was much reduced (Benson, 2006). Perhaps for this reason, scientists have been responding to political attacks less and less, despite the fact that some sectors of the press still publicize the attacks and continue to attract public attention.

Not responding to politically motivated attacks is likely to be the wrong strategy. Silence may further erode public confidence in science, as it may be interpreted as implicit acceptance that there is something wrong with your project. If your research is highlighted as an example of wasteful government spending, you will likely be contacted by media outlets to get your comments. Your response should not be limited to defending your project. Any scientific project when taken out of context can be made to sound silly and irrelevant, and therefore, these are attacks on our profession and science as a whole. To participate effectively in the defence we should be prepared to be the public face of basic science, and this paper may provide a useful starting point.

Who Should Know If You Have Been Targeted?

Inform your research collaborators, Department Chair, University Press Office and Program Officer immediately. They may be asked to comment and you should alert them so that they can be ready. Send them your summary document and a link to your Web

site. Be aware that a funding agency like NSF is limited in its responses because government employees cannot lobby; they can only provide information on the project's intellectual merit and broader impacts, if asked.

What to Say

Explain that your project is basic science. Do not overreach to make connections between your project and applied science unless these legitimately exist in your research, in which case you should not be having much trouble anyway. This is an opportunity to highlight that basic science is critical for scientific advancement and innovation, and to give general examples where such gains have been realized.

As members of what is arguably the most curious species ever to walk the earth, we gain as a society from expanding knowledge for its own sake. The immense popularity (and economic success) of TV cable channels devoted entirely to learning about nature attests to the intellectual stimulation and growth that new discoveries can foster. Teaching is enriched by sharing this scientific process with students, many of whom become excited about science careers after learning about organisms and animal behaviour. These are the primary reasons why we became organismal biologists. However, when we need to defend basic science and justify why we need more funding, these arguments alone may be less compelling than illustrations of how science enhances our economy and health.

Talking points

(1) Basic science is the foundation of all applied science. Because we cannot predict which basic science projects will turn into an application, we must cast a wide net.

(2) The connection between basic and applied science is seldom a straight line; more often, it involves a network that connects novel ideas, methods and data in a new way, leading to innovations.

(3) The government must fund basic science because its potential economic gains are unpredictable and generally long term. No private investing company can invest under those conditions.

(4) Government investment in science guarantees that at least some of our discoveries are free of special interests, and therefore it protects the integrity of the scientific process. Federal investment in research and development was only 24% of all U.S. science investment in 2008 (<http://www.nsf.gov/statistics/seind08/c4/c4h.htm>).

(5) Funding decisions at NSF, NIH and other agencies are made by panels of scientists who judge projects on the basis of their intellectual merit and impact to society.

(6) These agencies are severely underfunded and, as a result, many high-priority projects do not get funded.

(7) The return on investment estimated from government funding of science is enormous. Not all projects turn a profit, but when they do, they can transform society: think Google, Taq polymerase (Brock, 1997) and green fluorescent protein (GFP).

(8) Federally funded basic science projects are the engine of many research universities. Without these projects, universities could not train the next generation of scientists. Involvement in basic research is often the highlight of a student's undergraduate experience and provides training that cannot be replicated through coursework.

(9) Organisms are exquisitely adapted to their environment and the study of these adaptations has allowed us to make great strides in medicine and technology (Brennan et al., 2014).

EXAMPLES OF APPLICATIONS DERIVED FROM BEHAVIOUR STUDIES

Basic research on animal behaviour can benefit human society in ways that may not be immediately apparent. The examples

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