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Letter

Engaging in Effective Science Communication: A Response to Blancke *et al.* on Deproblematizing GMOs

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As science communication scholars, we encourage interdisciplinary efforts such as those by Blancke, Grunewald, and De Jaeger to engage with the public on GMOs and genetic engineering broadly. We extend the advice given by these scholars with tips based on what we know from the science of science communication.

We applaud efforts by Blancke, Grunewald, and De Jaeger [1] to engage with the public regarding the complex and controversial issues of genetic engineering and genetically modified organisms (GMOs). Both the public and the scientific community would likely benefit if more scientists were willing to talk with and listen to lay audiences with the intent of strengthening the quality of public discourse about science issues.

Nevertheless, few scientists have had formal training in communicating science, leaving most to rely on intuition. Unfortunately, these intuitions, even when informed by experience, are not always accurate. In the same way as we use scientific principles to make valid and reliable inferences about the world, we ought to use similar principles to determine how best to communicate about science, including how to deproblematize discussion of GMOs. Although more systematic research to further refine these principles is needed, we can use what we already know from the science of science communication (Box 1) to help scientists become more successful communicators [2].

Below we extend the advice given by Blancke *et al.* to include recommendations – backed by science communication research – for scientists engaging in GMO debates.

Be Clear about Your Goals

One goal of science communication is to inform, which is very different from the goal to persuade. Science communicators ought to be clear which of the two they are trying to achieve [3]. Audiences often assume that science should be value-free and that science communicators should aim simply to inform. However, in addressing the science behind controversial issues, science communicators often describe some positions as being superior to others, leading audiences to believe that the communicator primarily intends to persuade. In such cases audiences may come to believe that they have been misled, and react negatively [4].

Move Beyond the Deficit Model of Communication

One of the most common intuitions is that more effective explanations will increase public acceptance of scientific information. However, although making science more accessible is an important goal of science communication, Blancke *et al.* correctly state that conveying more information about genetic engineering will not suffice to deproblematize issues. The idea behind the deficit model of communication – that people would agree with the scientific consensus 'if they merely understood the facts' – has been debunked by both research and experience [5]. While facts matter, people also heavily consider their own prior knowledge and beliefs. In doing so they often engage in motivated reasoning, rejecting evidence and arguments that conflict with their existing beliefs, values, and affective assessments [6]. Thus, people may understand but still reject scientific consensus when it clashes with their own views [7].

Understand the Starting Points of your Audience

Everyone brings pre-existing knowledge and worldviews to discussions of GMOs. Blancke *et al.* suggest establishing common ground by explaining that genetic engineering is simply another form of conventional breeding. However, this assumes that audience members understand conventional breeding, which they may not. In fact, research suggests, for example, that many as half of Americans are unfamiliar with conventional breeding techniques, and only about 40% believe they have ever eaten a cross-bred fruit or vegetable [8]. Although communicators need to be careful not to overestimate what ordinary people know about science, agriculture, and food production, they must also be careful not to oversimplify concepts in ways that suggest that they disrespect their audience (e.g., by suggesting that

Box 1. The National Research Council on Engaging with the Public

On January 15 and 16, 2015, the National Research Council of the National Academy of Sciences, Engineering, and Medicine convened a workshop with the goal of exploring what social science knows about successful models of engaging with the public, using GMOs as the topic of discussion. The workshop brought together a diverse panel of individuals not only from fields such as anthropology, conservation biology, biotechnology, and entomology but also from communication sciences. We recommend that those interested in further information about engaging with the public on GMOs should read the workshop summary, which covers how people think about GMOS, the science information climate, and the cultural and political contexts surrounding GMOs, as well as how scientists should engage in dialogues about GMOs with the public. The workshop summary and other helpful materials are freely available at http://nas-sites.org/publicinterfaces/roundtable/events/gmointerfaces/.

audience members cannot understand complex ideas).

Don't Overreach

Good science communicators are confident in their expertise and are able to explain what they know and how they know it. Crucially, they also recognize when answers to questions exceed their own expertise, and when questions go beyond the realm of science itself. For example, while science can answer whether the GM products currently on the market pose any health risks to consumers, it cannot answer a host of ethical, legal, and social questions that concern the public. Scientists should anticipate such questions, as well as queries about their own personal views and behaviors with respect to GMOs. Although they may feel compelled to answer, they need to recognize that their views are subject to the same biases as all other humans [9]. When responding to such questions, they ought to make it clear to their audiences that they are speaking as informed citizens and not as experts with unique authority in such matters.

Choose Your Audiences Wisely

Finally, although we encourage scientists to engage with the public, not every opportunity to speak about controversial issues like GMOs leads to positive outcomes for those involved. Too often, public forums devoted to controversial issues such as GMOs are constructed and advertised as a clash between 'pro'- and 'anti'-GMO forces, and scientists are often asked to defend biotechnology in these debates. We urge careful consideration of what is likely to be gained by participating in events that are explicitly framed as conflicts. We also suggest caution in accepting invitations to take part in other events that specifically frame GMO issues as a contrast between risk and safety, science and nature, farmers and industry, God and man, or good and evil. Such events may fill auditoriums, but it is not clear that they advance public understanding, and instead are likely to continue to 'problematize' GMOs in the public's imagination.

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