



Values and Transparency in Science: A View from the Philosophy of Science

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Outline

- Overview of how values can relate to science
- Three examples:
 - Study design and interpretation
 - Standards of evidence
 - Framing
- The role of transparency in addressing values:
 - Why it's important
 - Why it's more complicated than it seems



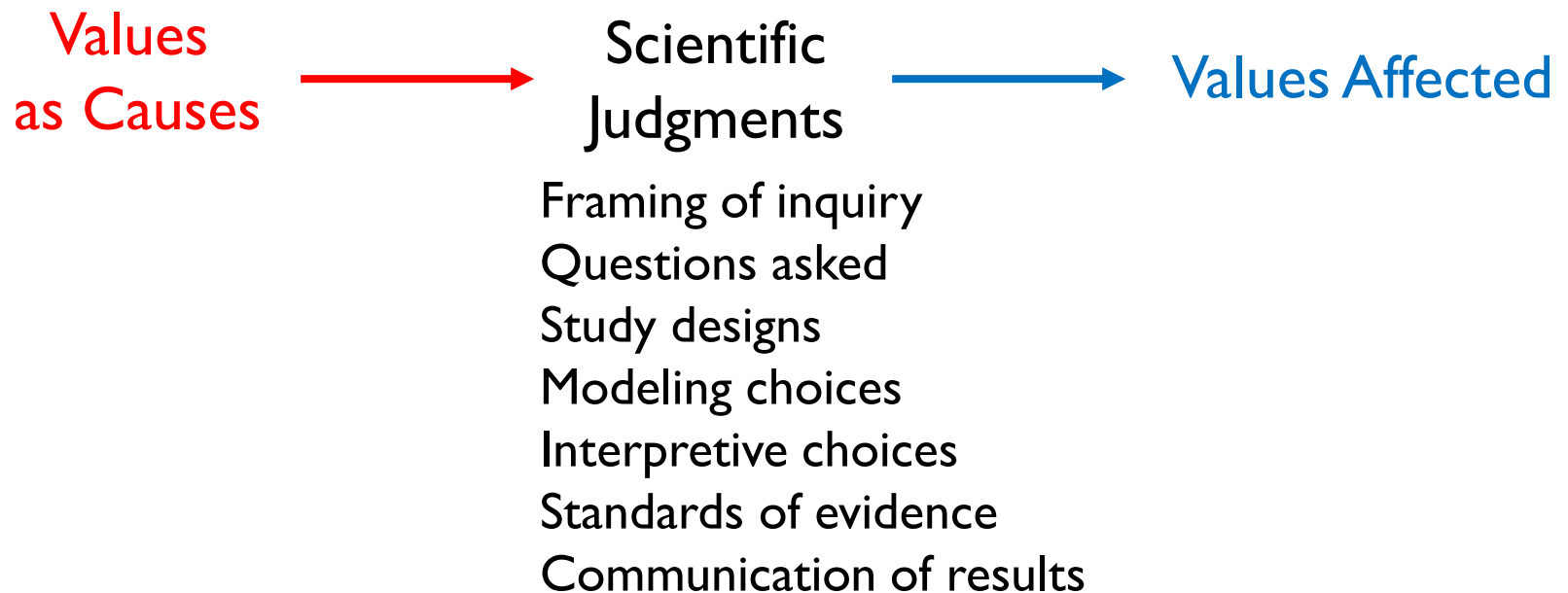
I. How Values Relate to Science

How Values Relate to Science

- When we talk about “values” in relation to science, we could mean a variety of things:
 - Worldviews (e.g., environmentalism or capitalism)
 - Ethical principles (e.g., minimizing harm or the precautionary principle)
 - Social values (e.g., public health or economic growth)
 - Personal priorities or inclinations (e.g., career aspirations or preferred hypotheses)
 - Scientific paradigms and disciplinary orientations (e.g., “the dose makes the poison”)
- I’m not worried about policing terms; I’m interested in how a wide range of “non-empirical” factors can relate to scientific practice

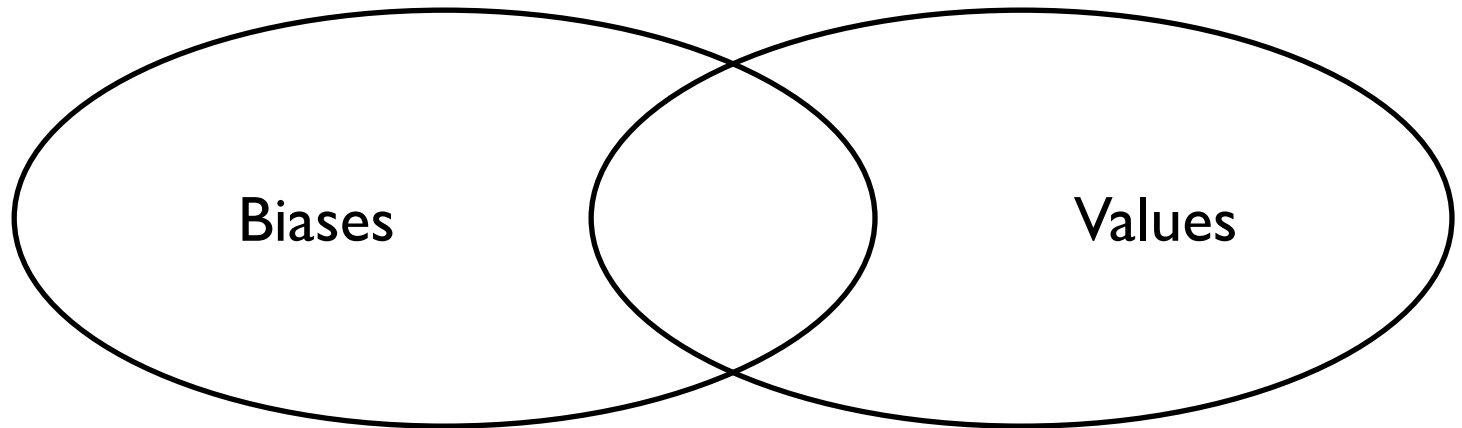
How Values Relate to Science

- Values relate to a host of unforced choices (judgments) in science, either as a **cause/motivation** or as **something affected**



How Values Relate to Science

- A final clarification:
 - Values and biases are related and can overlap but should probably not be treated as identical



Bias: systematic deviation from a standard

Value: something desirable or worthy of pursuit

- Someone could choose particular frames or questions or models without clearly deviating from a standard



II. Examples:

- Study design and interpretation
- Standards of evidence
- Framing

Study Design and Interpretation



“All (eco)toxicology studies inevitably make choices on central experimental dimensions, such as: the specific **hypotheses deemed salient** to test; the **test material** to use; the **experimental comparators**; the **endpoints** of interest; the **timeframe** for observations; the **statistical tools** applied; and the **interpretation** of results. The choices taken by scientists on any or all of these factors significantly influence the development of scientific knowledge and the appraisal of particular theories for policy”

The anglerfish deception

Fern Wickson & Brian Wynne

EMBO reports VOL 13 | NO 2 | 2012



Study Design and Interpretation

Differing views about the reliability of regulatory guideline studies versus peer-reviewed academic studies drive many controversies in toxicology

Why Public Health Agencies Cannot Depend on Good Laboratory Practices as a Criterion for Selecting Data: The Case of Bisphenol A

Environmental Health Perspectives • VOLUME 117 | NUMBER 3 | March 2009

Myers et al. 2009

Basic Exploratory Research versus Guideline-Compliant Studies Used for Hazard Evaluation and Risk Assessment: Bisphenol A as a Case Study

VOLUME 117 | NUMBER 11 | November 2009 • Environmental Health Perspectives

Tyl 2009

Study Design and Interpretation

“[W]hy is there so much controversy?”

In part, it is “a lack of consensus on what constitutes ‘adverse’; with some claiming that overt signs of toxicity must be identified whereas others consider developmental disruptions, interruption of measures of homeostasis, or other endpoints that are predictors of disease as qualifiers” (Vandenberg and Prins 2016)

Clarity in the face of confusion: new studies tip the scales on bisphenol A (BPA) ¹L. N. Vandenberg and ²G. S. Prins

ANDROLOGY

Andrology, 2016, 4, 561–564

Standards of Evidence



- Heather Douglas argues that many scientific disputes boil down to disagreements about how much evidence to demand before drawing conclusions
 - Number of studies
 - Kinds of studies
 - Statistical significance levels

Standards of Evidence

- James Hansen, 1988: “Global warming...is already happening now”
 - Alan Robock: “What bothers a lot of us is that we have a scientist telling Congress things we are reluctant to say ourselves”
 - But Hansen says he “weighed the costs of being wrong versus the costs of not talking” and concluded it was time to “stop waffling, and say that the evidence is pretty strong that the greenhouse effect is here”



Standards of Evidence

- **Glyphosate as a carcinogen:**
 - Did case-control studies provide adequate evidence?
 - EFSA thought they were unreliable, but IARC regarded them as a “reliable indication of an association”
 - Was statistical significance necessary?
 - EFSA thought so, but IARC concluded that a “significant positive trend” for some tumors was sufficient evidence, despite a lack of statistical significance

Differences in the carcinogenic evaluation of glyphosate between the International Agency for Research on Cancer (IARC) and the European Food Safety Authority (EFSA)

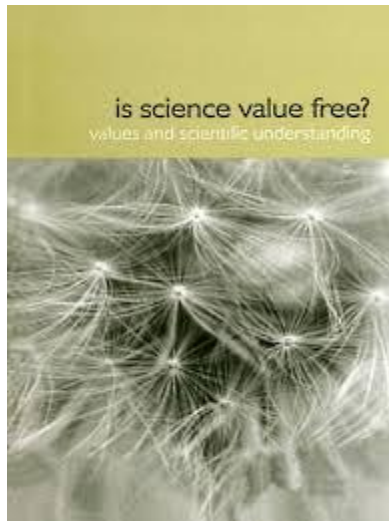
Journal of
**Epidemiology &
Community Health**

Portier et al. (2016)

Framing



- Hugh Lacey highlights different approaches to framing a problem as a significant form of judgment
 - This overarching judgment can in turn affect many other judgments



Framing

- Lacey highlights two large-scale questions that could frame agricultural research:
 - (1) How can we develop crops that have the greatest output?
 - (2) How can we use agriculture to “reduce hunger and poverty, improve rural livelihoods, and promote equitable environmentally, socially, and economically sustainable development”? (IAASTD 2009)
- These frames encourage different study designs, different standards of evidence, and different interpretations of ambiguous evidence



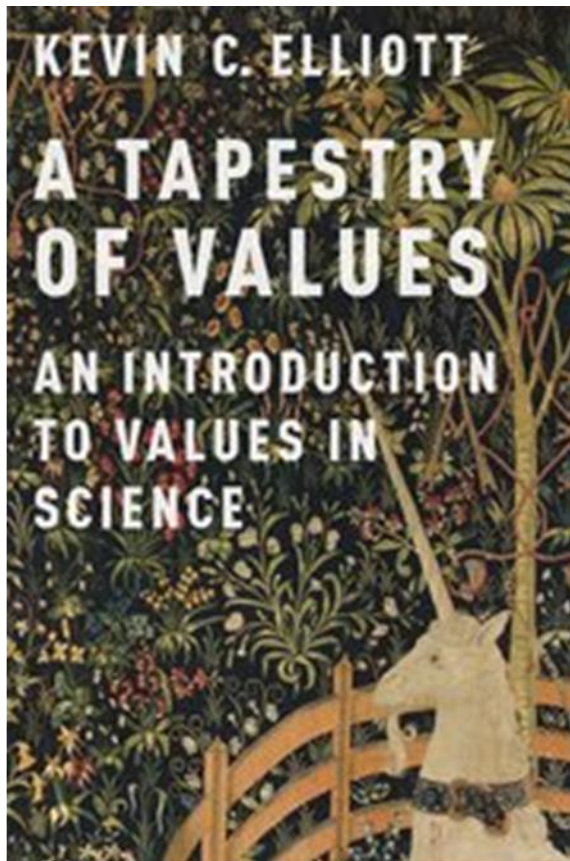
IAASTD

International Assessment of Agricultural Knowledge, Science and Technology for Development



III. Transparency as a Response

Transparency as a Response



Oxford University Press, 2017

- I have suggested responding to these value-laden judgments in three ways:
 - Making **responsible choices** that reflect ethical and social priorities
 - **Engagement** among interested and affected parties
 - Striving for **transparency** about the choices made

Transparency as a Response

- Transparency about value-laden judgments helps preserve the credibility of science because others can decide how to respond:
 - One might decide not to use the science because of the judgments made
 - One might be willing to use the science for some purposes but not others
 - One might reinterpret the science based on one's own values and preferred judgments—when that is feasible
- Potential objection: does this turn into a “free for all” where anything goes?

I don't think so

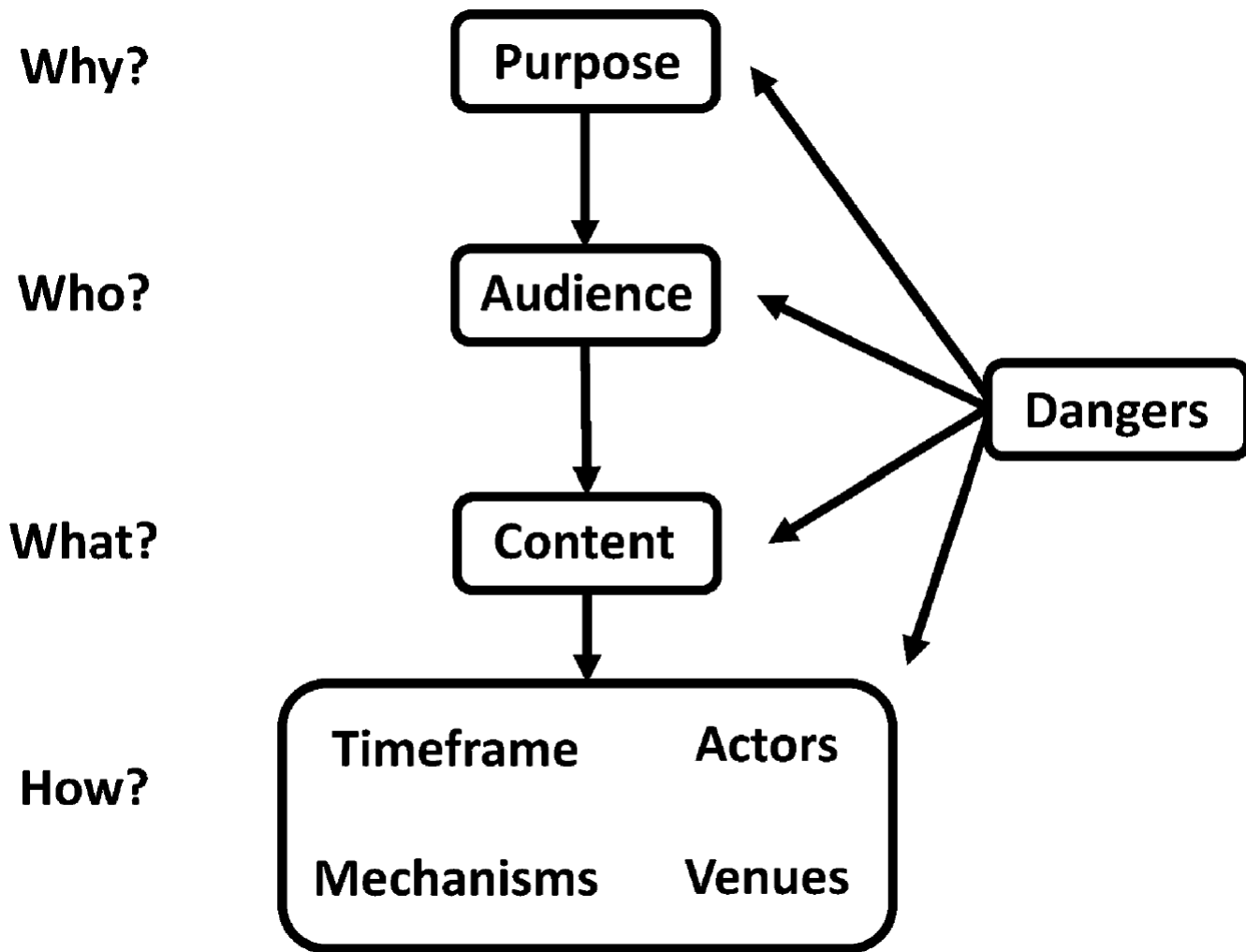
Transparency as a Response

- Unfortunately, transparency is more complicated than it might initially appear
- The pursuit of transparency itself involves difficult choices about how best to communicate about the first-order judgments associated with scientific practice

Second-order judgments about how to be transparent about first-order judgments



First-order judgments about how to do science



A Taxonomy of Transparency in Science

Kevin C. Elliott 

Canadian Journal of Philosophy (2020), 1–14
doi:[10.1017/can.2020.21](https://doi.org/10.1017/can.2020.21)

Transparency as a Response

- Some questions to consider:

(I) Who is the audience for this information?

- Other scientists?
- Policy makers?
- Members of the public?
- Specific communities (e.g., patients, fenceline communities, advocacy groups)

Making Open Science Work for Science and Society

Kevin C. Elliott¹ and David B. Resnik²

Transparency as a Response

- Some questions to consider:
 - (2) What is the content that these audiences care about?
 - Open access to study data?
 - Technical discussions of key interpretive choices and study limitations?
 - Basic clarification of key judgments (strengths, weaknesses, potential implications)?
 - Indicators of potential values (e.g., funding sources)?

Science Journalism, Value Judgments, and the Open Science Movement



Kevin C. Elliott*

Front. Commun., 20 November 2019



frontiers
in Communication

Transparency as a Response

- Some of the questions to consider:
 - (3) Who is in the best position to provide this sort of transparency?
 - When we're trying to meet the needs of varying stakeholder groups, we probably need networks of different actors and organizations...



ABOUT US

The Food Packaging Forum Foundation is a science communication organisation. The Food Packaging Forum provides independent and balanced information on issues related to food packaging and health. In doing so the Food Packaging Forum addresses all its stakeholders, including business decision makers, regulators, media and communication experts, scientists and consumers.

Conclusion

- Value-laden judgments can play an important role in science and merit attention
- Three examples:
 - Study design and interpretation
 - Standards of evidence
 - Framing
- Transparency is an important response, but it raises questions that we need to be considering
- Please feel free to contact me: **kce@msu.edu**