

Competing Epistemologies in the Construction of Popular Science

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Abstract: This paper focuses on how the personal epistemologies of scientists and science communicators shape their practices and interact with one another in the construction of popular science news. I present data from observations and interviews with scientists and reporters as they work together to produce science news to show how competing epistemologies result in compromises that—when presented to the public—might lead readers to form understandings that are at odds with disciplinary knowledge.

There is a rich thread of research in the learning sciences that deals with learners' (and educators') sense of what it means to know something. Often categorized together as studies of "epistemology" (e.g. Hofer & Pintrich, 2008), this thread is concerned with people's understandings of what it means to know and learn in a given context and how this impacts how people engage in knowledge construction. Scientific inquiry is a socio-epistemic practice. As such, science is not a collection of inerrant facts, but rather a process through which groups of people work together to construct shared knowledge by means of questioning, observation, experiment, and analysis. Researchers interested in both science education and communication argue that when teaching or communicating science it is important to make the process of scientific knowledge construction visible (e.g. Lederman, 1998). Of course, this is often not an easy task. This is particularly true when trying to communicate scientific research to the public through popular science news articles. That is because scientists must convey their research through mediators, like journalists. Journalism, too, is a socio-epistemic practice, but one with very different values, customs, and forms of discourse. Many argue that certain journalistic practices make it difficult to convey the process of science in news articles. In particular, the episodic nature of print stories is blamed for resulting in few descriptions of the scientific process or research methods (Dunwoody, 2008). Empirical studies of the content of science stories in the popular press seem to support this claim. Studies show that the majority of science stories contain little or no details about the methodological process of the research on which they report (Dimopoulos & Koulaidis, 2002). These competing socio-epistemic practices cause tensions between scientists and journalists with scientists often blaming journalists for not fully portraying the uncertainty of scientific research. Is this truly the sole fault of the journalists?

In this paper, I present research findings from a study of the individual interactions between various actors involved in science communication. In particular, this paper reports on observations and interviews with scientists and university news reporters. Four scientists were interviewed about their recently published research. The interviews took the form of semi-structured clinical interviews. The questions required the scientists to perform a variety of tasks, including describing their research in detail, explaining their beliefs about communicating science to the public, and making judgments about the most and least important aspects of the research for the public to understand. Three news reporters, assigned by the university news service to write about the research of the four scientists, were individually interviewed about their understanding of the research, their process of writing about the research, and their beliefs about what aspects of the research will appeal to the public. Furthermore, the interactions between the scientists and the news reporters were observed and video recorded. These interactions usually took the form of interviews of the scientists by the reporters. Additionally, email exchanges and notes between the scientists and the reporters were collected.

An analysis of the interviews and observations revealed that the reporters often struggled to understand the methods employed in the research. However, during interactions with the reporters, the scientists often left out details of the methods. In particular, they often failed to explain the justifications for many methodological decisions. Furthermore, when asked during interviews what is the least important part of the research for the public to understand, the scientists frequently referenced methodological details. However, when the scientists explained their research to me they gave much more detail about methods, justified their decisions more frequently, and provided caveats.

Gilbert & Mulkay (1985) argue that scientists frequently adopt two conflicting discursive repertoires within their practice. The *contingent repertoire* treats research as socially constructed and tentative, and treats claims as open for debate. The *empiricist repertoire* treats research as objective and unproblematic, and treats claims as confirmed facts. The contingent repertoire is often seen as "private" as it is commonly adopted between scientists themselves, while the empiricist repertoire is frequently used in "public" communications (Gilbert & Mulkay, 1985). I believe the differences in the depth of methodological description shows that the scientists in this study were treating me as a fellow scientist and, thus, utilizing their contingent repertoire. Whereas, interacting with the reporters they adopted the empiricist repertoire.

I argue that the mechanism that underlies these shifts in discourse is the instantiation of particular *epistemological resources* (Hammer & Elby, 2002) depending on the function and intent of their presentation of their research and claims. When presenting to the reporters, the participant scientists attempt to convey their findings as legitimate and important, and they are concerned with their knowledge claims being accepted rather than understood. However, when explaining their research to me, the participant scientists are less concerned with legitimizing their work, after all I am no power to aid in communicating their research. Instead, they treated me as a “knowledgeable outsider” who can appreciate the nitty-gritty details of laboratory life and the scientific process. So, the lack of provided details about methods can be seen, as at least partially, the result of variation within the discursive and epistemic practices of science. However, that only explains the scientists’ failure to provide details, not the journalists’ failure to ask for more detail.

Journalists also utilize a variety of roles within their epistemic practice. For example, Fahy & Nisbet (2011) map nine distinct roles—each with particular commitments and practices—that a journalist might adopt. Most important for my analysis is the role of *conduit* that accurately explains scientific information. When acting as conduits, journalists concentrate on portraying information from a single source as accurately as possible, rather than attempting to evaluate the validity of that information through multiple sources. This shifts the focus from whether the claim is supported by evidence to whether there is a match between what a source says and what a journalist presents. In this way, the journalist acts as a “neutral transmitter” of information (Dunwoody, 2008). This appears to be the stance adopted by the participant reporters. In essence, the participant reporters are treating the participant scientists as *epistemic authorities*—the most significant sources of information in the formation of knowledge (Kruglanski, 1989). One can imagine reporters who, instead of given sole epistemic authority to the scientist, relies on other sources and their own perspectives. These reporters may have demanded the additional information needed to make sense of the methods. In fact, other journalistic roles, such as *watchdog* and *interpretive reporter* (Fahy & Nisbet, 2011), do adopt such epistemologies. Of course, the same university employs both the reporters and the scientists in this study. The journalists have investment in “selling” the research, rather than engaging critically with it, but this results in representations that are difficult to understand or justify.

The lack of detailed methods in popular science news likely has many contributing factors. In this paper, I have argued that one of those factors is a network of competing epistemologies both within and between epistemic practices. Both scientists and journalists rely on multiple epistemologies and often, as is the case with the participants in this study; their epistemologies work together to construct understandings that obfuscate details of process in representations of science. When these representations are presented to the public they might lead readers to form understandings that are at odds with disciplinary knowledge (Corbett & Durfee, 2004). This is neither the fault of the scientist, the journalist, nor the lay public. Rather, all actors can be viewed as the source of failure and success in the communication of science. If the goal is to increase successful communication and public science engagement then scientists and journalists need work together to begin devising ways to coordinate epistemological resources to form a joint epistemic practice.

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