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Manufacturing doubt: journalists' roles and the construction of ignorance in a scientific controversy

S. Holly Stocking and Lisa W. Holstein

In recent decades, corporate and special interests have developed a wide repertoire of methods to manufacture doubt about science that threatens their interests. In the case presented here, a trade association issued a rich assortment of rhetorical claims intended to sow public confusion about university studies that threatened to undermine its industry's activities. Journalists' use of these claims appeared to vary largely as a function of their perceptions of their journalistic roles and of their audiences, though their knowledge of science also appeared to play a role. Our findings offer insight into how and why reporters respond to rhetorical claims about scientific ignorance and uncertainty that actors use to discredit threatening science. In so doing, they contribute to growing scholarship on journalists' contributions to the social construction of ignorance in scientific controversies.

1. Introduction

When the tobacco industry launched its campaign to “manufacture doubt” on the scientific link between smoking and cancer in the 1950s (Proctor, 1995; Miller, 1992), few could have predicted the eventual influence of such tactics on the shape of scientific controversies. In the years since, corporate interests, citizen activists, and political groups alike have adopted and expanded the tobacco industry's early doubt-production strategies, actively working—and actively using the news media—to discredit and discourage science that threatens their interests. Perhaps the most prominent recent example is the fossil fuel industry's successful efforts to manufacture doubt about global warming despite broad scientific consensus (Mooney, 2005; Corbett and Durfee, 2004; Zehr, 2000; Gelbspan, 1997; Beder, 1997; Trumbo, 1996), and even more recent efforts by conservative religious interests to amplify gaps in Darwin's theory of evolution (Mooney and Nisbet, 2005; Shanks, 2004; Pennock, 2001) despite its standing as the central organizing concept of biology. Earlier campaigns included efforts to sow doubt about scientific evidence that CFCs (chlorofluorocarbons) were damaging the ozone (Brown and Lyon, 1992), an issue in which environmentalists also used claims of scientific uncertainty to argue for halting industry's activities (Smithson, 1980).

To Australian sociologist Michael Smithson, it is strategic campaigns such as these that highlight the fact that scientific ignorance, far from being simply something that scientists work to erase, is often intentionally constructed (Smithson, 1993, 1989). Scientists themselves, when they appeal to funding agencies, are obliged under institutionalized norms to “specify ignorance” (Merton, 1987) in order to, for example, acquire the resources needed to generate knowledge; they do this by pointing out gaps in knowledge where more research is needed. Scientists may be

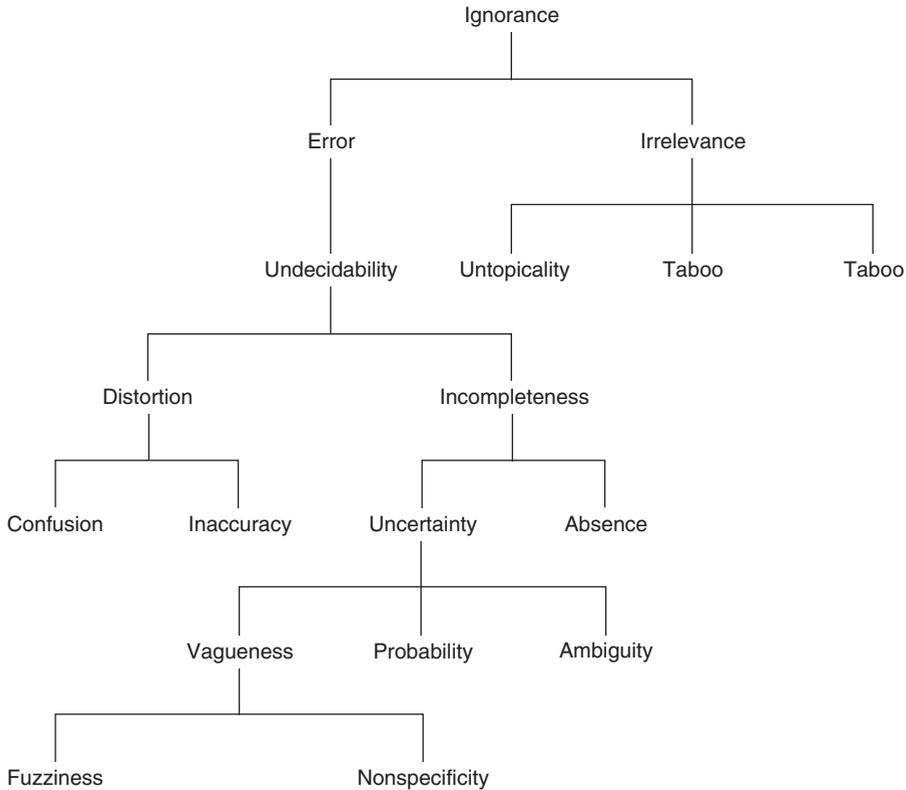


Figure 1. Smithson's taxonomy of ignorance

Source: From *Ignorance and Uncertainty: Emerging Paradigms* (p. 9) by Michael Smithson, 1989, New York: Springer-Verlag. Reprinted with permission.

called upon to attend to their “knowledge of the limitations of knowledge” itself (cf. Knorr Cetina, 1999: 252) when they have scientific problems they consider insoluble thrust upon them by policymakers and so must define and even measure parameters of the unknown—to specify “useable ignorance” (Ravetz, 1987). Especially in the public sphere, where science is increasingly part of political debate, various actors may try to halt or continue a potentially harmful activity by making “ignorance appeals,” or claims that something is not known. Actors opposed to particular kinds of knowledge may, in addition to making ignorance appeals, actively work to inhibit the acquisition or development of that knowledge by seeking to create various kinds of “ignorance arrangements” whereby knowledge threatening to their interests is not developed or is rendered effectively invisible.¹

Making points such as these, Smithson, in his 1989 work *Ignorance and Uncertainty: Emerging Paradigms*, invited scholars in science studies to turn their attention from the sociology of scientific knowledge (SSK) to the sociology of scientific ignorance (SSI). His work toward unpacking the concept of ignorance and specifying its dimensions (see Figure 1) moves beyond the research traditions of SSK (cf. Ravetz, 1996; Collins and Pinch, 1993; Collins, 1983; Mulkay, 1979) to consider ignorance as a social construction, whether as a varied and useful tool in the workings of science, a purposeful social negotiation by the lay public (Irwin and Wynn, 1996; Wynne, 1993)—or a strategic tool mobilized in the service of various private interests, the strand emphasized in this case study.

Accepting Smithson's invitation, especially with respect to the claims-making aspects of his reasoning and its (mostly implied) importance for science news reporting, we responded by suggesting that researchers should specify the rhetorical claims that are used to construct scientific ignorance in science and public policy and, in particular, to explore if and how ignorance claims are reconstructed in the news accounts of journalists. In a special issue devoted to "Understanding Ignorance" of the journal *Knowledge*, we argued that attention to scientific ignorance would significantly enhance our understanding of the contours of scientific knowledge, no less than understanding the value of negative space allows artists to better perceive and render the objects they are drawing (Stocking and Holstein, 1993).

Two years later, in an entirely independent move, historian of science Robert Proctor published one of the first and most extensive studies of the social construction of scientific ignorance. In his 1995 book *Cancer Wars*, Proctor painstakingly documented the multifaceted political work that led to the US government's investment of the lion's share of its monies in studies of biological mechanisms and cures for the disease. In responding to the claims of powerful professional, economic, and activist interest groups and putting the bulk of public resources behind this line of research, the government thus actively participated in the construction of ignorance, in the sense of fostering an absence of knowledge with respect to environmental and industrial causes of cancer and its prevention. Proctor also suggested that studies of ignorance would complement established studies of the social construction of knowledge. Ignorance, he argued, "has a distinct and changing political geography that is often an excellent indicator of the politics of knowledge," and he called for "a political agnatology to complement our political epistemologies" (Proctor, 1995: 8).

The case study we describe here follows up on these multidisciplinary appeals for scholarship on the social construction of scientific ignorance. In particular, it focuses on a case in which one industry, in the absence of its own countervailing knowledge claims, countered research it found threatening by issuing a broad set of claims about purported unknowns and uncertainties in the science. The industry further undertook a range of political and legal tactics intended to interrupt if not stop the research. It created, in short, a multifaceted marketing campaign intended to construct ignorance in ways identified by Stocking and Holstein and by Proctor. In this article, we describe the range of tactics industry used in its campaign. However, the primary focus of our investigation, as in our earlier call for research, is on the rhetorical claims that were directed at journalists and journalists' responses to these claims.

Indeed, our emphasis on journalists' use of industry's claims is based on the argument outlined in Stocking and Holstein (1993) that claims-making often lies at the heart of intentional efforts to construct scientific ignorance. Our concern for journalists' responses to claims intended to amplify scientific unknowns and uncertainties arises from the view, also advanced by Nelkin (1994, 1995), Dunwoody (1999), Stocking (1999) and others in Friedman et al. (1999), that how journalists convey such claims in their news stories can have a major bearing on the public's understanding of science that addresses potential or existing social problems and on subsequent public policymaking.

Our goal is to begin to create a framework for understanding how and why journalists magnify, downplay, emphasize or ignore attempts to manufacture doubt in a scientific controversy. To that end, we also explore journalists' professional interests by focusing on their perceptions of their roles and audiences. It is our hope that the findings from this case study will enhance our understanding of the particular nature of rhetorical claims that are so often used to discredit and inhibit science that threatens industry interests in public health and environmental controversies. Even more significantly, it is our hope, given the relative lack of scholarly attention to the matter,² that the findings will shed much-needed light on the conditions under which journalists, who are often sought out as allies in industry's efforts, do

and do not participate with industry and other powerful actors in the social construction of scientific ignorance.

2. The case

Our case centers on a site of intense public controversy that arose in 1999 in the aftermath of more than a decade of explosive growth of industrial hog production in North Carolina. The state's swine herd grew from about 3 million to more than 10 million in less than 10 years, from the mid-1980s to the mid-1990s, while the number of producers declined from more than 20,000 individual farms to fewer than 5,000 (Morgan, 1998).³ In these factory-style farms, row after row of long, low metal barns house hundreds of hogs each, with as many as 10,000 at a single site. Many tons of hog waste fall through slats in the floors of the barns and are funneled into vast open-air pits, called "lagoons" by the industry, where the waste decomposes, releasing noxious emissions and particulates into the air. Liquid waste is sprayed on nearby fields via a system similar to a large-scale pop-up lawn irrigation system.

A few years earlier, responding to major breaches of hog waste-holding lagoons and extensive documented fish kills in popular recreational and scenic rivers, the *Raleigh News & Observer* had won a Pulitzer Prize for its investigations of the industry (Stith et al., 1995). A moratorium on building or expanding farms with 250 or more hogs had been imposed, and the formerly quiescent state legislature had grown resistant to the once powerful industry lobby (Stinneford, 1997). North Carolina had experienced "the most rapid expansion of corporate swine production in the country" (Thu and Durrenberger, 1998: 13), but it had been brought to a screeching halt. The pork industry understandably felt increasingly on the defensive.

It was into this volatile political environment that epidemiologist Steven Wing of the University of North Carolina (UNC) at Chapel Hill's School of Public Health launched two studies (Crane, 1999; Williamson, 1999) that attracted the full force of a broadly orchestrated "ignorance campaign" by the pork industry.

Wing had several years earlier connected with an African-American community activist group, Concerned Citizens of Tillery (CCT), which had been working with little success to gain official attention to health problems that they believed were linked to living near factory hog farms. The CCT also suspected that these facilities were disproportionately sited in economically depressed African-American communities. But without scientific evidence to back them up, their complaints had been dismissed by legislators and even by some journalists they had attempted to enlist to draw attention to their cause (Grant, 2004).

As a public health researcher, Wing was sensitive to the health concerns of disempowered publics (Wing, 2004). In partnership with CCT, he sought and won a grant under a National Institute of Environmental Health Sciences "Environmental Justice: Partnerships for Communication" program. This program has as its mission the encouragement of community involvement in defining and investigating environmental health problems, particularly involving low-income and minority populations (Srinivasan, 2004). The Environmental Justice study results, made public in March 1999 by a news release from the University of North Carolina at Chapel Hill's office of news services (Williamson, 1999), supported the claims that intensive hog production facilities were differentially sited in areas populated by poor African-Americans.⁴

Wing's second research project, a Rural Health Survey undertaken in partnership with the same community group, was sponsored by the North Carolina Department of Health and Human Services (HHS), which already had stepped up its own testing program to document potentially dangerous health effects of industrialized hog farming on groundwater and wells

(Crane, 1999). The Rural Health Survey, announced at an HHS news conference just two months after the Environmental Justice study was released, found that neighbors of an industrial hog production facility reported a comparatively higher frequency of respiratory and gastrointestinal complaints than did residents of two agricultural communities without industrial hog farms.⁵

The statewide hog industry trade association, the North Carolina Pork Council, responded to both studies by characterizing the scientist as politically motivated and the studies as “pseudo-science” filled with holes and errors, charges they swiftly brought to the attention of the news media with rapidly issued news releases and follow-up interviews with reporters (Cherry and Mumford, 1999a, 1999b). The Pork Council supplemented these media attacks with behind-the-scenes tactics designed to disrupt the scientist’s research.

We first learned of this case through an article in the peer-reviewed journal of the National Institute of Environmental Health Sciences, which described in extensive detail the fallout from the release of these two studies (Wing, 2002). The scientist had written the article with the intention of sounding a warning to colleagues as well as unveiling the methods used by well-funded industrial interests threatened by research findings.

The story this scientist told was sobering. Specifically, he recounted in his article how the North Carolina pork industry, including state legislators allied with the industry, had expressed concerns about his research through every level of his institutional superiors, from his dean to the Chapel Hill chancellor’s office, the UNC-system president’s staff, and the Board of Trustees (where the pork industry was prominently represented). At one point, the scientist was summoned to appear before a committee of the state General Assembly to answer hostile questions about his Environmental Justice research, which included questioning about state funds used in his research. He further recounted how the industry also approached his National Institutes of Health funding agency through North Carolina’s Congressional delegation with questions about his federal grant.

In separate threats of legal action, after his legislative testimony about the Environmental Justice study, the Pork Council’s executive director verbally raised the prospect of a lawsuit with the scientist. Following the release of the Rural Health Survey, the scientist received a formal letter from the Pork Council’s legal counsel stating that they were assessing whether his statements had defamed the industry (Associated Press, 1999a; *News & Observer*, 1999; Wagner, 1999). In addition, the Pork Council demanded copies of all of the scientist’s raw data for the Rural Health Survey under North Carolina’s open records law. The university’s legal counsel ordered the scientist to comply despite promises of confidentiality that had been extended to the study participants, a not uncommon institutional response to attacks on faculty research where large sums of money are perceived to be at risk (Kuehn, 2004). Ultimately, after countless hours of the scientist’s time in meetings and negotiations, a compromise was reached that, while it protected his informants’ confidentiality, also required many more hours to redact reams of raw data and assemble documents for turning over to the Pork Council.

The Pork Council, it appeared—and as we later confirmed in an interview with the subsequent Council leadership (Carpenter, 2004)—had made use of a wide array of claims and tactics intentionally modeled on the strategies used so successfully in earlier years by the tobacco industry, all designed to discredit, interrupt and even stop the UNC scientist’s research. This was consistent with the array of silencing tactics that Proctor (1995) had identified in various incidents in the “cancer wars” and that investigative journalists (Mooney, 2005; Rampton and Stauber, 2001; Mundy, 2001; Gelbspan, 1997; Stauber and Rampton, 1995) and other academics (Kuehn, 2004; Bok, 2003; Petersen, 2002; Beder, 1997) have documented in a wide-ranging variety of other cases.

But the beleaguered scientist's article said little about industry efforts to enlist the news media to disseminate claims that attacked and attempted to discredit the science he had produced. It did not specify the content of the various ignorance claims that industry made. Nor did the article address journalists' responses to industry's rhetorical initiatives. Given our interest in rhetorical constructions of scientific ignorance and journalists' contributions to such constructions, this was an absence we were interested in remedying.

3. Research questions

Industry claims

Our suspicion, consistent with Smithson's taxonomy of ignorance (Smithson, 1989: see Figure 1) and with Stocking and Holstein's (1993) argument for the instrumental uses of scientific ignorance and uncertainty to rhetorically attack threatening research, was that industry would claim to journalists that the research was tainted by error, incompleteness, irrelevance and uncertainty and was therefore unsound, untrustworthy and open to doubt. On the basis of this earlier work, we anticipated that some of these claims—assertions about the various unknowns and uncertainties in science, which Stocking and Holstein (1993) have labeled "ignorance claims"—might even be appropriated from the scientist's own discourse. In addition, consistent with studies of scientists' discourse in scientific controversies (Collins and Pinch, 1982, 1993; Collins, 1983), it was possible that industry might go so far as to reject the research by calling it "junk science" or "pseudo-science." However, just which of these ignorance claims, if any, industry would use in this case wasn't at all clear.

Journalists' responses to industry claims

Our expectations for journalists as we began this exploratory research were even less clear. We suspected journalists would have attended to such claims if made, though again, we weren't sure how. Research has suggested that journalists as a group typically have great respect for expert and scientific knowledge (Weigold, 2001), but their generally limited science training may not prepare them for rigorous analysis of scientific studies or, we might add, for rigorous analysis of competing knowledge and ignorance claims. The fact that science stories in the media have been found to contain more errors and inaccuracies than general news reporting (Tankard and Ryan, 1974) suggests that journalists' abilities to deal with science stories are limited relative to their abilities to deal with other kinds of news. Moreover, the demanding routines of news work and the professional norms of journalism (Fishman, 1980; Gans, 1980; Epstein, 1973) make journalists deeply vulnerable to manipulation by claims-makers who attack science that threatens their interests. This may be especially true if the claims-makers have official standing (Berkowitz, 1992; Ericson et al., 1989).

But claims-makers who offer contrary views, however outrageous, often are quoted in news stories because their inclusion reinforces the impression of journalistic objectivity, a hallowed ideal and a defining norm of journalists' professional values (Reese, 1990; Schiller, 1981; Hackett, 1984; Schudson, 1978). This attachment to the "strategic ritual of objectivity" (Tuchman, 1972) also has been implicated in the success of the tobacco industry in using journalists to advance their interest in manufacturing doubt about scientific findings when reporting on the links between smoking and cancer (Miller, 1992). Indeed, journalists' professional commitment to the routine convention of balancing opposing claims, regardless of the relative merit of the claims or claims-makers (Dunwoody, 1999; Stocking, 1999;

Dearing, 1995; Wilkins, 1993), has been connected to the documented distortions of scientific knowledge about global warming and in the apparent confusion of the public and policymakers with respect to this issue (Boykoff and Boykoff, 2004; Zehr, 2000).

Given this research, there was reason to believe journalists would serve as unwitting allies in the trade association's attempts to construct scientific ignorance in this case. On the other hand, the scientist's research in this case was presented as "new findings," and prior work on discovery stories has suggested that journalists' accounts of new scientific findings often fail to mention the unknowns and uncertainties of the science (Singer and Endreny, 1993; Fahnestock, 1986). Thus there also existed some possibility that journalists might downplay industry's claims.

Finally, we were interested in uncovering the factors that might explain differences, if any, in how industry's claims were used by journalists in this case. We suspected that journalists' professional interests would have an impact on how they used ignorance claims in their stories (Stocking and Holstein, 1993; Stocking et al., 1992), although we were unsure just which interests might come into play or how important interests might prove to be.

4. Research methods

We began our search for evidence of industry claims with extensive archive searches, initially online and supplemented with site visits to North Carolina newspapers (for logistical reasons, at this exploratory stage of the research we did not examine broadcast media). We also gathered from organization websites and from public relations staff members a full set of copies of the news releases about the studies produced by the University of North Carolina at Chapel Hill and the state Department of Health and Human Services, and copies of the official statements issued by the NC Pork Council in response to those news releases. Departing from prior studies that have relied almost exclusively on textual analysis, we supplemented our analysis of the stories with informal, face-to-face interviews (and one by telephone) with reporters who had covered one or both of the studies for the *Raleigh News & Observer*, the *Fayetteville Observer*, and the *Charlotte Observer*; an editorial writer for the *Fayetteville Observer*; and the former Raleigh bureau chief for the Associated Press wire service, which our archive research identified as the source of the majority of newspaper stories printed around the state.

Although the primary focus of this article is on journalists' use of industry claims, our findings also are informed by in-depth interviews with the scientist and the leader of the citizen activist group involved in the research; the UNC-Chapel Hill news bureau science writer; the administrator at the National Institute of Environmental Health Sciences responsible for the Environmental Justice grants program; and initial conversations with researchers and public relations staff at North Carolina State University. We also visited several key sites in North Carolina, including the rural headquarters of Concerned Citizens of Tillery; and, with NC Pork Council staff, toured an industrialized hog production facility and interviewed its owners, long-time members of the agriculture community.

The journalists we interviewed represented the major print media in the state in which journalists had been assigned (or assigned themselves) to cover these two studies. In a fairly standard set of questions, we probed for factors that might explain their handling of industry's claims. In particular, we explored their perceptions of their journalistic roles and of the publics they served as well as their training in and understanding of science. Although four years had passed since the height of this phase of the hog farming controversy, events remained surprisingly clear in most of the journalists' minds, leading us toward some insights we might

Sample Pork Industry Claims

Claims about the Environmental Justice study:

From Pork Council news releases¹:

- “Pseudo-science discredits hog farmers” (headline on the release).
- The study “analyzed 10-year-old census data, excluded the state’s largest population centers and disregarded the natural resource and economic factors associated with farm placement...”
- “In his determination to discredit hog farmers Dr. Wing conveniently ignored the facts.”
- “In his quest to substantiate the inflammatory accusations of one of his study partners...”
- The researcher “disregarded the natural resource and economic factors associated with farm placement.”
- For the researcher “to imply that these hard-working citizens are racists who purposely harm their lower-income neighbors is, (*sic*) not only irresponsible, but immoral.”
- If the researcher “were truly concerned for the human health condition of poor, rural communities, he would have utilized his taxpayer resources to develop public health and education programs to benefit those communities.”
- “We should expect better from our public researchers.”

Pork industry claims reported in journalists’ accounts²:

- The researcher “should also have examined the money hog farms bring to rural counties.”³
- “I don’t know where this guy wants us to put them—in downtown Raleigh?”⁴
- A Pork Council executive “said he’s heard the argument before and he still doubts it.”⁵
- “The land is often cheaper in rural areas where you can’t do anything else with it.”⁶
- “The whole issue...is ludicrous.”⁷

Claims about the Rural Health Survey:

From Pork Council news releases⁸:

- “To suggest without scientific documentation that farmers are a threat to their neighbors is irresponsible....”
- “Researchers at UNC, whose anti-farm bias is well-noted....”
- “A poll of hand-selected people....”
- Dept. of Health and Human Services is asked to “release whatever reputable scientific studies they have to substantiate their claims....”
- “They freely admit they did not consider the multitude of factors, such as age or medical history, which could result in...illnesses.”
- The researchers “have failed to make a direct scientific link between common health ailments and proximity to hog farms.”

Pork industry claims reported in journalists’ accounts:

- “They don’t have one iota of data...that will substantiate their claims.”⁹
- The researcher “used a ‘community group’ to help select people for his survey.”¹⁰
- “Pork producers of this state are getting real tired of people using pseudoscience and it’s got to stop.”¹¹
- Study was “too narrow and unscientific.”¹²
- “Just saying these people live near the hog farm and then saying that could have caused [their ailments] is not good enough.”¹³
- “It’s not safe to make a finding about a whole industry based on a handful of people near one hog farm.”¹⁴
- “I think there’s absolutely no credibility in the survey whatsoever.”¹⁵
- “They are going to have to provide some real health data or they are going to be defending it legally.”¹⁶

(continued)

Figure 2 (continued)

- The study “amounts to a community survey that relied on people’s memory.”¹⁷
- “It’s just junk science.”¹⁸
- “From a tax standpoint, that money was wasted if you’re trying to prove something.”¹⁹
- Study is “an anti-hog crusade in search of facts.”²⁰

Figure 2 Sample pork industry claims.

¹Cherry and Mumford, 1999a. ²All news stories were published 18 March 1999. ³Henderson, 1999a. ⁴Henderson, 1999a. ⁵Shiffer, 1999. ⁶Shiffer, 1999. ⁷Shiffer, 1999. ⁸Cherry and Mumford, 1999b. ⁹Associated Press, 1999b. ¹⁰Associated Press, 1999b. ¹¹Associated Press, 1999b. ¹²Obermayer, 1999. ¹³Obermayer, 1999. ¹⁴Obermayer, 1999. ¹⁵Mitchell, 1999. ¹⁶Mitchell, 1999. ¹⁷Williams, 1999b. ¹⁸Mooneyham, 2000. ¹⁹Mooneyham, 2000. ²⁰Mooneyham, 2000.

not have gained had we limited ourselves to what we found in the online and on-site archives. In some cases we checked journalists’ assertions against additional evidence in the archives. We also conducted interviews at their Raleigh headquarters with the leadership of the industry trade association, which by the time we did our research had changed hands and appeared to want to distance itself from previous tactics. Although we were able to speak by telephone with the former public relations director to clarify some points of fact (Mumford, 2006), the former executive director of the NC Pork Council who presided over the campaign reported in this case adamantly refused to speak with us.

5. Findings

Industry claims

Industry’s claims were sweeping and sometimes vitriolic, both in the news releases and in statements from Pork Council representatives that were reported in the journalists’ news stories (see Figure 2). Some of the claims were descriptive, presenting an alternative version of the meaning of the findings, although unconstrained by any need to offer empirical support for such speculation; others were prescriptive, stating what should or should not have been done instead. They included:

- attacks on research methods, including on the population examined (“a poll of hand-selected people”) and on variables that had been excluded from the analysis (the researcher “disregarded the natural resource and economic factors associated with farm placement”);
- challenges to the scientist’s conclusion that the data supported an association between industrial hog farms and the public’s health (“they don’t have one iota of data ... that will substantiate their claims” and “it’s not safe to make a finding about a whole industry based on a handful of people near one hog farm”);
- transformation of the normal caveats of scientific discourse into an implied admission of guilt (the researchers “freely admit they did not consider the multitude of factors, such as age or medical history, which would result in ... illnesses”);
- claims that the research was “pseudo-science”;
- claims that the scientist was biased and on a “quest to substantiate the inflammatory accusations of one of his study partners”;
- claims that the researcher’s university harbored an “anti-farm bias”; and
- use of ironic quotation marks to discredit the scientist’s community collaborators (the researcher “used a ‘community group’ to help select people for his survey”).

In short, industry's intentional efforts to manufacture doubt in this case included charges that the study data were biased and incomplete, that the conclusions were unwarranted, and that the scientist, his institution and collaborators were on an unscientific crusade to discredit the hog industry.

Journalists' responses to industry claims

All the journalists gave at least some hearing to industry's ignorance claims. However, there also were compelling differences in journalists' treatments of these claims. In our interviews with journalists, these differences appeared to be most strongly related to how the journalists perceived their roles. In addition, their treatment of industry's claims appeared to be related in some degree to perceptions of their audiences. It is to those differences that seem to be a function of journalists' role perceptions that we now turn.

Journalists' roles

Weaver and Wilhoit, drawing on a long tradition of research that considers the role of journalists in society (and explicitly modeled on Johnstone et al., 1976), have found in their continuing national survey research over two decades that journalists' "core belief systems" (Weaver and Wilhoit, 1996: 137) can be roughly categorized under four attitudinal clusters.⁶ They caution that the categories, as described below, are not mutually exclusive for any particular individual and that most journalists have pluralistic attitudes that combine two or even three of these clusters. We found this, too. But for the journalists we have interviewed, their accounts of this controversy—their use of industry ignorance claims in particular—are highly consistent with these roles:

- *Disseminator*. The disseminator journalist sees his or her primary role as getting the straight facts and getting them to the public quickly (Weaver and Wilhoit, 1996: 138).
- *Interpretive/Investigative*. The interpretive/investigative journalist sees his or her role as "investigating 'the truth about facts'" and providing useful context (p. 138).
- *Populist Mobilizer*. In the spirit of "public journalism," the populist mobilizer journalist seeks to engage audiences with entertaining stories that give a voice to the public and set political agendas (p. 140).
- *Adversarial*. The adversarial journalist sees his or her role as remaining "constantly skeptical" of public officials and special interests (p. 139).

Examples from some of our interviews presented below reveal some of the consistencies we found between journalists' perceptions of their roles and how they chose to make use of industry's ignorance claims as a defining element of what was left in and what was left out of their stories.

Disseminator

The disseminator role, which emphasized getting verifiable facts to the public quickly, was noticeably embraced, not surprisingly, by an Associated Press (AP) wire service reporter. This reporter believed it was his obligation to publish the views of all parties to the hog research controversy, including the pork industry's "pseudo-science" label and its charges that the University of North Carolina had an "anti-farm bias" in his story on the Rural Health Survey. He felt the public would consider the source and would not deem such claims credible anyway. In his view, it was an AP reporter's job to get the story on the wire fast and first, and to present all sides of a controversy when possible, even if one side (the scientist's side, he

believed) happened to be more credible than the other. For example, when the state health department first issued the news release about the Rural Health Survey, the AP journalist quickly wrote a conventional, one-sided “discovery” story (“here’s what the study found and why it’s significant”). This initial news story (Associated Press, 1999b) was followed up with a more extensive story (Patterson, 1999) that presented both sides—the scientist’s knowledge claims and industry’s ignorance claims—once the Pork Council weighed in with its criticisms. The public, this journalist believed, would filter out what he characterized as industry’s self-serving claims; it was the journalist’s job to provide the information about who said what, and let the public decide (Patterson, 2004).

Interpretive/investigative

While most of the journalists in our case, as with the journalists in Weaver and Wilhoit’s survey, were committed to some elements of the interpretive/investigative role, only the editorial writer for the Fayetteville newspaper carried out independent investigation with respect to the claims in this controversy. Science can be difficult for ordinary reporters to decipher and make sense of, but this veteran journalist was a sophisticated consumer of science. He had spent a great deal of time studying the hog farm issue and formulating what he considered to be a realistic, measured assessment of all sides and of the science in this case and, as an editorial writer, he had a platform to present his assessment.

Like a populist mobilizer journalist, he sought to set the agenda for policymakers, but to do so, he first independently investigated and interpreted “the truth about the facts” and put them into broader and historical context. In reflecting on his own treatment of this controversy, this journalist noted that reporters can get taken in with the *appearance* of fairness and so present an unfair story; as he defined it: “You don’t add truth to a lie and divide by two” (Smith, 2004). Though his newspaper was in the heart of North Carolina’s “hog country,” his tightly reasoned editorial on the Environmental Justice research disregarded all of the industry’s ignorance claims, calling the study that the Pork Council had vilified a “meticulous piece of work” and further asserting that “a heavy burden of proof awaits those who would attempt a responsible attack on it” (*Fayetteville Observer*, 1999).

Populist mobilizer

The populist mobilizer is a new role cluster that Weaver and Wilhoit have added to their classification scheme in the latest iteration of the national surveys, with very old roots in the earliest days of the crusading spirit in US journalism (Nord, 1986). One of the journalists we interviewed, a reporter for the Fayetteville newspaper, was unwilling to parse the scientific claims and counter-claims (although she noted in an interview that her job did include assessing “how the study was done and who did it”). She also perceived little need, working in a one-newspaper town, to rush all the facts out fast and first, as the AP disseminator journalist did. But she had a strong feel for her audience and sought to write stories that would feature local sources. For example, she spent some time in developing a major human interest feature story organized around the perspectives of people who lived near factory hog operations; this story appeared three months after the release of the Rural Health Survey and incorporated its findings into a broader story. In particular, she led with one individual’s claims about accelerating harm to his fragile health from the air he was breathing once factory hog farming arrived in his neighborhood, thus meeting what she felt to be her obligation to give ordinary people an opportunity to be heard (Williams, 1999b).

Science was an essential part of this journalist’s story, but she approached the health issue not as a science story per se, but from the perspective of “what do our readers need to know?” in the context of their daily lives. And one of the things this reporter thought her read-

ers needed to know was how “inconclusive” the studies had been so far; in our interview, this reporter conveyed her admiration for the UNC scientist in particular for pointing out, both in press interviews and in the announcements of his findings, that more research was needed to resolve remaining questions about health impacts. The pork industry’s claims that the survey methods were faulty and that the research “doesn’t prove that living near a hog farm causes health problems” were included in the story, too, but tended to be discounted when measured against the ordinary voices making credible claims of personal, individual health impacts; each time pork industry claims were presented, they were followed by contradictory lay knowledge claims from residents or by scientific knowledge claims from researchers. She also reported on other aspects of the Pork Council’s ignorance campaign, including their threat of a defamation lawsuit and the scientist’s view that this was an intimidation tactic. Her story, in short, did not slight industry’s use of ignorance claims to attack the scientist’s findings and create a scientific controversy, but it emphasized the science that supported her lay sources’ perspectives. Her bottom line was that more research was needed before conclusions based on science could be drawn.

Also illustrating the populist mobilizer core belief system was a reporter from Charlotte, a city outside the primary hog growing areas of the state. He wrote his stories about both studies, he said, because industrial hog farms had become an issue of statewide concern and debate in the statehouse and thus he believed all citizens needed to be informed, an agenda-building goal in keeping with the populist mobilizer attitudinal cluster. He, too, invested much time and independent reporting seeking out lay opinions, which he presented as additional verification of the credibility of the scientific findings (Henderson, 1999a).

Although he did not feel competent to make independent judgments about the science, as the interpretive/investigative journalist had, he did share the belief that scientific controversies should not be considered “a fifty-fifty contest.” In his news stories about both studies, ignorance claims from industry representatives were given space, including in particular their attacks on the scientist’s research methods and interpretation of the data and the Pork Council’s charge that the researchers who produced the Rural Health Survey were biased (Henderson, 1999b). But based on his own earlier reporting on the overall issue of the newly vast scale of the state’s swine industry, the reporter also included in his stories references to other scientific research that previously had found evidence of harm to human health and the environment from industrialized hog production. This additional scientific context, he believed, contributed to the “weight of the evidence” that should always be considered in reporting on new scientific studies (Henderson, 2005). In this particular case, it added weight to the scientist’s claims.

Adversarial

The adversarial role has over the course of several years been embraced by only a small minority of journalists (Weaver and Wilhoit, 1996: 139). Most research in mass communication has instead found journalism to be profoundly conservative in support of existing power structures and the status quo (Shah, 1994; Hallin, 1986; Gitlin, 1980; Gans, 1980). In this case, one of our journalists was a self-described “critical, skeptical person” (Shiffer, 2004). He defined his role as challenging any and all claims not only from government and business, but also from environmentalists and other citizen activist groups. To his way of thinking, most public actors, including scientists, have hidden interests which it is his job to uncover. Aware that the research had not yet appeared in a peer-reviewed journal and seeking a new angle on the hog issue after the release of the Environmental Justice study, he did not write a conventional “discovery” story about what the study said. Instead, he cast a skeptical eye on what he construed as the School of Public Health’s efforts in support of anti-hog activities, writing that some researchers

were approaching the state's swine herd expansion "as a public health menace" (Shiffer, 1999).

The story he wrote from this perspective did not use the industry's "pseudo-science" claim from its news release responding to the Environmental Justice research, but it did quote a Pork Council spokesperson calling the study "ludicrous," and had the effect of magnifying industry's claims that political bias was at work in the UNC research. The story framed UNC's School of Public Health as a tax-supported institution that was taking an "activist stance" with varied "anti-hog" activities in research and educational programs alike. The journalist, in our interview, denied that the idea for doing such a story had any connection with the hog industry, and our own examination of past stories he had written as an environmental beat reporter showed no evidence of consistent industry bias of this sort. If anything, what this journalist displayed was a role-based bias, in which the adversarial perspective strongly colored his reporting and writing decisions.⁷

Understandings of science and perceptions of their audiences

In addition to these core belief systems about their roles, journalists' understandings of science, as well as their perceptions of their audiences, seemed to have a bearing on how they treated industry's claims in this case. In fact, both factors seem very much intertwined with their perceived roles.

For example, in his interview with us, the AP disseminator journalist expressed his belief that university-produced research, unlike industry pronouncements, is disinterested. This was a view of science he considered so self-evident that he saw no reason to filter or interpret industry's claims for public consumption, since his readers could be expected to share the view that any study from a university conferred legitimacy on the scientific research it announced. In contrast, the interpretive/investigative journalist had an uncommonly informed understanding of science, which allowed him to make his own discriminating judgments about research and explicitly dismiss what he saw as groundless industry claims, something he presumed his audiences would not be as able to do independently. He considered publication in a scientific journal the gold standard of legitimacy, but he was willing to draw his own conclusions about studies that had not been published in a peer-reviewed journal based on his own analyses of the claims and data.

The populist mobilizer journalist on the staff of the Fayetteville paper differed from her editorial writer colleague in the depth of her understanding of science, but she was not all that different from the disseminator journalist with respect to her almost automatic respect for university research. She confessed to knowing very little about science, taking anyone in the role of university professor as possessing sufficient knowledge and status to make legitimate knowledge claims, weighted by her assessment (from her broader acquaintance with what had by then become a public controversy) that the science was, in fact, inconclusive. She saw her primary job as not to independently adjudicate the competing claims about the science in a controversy like this one, but rather to give voice to the voiceless in the debate—in this case, local residents who lived near the hog operations who, as she put it, "could show me proof" of deterioration in their medical conditions (Williams, 2004). She sought out various scientists to test those lay claims for plausibility, but felt it was not her job to evaluate on her own what was said by these expert sources. Interviews with average residents were her gold standard for the substance of the stories she wrote on the issue, and the fact that the science corroborated the residents' perceptions just added another layer of credibility to her people-centered account. Even when reporting, in a different story, on a state public health symposium where scientists were featured speakers, she enhanced her reporting of what was said from the podium by interviews with audience members who had no credentials other than being neighbors of hog farms (Williams, 1999a).

The Charlotte reporter, also in the populist mobilizer attitudinal cluster, considered his lay interview subjects to have legitimate knowledge to comment on industrialized hog farming. He also believed interviewing people from minority communities other than the one involved in the research—sources who all agreed with the research results—offered important confirmation for the research findings, as did the weight of other related studies he found that provided additional “building blocks” of scientific credibility. He had little background in science, but once he was assigned to his newspaper’s environment beat he developed a strong interest in educating himself, even re-reading the science textbooks that had held little interest for him in high school and college. As a journalist, he sought to compel the attention of what he perceived to be a sometimes apathetic and even resistant audience by making science stories comprehensible to his readers and finding ways to make science relevant to their lives. Although he believed the scientist in this case did have a point of view about industrial hog farming, he also considered that the acknowledged presence of a community group in the research provided acceptable “open bookkeeping” and did not believe this detracted from the credibility of the studies, which he considered to be “evidence done in a scientific manner that went beyond just the shouting.” His assessment of the studies’ validity was based in particular on the sponsorship of a state government agency for the Rural Health Survey and the federal funding for the Environmental Justice study (Henderson, 2005).

The adversarial reporter, in contrast, believed he knew enough about science to make his own discriminating judgments about research findings, and indeed he had made such judgments in other stories he had written for his newspaper. He further believed it was “ludicrous” to think that scientists do not have interests or agendas, and he did not grant much credence to unpublished research (Shiffer, 2004), which as we have noted was the case for both UNC studies at the time they were released to the public.⁸ In fact, the absence of publication contributed to this reporter’s skepticism about the Environmental Justice study. Alone among the news stories when the findings were released, his made a point of calling the research an “unpublished study” (Shiffer, 1999).

6. Some preliminary conclusions

In the absence of countervailing knowledge claims in this case, ignorance claims became a viable tool for an economically powerful but threatened industry that sought to follow the tobacco industry’s lead and manufacture doubt about science that jeopardized their interests. This was so even though a respected scientist at a high-status institution, someone who had won state and federal funding for his work, produced the science. Industry’s claims—which were wide-ranging and consistent with Smithson’s taxonomy of ignorance (see Figure 1)—encompassed much more than attacks on the conclusions. They included attacks on the research methods, the data, the scientist and his community collaborators, and the scientist’s university; and virtually all of these claims received an airing at some point in the press. In some news accounts, even the ultimate ignorance claim—industry’s claim that the science was not science at all, but “pseudo-science”—was published.

These results appear to contradict earlier findings that journalistic accounts of single studies (which is how the studies in this case were initially released to the public) give short shrift to unknowns and uncertainties in the science (Singer and Endreny, 1993; Fahnestock, 1986). Instead, they support accumulating evidence (Mooney, 2005; Boykoff and Boykoff, 2004; Zehr, 2000) that when scientific studies are attacked in the public arena, the news media’s attraction to stories about controversy can lead them to become unwitting allies of

the efforts of powerful actors to discredit new claims to knowledge with ignorance claims. That industry's non-scientist spokespersons succeeded in getting many journalists to report their claims in this case lends further credence to the observation by historian of science Jerome Ravetz (1987, 1996) that scientific ignorance may in some ways be more prone to social construction than scientific knowledge (as cited in Stocking and Holstein, 1993: 208). Powerful actors need only to make ignorance claims that cast doubt on the knowledge claims of scientists and they are likely to gain a hearing in the press.

While industry managed to some extent to manufacture doubt in this case, it is important to note that their campaign to construct scientific ignorance was not uniformly successful; the journalists differed greatly in their treatment of industry's claims. Variations in how the claims were used in news stories appeared to be highly consistent with the journalists' perceptions of their roles. That is:

- The *disseminator* journalist used ignorance claims as they were presented, distancing himself from assessing their "truth" by simply reporting, with scrupulous accuracy, what the industry source had said about the science and trusting the public to decide.
- The *interpretive/investigative* journalist assessed the claims with independent research and dismissed them, writing an editorial that ignored industry's claims and praised the scientist's research.
- The *populist mobilizer* journalists emphasized the views of non-expert citizens whose claims are normally not admitted to such debates. They reported on industry's ignorance claims, but ignored the more incendiary ones; and used lay claims in ways that bolstered the representation of the studies as credible science.
- The *adversarial* journalist appeared to be skeptical of all the claims, including the scientist's, thereby enhancing the credibility of industry claims of bias in the research. The resulting story was, in effect, supportive of industry and hostile to the science.

Journalists' perceptions of their audiences and their understanding of science, which in many cases appeared entangled with their role perceptions, also seemed to be factors in understanding the conditions under which journalists are likely to help or hinder the efforts of those who would construct scientific ignorance in the public domain. Although it is premature to draw firm conclusions from a study of so few journalists, the evidence in this case study does support Stocking and Holstein's (1993) argument that journalists—no less than scientists, industry, and other political actors—construct scientific ignorance consistent with their interests. When ignorance claims assisted journalists to fulfill their roles and meet the needs of their audiences, they tended to give good play to the ignorance claims of industry; conversely, when these claims seemed to hinder journalists from fulfilling their journalistic roles and meeting the needs of their audiences, they tended to downplay or ignore them. Independent knowledge of science (or overconfidence arising from a perhaps naïve understanding of science) seemed to moderate these uses. Future studies would do well to see if the patterns we have begun to identify hold up across other cases. Indeed, the question of what to leave in and what to leave out is at the heart of every story journalists write, whether the story is about scientific research or any other topic. Given that role perceptions may, albeit unintentionally, drive each journalist's answers to a surprising degree, more work is called for on the differences—and similarities—in the stories that are produced from disparate role-based perspectives.⁹

As the strategic use of ignorance claims to manufacture doubt in scientific controversies grows, public misunderstanding of important scientific issues may be expected to accelerate. Given this likelihood, it is imperative that we come to understand the conditions under which journalists use those claims intended to construct scientific ignorance and confuse the public.

It also is imperative that we identify and bring to light the various other tactics, apart from claims-making, that actors use to construct scientific ignorance in the public realm and journalists' responses to these tactics. From a research standpoint, much remains to be done. In our case study alone, we have yet to explore in depth the lay-expert knowledge divide that was central to the early dismissal of the claims of the Concerned Citizens of Tillery, and that subsequently played a role in industry's efforts to discredit the science in the eyes of the public. We have yet to delineate the interlocking interests and activities of the web of actors in this case, interests and activities that may say a lot about which claims ultimately become visible in the media and placed on the public's agenda. Conceptual and empirical linkages between Proctor's work on the construction of ignorance by tactics that inhibit science and Smithson's notions of ignorance arrangements also need to be made. Our study, too, is limited in that it provides but a snapshot of one industry's efforts at one moment in time to undermine research that threatened its economic interests. We call upon investigators who have interests in building theory that has practical implications to join us in these efforts to document the various ways that actors work intentionally to construct scientific ignorance and to obscure what the public needs to know.

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Notes

- 1 Ignorance arrangements may include the social norms of privacy and secrecy (Smithson, 1989: 219), as well as "norms against knowledge seeking," including taboos, both good and bad (Smithson, 1985). We are indebted to an anonymous reviewer for calling to our attention the related cultural critique of Eve Kosofsky Sedgwick and her concept of the "privilege of unknowing" (Sedgwick, 1993).
- 2 Miller (1992) is one of the few to study the role of journalists specifically in the claims-making process.
- 3 The expansion and concentration of hogs in industrial "Confined Animal Feeding Operations" (CAFOs) was facilitated by a series of legislation, passed during the tenure of a General Assembly member who also became the nation's largest hog producer (Stith et al., 1995: 22 February), which had made North Carolina a particularly welcoming environment for the factory-style production that was taking over the formerly family farm-based swine industry. These included extending family farm protections to the industrial-style operations, sweeping tax exemptions, fee waivers, and the repeal of local zoning powers that left local communities unable to regulate the growth of the industry (Morgan, 1998; Stith et al., 1995), which was concentrated primarily in North Carolina's eastern coastal plains. Two counties near Fayetteville, Sampson and Duplin, grew into the nation's top two hog farming counties, with about 1,300 hogs per square mile (Stith et al., 1995: 19 February). Between the early 1980s and mid-1990s, the swine population of Duplin County alone, headquarters of the state legislator's Murphy Family Farms, surged from 172,000 to more than a million hogs (Stith et al., 1995: 22 February).
- 4 In the Environmental Justice study, hog farms and population densities were compared in census blocks after eliminating the mountainous western counties of the state and large cities which would not be expected to have hog farms. The greatest discrepancies were found when poor and minority areas were compared with white and wealthier areas, with eight times more hog farms in the poorest areas than would be expected under even distribution of the hog farms, and six times more than expected in primarily minority areas.
- 5 The Rural Health Survey was designed to investigate the health complaints of people who lived adjacent to industrial hog operations and sometimes found it impossible, due to the noxious odors (Schiffman et al., 1998)

- and wind-borne drift from spray fields, to spend time in their own yards or even to open their windows (Morgan, 1998). Households living near an intensive hog operation were compared with households near a dairy farm and in a rural area with no nearby livestock operations. Responses about health complaints were similar in all cases except for respiratory and gastrointestinal complaints, which were significantly greater among the CAFO neighbors.
- 6 See their footnote 30, p. 194, for explanation of the factor analysis used to aggregate individual survey responses. See also Weaver, D.H., Beam, R.A., Brownlee, B.J, Voakes, P.S. and Wilhoit, G.C. (2007) *The American Journalist in the 21st Century: US News People at the Dawn of a New Millenium*. Mahwah, NJ: Erlbaum, pp.136–159.
 - 7 It was not at all clear that this reporter understood that the UNC School of Public Health, like all schools of public health, is a mission-based educational institution, no less than schools of agriculture in land-grant colleges. In the case of public health programs, the mission is to advance and promote the public's health, just as in land-grant colleges of agriculture, the mission is to advance and promote agricultural industries (a relationship that is, in the case of the pork industry in North Carolina, extremely tightly interwoven). Other than writing that the pork industry had its own stable of scientists at the state agricultural school, the journalist did not provide information in his story that would have educated the public on these matters. In fact, whether it was intentional or not, his story claiming an "activist stance" on the part of the School of Public Health ironically (given this reporter's skeptical approach) reflected and perpetuated for the public a naïve view of mission-based science and left the impression that such commitments undermined any knowledge claims that scientists in this institution might make.
 - 8 The Environmental Justice study had been accepted for presentation at a national meeting at the time of the news release and was published a year later (Wing et al., 2000); the Rural Health Survey was a preliminary release at the behest of the state Department of Health and Human Services and was published about a year after the HHS news conference (Wing and Wolf, 2000).
 - 9 We are grateful to an anonymous reviewer for suggesting another intriguing dimension for demarcating the role differences among journalists by how "doubt friendly" the role seemed to be. For example, a disseminator journalist enacts an essentially passive role by deferring judgment to the public, reproducing unexamined claims from all sides; whereas, while an adversarial journalist does challenge rhetorical claims with skepticism toward all actors, the result is that the journalist can become an active agent for casting doubt. The roles are thus similarly doubt-friendly, but emerge from differing role perceptions.

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