NEWS COVERAGE OF BIOTECHNOLOGY DEBATES

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Any possibility of a broad democratic debate in modern society concerning technology or science, other than those confined to elite circles, is dependent on the mass media. While science and technology policy is imagined to have broad influence over the course of people's lives, these influences are rarely obvious in the short term. The general public has many other, often more immediate, daily concerns, and people do not necessarily have many other sources of expert information or interpretation for these issues. For these reasons it is very likely that the power of media to influence public opinion is stronger for science and technology issues than for other questions. Media messages do not dictate public opinion; readers and viewers exercise considerable power in their selection and interpretation of messages. But messages influence the opinion climate in which individuals see themselves as being situated. This, in turn, has consequences for shaping the course of public debate.

For example, while the direct effects of mass media messages on public opinion are often misunderstood (and greatly exaggerated), their ability to set the agenda for popular debate is very well documented. Media can also frame debate by defining issues in certain ways, and they represent particular points of view as legitimate while marginalizing others. These indirect effects certainly do not fully determine opinions nor entirely constrain debate; media audiences are active rather than passive and not always so easily manipulated by the whims of reporters or the sources they quote. On the other hand media framing and legitimization effects undoubtedly contribute to the formation of an opinion climate in which public debate on certain issues can be discouraged or even suppressed while attention is focused on others, and some actors and positions are taken more seriously than others.

The ability of media to suggest which issues are important and to create a sense of how others feel about them are thus indirect but nontrivial forms of influence. People are quite unlikely to form strong opinions about technical issues they have never heard about, for one thing. And the sense people have about what others are thinking—what is expert opinion, what opinions belong only to a marginalized minority, what are the opinions of other people like them, and so on—is also an important factor. Opinion formation is dependent on what people understand the opinions of others to be. We quickly position ourselves along an imagined opinion continuum in crystallizing our own thinking and in projecting how others might react.

Further, people's willingness to speak out—as postulated by Elisabeth Noelle-Neumann's "spiral of silence" theory—is especially subject to being influenced by perceptions as to what others think, specifically what dominant or mainstream opinion is perceived to be. If people do not believe others share their opinions or that they may be ostracized for holding particular opinions, their points of view are less likely to be expressed and thus can have less of an influence on the course of public discussion.

Activists can affect others through direct persuasion, though that is typically not enough. It is important that a dissenting message is publicized by the news media—that the rhetoric of a group of people with a particular, especially a non-mainstream, opinion, is made available for public reflection. This has the effect of extending the range of public debate; it is easy to imagine people reorienting themselves on a revised public opinion continuum and projecting a different reaction from others as a result of learning about oppositional views. Activist groups know this; public protests are a means to gain entrance to the public sphere (via media

coverage) that is often deemed worth the risk some legitimacy could be lost in the process, depending on the nature of the coverage. Conversely, the expressed opinions of corporate and governmental leaders—those that represent the existing power structure in society—define the mainstream backdrop against which dissent will be illuminated.

In Western democracies the role of the media is generally seen as providing balanced discussion of important issues, the kind of discussion that people need to make up their minds about the issues of the day. However, news traditions vary across localities. U.S. news organizations in particular—even though some of them are thought to be more liberal or more conservative—are expected to be "objective" in their reporting. News stories are not supposed to reflect or even reveal the point of view of the reporter or his/her organization. This is arguably less true in much of Europe, where particular publications or programs/channels are more often and more strongly identified with particular political positions. Both the U.S. and European presses (to use the term broadly to encompass broadcast as well as print media) are expected to inform public debate. However, it may be that some European populations have available a broader range of legitimized opinion from which to construct an imagined opinion scale. While this is not necessarily a direct result of differences in how the media operate, it is also apparent that certain voices (e.g., environmentalist voices) are more likely to be regarded as legitimate or mainstream in Europe than in the U.S. This may be very important for opinion formation in regard to biotechnology.

In general, is it possible to identify which interests the media serve? Scholars often see media as instruments of social control, despite media organizations' perceptions of themselves as fulfilling a "watchdog" role. "Objectivity" may be a defensible ethic on the grounds of the media's role in democracies, but it is also necessarily a mythical standard in practice; choices about which issues to emphasize, how to define them, which sources to treat as legitimate cannot be made "objectively" but reflect judgment and values. In addition, news media are highly dependent on official cooperation in the form of information provision and general facilitation of news gathering. Despite the common expectation that in democracies the media will have an adversarial relationship to government, media still cannot do their jobs without government support, even where this support consists largely of no more than tacit cooperation.

Further, in Western capitalist democracies news media operations are generally owned by corporations (with some exceptions where the broadcast system is publicly owned), often large corporations who have interests and investments in other areas, and for this reason—especially in the U.S.—the media are regularly accused by scholars of reflecting a pro-corporate, pro-establishment point of view. This is true despite journalism's general reputation for "liberalism." This is a bias inherent in the dependence of the institutions of journalism on both official sources and substantial financial interests.

In other words, generally speaking, there are strong reasons to suggest that media in the U.S. and other democratic capitalistic systems tend to overemphasize mainstream, large-organization points of view, whether governmental or corporate. And this point has also been made specifically for science and technology reporting, which often adopts a "booster" orientation.

The media's legitimization role takes on new and very special significance in discussions of scientific truth-telling; reporters' errors in such cases—e.g., in their assumption of the invincibility of the U.S. space shuttle program before the Challenger explosion, or of the validity of cold fusion theory as announced by two Utah scientists in 1989—also receive considerable post hoc attention. The media are often criticized for distorting or exaggerating many risks and for inducing negative public reactions in all cases of technology-based controversies. Especially in the absence of clear and present evidence of either malfeasance or catastrophe, journalists who report risks are subject to accusations of being scaremongers. But in cases like the Challenger disaster or Pons and Fleishman's claims about "discovering" cold fusion processes, media are also blamed for ignoring risks and uncertainties that—after the fact—seem glaring, as though better reporting could have prevented the Challenger disaster or establish more quickly than the scientific community that Pons and Fleishman's conclusions were not entirely credible. This form of criticism also has the effect of serving mainstream interests to the extent the media can thus be made scapegoats for technological and scientific failures.

This is good context for understanding the issues underlying an analysis of media framing of the biotechnology controversy in the context of the media's role in facilitating democratic debate. For biotechnology, despite years of "booster" coverage of the investment opportunities and potential social benefits of genetic engineering, the human genome

project, and other miracles of modern life science, the scientific mainstream remains concerned that the news media have overemphasized and inappropriately legitimized opposition points of view. This does not seem to be borne out by available evidence regarding news coverage of biotech in the U.S. or Europe.

Even in the case of cloning, where coverage reached an intensity that was probably unprecedented for any science-related story, serious criticism in the U.S. press was short-lived and rather quickly set aside in favor of stories that marveled at pseudoscientific attempts to duplicate individual humans (along with more serious scientific efforts, such as the Texas A&M University "Missiplicity" project that despite its legitimate scientific purposes was nevertheless directed at cloning someone's beloved pet), effectively marginalizing the whole subject by relegating it to crackpot status.

And reports of research suggesting a negative effect of biotechnology—from concerns about escaping modified fish out-competing wild species to the potential harm to Monarch butterflies from engineered crops—regularly set off criticism that the news media have overstated the significance of what is perceived by biotech boosters as at most a mild "glitch," a small dark cloud on an otherwise sunny horizon. This is true even when such reports are made by credentialed scientists, as though journalists should exercise a more active gate-keeping function over what constitutes legitimate science even where the researchers are appropriately qualified and employed by recognized institutions. This seems rather a lot to ask.

Below, we present data from a multinational and multiyear study of elite newspaper coverage of biotechnology in the U.S. and Europe that serves to define the more general patterns in how the media frame these issues on either side of the Atlantic.

Media Framing in the US and Europe

The analysis and interpretation that follows is based on content analyses of newspapers from 14 European countries (Austria, Denmark, Finland, France, Germany, Greece, Italy, The Netherlands, Norway, Poland, Portugal, Sweden, Switzerland, and the United Kingdom), Canada, and the U.S. It should be noted that coordinating and training a small group of researchers within one country can be difficult, and this has been exacerbated by including groups from 16 countries. While efforts were made to increase inter-coder reliability across countries, some discrepancies are inevitable. At the same time, it is felt that the following discussion is a strong reflection of elite newspaper coverage in these countries. (This study was conducted under the leadership and coordination of George Gaskell and Martin Bauer of the London School of Economics, with funding by the European Commission. The work of the U.S. and other non-E.U. teams were independently funded. We received funding for our work on this project from Texas A&M University, Michigan State University, and the National Science Foundation Ethics and Values Studies program.)

Researchers in each country were asked to code articles from newspapers that were known to be opinion leaders. In the U.S., for example, *The New York Times* and *Washington Post* were used, while in the U.K., researchers used *The Times* for 1973 to 1987 and the *Independent* from 1987 to 1999. French researchers used *Le Monde*, while in Germany, *Der Spiegel* and *Frankfurter Allgemeine Zeitung* were used. The number of articles coded in each country differed, relative to the total number of articles that focused on genetic issues.

Given our focus on processes of legitimation, we decided that framing would give some indication of how issues related to genetics were being presented to the general public. Eight frames were developed to help categorize the articles. These included 1) progress—includes discussions of how the technology is an extension of science or a debate over its efficiency and effectiveness, 2) economic—which includes discussions of financial developments around new drugs and crops, 3) ethical—encompasses concerns with the role of humans in developing new species, the role of the church in these debates, and so forth, 4) Pandora's Box—arguments that if this kind of technology is released into the environment it will only bring evil, 5) runaway technology—contentions that if this technology is started humans will not be able to stop or control it, 6) nature/nurture—concerns with designer babies and other species of animals and plants, 7) public accountability—if something goes wrong, who will be responsible?, and 8) globalization—questions regarding dependency of some nations on those nations where the technology is being developed. Given discourse on the transatlantic divide, one may assume that it is only the U.S. and Canada that biotechnology and other genetic topics are being framed as progressive. In fact, the progressive frame is one of the top three frames in every nation, though this ranges from a low of 12% in Denmark to a high of 67% in Portugal. In eleven of the sixteen countries, the progressive framing was the most used frame.

Use of this frame averaged 37% across Europe, 39% in Canada, and 63% in the U.S.

The second most used frame was public accountability, followed by economic prospects. The mention of risks and benefits for each of these frames shows how reporting was legitimizing genetic technology. When progressive framing is used, 58% of the articles mentioned that a benefit was either likely or very likely, though only 8% of these articles mentioned that a risk was likely or very likely. For the public accountability frame, the respective percentages are 24% and 33%, and for economic prospects they are 48% and 16%. While public accountability is typically a negative frame, the difference between discussions of benefits and risks is much smaller than for the progress and economic prospect frames.

While the progress frame is the most significant across all countries, is it not equally distributed across all issues. In Europe, for example, nearly 60% of articles dealing with medical issues used the progressive frame, while only about 30% of the agriculture/food articles used the progressive frame. In Canada, just over 63% of the medical articles were framed as progressive, and 36% of the agriculture/food articles. In the U.S., 50.6% of the articles with food themes were written as progressive, while 64.5% of medical articles fell under the progressive theme. All of these differences are statistically significant at the .01 level.

Some correlation is apparent between these media trends and public acceptance of agriculture/food versus medical applications of genetic technologies; in all countries studied there is more public support for medical biotechnology than for agriculture/food applications. It is not our intention to overstate this relationship, as few agree as to what extent media discourse might be a reflection of public opinion (or, vice versa, its source). In addition, it would be difficult to discern whether these attitudes represent support for medical biotechnology per se, or for new developments in medical research more generally. What is interesting to note is the seemingly deeper resonance for medical technologies being considered progressive as compared to food and agriculture applications, and the fact that this difference clearly exists on both sides of the Atlantic. This persistent pattern seems to overshadow observed differences between Europe and the U.S. in either general attitudes or general patterns in media framing vis-à-vis biotechnology as a whole.

To further explore this generalization, we analyzed two of the more damaging frames—runaway technology and Pandora's Box. In Europe, over 11% of the food articles used the Pandora's Box frame, and just over 4% used the runaway frame. For medicine, the Pandora's Box was only used in just over 3% of the articles, and the runaway frame was used less than 2% of the time. In Canada, no medical articles were framed as runaway technology, and Pandora's Box was used in less than 3% of the articles. For food, on the other hand, the Pandora's Box frame was used in 15% of the articles, though runaway technology was used for just over 3% of the articles. Finally, in the U.S., the Pandora's Box frame was used in 8% of the food articles, but only 3% of the medical articles, while the runaway technology frame was used for over 9% of the food articles and just over 2% of the medical articles. The major discrepancies in this matrix are within countries in terms of the treatment of food and medical technologies, not between the countries. While we must again stress that these discrepancies cannot be described as "causes" of opinion differences, they certainly reflect and resonate with such differences.

These issue framings also draw attention to the processes of legitimation that occur within the pages of newspapers. Biotechnology, genetic engineering, and other issues related to genetics have become part of both the mainstream news and popular culture (e.g., *Jurassic Park*, *The X-Men*), as well as the science-based literature. Surveys of public knowledge concerning genetics still show gaps in awareness of these issues, though this does not necessarily reflect a lack of publicly-available discourse. These issues have become legitimate in the sense that they are seen as needing space or attention in a highly valued public arena—the mass media—which has a limited carrying capacity.

This legitimation process involves more than just issues. In an analysis of 2720 articles from the U.S. appearing in *The New York Times* and *Washington Post* between 1971 and 2000, scientists were more likely to be attached to progressive frames than government officials. This connection between scientists and progress frames leads readers to believe that science and scientists are about moving ahead, and that the enterprise of science (as it relates to biotechnology and genetics) is evolutionary and beneficial. Recent surveys by Michael Corrado have shown that the U.S. public tends to rate scientists as high on levels of trust. At the same time, they tend to rate the mass media low on the same scale, though we would argue that many people in the U.S. only hear from scientists when they are quoted in the news.

In addition to scientists and government officials, reporters used corporate spokespersons, activist groups, opinion polls, and financial advisers (including stock markets) to make sense of the genetic revolution. Few of these groups shared the same amount of media spotlight as scientists and government officials, and none were as likely to be attached to the progressive frame as scientists. This is true in both North America and Europe, where, once again, there seem to be as many differences within countries with regards to framing as between them.

Media Coverage and the Public Sphere

Continuities in framing between leading U.S. and European papers suggest that we cannot attribute differences in opinion between U.S. and European populations exclusively to media treatment. However, subtler differences between the structures of media systems in Europe and the U.S. are not reflected in content analysis that is limited to a handful of elite publications and may be very important for understanding the character of public debate in the context of media reports on both sides of the Atlantic.

While there is some indication that news media in much of Western Europe are headed toward a U.S. model in which "objectivity" rather than analysis is emphasized, the concept of press freedom and the press's appropriate role in society is different in Europe and the U.S. Press law is different, for one thing. And historically, quite possibly for economic reasons, the European system has produced papers more clearly identifiable with particular political positions than has the U.S. system, in which domination by Associated Press wire stories has created a relatively homogeneous news system across the 50 states. (AP domination often extends to the agenda in television news reports as well.)

It is quite possible, therefore, that diversity of opinion is both more visible and more encouraged in Europe as opposed to the U.S., despite the fact that in many ways U.S. law seems more adamantly protective of journalistic freedom. This hypothesis would go a long way toward explaining why the actual differences between U.S. and European opinion—while they are definitely real—are rather less striking than casual perusal of news on both continents would suggest. Yet leading elite papers in both areas are still dominated by similar interpretations of biotechnology issues.

In addition, studies of mainstream U.S. papers may further mask the existence of diversity of perspective in that local news accounts of biotech-related controversy may not achieve national attention at all. The U.S. consists of fifty states and countless communities that are geographically and ethnically diverse. Stories about local events—especially controversies related to agriculture, which are going to be seen as less compelling to the audiences in major urban centers that produce the elite publications most often studied—only become nationally prominent on rare occasions.

A number of European countries have active environmental ("Green") parties, for example, who are recognized as legitimate political forces operating in mainstream arenas rather than "fringe" groups that are more easily dismissed. The U.S. does not.

The same dynamics likely characterize the European press, and this may also help explain the apparent commonalities in news framing, even while more diversity of perspective may well characterize the national news in many European countries more than in the U.S. In other words, studying the news as reported in leading national U.S. papers may suggest a monolithic view that is not representative of broad public opinion and not reflective of "mundane" local controversy. Studying the news as reported in leading European papers may give somewhat the same impression, although competing national papers in many European countries nevertheless may make dissent more visible to well-read citizens, whereas in the U.S. the range of opinion legitimized in the national news is likely more limited. This remains a subject for further research, as the logistical and measurement problems associated with characterizing news content across different nations are formidable.

It also seems highly likely that some voices are more likely to be portrayed as legitimate "players" on the public political stage, as well, and this also differs in different national cultures. This is not just a news phenomenon but reflects differences in political culture. A number of European countries have active environmental ("Green") parties, for example, who are recognized as legitimate political forces operating in mainstream arenas rather than "fringe" groups that are more easily dismissed. The U.S. does not. Inevitably, news coverage will reflect these differences in political culture. Dissenting voices can be represented as voices that count or as voices

that do not, and this representation takes place in ways too subtle to reflect in most large-scale content studies.

In short, the superficial similarity in news frames between European and U.S. papers goes a long way toward undermining the assertion that opinion differences here are a simple function of news accounts. However, it is important not to take this line of reasoning too far, because the European press may well tend to legitimize certain opposition points of view and/or make them more visible in comparison to the more relentlessly mainstream national press in the U.S. While it would be naïve to suppose that public opinion differences are so easily manipulated or created, it would also be naïve to suppose that news accounts make no contribution to the political culture in each case. In the U.S., only a handful of national media exist and these are largely dominated by the Associated Press agenda (and heavily influenced on technical issues by information subsidies from mainstream institutions such as large corporations and research universities). While the most elite papers in much of Europe reflect similar dynamics, the likely generally greater prominence and legitimacy of dissenting views may well have contributed to more vigorous and open public debate on questions related to biotechnology.

U.S. researchers often assume that opinion differences between the U.S. and Europe on biotechnology-related issues are attributable to differences in knowledge of the science involved, implicating journalism in another way. While there is a relationship, it is a weak one. Many observers have speculated that the explanation for differences in acceptance of food biotechnology between U.S. and European populations stems from cultural differences in attitudes toward food; however, we know of no empirical evidence that would prove or disprove this hypothesis, however intriguing. Citizens are making choices among competing voices and claims, and those choices are influenced by their relative trust of the claimsmakers. Research continues on whether a "spiral of silence" might have existed for dissent over biotechnology within the U.S. that made European objections particularly unexpected.

What does the future hold for biotechnology and the media in the public sphere? If the "hype" over cloning had any long-term impact on U.S. public opinion, it may well have been the diminution of this spiral and the reframing of debate over biotechnology to encompass ethics. Other researchers have presented evidence of a late-1990s turn toward the critical in U.S. coverage, a turn that may foreshadow further public attention to ethics, accountability, and other associated controversies. It is quite plausible that these trends will further erode existing differences in European and U.S. support on the food/agriculture side. Finally, however, yet others have argued that media imagery may serve an important symbolic function by aiding public thinking about a new technology, without necessarily determining public attitudes, and that the intensity of media attention will naturally diminish once the technology becomes a more familiar one.

SUGGESTED FURTHER READINGS

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