Science Communication

http://scx.sagepub.com

A Question of Balance: The Autism-Vaccine Controversy in the British and American Elite Press

Christopher E. Clarke

Science Communication 2008; 30; 77 originally published online Jun 24, 2008;
DOI: 10.1177/1075547008320262

The online version of this article can be found at:
http://scx.sagepub.com/cgi/content/abstract/30/1/77

Published by:

http://www.sagepublications.com

Additional services and information for *Science Communication* can be found at:

Email Alerts: http://scx.sagepub.com/cgi/alerts

Subscriptions: http://scx.sagepub.com/subscriptions

Reprints: http://www.sagepub.com/journalsReprints.nav

Permissions: http://www.sagepub.com/journalsPermissions.nav

Citations http://scx.sagepub.com/cgi/content/refs/30/1/77

Downloaded from http://scx.sagepub.com by ashley mayer on October 20, 2008

Science Communication
Volume 30 Number 1
September 2008 77-107
© 2008 Sage Publications
10.1177/1075547008320262
http://scx.sagepub.com
hosted at
http://online.sagepub.com

A Question of Balance

The Autism-Vaccine Controversy in the British and American Elite Press

Christopher E. Clarke
Cornell University

Although balance is a well-known and arguably important journalistic norm, how should journalists adhere to this norm when the bulk of scientific evidence clearly favors one (presumably accurate) perspective? Should balance be defined in terms of the quantity of information or the quality of viewpoints presented? Using British and American newspaper coverage of the autism-vaccine controversy as a case study, this article explores whether balanced reporting on scientific claims produced a discourse at odds with the scientific consensus that there was no autism-vaccine link. Implications for journalism ethics and risk communication are discussed.

Keywords: *vaccination; autism; media; ethics; risk communication*

Journalists face numerous—and perhaps conflicting—norms when reporting controversial stories. For example, balance and accuracy are two norms that traditionally govern media coverage of controversial issues (Boykoff & Boykoff, 2004; Ryan, 2001). In theory, balance demands that journalists present all sides of an issue (including all relevant information and stakeholder perspectives) in an objective manner, while accuracy involves scrutinizing details, verifying facts, avoiding errors, and ensuring that the perspective with the most supportive evidence is conveyed—if it exists at all (Antilla, 2005; Bennett, 1996; Ryan, 2001; Singer, 1990).

However, can balanced reporting potentially conflict with a commitment to accuracy? For example, how should journalists adhere to the balance norm when the bulk of scientific evidence clearly favors one (presumably accurate) perspective? Moreover, are there potentially conflicting interpretations of

Author's Note: The author is deeply grateful to Philip Hart, Josh Braun, and Janet Yang for their assistance with coding; to Ronald Ostman and James Shanahan for their invaluable feedback on earlier drafts of this article; and to the two anonymous reviewers at *Science Communication* for their helpful comments and suggestions.

Downloaded from http://scx.sagepub.com by ashley mayer on October 20, 2008

what balanced reporting is or should look like? On one hand, balance may be a function of the quantity of information presented, in which a journalist highlights all relevant viewpoints regardless of how well-known or influential they may be (Donohue, Olien, & Tichenor, 1985a, 1985b; Griffin & Dunwoody, 1997). On the other hand, balance may be a function of quality, in which one identifies the two most influential perspectives, presents them in a point-counterpoint format, and affords both relatively equal attention (Dearing, 1995; Entman, 1989; Gans, 1979). The latter definition of balance is particularly relevant in situations where journalists, because of deadlines or unfamiliarity with an issue, have neither the time nor expertise to investigate all possible perspectives (Boykoff, 2007a; Dunwoody & Peters, 1992). It is also relevant when a perceived maverick—individuals whose viewpoints place him/her at odds with an established authority—receives equal attention under the premise of challenging the establishment (Dearing, 1995; Gregory & Miller, 1998; Miller, 1999).

Balanced Reporting and the Autism-Vaccine Controversy (AVC)

This article explores one particular area of scholarly inquiry that speaks to the aforementioned questions and conflicts: whether an adherence to balanced reporting (in terms of quality) can actually represent a form of bias. That is, what happens if the perspective with the most supporting evidence is (inaccurately) balanced against a competing viewpoint with comparatively less support (Boykoff & Boykoff, 2004)? This question is applied to a case study: coverage of the autism-vaccine controversy (AVC) in British and American elite newspapers. The underlying facts surrounding the AVC are fairly straightforward—despite a widely publicized (but ultimately discredited) 1998 study in the *Lancet* medical journal, the overwhelming body of scientific evidence does *not* support a relationship between autism[1] and any childhood vaccine or vaccine component (Dales, Hammer, & Smith, 2001; Institute of Medicine [IOM], 2004; Kaye, Melero-Montes, & Jick, 2001; Madsen et al., 2002; Taylor et al., 2002). Nonetheless, this issue continues to generate public interest and media attention, both in the U.S. and Great Britain (Associated Press, 2007; Baker, 2008; Harris, 2006; Manning, 2005; Mason & Donnelly, 2000; Petts & Niemeyer, 2004).

The AVC can, of course, be examined from numerous media and non-media angles. It can be viewed as a failure on the part of health officials to

Downloaded from http://scx.sagepub.com by ashley mayer on October 20, 2008

maintain public confidence in childhood vaccination (Salmon, Teret, MacIntrye, Salisbury, Burgess, & Halsey, 2006). Likewise, it can be seen as a misinterpretation of risk on the part of the public (Bellaby, 2003). However, what has kept this controversy in the public spotlight, some argue, has been a media discourse on a potential autism-vaccine link that has been at odds with the prevailing scientific consensus (British Social and Economic Research Council, 2003; Hargreaves, Lewis, & Speers, 2003). By covering the perspectives of both supporters and skeptics of a link in the interest of balance, media discourse gave the impression that the epidemiological evidence was uncertain and a potential relationship was plausible (despite the preponderance of scientific evidence to the contrary). However, to date no research has explored this issue via a systematic analysis of AVC coverage. Nor has research addressed fundamental questions about the balance norm as it applies to this controversy: How do we define balance? When is a story balanced?

There are two angles from which one can approach the issue of balanced reporting in the context of the AVC: one structural and the other functional. The structural approach speaks to the actual messages conveyed in media coverage. In other words, how often was one claim or perspective mentioned compared to its counterpart? By contrast, the functional approach speaks to what people do with this information. How does balanced reporting impact how consumers of news recall, learn about, and debate an issue (Anderson, Allan, Petersen, & Wilkinson, 2005; Gamson & Modigliani, 1989)?

To the author's knowledge, this research is the first systematic content analysis of newspaper coverage of the AVC. Moreover, to investigate the potential impacts (if any) of media coverage on public perceptions, one must first acquire a working knowledge of what messages are actually being conveyed. Therefore, this article focuses on the structural angle of AVC coverage with an emphasis on a quality approach to balanced reporting (given that the autism-vaccine debate has come to be defined by two competing viewpoints: that vaccines do—or do not—cause autism).

Balance as a Form of Bias

Can the balance norm actually represent a form of journalistic bias, not in an ideological sense (i.e., liberal or conservative) but in terms of the accuracy of the information conveyed? Smith (2005) pointed out that science is largely a process of debate and discussion, in which competing viewpoints are weighed in terms of the strength of evidence. Although there may be more than one side to an issue, rarely is there a 50-50 division involving two

Downloaded from http://scx.sagepub.com by ashley mayer on October 20, 2008

competing viewpoints. However, Boykoff and Boykoff (2004) argued that balanced reporting on an issue, as part of a *quality* approach, can produce a disconnect between media and scientific discourse. By adhering to a point-counterpoint format—in which two particularly well-known sides are afforded relatively equal attention—journalists can give the impression of uncertainty where there is none, elevate a fringe group to a high-profile status, or suggest that opposing perspectives are equally well-supported by evidence. In essence, coverage can be biased against the accurate perspective. As Corbett and Durfree (2004, p. 142) observed, "[although] the long-standing tradition of bringing in opposing sides is an attempt to provide balance and objectivity . . . it is problematic to introduce dissent into an area where science largely agrees, particularly for readers unable to evaluate where the balance of the evidence lies."

Boykoff and Boykoff (2004, 2007a), for example, observed that balanced reporting on the issue of global warming—specifically, emphasizing both proponents and skeptics of anthropogenic climate change—helped retard meaningful debate on (and implementation of) mitigation strategies to reduce global carbon dioxide emissions. The result was a media discourse that differed substantially from the scientific consensus: that climate change was (and is) a problem in need of immediate action (Intergovernmental Panel on Climate Change [IPCC], 2007).

To more clearly understand print media coverage of the AVC in light of the balance norm, the present study analyzed 279 articles that appeared in major U.S. and British newspapers from February 1998 to June 2006. It explored the extent to which these print media—in adhering to the balance norm in their presentation of epidemiological studies and expert claims—formed a discourse that differed from the preponderance of scientific evidence concerning an autism-vaccine link. It also examined how this discourse evolved during the eight-year study period. Did it change, for example, as coverage of the AVC progressed and the scientific consensus became clearer? Finally, it compared coverage between the U.S. and Britain, given that the AVC followed somewhat different trajectories within each nation (Baker, 2008). Implications for journalism ethics and risk communication are discussed.

The Benefits and Risks of Vaccination

Vaccination is public health's quintessential success story. Immunization programs in both developed and developing countries have sharply reduced

Downloaded from http://scx.sagepub.com by ashley mayer on October 20, 2008

the prevalence of (and deaths from) pertussis, diphtheria, influenza, polio, and other infectious diseases (American Medical Association, 2004). However, like any medicine, immunization is not a risk-free endeavor. Safety crises occasionally occur, in which vaccination is associated, or perceived to be associated, with unanticipated and undesired risks (Salisbury, Beverly, & Miller, 2002). When such crises emerge, health officials must act quickly to communicate health information to a concerned public. However, vaccine-related risk communication is notoriously difficult for several reasons (Ball, Evans, & Bostrom, 1998). In a sense, vaccines can become victims of their own success. Reductions in disease prevalence can lead individuals to question their necessity. Also, people may assume that what follows immunization must be caused by it. Finally, there is the sometimes uneasy relationship between the "public good" vaccinations provide and an individual's right to decline a medical intervention.

Vaccination and the Mass Media

Vaccine safety crises like the AVC are often the subject of intense national and international press coverage. Consequently, health officials often use the media to convey risk information, such as which vaccines are potentially affected, what safety precautions are being taken, and what concerned individuals can do to reduce their risk (Leask & Chapman, 2002). This strategy is clearly advantageous as the media remain an important source of health information (Griffin, Dunwoody, & Gehrmann, 1995; Vasterman, Yzermans, & Dirkzwager, 2005). However, the media are also more than mere message channels. As Boykoff and Boykoff (2004, 2007a) asserted, media coverage represents a social relationship with news consumers, in which journalists become not only information conduits for citizens, but also a key factor in identifying a problem, relevant stakeholders, and potential solutions. The journalistic norms of balance—among others—help set the boundaries of this relationship, as they shape what information is presented and which perspectives are heard. Bennett (1996), for example, argued that journalists are also influenced by economic and political norms. Economic norms reflect the mass media's place in a consumer-driven, capitalist society (especially in the U.S. and Britain), in which news stories are expected to be efficiently produced and profit-generating. Political norms stress the role of the media as a watchdog, providing accountability to elected officials by keeping citizens politically informed.

Downloaded from http://scx.sagepub.com by ashley mayer on October 20, 2008

Overview of the AVC

The AVC began in Britain with a 1998 journal article concerning the vaccine for measles, mumps, and rubella (MMR). In the study, published in the *Lancet,* gastroenterologist Andrew Wakefield and 12 colleagues described a self-selected sample of 12 children referred to the Royal Free Hospital in London (Wakefield et al., 1998). All had been diagnosed with autism prior to enrollment in the study. They were also found to have both a unique form of inflammatory bowel disease (IBD) as well as traces of measles virus in their intestines that matched the strain used in the vaccine. The underlying premise of Wakefield's research—the so-called "leaky gut" hypothesis of autism causality, in which deficiencies in intestine permeability could potentially permit the entry of toxins that would then affect the nervous system—existed before 1998 (Baker, 2008). The *Lancet* article proposed a link between this hypothesis and an environmental trigger (in this case, MMR vaccination).

However, the article drew no firm conclusions as to the relationship among the IBD condition, autism, and MMR, other than that future research was needed (Petts & Niemeyer, 2004). Nonetheless, at a press conference announcing the study, Wakefield suggested that single vaccines (one each for measles, mumps, and rubella) be offered in place of MMR until a potential link with autism could be resolved. His arguments were not supported by the study's limited conclusions or by its coauthors. As Hargreaves et al. (2003, p. 23) pointed out,

> The evidence provided by Wakefield's research—limited as it [was]—[involved] a link between the measles virus (as opposed to the MMR vaccine itself) and a form of bowel disease linked to autism; The connection between the MMR vaccine and autism [was] a speculative claim made by Wakefield with questionable scientific data to support it.

Moreover, Gregory and Miller (1998) argued that journalists often downplay caveats and limitations of research and instead focus on the implications (in this case, what the Wakefield et al. study could mean for childhood vaccination programs in Britain). However, despite the limited nature of the Wakefield et al. study, the MMR-autism issue attracted considerable public interest. Beginning in 2000, for example, both the British Parliament and U.S. House of Representatives held testimony on the issue (Colgrove & Bayer, 2005; Parliamentary Office of Science and Technology, 2004).

Downloaded from http://scx.sagepub.com by ashley mayer on October 20, 2008

The Issue of Thimerosal

In the aftermath of the Wakefield report, American and British health officials faced several challenges. First, they had to address mounting public skepticism of MMR vaccination. Second, and at the same time, they had to maintain sufficient levels of MMR vaccine uptake so as to ensure herd immunity. This task became especially problematic in Britain, where some localities reported up to a 30% decrease in uptake (Petts & Niemeyer, 2004). Finally, they had to respond to an even larger (but related) accusation—that a vaccine preservative (thimerosal) was likewise causing autism in young children. By 1998, thimerosal had been in use as a vaccine preservative for nearly 70 years. It is 50% ethylmercury by weight (Baker, 2008), making it similar to (but not the same as) methylmercury, which is known to be neurotoxic in high doses (Food and Drug Administration [FDA], 2005; United States Environmental Protection Agency [USEPA], 2006).

The thimerosal/autism issue was not merely an extension of the MMR controversy (given that MMR never contained the preservative). As Baker (2008, p. 2) argued, vaccine controversies have "often followed quite disparate trajectories in different settings," even if the fundamental concern (i.e., vaccines causing a condition) remains the same. Baker also observed that the thimerosal issue reflected a confluence of factors, including (a) the public's growing familiarity with autism by the late 1990s, (b) the struggle on the part of parents to translate this awareness into research and treatment initiatives, and (c) the advent of a parent-led movement that broke from mainstream medical research to argue that autism was not biological, but instead biomedical and even potentially environmental in origin. This so-called alternative viewpoint stressed that high levels of thimerosal could trigger autism in children particularly susceptible to mercury toxicity. This claim was extensively covered by the media (Ackerman, 2004; Parker-Pope, 2005), although virtually all research on the matter failed to establish a link (Baker, 2008; Clements & Ratzan, 2003; IOM, 2004). Nonetheless, in 1999, the CDC recommended that thimerosal be removed from all childhood vaccines in the U.S.—a decision that was not reached without considerable debate. Currently, all childhood immunizations in the U.S. are thimerosal-free (with the exception of some versions of influenza vaccine) (Centers for Disease Control and Prevention, 2007; Institute for Vaccine Safety, 2007).

Downloaded from http://scx.sagepub.com by ashley mayer on October 20, 2008

Media Coverage of the AVC: A Structural Versus Functional Approach to Understanding Balanced Reporting

There are two ways from which one could approach the issue of balanced reporting in the context of the AVC. As part of the structural approach, one examines the actual messages conveyed in media coverage and the norms that shape their development. As part of the functional approach, one explores the effect these messages have on audiences (if any). Although this article focuses on the former (manifested in how to appropriately define balanced reporting), a brief discussion of the latter is provided to help lay a strong theoretical foundation for future research.

A Structural Approach—What Is Balance?

Balance as quantity. Antilla (2005, p. 339) noted that in the latter half of the 20th century, journalism (especially in the U.S.) was "transformed into a profession with its own set of standards that emphasized non-partisanship and factual accuracy." Indeed, the balance norm was at the time (and continues to be) a powerful force in shaping coverage. However, some scholars have argued that this norm—like other norms in a given social context—is not a standard that all journalists conceive of and implement uniformly. While a commitment to balance may be a generic goal shared by most, in practice it is manifested in different ways (Hafez, 2002).

Some media scholars and journalists point out that in order to be considered balanced, media coverage should reflect a commitment to objectivity—that is, giving attention to all sides of an issue and impartially presenting facts (Myrick, 2002). In other words, the focus is on the quantity of information, ensuring that news consumers have access to all sides of an issue so as to make informed judgments. To this end, Ryan (2001) argued that a journalist committed to this form of balance works to ensure that

> All relevant information is obtained and disseminated—even that which [journalists] or powerful interests would prefer to see suppressed. This means that journalists gather facts and opinions that conflict, verify information carefully, seek to determine why accounts conflict and which more accurately reflect reality, and evaluate and fully identify sources; It is the moral duty of objective journalists to collect and to disseminate the information [people] need to make sound decisions. (pp. 4, 7)

Downloaded from http://scx.sagepub.com by ashley mayer on October 20, 2008

In some respects, this idealized form of balance often finds its way into the health risk communication literature. Indeed, health officials often argue that people need as much information as possible so as to make informed health decisions. For vaccination, this means information on both benefits (disease prevention) and risks (unwanted side effects). Huh and Cude (2004), moreover, in describing FDA guidelines for direct-to-consumer drug advertising, observed that

> Balance is considered one of the most important aspects of FDA's regulations, because consumers are able to make sound decisions only with a complete understanding of the advertised drug's benefits and risks. Balance is determined both in terms of content and the format of the information. Any [drug] ad may be considered misleading if it does not present risk information in at least the same "scope, depth, or detail" as that of the benefit information. (p. 530)

Balance as quality. Other scholars argue that "balance as quantity" is an idealized standard that most journalists do not follow. Instead, balanced reporting often centers on the *quality* of information. Since, under most circumstances, journalists have neither the time nor expertise to identify all potential viewpoints, they instead emphasize the two most influential perspectives, present them in a "point-counterpoint" format, and afford both relatively equal attention (Dearing, 1995; Dunwoody & Peters, 1992). As Entman (1989, p. 30) observed, this form of balance "requires that reporters present the views of legitimate spokespersons of the conflicting sides in any significant dispute and provide both sides with relatively equal attention." Similarly, Gans (1979, p. 175) argued that this approach "is usually achieved by identifying the dominant, most widespread, or most vocal positions, then presenting 'both sides.'"

At times, one of these positions can best be described as a maverick, challenging the establishment with unorthodox beliefs. Hargreaves et al. (2003, p. 40), for example, pointed out that in the case of the AVC, "Andrew Wakefield may be something for a voice in the wilderness, but pitted against a phalanx of government officials and experts, journalists were unwilling to discount the possibility that he may [have been] right." Indeed, according to Dearing (1995), journalists are trained to seek out the most extreme positions on an issue, regardless of whether they are in the mainstream of scientific discourse. In a content analysis of newspaper coverage of three maverick theories (a 1990 earthquake prediction, an alternative theory of AIDS causation, and the cold fusion debate), Dearing found that

Downloaded from http://scx.sagepub.com by ashley mayer on October 20, 2008

journalists often portrayed maverick scientists in sympathetic terms, even though "the journalists themselves thought that the [mavericks] lack[ed] credibility" (p. 341). Consequently, Wakefield may have had limited data on which to base his conclusions, but the underlying issues that he was addressing—vaccine safety and concern over autism—were extremely newsworthy. As a result, journalists found it prudent to contrast his viewpoint with those of the larger medical and epidemiological community, even though the bulk of the scientific evidence favored the safety of MMR.

Conflicting norms. The struggle to define balanced reporting suggests that journalistic norms (like those operating in other areas of society) are delineated not only according to goals to which journalists aspire and the means with which they are pursued (Merton, 1968), but also the extent to which these goals are seen as conflicting. That is, for every norm there may be an equally influential counter-norm. Mitroff (1974), for example, wrote about the norm-counter-norm dichotomy of science: specifically, the extent to which scientists see themselves as both objective in their research and partisan in favoring certain viewpoints or interpretations. Mitroff argued that these conflicting norms place scientists in a quandary, in which *both* norms are viewed as desirable to a certain extent (i.e., the detached researcher weighing all options, and the partisan researcher sticking to his/her values). Similarly, journalists may face a similar quandary when it comes to the balance norm. Not only may it conflict with other responsibilities (such as accurate reporting), but the different *interpretations* may appear diametrically opposed. Lack of expertise on an issue and time constraints may shift the norm to one of quality, even if it conflicts with the perceived obligation to tell the whole story to the fullest extent possible.

Exploring the Effect on Audiences

In the immediate aftermath of the Wakefield et al. (1998) article, the media were faced with an important challenge: to report on an issue with crucial health policy implications, even though the scientific debate surrounding an autism-vaccine link was (at that point in time) ongoing. In doing so, the media was in effect "creating science" in lieu of a scientific consensus emerging (Lewenstein, 1995). Furthermore, health officials have argued that because the media balanced the claims of supporters of an autism-vaccine link with those of skeptics (i.e., the majority of the scientific community), they created a discourse that emphasized uncertainty (Mason & Donnelly, 2000). They also gave the illusion that because both

Downloaded from http://scx.sagepub.com by ashley mayer on October 20, 2008

sides received coverage, their arguments deserved equal merit. According to a report prepared by the British Economic and Social Research Council (2003), this had a powerful impact on how people perceived the issue:

> Over half the British public [surveyed in 2002] wrongly believed that medical science was split down the middle about the safety of the MMR vaccine . . . Although almost all scientific experts rejected the claim of a link between MMR and autism, 53% of those surveyed at the height of the media coverage [in 2002] assumed that because both sides of the debate received equal media coverage, there must [have been] equal evidence for both. Only 23% of the population was aware that the bulk of evidence favored supporters of the vaccine. (p. 1)

The quote above is indicative of a relatively broad consensus among health officials: that balanced coverage of the AVC did something to individuals in terms of how they interpreted the scientific evidence for and against each side. Of course, addressing this contention is of crucial importance to media scholars and officials alike. This article discusses one specific area of mass communication research that may hold the answer: the literature on framing. This section provides a brief overview of framing and its relevance to the AVC. A commentary on future research directions is provided in a later section.

Framing the AVC. When studying whether media coverage of the AVC did something to news consumers, it is all too tempting to assume a linear, one-way relationship between news coverage and public opinion. However, one must also consider the dynamic ways in which these two entities—as well as other factors—interact. Framing research provides an avenue for understanding these relationships. Broadly speaking, to frame is to "select some aspects of a perceived reality and make them more salient in a communication text, in such a way as to promote a particular problem definition, casual interpretation, moral evaluation, and/or treatment recommendation" (Entman, 1993, p. 52). Frames represent, according to Boykoff (2007b, p. 478), a "construction of meaning" derived through interactions among "scientist, policymakers, and the public."

One of the fundamental assumptions of framing research is that "everyone does it." In the course of debating an issue in the public arena, policymakers, interest groups, journalists, and others attempt to promote their own interpretations (or frames) so as to "impact . . . both the volume and character of news messages about a particular issue" (Scheufele & Tewksbury,

Downloaded from http://scx.sagepub.com by ashley mayer on October 20, 2008

2007, p. 12; Gamson and Modigliani, 1989). In journalism, frames are a product of professional norms such as balance and accuracy. In the case of the AVC, for example, health officials were intent on promoting the viewpoint that there was no scientific evidence supporting an autism-vaccine link. By contrast, advocacy groups such as SafeMinds, the National Vaccine Information Center, and Justice Awareness and Basic Support—many of them organized and led by parents believing in a link (Baker, 2008)—were intent on promoting the viewpoint that a link was plausible, if not likely.

Why frame in the first place? Entman (2007, p. 165) observed that frames are designed to "introduce or raise the salience or apparent importance of certain ideas, activating schemes that encourage target audiences to think, feel, and decide in a particular way." In essence, frames are used to reduce the complexity of an issue and make it understandable (Scheufele, 1999). Frames also function as persuasive mechanisms that not only increase the ease with which individuals recall certain issue interpretations, but also shape what exactly it is that people remember (Scheufele, 1999). Indeed, Chong and Druckman (2007) noted,

> Virtually all public debates involve competition between contending parties to establish the meaning and interpretation of issues. . . . [Citizens] must grapple with opposing frames that are intended by opinion leaders to influence policy preferences. . . . If one side can establish the relevant terms of debate over an issue, it can successfully persuade individuals to support its position. (p. 100)

Did the competing frames associated with the AVC—namely, the consensus viewpoint put forth by health officials (no link) and the conflict viewpoint promoted by some advocacy groups (a probable, if not a definitive, link)—have an impact on how news consumers perceived this issue? Unfortunately, there is no research to the author's knowledge that specifically explores this question. However, findings in other areas suggest that such research would be potentially worthwhile from both a theoretical and practical angle. For example, Corbett and Durfree (2004) conducted an experiment in which participants read news stories about global warming. The stories highlighted scientific studies that showed a thickening of the Antarctic ice sheet, rather than a thinning which most scientists attribute to climate change. Corbett and Durfree manipulated the stories to emphasize controversy (i.e., that other scientists disagreed with the findings), context (i.e., that other studies had found the ice sheet to be thinning), both controversy and context, and neither (as a

Downloaded from http://scx.sagepub.com by ashley mayer on October 20, 2008

control). Outcome variables were participants' perceptions of the certainty of global warming. They found that individuals exposed to the story with context only expressed the highest level of certainty that global warming was occurring, followed by individuals exposed to stories that emphasized both and stories that emphasized only controversy. The control group (i.e., exposed to stories with neither context nor controversy) were the least certain.

According to Corbett and Durfree (2004), these results speak to the powerful influence of media representations of scientific deliberation on public perceptions of the evidence for and against a particular issue. In this case, providing context that reflected the larger scientific consensus on global warming exerted a powerful influence on participants' perceptions of certainty. Given that media coverage is often episodic in nature (driven by discrete events such as newly released studies) and fails to provide context (in terms of establishing connections to existing research) (Gregory & Miller, 1998), the study provides insight into how issue stakeholders (including journalists) are able to convey interpretations via the media. Broadly speaking, a story doesn't even need to mention the word "uncertainty" to inject doubt into the minds of readers. Merely providing context or controversy can perhaps be sufficient.

Research Questions

This study explored the role of the balance norm in shaping U.S. and British newspaper coverage of the AVC from 1998 to 2006. Specifically, it focused on the extent to which studies/claims that refuted an autism-vaccine link were discussed along with studies/claims that appeared to support it. Specifically, two research questions were addressed:

Research Question 1: Within the combined sample of U.S. and British newspaper articles ($N = 279$ articles), to what extent were both types of studies/claims discussed?

Research Question 2: Were there differences in U.S. and British newspaper coverage of these perspectives?

Both research questions were addressed in two ways. Coverage across the entire eight-year study period was examined, followed by coverage on a year-by-year basis.

Downloaded from http://scx.sagepub.com by ashley mayer on October 20, 2008

Method

Selection of Sample

U.S. and British newspaper articles were selected via the Major Newspapers section of Lexis-Nexis. The search terms *vaccines* and *autism* were used because they generated the highest number of hits compared to other phrases such as MMR and autism. Moreover, the researcher did not want to inadvertently ignore the thimerosal issue—a distinct possibility with the latter phrase. However, the major newspapers function limited the sample to periodicals with large circulations (both nationally and internationally). Within the U.S., these included *USA Today* (a daily circulation of over two million copies), *The Wall Street Journal* (two million copies), and *The New York Times* (one million copies) (BurrellesLuce, 2007). Examples from the UK included the *Daily Telegraph* (a daily circulation of approximately 900,000 copies), *The Guardian* (360,000 copies), and *The Independent* (250,000 copies) (Brook, 2007). While this sampling approach may overlook more nuanced coverage on the state/local level, the aforementioned newspapers are often considered "elite" or "agenda-setting" media (Boykoff & Boykoff, 2004). Specifically, they often serve as news sources for political elites and more local, secondary newspapers.

The initial Lexis-Nexis search yielded more than 1,000 articles. To arrive at a more manageable number to code, the researcher used a stratified sampling technique to produce a sample of 279 articles. The years 2002 and 2004 were each over-sampled 10%, given that they produced (by far) the greatest quantity of hits. All news articles were included regardless of length, although editorials, commentaries, and advertisements were excluded.

Variables

Articles were coded based on whether they mentioned studies or expert claims pertaining to an autism-vaccine link, irrespective of how many times each appeared. Experts were defined as government health officials, medical experts, and/or academic researchers. Studies or claims were coded as "pro-link" if they indicated that a link was possible, plausible, or probable. This variable included, for example, mention of the Wakefield et al. (1998) article in the *Lancet.* Wakefield himself was often very vocal in his support for a potential autism-vaccine association; British newspaper accounts declared that he "stood by" his research findings (Day, 2004). By contrast,

Downloaded from http://scx.sagepub.com by ashley mayer on October 20, 2008

studies or claims were coded as anti-link if they indicated that a link was considered improbable, unsupported by evidence, or disproved (for example, a series of eight reports released by the Institute of Medicine).

To determine balance, pro- and anti-link studies/claims were grouped into four categories:

- Article mentioned *only* "anti-link" studies/claims.
- Article mentioned *both* pro- and "anti-link" studies/claims (at least one each).
- Article mentioned *only* pro-link studies/claims.
- Article mentioned *neither* pro- nor "anti-link" studies/claims.

Coding Process and Reliability Testing

The researcher, with several assistants, coded all articles—an approach with inherent benefits and drawbacks. While the coding process arguably is made more efficient if the researcher assists with data collection, s/he may inadvertently introduce an expectation bias into the results. To guard against this problem, several reliability checks were implemented (Stephens, 2005). First, the researcher coded a randomly selected subsample of 50 articles. Second, two colleagues not familiar with the research coded the same subsample. Cohen's Kappa was used to assess reliability, differences were addressed, and the researcher then recoded some variables in need of reexamination. Finally, a third colleague (also with no knowledge of the project) coded the same subsample, with Kappa used once again to determine level of agreement. Final coefficients were 0.767 for "pro-link" studies/claims and 0.75 for "anti-link" studies/claims. The author then coded the remaining 229 articles.

Results

Summary of Sample

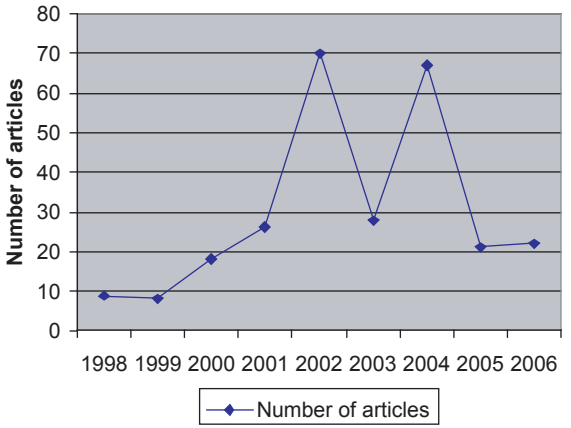
In total, 279 articles were coded in this study, 72 from U.S. newspapers and 207 from British newspapers. As shown in Table 1 and Figure 1, coverage of the AVC in both samples was relatively low between 1998 and 2000, increased substantially from 2001 to 2002, decreased in 2003, increased in 2004, and decreased after 2005. The year 2002 featured the most articles ($n = 70$), followed closely by 2004 ($n = 67$), even after controlling for a 10% over-sampling for both years. Moreover, nearly 85% of British articles appeared in one of six newspapers: *The Herald, The Independent, The*

Downloaded from http://scx.sagepub.com by ashley mayer on October 20, 2008

Table 1
Distribution of Articles Coded by Year (*N* = 279 articles)

Year	Number of Articles	Percent of Total
1998	9	3.2
1999	8	2.9
2000	18	6.5
2001	36	13.0
2002	70	25.1
2003	28	10
2004	67	24
2005	21	7.5
2006	22	7.8
Totals	279	100

Figure 1
Coverage of AVC by Year, Combined Sample (*n* = 279)



Guardian, The Scotsman, The Daily Telegraph, and *The Sunday Telegraph.* By contrast, in the U.S. 39% of articles appeared in three main newspapers, *The New York Times, The Wall Street Journal,* and *The Washington Post.*

Autism-Vaccine Studies and Claims

Research Question 1: Combined U.S.-British sample (all years—see Figure 2). Across the entire combined sample (*n* = 279 articles) over the

Downloaded from http://scx.sagepub.com by ashley mayer on October 20, 2008

Figure 2
Presentation of Autism-Vaccine Studies and Claims (n = 279), Combined Sample

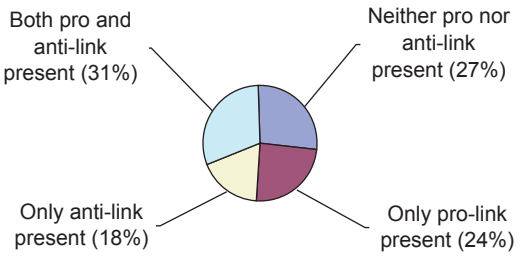
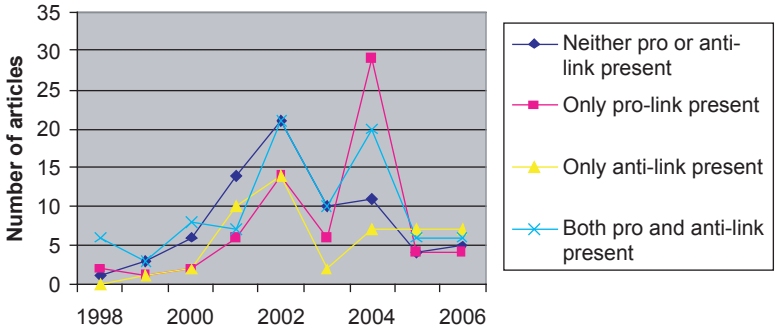


Figure 3
Coverage of Autism Studies/Claims by Year, Combined Sample (n = 279)



eight-year study period, 31% of articles mentioned at least one pro- and anti-link study/claim together, 27% mentioned neither a pro-link nor anti-link study/claim, 24% mentioned pro-link studies/claims by themselves, and 18% mentioned anti-link studies/claims by themselves.

Combined U.S.-British sample (year-by-year—see Figure 3). On a year-by-year basis, overall coverage was relatively low from 1998-2000, increased in 2002, declined in 2003, peaked in 2004, and substantially decreased thereafter. Both 2002 and 2004 featured noticeable increases in the number of

Downloaded from http://scx.sagepub.com by ashley mayer on October 20, 2008

Figure 4
Presentation of Autism-Vaccine Studies and Claims, U.S. Sample ($n = 72$)

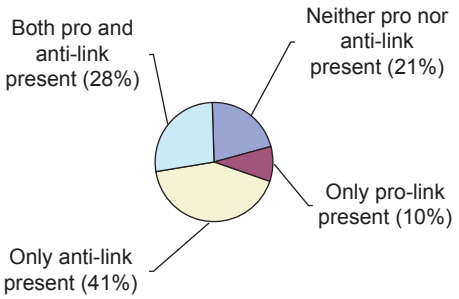
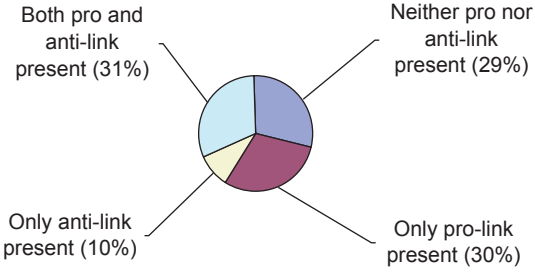


Figure 5
Presentation of Autism-Vaccine Studies and Claims, UK Sample ($n = 207$)



articles. In 2002, the most common articles were those that mentioned both pro- and anti-link studies/claims as well as neither type of study/claim. In 2004, by contrast, coverage focused on pro-link studies/claims by themselves, followed by both pro-link and anti-link studies/claims, neither type of study/claim, and anti-link studies/claims by themselves.

Research Question 2: U.S.-British comparisons (all years). Variable comparisons between the U.S. and British samples, using Chi Square tests for independence, are provided in Figures 4 and 5. Results showed that pro-link

Downloaded from http://scx.sagepub.com by ashley mayer on October 20, 2008

Figure 6
Coverage of Autism Claims/Samples by Year, U.S. Sample ($n = 72$)

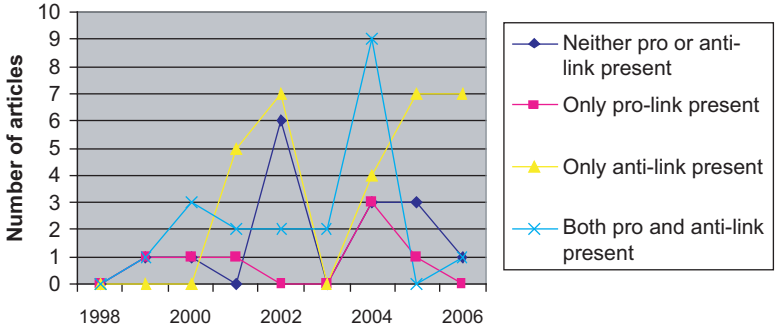
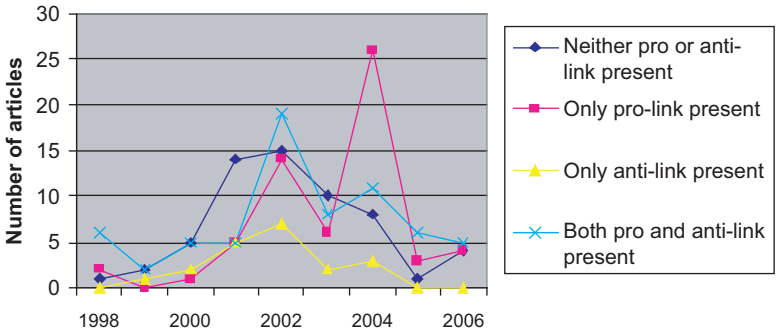


Figure 7
Coverage of Autism Claims/Samples by Year, UK Sample ($n = 207$)



studies/claims by themselves were significantly more likely to appear in the British sample (30%) than in the U.S. sample (10%; $\chi^2 = 11.300$, $p = .001$). By contrast, anti-link studies/claims were significantly more likely to appear in U.S. articles (41%) than their British counterparts (10%; $\chi^2 = 37.199$, $p < .001$). However, coverage was similar (and not significantly different) for the latter two variables. The British sample was only slightly more likely to include articles that mentioned at least one pro-link *and* anti-link study/claim

Downloaded from http://scx.sagepub.com by ashley mayer on October 20, 2008

together (31%) than the U.S. sample (28%; $\chi^2 = .422$, $p = .516$). Also, the British sample was only slightly more likely to include articles that mentioned *neither* a pro-link nor anti-link study/claim (29%) than the U.S. sample (21%; $\chi^2 = 1.612$, $p = .204$). Indeed, for U.S. ($r = -.299$, $p = .011$) and British newspapers ($r = -.284$, $p < .001$), there was a strong negative correlation between the presentation of pro- and anti-link studies/claims—that is, articles that mentioned the former tended not to mention the latter (and vice versa).

U.S.-British comparisons (year-by-year). In no year did the U.S. sample devote significant attention to pro-link studies/claims by themselves (see Figure 6); by contrast, they were far more likely to discuss anti-link studies/claims by themselves (especially in 2002 and 2004-2006). Moreover, coverage of both claims together was relatively low before 2004, peaked in that same year, and substantially decreased thereafter. However, in the British sample (see Figure 7), pro-link studies/claims remained a consistent feature of coverage, increasing in 2001 and 2002, reaching a peak in 2004, and decreasing thereafter. The number of articles that discussed neither pro- nor anti-link perspectives increased from 2000-2002 and decreased afterwards. Finally, in no year did British newspapers devote considerable coverage to anti-link studies/claims by themselves.

Discussion

When the AVC first emerged in 1998, journalists were challenged to report on a controversial issue even though a scientific consensus had not yet taken shape. Moreover, because journalists often lack the time and expertise to present all sides of an issue—and because the AVC quickly distilled into two dominant viewpoints (supporters and skeptics of an autism-vaccine link)—discussing two competing perspectives became an important feature of balanced coverage. However, what happens if the media remain preoccupied with balance even when a consensus does emerge (as it did in the case of the AVC)? Boykoff and Boykoff (2004, 2007a) argued that under such conditions the media can produce a discourse that differs from the prevailing scientific viewpoint (in this case, that there was no relationship between autism and any vaccine or vaccine component). This difference can potentially impact the way an issue is defined, debated, and resolved in the public arena.

Downloaded from http://scx.sagepub.com by ashley mayer on October 20, 2008

Balance and the Media/Science Disconnect

In this study of U.S. and British newspaper coverage of the AVC ($n = 279$ articles), 31% of articles in the combined sample cited at least one pro-link and anti-link study or claim (28% and 31% for the U.S. and British samples, respectfully). On one hand, these figures may not indicate a systematic attempt to balance perspectives. Indeed, for both samples there was a strong *inverse* correlation between the presentation of pro- and anti-link studies/claims, in which articles that mentioned the former tended *not* to mention the latter (and vice versa). Moreover, in over 40% of the articles (51% for the U.S., 40% for the British), only one perspective was discussed, with the opposing side entirely ignored. Also, U.S. and British newspapers differed in terms of which perspective was emphasized. Anti-link studies/claims were four times as common in the former, while pro-link studies/claims appeared three times as often in the latter. On the other hand, when one considers the number of articles in which *neither* perspective was mentioned (27% of the total sample—21% and 29% for U.S. and British newspapers, respectfully), it appears that newspapers did take a more balanced approach to reporting. Fifty-eight percent of articles in the combined sample were balanced, therefore, in terms of mentioning both perspectives or neither perspective (49% for U.S. newspapers, 60% for British newspapers).

Coverage patterns during the entire eight-year study period were similar across both national samples: relatively low coverage from 1998-2000, increased attention from 2001-2002, falling coverage in 2003, a prominent spike in articles in 2004, and a steady decline in 2005 and 2006. Overall, U.S. newspapers devoted considerable attention to anti-link studies/claims by themselves as well as both pro and anti-link perspectives together. Coverage of pro-link perspectives by themselves remained low throughout the entire study period. By contrast, British newspapers focused attention on pro-link studies/claims by themselves (especially during the 2004 "coverage spike"). Coverage of anti-link perspectives by themselves remained low throughout this period.

In summary, while U.S. and British newspaper coverage of the AVC did appear somewhat balanced, a significant number of articles in both samples gave attention to only one perspective. In one sense, this finding is encouraging, given that the anti-link perspective received significant coverage in the U.S. press. However, it is also somewhat troubling because the British press devoted considerable attention to pro-link studies and claims by themselves, especially during periods of increased coverage in 2001-2002 and 2004–a time when the scientific consensus on an autism-vaccine link strengthened,

Downloaded from http://scx.sagepub.com by ashley mayer on October 20, 2008

rather that weakened (for example, Dales et al., 2001; IOM, 2004; Kaye et al., 2001; Madsen et al., 2002).

Implications for Journalism Ethics

Journalists face many challenges when they cover controversial issues such as the AVC. In addition to economic norms that stress efficiently-produced and profit-generating stories and political norms that emphasize the media's role in ensuring an informed citizenry, there is the challenge of providing balance in a story while also ensuring information accuracy. Of course, criticism of the balance norm is nothing new (Boykoff & Boykoff, 2004). Nor are these critiques always as simple as a balance as bias argument. This article has argued that journalists must negotiate various norms when reporting controversial stories. Moreover, like those in any social system, these norms can (at times) appear to conflict with each other (Mitroff, 1974). For example, the balance norm may appear to conflict with a commitment to accuracy—a situation in which (a) a perspective with little supporting evidence receives prominent attention compared to an established consensus or (b) a "maverick" receives press because s/he is seen as challenging an established authority (Boykoff & Boykoff, 2004, 2007a, 2007b; Dearing, 1995). Similarly, the balance norm itself is open to different and potentially conflicting interpretations. While a quantity approach may seem like an idealized standard (i.e., presenting all sides of an issue and telling the whole story), quality is often the reality, given that journalists often lack the time and expertise to identify all relevant viewpoints.

Implications for Health Policy

From a health policy perspective, it is important to explore the reasons why pro-link studies and claims received the type of press that they did (especially in the British sample). Obviously, the balance norm is only part of the story. One potential explanation relates to the autism-vaccine question itself and not simply the amount of evidence that existed to support or refute it. The issue, in other words, was not only about a potential link, but also the crucial policy questions that it raised. These questions included (a) whether MMR should be replaced with single vaccines each for measles, mumps, and rubella, (b) whether thimerosal should be removed from all vaccines that still contain it (i.e., flu vaccine), (c) whether individuals could file lawsuits against thimerosal manufacturers, (d) whether government health agencies should be permitted to both promote and regulate vaccines,

Downloaded from http://scx.sagepub.com by ashley mayer on October 20, 2008

and (e) whether the AVC signaled a decline in public acceptance of immunization policies (Tharp, 2003). Concurrent media attention to these issues helped create a self-perpetuating cycle, in which coverage of policy implications focused attention on scientific research concerning a link and vice versa (Hargreaves et al., 2003).

In another sense, the cause was also external to the AVC. Gregory and Miller (1998), for example, argued that media scholars should consider the larger social context in which news stories emerge. At the time of the Wakefield et al. article in 1998, Mad Cow Disease (also known as BSE) was the subject of considerable policy debate, as the British government struggled to understand the full scope of the threat, and the British public grew distrustful of government reassurances that beef was safe to consume. Indeed, as Hargreaves et al. (2003, p. 40) noted, the AVC "is often compared to the [BSE] crisis, [with] both stories involving potential risks to the public initially denied by both government and mainstream science." The possibility that the government could also be wrong on another health issue (an autism-vaccine link) was thus the subject of considerable public interest and media attention. This argument also raises an important question: whether the British media is inherently more critical of the government than their U.S. counterparts. Here, the evidence is mixed at best. Certainly the BSE scare provided a potential avenue for journalists to become more critical of government policy. Moreover, Esser (1999) observed that "tabloid journalism," with a focus on scandal and entertainment, is a relatively more established phenomenon in Britain compared to the U.S., spurring competition with more mainstream newspapers for readership. However, a number of scholars have argued that newspapers may, in fact, be less critical overall. For example, journalists may not consider an issue controversial until elite sources (such politicians) begin to voice disagreement and division (Newton, 1999).

Implications for Vaccine Communication

Health officials often communicate about vaccine safety in a climate of intense media scrutiny. Traditionally, they have responded to this challenge by focusing on vaccine education: that if they spoke louder about the benefit of immunization, the problem would be solved. However, this communication as education approach often misses the point. This article instead argues for a more nuanced strategy by which health officials not only work to disseminate safety messages, but also monitor media coverage and address salient concerns on which the press may focus.

Downloaded from http://scx.sagepub.com by ashley mayer on October 20, 2008

Monitoring the Media and Addressing Concerns

During health crises, the media are not only a valuable resource through which officials can provide health information. Officials can also use the media to identify emerging issues of public concern—issues that they may have failed to consider. During the AVC, for example, health officials devoted considerable effort to emphasizing the safety of the vaccines under fire (as well as of immunization in general). Unfortunately, this failed to address a key underlying public concern: whether the government was doing enough to address the potential risks, however small. This theme, however, was a central component of media coverage. The British government, for example, came under fire for its high-profile, $3 million campaign to encourage MMR vaccine uptake, which appeared (to some citizens) as more public relations than risk communication (Bosley, 2001; Colgrove & Bayer, 2005). Nor did the government seem to effectively explain the rationale behind its decision to *not* offer single vaccines in place of MMR. While the rationale itself made sense (the time period for administering each vaccine left the child susceptible to disease; National Health Service, 2007), this article argues that it was not communicated nearly as well as the policy itself. This problem left health officials open to accusations that they were not effectively regulating vaccines to ensure safety.

Monitoring media coverage of an issue has paid dividends in the past. For example, during the fall 2001 anthrax attacks, the CDC not only monitored news outlets for the type of information being provided, but also used this data to craft messages the agency wished to see covered (Prue, Lackey, Swenarski & Gantt, 2003). These messages were subsequently provided to reporters at daily telephone conference calls, via Frequently Asked Question sheets, and other methods. Consequently, the CDC not only helped shape media coverage of the nation's first bioterrorist attack, but also helped ensure that vital health information reached the American public. Such information included (a) CDC's role in bioterrorism response, (b) concerns about smallpox vaccine (during the anthrax crisis, smallpox emerged as a potential bioweapon), and (c) new rapid-results tests to detect anthrax contamination within facilities (Prue et al., 2003).

Future Research Directions

The extent to which the mass media, in adhering to the balance norm, can produce a discourse at odds with an established consensus depends largely on how individuals come to view the issue in question. It is tempting

Downloaded from http://scx.sagepub.com by ashley mayer on October 20, 2008

to conclude that because journalists appeared to give somewhat equal weight to supporters and skeptics of a vaccine autism link, people automatically assumed that the scientific evidence was uncertain and the scientific community divided. Hargreaves et al. (2003), moreover, argued that what often persists in peoples' minds is not the absolute amount of attention afforded to a perspective, but that there are (in fact) opposing sides that are receiving press. Within the British sample, for example, the emphasis on pro-link perspectives—far out of proportion to anti-link studies/claims—may have helped propagate the belief that the scientific community was evenly divided on the issue of a vaccine-autism relationship. This emphasis occurred especially during periods of increased coverage in 2001-2002 and 2004, a time when the scientific consensus strengthened.

However, to the author's knowledge, no research to date has examined the impact of media representations of the AVC on public perceptions of the controversy. This article argues that future research should do so in the context of the rich literature on framing. Broadly speaking, the AVC can arguably be seen as a situation in which a number of entities, including government health officials and parent-led advocacy groups, competed with each other to convey their particular interpretation within the public arena, in terms of whether an autism-vaccine link was disproven (the former group) or plausible, if not probable (the latter group). In essence, they were trying to frame the problem—whether vaccines cause autism—and persuade individuals to adopt their particular viewpoint. Moreover, given that people develop issue-relevant frames through a combination of personal experience, interpersonal interactions, and media images, frames conveyed by journalists in their reporting can potentially resonate with individuals. These frames can become available in memory and readily accessible when forming issue-relevant judgments (Corbett & Durfree, 2004). Were advocacy groups and other supporters of a link more successful at promoting their frame, given (limited) evidence that individuals saw the AVC as a situation in which the epidemiological evidence was uncertain (Hargreaves et al., 2003)?

Scholars will need to consider a number of factors in attempting to isolate any effects (however large or small) of frames on public perceptions of or attitude towards the AVC. First, given the long duration of the AVC (over 10 years if one uses the Wakefield et al. 1998 article as a reference point), studying public attitudes over time may prove far more rewarding that an analysis done only once at a particular point in time. Second, researchers will need to decide how best to define the impacts of frames. Chong and Druckman (2007) suggested two ways. For example, one can compare attitude change across frames. That is, which frame (pro- or anti-link, for

Downloaded from http://scx.sagepub.com by ashley mayer on October 20, 2008

example) is most adept at changing attitudes? In other words, the focus is not on isolating the effect of framing versus no framing, but rather identifying *which frames* have the most powerful impact. Furthermore, one can also compare attitude change in a pre-post test format, in which an individual first indicates their existing attitudes towards the AVC, is then exposed to an article with a particular frame and subsequently indicates whether their attitude has changed (see Corbett & Durfree, 2004). In other words, the focus is on isolating the effect of the framing.

Limitations

This analysis has several limitations. First, the focus on major newspapers meant that AVC coverage in state and local newspapers was overlooked. Second, the sample may have been biased in favor of major U.S. newspapers, given that the U.S. has a greater number of mass-circulation newspapers than Great Britain. A third limitation is that the analysis excluded editorials, commentaries, and letters to the editor. However, these pieces can serve as barometers for community sentiments about controversial issues. Fourth, the definition of balance used in this study only included claims made by experts, although one could argue that the claims of other entities (such as parents, vaccine advocates, and politicians) should have also been considered. However, criticisms of the media during the AVC emphasized how coverage of conflicting experts claims created a sense of confusion, not the claims of other stakeholders per se.

A final limitation is whether a better measure for balance could have been used. Specifically, this study collapsed pro- and anti-link studies/claims into a single *presence/absence* variable for each article. This approach, however, did not consider the *number* of times a particular study/claim appeared or its placement in an article. Broadly speaking, since there are many ways to define balanced reporting, future research on the AVC could further provide valuable insight.

Conclusion

Despite these limitations and the need for more research, this study has important implications for journalism ethics, mass media norms, and vaccine risk communication via the media. How the balance norm shapes media coverage of controversial issues is a subject of considerable debate.

Downloaded from http://scx.sagepub.com by ashley mayer on October 20, 2008

How should journalists best adhere to this norm while also addressing the public's right to be informed, stakeholders' rights to have their perspectives heard in the public arena, and their own responsibility to convey truthful information in their reporting? What exactly counts as balanced reporting? Is it a function of quantity (the number of viewpoints presented) or quality (selecting the two most prominent sides)? Moreover, covering controversial issues in which one perspective is well-supported by scientific evidence while the others are not presents additional challenges—namely, that the media can produce a discourse at odds with a prevailing scientific consensus (in this case, the potential existence of an autism-vaccine link).

At the same time, this argument does not mean that the balance norm is necessarily undesirable, given the journalist's role in informing the citizenry and providing a full range of information with which to make informed decisions about a given topic. Health officials, moreover, can take advantage of the balance norm to improve their risk communications and identify relevant issues of public concern as conveyed in the media.

Note

1. Autism (or classical autism) is a developmental disorder that affects a child's social interaction skills and verbal/non-verbal communication skills (National Institute of Mental Health [NIMH], 2008; National Institute of Neurological Disorders and Stroke [NINDS], 2007). Symptoms vary in severity but include difficulties interacting and communicating with others, problems interpreting social cues, repetitive movements, and unusual reactions to sounds or other sensory information. Autism is part of a group of related conditions called Autism Spectrum Disorders (ASDs), which also include Asperger Syndrome, Rett syndrome, childhood disintegrative disorders, and persuasive developmental disorder not otherwise specified (PDD-NOS) (NIMH, 2007; NINDS, 2007). Approximately three to six children out of every 1,000 are believed to have autism, and the condition is four times as common in males as females. Theories of causality include genetics and environmental factors. While there is no known cure, various types of behavioral therapies are designed to address specific symptoms.

References

Ackerman, T. (2004, June 17). Vaccines' mercury linked to autism-like signs in mice. *The Houston Chronicle,* A7.

American Medical Association. (2004). *Pediatric vaccination.* Retrieved April 27, 2008, from http://www.ama-assn.org/ama/pub/category/1824.html

Anderson, A., Allan, S., Petersen, A., & Wilkinson, C. (2005). The framing of nanotechnologies in the British newspaper press. *Science Communication, 27*(2), 200-220.

Antilla, L. (2005). Climate of skepticism: U.S. newspaper coverage of the science of climate change. *Global Environmental Change, 15,* 338-352.

Downloaded from http://scx.sagepub.com by ashley mayer on October 20, 2008

Associated Press. (2007, September 26). *Study: No link for thimerosal, kids' neurological risks.* Retrieved April 27, 2008, from http://www.cnn.com/2007/HEALTH/09/26/vaccine.safety.ap/index.html

Baker, J. P. (2008). Mercury, vaccines and autism: One controversy, three histories. *American Journal of Public Health, 98*(2), 2-11.

Ball, L. K., Evans, G., & Bostrom, A. (1998). Risky business: Challenges in vaccine risk communication. *Pediatrics, 101*(3), 453-458.

Bennett, W. L. (1996). An introduction to journalism norms and representations in politics. *Political Communication, 13,* 373-384.

Bellaby, P. (2003). Communication and miscommunication of risk: Understanding UK parents' attitudes to combined MMR vaccination. *British Medical Journal, 327,* 725-728.

Bosley, S. (2001, January 23). Pounds 3M advert drive to promote MMR jabs: Medical establishment seeks to restore faith in vaccine. *The Guardian,* 1.

Boykoff, M. T., & Boykoff, J. M. (2004). Balances as bias: Global warming and the U.S. prestige press. *Global Environmental Change, 14,* 125-136.

Boykoff, M. T. (2007a). Flogging a dead norm? Newspaper coverage of anthropogenic climate change in the United States and United Kingdom from 2003 to 2006. *Area, 39*(4), 470-481.

Boykoff, M. T. (2007b). From convergence to contention: United States mass media representations of anthropogenic climate change science. *Transactions of the Institute for British Geographers, 32,* 477-489.

British Economic and Social Research Council. (2003). *Public duped by media over MMR.* Retrieved April 27, 2008, from http://www.esrcsocietytoday.ac.uk/ESRCInfoCentre/PO/releases/2003/may/duped.aspx?ComponentId=2109&SourcePageId=1404

Brook, S. (2007, May 11). *Sales of all quality dailies down.* Retrieved April 24, 2008, from http://www.guardian.co.uk/media/2007/may/11/abcs.pressandpublishing

BurrellesLuce. (2007). *Top 100 U.S. daily newspapers.* Retrieved April 24, 2008, from http://www.burrellesluce.com/top100/2007_Top_100List.pdf

Centers for Disease Control and Prevention. (2007). Thimerosal in seasonal influenza vaccine. Retrieved April 27, 2008, from http://www.cdc.gov/flu/about/qa/thimerosal.htm

Chong, D., & Druckman, J. N. (2007). A theory of framing and opinion formation in competitive elite environments. *Journal of Communication, 57,* 99-118.

Clements, C. J., & Ratzan, S. (2003). Misled and confused? Telling the public about MMR vaccine safety. *Journal of Medical Ethics, 29*, 22-26.

Colgrove, J., & Bayer, R. (2005). Could it happen here? Vaccine risk controversies and the specter of derailment. *Health Affairs, 24*(3), 729-738.

Corbett, J. B., & Durfree, J. L. (2004). Testing public (un)certainty of science: Media representations of global warming. *Science Communication, 26,* 129-151.

Dales, L., Hammer, S. J., & Smith, N. J. (2001). Time trends in autism and in MMR immunization coverage in California. *Journal of the American Medical Association, 285,* 1183-1185.

Day, M. (2004). MMR doctor: I stand by my research on autism link. Retrieved April 27, 2008, from http://www.telegraph.co.uk/news/main.jhtml?xml=/news/2004/02/22/nmmr22.xml&sSheet=/news/2004/02/22/ixnewstop.html

Dearing, J. W. (1995). Newspaper coverage of maverick science: Creating controversy through balancing. *Public Understanding of Science, 4*(4), 341-361.

Donohue, G. A., Olien, C. N., & Tichenor, P. J. (1985a). Reporting conflict by pluralism, newspaper type and ownership. *Journalism Quarterly, 62*(3), 489-507.

Donohue, G. A., Olien, C. N., & Tichenor, P. J. (1985b). Leader and editor views on role of press in community development. *Journalism Quarterly, 62*(2), 367-372.

Downloaded from http://scx.sagepub.com by ashley mayer on October 20, 2008

Dunwoody, S., & Peters, H. P. (1992). Mass media coverage of technological and environmental risks. *Public Understanding of Science, 1*(2), 199-230.

Entman, R. M. (1989). *Democracy without citizens: Media and the decay of American politics.* Chicago: University of Chicago Press.

Entman, R. M. (1993). Framing: Toward clarification of a fractured paradigm. *Journal of Communication, 43*(4), 51-58.

Entman, R. M. (2007). Framing bias: Media in the distribution of power. *Journal of Communication, 57,* 163-173.

Esser, F. (1999). "Tabloidization" of news: A comparative analysis of Anglo-American and German press journalism. *European Journal of Communication, 14,* 291-324.

Food and Drug Administration. (2005). Thimerosal in vaccines. Retrieved April 27, 2008, from http://www.fda.gov/CBER/vaccine/thimerosal.htm

Gamson, W. A., & Modigliani, A. (1989). Media discourse and public opinion on nuclear power: A constructionist approach. *The American Journal of Sociology, 95*(1), 1-37.

Gans, H. (1979). *Deciding what's news.* New York: Pantheon.

Gregory, J., & Miller, S. (1998). *Science in public: Communication, culture, and credibility.* Cambridge, MA: Basic Books.

Griffin, R. J., & Dunwoody, S. (1997). Community structure and science framing of news about environmental risks. *Science Communication, 18*(4), 362-384.

Griffin, R. J., Dunwoody, S., & Gehrmann, C. (1995). The effects of community pluralism on press coverage of health risks from local environmental contamination. *Risk Analysis, 15*(4), 449-458.

Hafez, K. (2002). Journalism ethics revisited: A comparison of ethics codes in Europe, North Africa, the Middle East, and Muslim Asia. *Political Communication, 19,* 225-250.

Hargreaves, I., Lewis, J., & Speers, T. (2003). *Towards a better map: Science, the public and the media.* Retrieved August 1, 2007, from http://www.esrcsocietytoday.ac.uk/ESRCInfoCentre/Images/Mapdocfinal_tcm6-5505.pdf

Harris, G. (2006). *No vaccine-autism link, parents are told.* Retrieved April 27, 2008, from http://www.nytimes.com/2005/07/20/politics/20vaccine.html

Huh, B. J., & Cude, J. (2004). Is the information "fair and balanced" in direct-to-consumer prescription drug websites? *Journal of Health Communication, 9,* 529-540.

Institute of Medicine. (2004). *Immunization safety review: Vaccines and autism.* Washington, D.C.: The National Academies Press.

Institute for Vaccine Safety. (2007). *Thimerosal content in some U.S. licensed vaccines.* Retrieved April 27, 2008, from http://www.vaccinesafety.edu/thi-table.htm

Intergovernmental Panel on Climate Change. (2007). *A report of Working Group I of the Intergovernmental Panel on Climate Change.* Retrieved April 27, 2008, from http://www.ipcc.ch/pdf/assessment-report/ar4/wg1/ar4-wg1-spm.pdf

Kaye, J. A., Melero-Montese, M. M., & Jick, H. (2001). Measles, mumps, and rubella vaccine and the incidence of autism by general practitioners: A time trend analysis. *British Medical Journal, 322,* 460-463.

Leask, J., & Chapman, S. (2002). "The cold hard facts:" Immunization and vaccine-preventable diseases in Australia's newsprint media, 1993-1998. *Social Science & Medicine, 54,* 445-457.

Lewenstein, B.V. (1995). From fax to facts: Communication in the cold fusion saga. *Social Studies of Science, 25*(3), 403-436.

Madsen, K. M., Hviid, A., Vestergaard, M., Schendel, D., Wohlfahrt, J., Thorsen, P., Olsen, J., & Melbye, M. (2002). A population study of measles, mumps and rubella vaccination and autism. *New England Journal of Medicine, 347*(19), 1477-1482.

Downloaded from http://scx.sagepub.com by ashley mayer on October 20, 2008

Manning, A. (2005). Mistrust rises with autism rate. Retrieved April 27, 2008, from http://www.usatoday.com/news/health/2005-07-06-autism_x.htm

Mason, B. W., & Donnelly, P. D. (2000). Impact of a local newspaper campaign on the uptake of the measles mumps and rubella vaccine. *Journal of Epidemiology and Community Health, 54*, 473-474.

Merton, R. K. (1968). *Social theory and social structure.* Toronto, Ontario, Canada: The Free Press.

Miller, D. (1999). Risk, science and policy: Definitional struggles, information management, the media and BSE. *Social Science and Medicine, 49,* 1239-1255.

Mitroff, I. I. (1974). Norms and counter-norms in a select group of the Apollo moon scientists: A case study of the ambivalence of scientists. *American Sociological Review, 39*(4), 579-595.

Myrick, H. A. (2002). *The search for objectivity in journalism.* Retrieved April 27, 2008, from http://findarticles.com/p/articles/mi_m1272/is_2690_131/ai_94384327

National Health Service. (2007). *MMR library: Why not give parents the choice of single vaccines?* Retrieved April 27, 2008, from http://www.mmrthefacts.nhs.uk/library/singlesafer.php

National Institute of Mental Health. (2008). *Autism Spectrum Disorders (Pervasive Developmental Disorders).* Retrieved April 27, 2008, from http://www.nimh.nih.gov/health/publications/autism/complete-publication.shtml

National Institute of Neurological Disorders and Stroke. (2007). *Autism fact sheet.* Retrieved April 27, 2008, from http://www.ninds.nih.gov/disorders/autism/detail_autism.htm

Newton, K. (1999). Mass media effects: Mobilization or media malaise? *British Journal of Politics, 29,* 577-599.

Parker-Pope, T. (2005, October 10). Debate on autism link to vaccines rekindled. *Pittsburgh Post-Gazette,* D1.

Parliamentary Office of Science and Technology. (2004). Handling uncertainty in scientific advice. Retrieved April 27, 2008, from http://www.parliament.uk/documents/upload/POSTpn220.pdf

Petts, J., & Niemeyer, S. (2004). Health risk communication and amplification: Learning from the MMR vaccination controversy. *Health, Risk & Society, 6*(1): 7-23.

Prue, C. E., Lackey, C., Swenarski, L., & Gantt, J. M. (2003). Communication monitoring: Shaping CDC's emergency risk communication efforts. *Journal of Health Communication, 8*(3), 35-49.

Ryan, M. (2001). Journalistic ethics, objectivity, existential journalism, standpoint epistemology, and public journalism. *Journal of Mass Media Ethics, 16*(1), 3-22.

Salisbury, D. M., Beverly, P. C. L., & Miller, E. (2002). Vaccine programs and policies. *British Medical Bulletin, 62*, 201-211.

Salmon, D. A., Teret, S. P., MacIntrye, C. R., Salisbury, D., Burgess, M. A., & Halsey, N. A. (2006). Compulsory vaccination and conscientious or philosophical exemptions: Past, present and future. *Lancet, 367*, 436-442.

Scheufele. D. A. (1999). Framing as a theory of media effects. *Journal of Communication, 49*(1), 103-122.

Scheufele, D. A., & Tewksbury, D. (2007). Framing, agenda setting, and priming: The evolution of three media effects models. *Journal of Communication, 57,* 9-20.

Singer, E. (1990). A question of accuracy: How journalists and scientists report research on hazards. *Journal of Communication, 40*(4), 102-116.

Smith, J. (2005). Dangerous news: Media decision making about climate change risk. *Risk Analysis, 25*(6), 1471-1482.

Stephens, L. F. (2005). News narrative about nano S&T in major U.S. and non-U.S. newspapers. *Science Communication, 27*(2), 175-199.

Downloaded from http://scx.sagepub.com by ashley mayer on October 20, 2008

Taylor, B., Miller, E., Lingam, R., Andrew, N., Simons, A., & Stowe, J. (2002). Measles, mumps, and rubella vaccination and bowel problems or developmental regression in children with autism: Population study. *British Medical Journal, 324,* 393-396.

Tharp, M. (2003). Thimerosal cases in Oregon dismissed. *AAP News, 22*(1), 4.

United States Environmental Protection Agency. (2006). Mercury: Basic information. Retrieved April 27, 2008, from http://www.epa.gov/mercury/about.htm

Vasterman, P., Yzermans, C. J., & Dirkzwager, A. J. E. (2005). The role of the media and media hypes in the aftermath of disasters. *Epidemiological Reviews, 27*, 107-114.

Wakefield, A. J., Murch, S. H., Anthony, A., Linnell, J., Casson, D. M., Malik, M., Berelowitz, M., Dhillon, A. P., Thomson, M. A., Harvey, P., Valentine, A., Davies, S. E., & Walker-Smith, J. A. (1998). Ilead-Lymphoid-nodular hyperplasia, non-specific colitis, and pervasive developmental disorder in children. *Lancet, 351*, 637-641.

Christopher E. Clarke is with the Department of Communication at Cornell University. His research interests center on risk communication in the context of infectious diseases. He is also interested in media portrayal of controversial health issues.

Downloaded from http://scx.sagepub.com by ashley mayer on October 20, 2008