Harms of Hedging in Scientific Discourse: Andrew Wakefield and the Origins of the Autism Vaccine Controversy

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Accepted author version posted online: 21 Jun 2013. Published online: 09 Jun 2014.


**To link to this article:** [http://dx.doi.org/10.1080/10572252.2013.816487](http://dx.doi.org/10.1080/10572252.2013.816487)
Harms of Hedging in Scientific Discourse: Andrew Wakefield and the Origins of the Autism Vaccine Controversy

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This study reveals the discursive origins of the Autism MMR vaccine controversy through a rhetorical examination of the 1998 Wakefield et al. article. I argue the very practices of scientific publishing, specifically the tradition of hedging, help to create a scientifically acceptable text but also leave discursive gaps. These gaps allow for alternate interpretations as scientific texts pass from technical to public contexts, enabling insufficiently supported claims the standing of scientific knowledge among citizens.

Keywords: hedging, manufactured controversy, peer review, reception study, scientific discourse

The vast majority of scientific research never gains much attention beyond a small community of interested scientists and engineers, but in 1998, the prestigious British medical journal The Lancet published an article that continues to garner attention 15 years later, even after being repudiated by most of those involved in its publication and officially retracted by the publishing journal (Wakefield et al., 1998). In an early report case study of 12 children, Wakefield and 12 coauthors announced evidence of gastrointestinal issues in children who showed developmental regression despite previous normal progress. (Although Wakefield had 12 coauthors, the British General Medical Council investigated and proved that Wakefield authored the paper alone. Thus, in this article, I will give Wakefield sole credit.) However, the article’s wide recognition is not due to this finding. Rather, it has received significant attention, both positive and negative, because it is credited with establishing a link between the measles, mumps, and rubella (MMR) vaccine and the onset of autism spectrum disorders (ASD). (For more information on ASD, see “NIMH—What is autism spectrum disorder (ASD)” [National Institute of Mental Health, 2011].) Despite the article’s explicit denial of proving a link between autism and the MMR, many people still view this article as establishing the scientific grounds for such a conclusion, and, as a result, the Wakefield et al. article is commonly identified as the starting point of the autism vaccine controversy (AVC) (e.g., Poland & Jacobsen, 2011; Rope, 2010; Ropeik, 2011; Woolcock & Hawkes, 2006).

The AVC has been linked to decreasing immunization rates in the U.K., the U.S., and a variety of other locations (Science Media Centre, 2010). By 2002, MMR immunization rates in the U.K. dropped below 85%, with some areas as low as 75%, and fell under the minimum for maintaining “herd immunity” (Fitzpatrick, 2004; Mascarelli, 2011). In the U.S., MMR vaccination rates remain high, but the percentage of parents exercising their right to opt out
of vaccines has increased, and, in certain geographic locations, exemption rates are high enough that outbreaks of infectious diseases have occurred (Greby, Wooten, Knighton, Avey, & Stokley, 2012; Lynfield, 2011; Storrs, 2012). Although scientific research has failed to find evidence that supports a causal link between vaccination and the onset of autism, anecdotal “evidence” from parents reporting their experiences continues to circulate, keeping the issue alive in the public sphere (see McCarthy, 2011). A 2009 survey found that 1 in 4 parents in the U.S. still believed that vaccines caused autism (Freed, Clark, Butchart, Singer, & Davis, 2010). The broader implications of this controversy relate to public health concerns and could carry severe consequences: Parents, fearing a link between vaccination and autism, decide not to vaccinate their children, and, as a result, diseases once nearly eliminated through successful vaccination programs begin reappearing.

In this article, I conduct a rhetorical analysis of the original Wakefield et al. (1998) article to better understand the discursive origins of the AVC. Although the Wakefield et al. article typically is cited as the source of the AVC (as noted above), no close rhetorical analysis of this infamous text yet exists. Despite this, claims about the rhetorical style of the article have been made. For example, Reeves (2005) stated in passing that the Wakefield et al. article employed a bold rhetorical style that contributed to a misreading of the article by the media and the public, but Reeves offered no discussion of how she reached that conclusion, nor did she provide textual examples to illustrate this style. My own reading suggests that it was not bold style that allowed a misreading of this text but quite the reverse—careful hedging that hid a strategic ambiguity of meaning. Fahnestock (2009) identified the Wakefield et al. article as a particularly interesting case in which disqualification should have occurred through peer review. A rhetorical analysis of the Wakefield et al. article and its expert readers can shed insight into how this article managed to pass successfully through the peer-review process.

Since the AVC has been receiving attention for almost 15 years, examining the Wakefield et al. (1998) article only scratches the surface of the complex rhetorical dynamics of this science-based controversy, but such an effort presents an important first step in understanding the broader discursive terrain surrounding it. Whereas many rhetorical aspects of this controversy deserve study—such as the press conference (Deer, n.d.) at which Wakefield catapulted the MMR-autism issue into the media spotlight—a full exploration of the controversy is too complex to be discussed here. Without the publication of the Wakefield et al. article, the evolution of the AVC would not have occurred as it did; therefore, we must understand what authorization the original scientific article provided to fully appreciate the larger controversy. An analysis of the Wakefield et al. article and its immediate reception by scientists is a first step to a more robust understanding of this particular controversy. It will also provide insight into the role peer review can unwittingly play in the creation of such science-based controversies.

In this article, I show how Wakefield et al. (1998) sufficiently followed the discursive norms and requirements of scientific research articles, especially through the use of hedging and passive voice. These rhetorical choices aid the article in successfully passing through the peer review process to be published as part of the scientific record. This is not to say that the science of the article did not matter but rather to emphasize that the rhetorical choices Wakefield made in presenting these findings helped make the findings palatable to a panel of peer reviewers and helped the study garner approval. This study builds from the work of other scholars (Hyland 1996; Myers, 1990) who also have traced the role of rhetoric in the acceptance of scientific research articles by peer reviewers. Additionally, the Wakefield et al. (1998) article
reads like a typical research article, which makes it all the more essential to determine what rhetorical elements enabled it to serve as the point of origin for the AVC. I argue that Wakefield incorporated enough strategic ambiguity into the scientific text to allow for a broad reading of the article, providing sufficient context for his later claims questioning the safety of the MMR vaccine, thus setting up the seemingly typical article to serve as the discursive foundation for the broader controversy. At the same time, Wakefield could reference the carefully composed *Lancet* article to defend himself against accusations of making unsupported claims about the MMR vaccine. In particular, the hedges incorporated in the article created discursive gaps that allowed Wakefield to later fluctuate between the explicit text of the article and the implied message of the hedges, depending on the context. In other words, the Wakefield et al. article reveals how the very practices and traditions of scientific discourse can actually prove harmful to science.

I begin by considering the rhetorical aspects of science-based controversies. Then, through a close examination of the original Wakefield et al. (1998) article, I reveal how the text supports multiple readings. I look to reception discourse from Wakefield’s colleagues following the article’s publication to outline the two dominant readings that emerged. Finally, I consider the implications of this analysis for understanding the problem of scientists’ transporting published scientific work from a technical context into a public context, the possibilities of hedging and other norms of scientific publication practices in creating and perpetuating science-based controversies, and the role of peer review in trying to anticipate such moves.

SCIENCE, SPHERES, AND CONTROVERSIES

Goodnight’s (1982) delineation of the personal, technical, and public spheres established that unique standards of argumentation and assumptions operate within each realm. Goodnight explained that a technical sphere—which includes areas like science—“brings together a degree of expertise with the formal expectations of scholarly argument” and relies on “more limited rules of evidence, presentation and judgment” (pp. 219–220). The specificity and nuances of technical arguments require technical knowledge to be understood and technical standards to be accepted. In contrast, arguments occurring within a public realm rely on less formal argumentation styles and incorporate types of evidence likely to be understood by a more general audience. According to Goodnight, each sphere provides a distinct context and establishes different argumentative standards. Typically scientific debate works itself out in the technical sphere, but when a controversy arises, interaction between technical and public realms often occurs. As discourse shifts from the context of a technical sphere to the context of a public sphere, the discursive norms of the technical sphere take on new meanings in the public realm. As Goodnight noted, “Once the public sphere is entered, the private and technical dimensions of the disagreement become relevant only insofar as they are made congruent with the practices of public forums [emphasis added]” (p. 219). As a result, the expectations for valid arguments can blur. Lyne and Howe (1990) traced this blurring in E.O. Wilson’s rhetoric to promote the new field of sociobiology. They argued that, as scientific arguments cross discursive boundaries, standards of accountability become unclear. Specifically, Lyne and Howe expressed concern that, as rhetors shifted from addressing specialized audiences to general audiences, they could broaden their claims without needing to present the same rigorous level of evidence as when trying to persuade a highly technical audience well versed in the field being discussed and better equipped to apply technical argumentative standards of proof for knowledge creation in that realm.
Although Goodnight’s (1982) organizational scheme may oversimplify the separation between argument realms, specifically in regard to the delineation between technical and public spheres, it can still prove useful in studying the rhetoric of science-based controversies. Rather than employing the personal, technical, and public spheres as ontologically accurate divisions of the discursive world, I view them as helpful descriptions to identify the interpretive frames one might take in evaluating arguments or interpreting artifacts. In this article, I apply the notion of technical spheres and public spheres to understand the different readings of the Wakefield et al. (1998) article that emerge. I show how Wakefield took advantage of the different contexts of the technical and public spheres. A close reading reveals how the rhetorical elements of the article, especially the use of hedges, enabled two different readings. Although some readers declare that the article establishes a link between the MMR vaccine and autism, others maintain that it did not prove a link. The difference in interpretation depends on whether readers interpret the article in a technical sphere context or a public sphere context.

To support the claim that the Wakefield et al. (1998) article invited multiple interpretations, my analysis considers some of the reception discourse surrounding the article’s publication. Ceccarelli (2001) encouraged rhetorical scholars to consider intertextual elements such as book reviews, articles citing the primary text, interviews, and newspaper articles when conducting a rhetorical analysis because these texts allow a rhetorical critic to not only recognize the invitation a text’s structure provides but also to examine the text’s influence. To study reception in this case, I consider the article’s uptake and discussion among Wakefield’s peers shortly after the article’s publication. I examine responses published in The Lancet, including a critical commentary on the article (Chen & DeStefano, 1998), several letters to the editor (Beale, 1998; Bedford et al., 1998; Black, Prempeh, & Baxter, 1998; Lee et al., 1998; Lindley & Milla, 1998; O’Brien, Jones, & Christie, 1998; Payne & Maxon, 1998), and the authors’ (Murch, Thomson, & Walker-Smith, 1998; Wakefield, 1998) and editor’s (Horton, 1998) responses to critiques. I focus on examining the reception among scientific and technical colleagues because they presumably make up the primary audience for an article published in a prestigious medical journal. Through an examination of their responses, I show how the rhetorical elements of the Wakefield et al. article resulted in differing interpretations among technical experts. This analysis extends Lyne and Howe’s (1990) argument regarding standards of proof, as this study shows that ambiguity in argumentative standards exists, even among the audience most equipped to interpret the rhetorical strategies Wakefield employed. This study also supports scholarship that complicates any notion of a clean division between technical and public spheres, as my examination of responses to the Wakefield et al. article in a technical sphere reveals that many of these technical experts read the article with a public sphere in mind. By examining how scientists interpreted the article in ways that mirrored and facilitated the interpretations later developed in the media and by members of the public, I provide a more robust understanding of the Wakefield et al. text and its influence on the origins of the AVC while contributing to a growing body of scholarship incorporating rhetorically grounded reception studies into textual analysis.

SCIENTIFIC STANDARDS AND STRATEGIC AMBIGUITY IN THE WAKEFIELD ET AL. ARTICLE

As Hartelius (2011) noted, “Scientists and doctors are bound together by language practices that define their professional identity, both among themselves and to the outside world” (p. 106). To
be recognized as an expert among peers, one must exhibit those language practices. The research report provides a prime avenue for exhibiting these markers of belonging to the community. Wander (1976) argued, “The archetypal speaking situation for the scientist occurs in addressing an audience of fellow scientists, and the archetypal form of discourse is the research report” (p. 230). Through rhetorical features such as avoiding absolute statements, using passive voice, and incorporating hedges, the Wakefield et al. (1998) article maintained the discursive traditions of the research report that supported a reading of the article as scientifically sound. These rhetorical choices helped the article pass through the significant hurdle of peer review. As Myers (1990) stated, “In most academic fields, and certainly in all fields of biology, every claim that counts, however renowned the originator, must appear in a journal that makes decisions on the reports of referees” (pp. 63–64). This process of having articles pass through a review process by technical experts grants authority to those findings that are published. The Wakefield et al. article’s appearance in a prestigious, peer-reviewed journal granted a certain level of credence to the claims that the article made.

Surviving the peer-review processes imbues a certain status on a scientific article, but the process also places constraints on the final version of an article. Authors must carefully construct claims to be acceptable to reviewers while still making a noteworthy contribution (Myers, 1990, p. 67). The Wakefield et al. (1998) article successfully maintained scientific standards of proof and aligned with professional norms for making claims, as evidenced by its publication. Given the limited amount of data reported, the article contained clear denials of having met scientific standards for showing a causal connection between MMR and ASD. Most specifically, the article stated, “We did not prove an association between measles, mumps, and rubella vaccine and the syndrome described,” which explicitly denied the existence of a link (Wakefield et al., 1998, p. 641). Wakefield followed this statement with a description of the insufficiency of current data that might support such a link and ended the article by calling for more research. He also discussed possible limitations of the results being reported, further qualifying the study (p. 639). Although Wakefield clearly stated what the study did not prove, he also made interpretations and explored possible implications of the data he presented; however, these speculations remained within the boundaries of acceptable research report statements because Wakefield embedded them with hedges, allowing him to make novel claims while distancing himself from possible criticisms.

Hyland (1996) explored the social aspects of hedging in scientific articles, explaining:

Scientists gain and keep reputations by making the highest level claims they can, demonstrating that they deserve credit for something new. But in presenting such claims they must meet both adequacy and acceptability conditions. They therefore use hedges to reduce the risk of negation on objective grounds, i.e., the match between propositional content and what reality is believed to be like, and on subjective grounds, relating to acceptable levels of self-assertion, deference, and willingness to debate. (p. 437)

In the 1998 article, Wakefield et al. used hedges to avoid making scientifically unacceptable claims and absolute statements. As Hyland explained, “In science, hedges play a critical role in gaining ratification for claims from a powerful peer group by allowing writers to present statements with appropriate accuracy, caution, and humility” (p. 434). Words such as “suggest,” “possibly,” and “may” work rhetorically to soften the level of certainty of a statement with the intention of making it more acceptable to (potentially critical or at least skeptical) reviewers.
Hedges appear throughout the Wakefield et al. (1998) article. For example, the following excerpt contains several (and I have noted these with italics):

We have identified a chronic enterocolitis in children that *may* be related to neuropsychiatric dysfunction. *In most cases,* onset of symptoms was after measles[,] mumps, and rubella immunization. *Further investigations are needed* to examine this syndrome and its *possible* relation to this vaccine. (p. 641)

In this excerpt, the hedges ‘‘may’’ and ‘‘possible’’ temper the certainty of the claims being made, underscoring the status of the proposed relationship as simply a hypothesis. The hedge ‘‘in most cases’’ offers an imprecise (i.e., nonspecific) indicator of the prevalence of a particular observation, in this case the occurrence of symptoms in relation to receiving the MMR. The inclusion of the ‘‘further investigations are needed’’ hedge operates to acknowledge the limitations of current knowledge and again underscores the nature of these claims as a hypothesis—in other words, as preliminary and untested. Such language emphasizes the tenuous nature of the ideas being presented.

Another statement from the discussion section also contains hedging (indicated with italics): ‘‘*These studies, together with our own,*... support the hypothesis that the consequences of an inflamed or dysfunctional intestine *may play a part* in behavioural changes in *some* children’’ (Wakefield et al., 1998, p. 639). The most apparent hedge in this statement comes from the phrase ‘‘may play a part,’’ which actually includes two hedging moves. First, the word ‘‘may’’ indicates the level of certainty regarding the role of gastrointestinal infection in behavioral regression—in this case tempering certainty to avoid an absolute statement. Second, the phrase ‘‘play a part’’ allows Wakefield to sidestep making a single cause fallacy by acknowledging that there are potentially other factors beyond the intestinal problems. The qualifier ‘‘some’’ limits the scope of this new gastrointestinal condition, noting that it will not occur in all children. In addition, the phrase ‘‘these studies, together with our own’’ works as a hedge by implying that Wakefield does not overreach his authority for self-assertion with this single study but instead defers to others who supply additional backing for the claim made. This hedging move grants the claim more credibility and believability. It shows that Wakefield avoids making inferential leaps but rather cautiously—as evidenced by his hedging qualifiers—reads his data in conjunction with the findings of other scientific studies. Such hedged language also grants the article an appropriate tone of deference to the established scientific record. Thus, in contrast to Reeves’s (2005) conclusion that the Wakefield et al. article relies on a bold rhetorical style, I argue that Wakefield’s use of hedges provides a tone of caution and invokes the scientific ideal of standing on the shoulders of giants by allowing others’ work to shore up the strength of the findings presented. This cautious hedging allows Wakefield to discuss the possibility of a link without overstepping the data presented in the report or appearing overly confident.

Wakefield et al. (1998) also included hedging when making calls for future investigations. Toward the end of the article he stated (with hedges in italics),

*If* there is a causal link between measles, mumps, and rubella vaccine and this syndrome, a rising incidence *might* be anticipated after the introduction of this vaccine in the UK in 1988. Published evidence is inadequate to show whether there is a change in incidence. (p. 640)
Again hedges such as “if” and “might” serve the rhetorical purpose of allowing these interpretations to be aired in the official record of scientific knowledge without Wakefield’s technically declaring a causal link between the vaccine and autism. The hedges in this passage also serve the double purpose of undermining a potential counterargument to Wakefield’s suggestions. With the hedge “might,” Wakefield claimed a rise in autism after the introduction of the vaccine is possible but not guaranteed. Taken in the reverse, a lack of rise in the number of autism cases “might” be proof that a link does not exist, but it also “might” not be proof. Additionally, most of the hedges included in the Wakefield et al. article occurred in the discussion section, wherein authors “speculate” and “extrapolate” from their findings and point to the larger significance of their work (Salager-Meyer, 1994).

The claims presented within the Wakefield et al. (1998) article regarding the possibility of a link between the MMR and autism, given their placement in the discussion section of the article and the presence of hedges to mark them as speculative rather than declarative, fall within the norms of scientific discourse. However, as Hyland (1996) pointed out, hedges “are likely to express several meanings simultaneously” (p. 449). As I will show later in greater detail, the polysemous nature of these hedged statements in the Wakefield et al. article allowed for an alternate interpretation of the article, one that led to the AVC and to more than a decade of debate regarding the safety of childhood immunization.

Other norms of scientific discourse presented in the Wakefield et al. (1998) article grant the same style and tone as a typical research article while creating further opportunities for multiple interpretations of the text to emerge. Wakefield wrote this article in passive voice. Passive voice, which often appears in scientific writing, emphasizes results rather than the person completing the action (Halloran, 1984). However, Wakefield incorporated passive voice in problematic ways to present parent-supplied information regarding the children’s medical histories. For example, in the article, Wakefield wrote, “Onset of behavioural symptoms was associated, by the parents, with measles, mumps, and rubella vaccination in eight of the 12 children” (p. 637). Here, passive voice places the emphasis on the association between the MMR vaccine and the onset of behavioral symptoms. Wakefield deemphasized that parents assumed and reported this association, as opposed to medical experts observing it, by placing the statement within the larger sentence as a parenthetical phrase set off by commas. Wakefield relied on this phrasing twice in the article: once in the overview of the article’s findings on the front page and again in the results section (p. 638). Through passive-voice construction, Wakefield avoided making any explicit claims himself but still inserted the idea of a link between the MMR vaccine and autism. The use of passive voice in these statements also minimizes the fact that such a link has only been hypothesized by parents but not scientifically tested or proven. At another point in the article, Wakefield reported, “In these eight children, the average interval from exposure to first behavioral symptoms was 6.3 days (range 1–14)” (p. 638). Again, he used passive voice to focus on the “data,” but this statement proves even more problematic than the other constructions because no source is identified, even though, again, this information comes from parent recall. Stated in passive voice, these statements become imbued with scientific standing despite the lack of scientific evidence to corroborate the parent reports. These constructions maintain the standards of scientific publishing while creating an opening for interpreting the article as establishing a link between the MMR vaccine and autism.

Additionally, Wakefield’s word choice in the article creates a subtle message regarding the connection between the MMR and autism. At one point in the article, he stated, “Rubella virus
is associated with autism and the combined measles, mumps, and rubella vaccine (rather than monovalent measles vaccine) has also been implicated” (Wakefield et al., 1998, p. 640). Words such as “linked,” “associated,” and “implicated” frequently appear in sentences discussing the MMR vaccine and its involvement in the syndrome Wakefield described in the article. Although Wakefield may deny proving a relationship between MMR and ASD, his word choice scattered throughout the article subtly implied that a link does, indeed, exist.

A key passage in the article contains several of the various rhetorical strategies explored above, demonstrating how they function to make the article seem to simultaneously declare and deny a causal link between the MMR vaccine and autism. Early in the discussion section, the Wakefield et al. (1998) article reads,

Intestinal and behavioral pathologies may have occurred together by chance, reflecting a selection bias in a self-referred group; however, the uniformity of the intestinal pathological changes and the fact that previous studies have found intestinal dysfunction in children with autistic-spectrum disorders suggests that the connection is real and reflects a unique disease progress. (p. 639)

The hedge “suggests” tempers the overall claim about a link between gastrointestinal infection and autism—nothing has been proven, but enough evidence exists to warrant paying attention to the possible link. The qualifying phrase regarding the chance co-occurrence of intestinal disorders and autism also contains a hedge, “may,” that serves to temper the statement and avoid an absolute claim. This qualifying phrase also operates as part of a procatalepsis, or a statement that anticipates objections and preemptively refutes them. The “however” clause that follows argues for the unlikelihood that selection bias explains the suggested connection between these two conditions. Although initially this statement seems to acknowledge a limitation of the study, through the construction of a procatalepsis, Wakefield granted even more strength to his claim of a “real” connection between gastrointestinal problems (which later in the article Wakefield linked to the MMR vaccine) and behavior problems (i.e., autism). Wakefield further encouraged such a reading through his word choice—with terms like “uniformity,” “real,” and “unique”—implying a level of certainty in the statement regarding the association between gastrointestinal issues and ASD. Significantly, this passage introduces a shift in the overall article; what follows becomes much more speculative as Wakefield leads the reader from a discussion about a possible link between bowel problems and ASD into a hypothetical exploration of why the MMR vaccine might be the causal factor at work.

Given these carefully constructed claims and cautiously hedged comments, readers clearly see how the Wakefield et al. (1998) article came to be interpreted as claiming that a link between autism and the MMR existed. At the press conference to promote the article, Wakefield made explicit what was implicit in the published text. His statements at the press conference propelled the article from an audience in a technical sphere to an audience in a public sphere (Goodnight, 1982) and caused a shift in the way people interpreted the article. Although he acknowledged in his comments that the published article did not prove a link between MMR and ASD, he utilized the press conference format to air his opinion regarding the possibility of such an association. He stated,

The work certainly raises a question mark over MMR vaccine, but it is [sic], there is not a proven link as such and we are seeking to establish whether there is a genuine causal association between the
MMR and this syndrome or not. It is our suspicion that there may well be, but that is far from being a causal association that is proven beyond doubt. (Deer, n.d.)

Although this hedge about failing to prove an association “beyond doubt” may mean something quite specific within a research article read primarily by technical experts, these subtleties can be misunderstood or ignored in the public sphere as the media translates technical information for nontechnical audiences (Fahnestock, 1986). In fact, the hedge “beyond doubt” in Wakefield’s press conference comments works to strengthen the attribution given to the article by suggesting that a causal association has been determined, just not proven “beyond doubt.” Ultimately, then, Wakefield himself utilized the discursive gaps left by hedges in the *Lancet* article to authorize claims about the MMR vaccine that were not actually supported by the research data. Although his press conference comments served as a key moment in the birth of the AVC, Wakefield’s claims about the MMR needed some context to seem plausible, and the publication of his article in a peer-reviewed journal provided that. At the same time, these press conference statements reframed the article. The interpretation Wakefield encouraged through his comments at the press conference made it more likely that the original article would be read as claiming that a link between MMR and ASD existed and the inclusion of strategically ambiguous moves in the text made such a shift in reading possible.

A MATTER OF INTERPRETATION: PEER RECEPTION OF THE WAKEFIELD ET AL. ARTICLE

Shortly after the Wakefield et al. (1998) article’s initial publication and the related press conference, two distinct interpretations of the article emerged among scientists, for the most part dictated by the context within which individuals read the article. As Fahnestock (1986) noted, “Much of the relevance of scientific articles is extratextual, not spelled out in the discourse but supplied by context, by the assumed inferences the intended audience will make” (p. 278). For the Wakefield et al. article, that relevance and those inferences depended on which of Goodnight’s (1982) argumentative spheres provided the context for the reading and, by extension, which standards of argumentation and assumptions a reader applied to the text. One interpretation, primarily in the context of a public sphere, highlighted the shortcomings of the study and noted the ways in which the article seemed to argue for a link between the MMR vaccine and autism. The other take on the article, primarily in the context of a technical sphere, denied such an interpretation and instead emphasized the contribution the authors made to scientific knowledge. Proponents of each interpretation claimed a concern for public health, but in one case, this concern led to the conclusion that the article should not have been published because of its limitations, while on the other side, this concern for public health justified the article’s publication despite its limitations.

First Interpretation

The first interpretation of the Wakefield et al. (1998) article argued that it did more harm than good to public health in the way it hinted at a causal link between the MMR vaccine and autism. Those supporting such a reading challenged whether the article should have been published,
based on its scientific shortcomings as well as its potentially negative impact on public health. This reading first emerged in the critical commentary that *The Lancet* commissioned for inclusion in the same issue as the Wakefield et al. article. In the commentary, Chen and DeStefano (1998) identified the Wakefield et al. article as raising “vaccine-safety concerns” and claimed that the authors “suggest [emphasis added] that MMR immunization may lead to IBD [inflammatory bowel disease], which results in malabsorption, consequent neurological damage, and ‘autism’” (p. 612). These authors credited the article with proposing a link between the MMR vaccine and autism, and then the commentary noted the various shortcomings of the study in proving that such a relationship exists. Chen and DeStefano’s comments revealed the mixed reading strategy they applied to the Wakefield et al. article. Although they read the methodology of the study for its rigor compared with technical standards, they read the hedges much differently. Presenting hypotheses and speculating about the significance of one’s findings through hedged language in the discussion section of a research article is a traditional part of scientific discourse (Salager-Meyer, 1994). Such discursive practices are vital to pushing science forward, claiming ownership of particular avenues of research, and persuading audiences of the significance of data. But rather than reading the hedges in the Wakefield et al. article as a way of introducing ideas in a scientifically responsible and acceptable way (their traditional use in a technical context), Chen and DeStefano interpreted them like a nontechnical audience would, as more declarative than speculative.

Others in the scientific community would also apply this mixed reading strategy to the Wakefield et al. (1998) article. Less than a month after publication, *The Lancet* published seven letters in the correspondence section commenting on the publication of the article (Beale, 1998; Bedford et al., 1998; Black, Prempeh, & Baxter, 1998; Lee et al., 1998; Lindley & Milla, 1998; O’Brien, Jones, & Christie, 1998; Payne & Maxon, 1998). Most of these letters reinforced the interpretation that the Chen and DeStefano (1998) commentary highlighted. They raised concerns about the article, interpreting it as claiming that a link existed between the MMR vaccine and autism. Some letters directly challenged the journal’s decision to publish the study. For example, Beale stated,

> By publishing Andrew Wakefield and colleagues’ work purporting to show a link between MMR vaccination and inflammatory bowel disease and autism and related problems you give increased credence to their report. *The Lancet* is a prestigious, peer-reviewed journal with high public profile. The profession, journalists, the public, and especially distressed parents of ill children suppose that a publication in your journal will be true. In this example you print a commentary, which if it had been a peer reviewer’s report, should have led to the rejection of the paper. (p. 906)

Once again, we see an individual of the scientific community who interpreted the Wakefield et al. article as demonstrating a link between MMR vaccination and autism, despite the explicit denial in the original article. This respondent grounded his criticism in a concern for public, rather than scientific, interpretation and reaction to the article. Of the four audiences that Beale felt were misled by publication of the Wakefield et al. article, three (journalists, the public, and distressed parents of ill children) fall outside the scientific community. This concern—that unsupported and speculative claims regarding the MMR have been granted scientific validity through their presence in the journal—recognized the key role peer review plays in the creation of knowledge as well as the influence published scientific research can have on the public.
Beale’s reaction also demonstrated how hedging in particular leaves discursive gaps that enable alternate interpretations of scientific articles. Beale’s objection pertained to publication, making the article seem “true”—this comment ignored the hedges of the article that marked the presented ideas as speculative. Despite the frequent use of hedges in scientific publications, Beale read them differently, reducing the hedged statements to absolute claims that must be either true or false.

In another letter, Lee et al. (1998) argued,

Wakefield and co-workers state, “We did not prove an association between measles, mumps, and rubella vaccines and the syndrome described.” However, there are enough references in the text to lead the reader to the assumption that there is sufficient evidence provided by the study, and by other scientific publications, to suggest that there is a likely (although as yet unproven) link. (p. 905)

The writers of this letter directly acknowledged that the Wakefield et al. (1998) article explicitly denied proving a link, but they argued that the article, as written, contained hints that implicitly assert the existence of such a link. The hedged statements noted in the analysis above created these hints, and for these commentators, the implicit message they identified made the article problematic, regardless of any denial it contained, because of the potential for this underlying message to dominate public interpretation. Similarly, Bedford et al. (1998) remarked, “This publication provided a platform for the expression of views about MMR vaccination that have no proven scientific foundation” (p. 907). Although these respondents did not offer any discussion of how Wakefield used the article in this manner, their comments suggested that the article was designed to serve just this function: to anchor broader claims than what the initial case study actually supported. Although the Wakefield et al. article presented an argument in a technical sphere regarding a case study of 12 children, each of these respondents read the article with a public sphere context in mind, interpreting some of the standards of scientific discourse—such as hedging claims—differently than they might normally interpret them when reading a research report (Goodnight, 1982).

Second Interpretation

A second interpretation of the article emerged in the responses provided to these critiques of the Wakefield et al. (1998) article. These responses justified the decision to publish the study and defended the article as not making a claim regarding a link between MMR and autism. The same issue of The Lancet that featured the critical letters discussed above also included a response from Wakefield (1998); a response from three of the article’s other original authors—Murch, Thomson, and Walker-Smith (1998); and a reply from Richard Horton (1998), editor of The Lancet at the time of the article’s publication. Wakefield’s response said little regarding how to interpret the original article and instead made an emotional appeal regarding the need to listen to parents. Wakefield defended his work in light of a concern for the public, but he did little to directly respond to the criticisms raised by his colleagues. The other authors responded more thoroughly to the criticisms raised while emphasizing that their concern for public well-being convinced them to move ahead with publishing despite the limitations of the study. In their letter, Murch, Thomson, and Walker-Smith defended both the publication of the article and the merit of the knowledge they claimed the article contributed. Specifically, they responded
to accusations of insufficient data by pointing out that they discussed the study’s limitations, including the small data set, in the original article (p. 908). They used the text itself, and specifically a type of hedging—the tradition in scientific reports of discussing study or data limitations—as part of their defense. They further supported such an interpretation of the article by pointing out that media reports had been balanced and supported continued immunization.

Horton’s (1998) reply accompanying these letters defended even more emphatically the decision to publish. He began by declaring, “The paper by Andrew Wakefield and colleagues is an example of how researchers, editors and those concerned with the public’s health can work together to present new evidence in a scientifically balanced and careful way [emphasis added]” (p. 908). Horton placed the Wakefield et al. (1998) study firmly within the realm of science, describing it as an exemplar for maintaining scientific commitments while addressing issues with public relevance. He read the hedged statements in the discussion section in a technical context, interpreting them as a cautious presentation of new ideas. He then stated, “Peer review confirmed that the paper merited publication” (p. 909). This comment supported an interpretation of the Wakefield et al. article as appropriately meeting the standards of scientific discourse, as determined by peer review. Horton also explicitly defended the article as not claiming a link between MMR and autism. He stated, “Reported adverse comments about the safety of MMR vaccination were made at this press conference [promoting the article]. By contrast, the views expressed in the paper are unambiguously [emphasis added] clear” (p. 908). Horton attempted to disassociate the article from the press conference comments by quoting the explicit denial of proving an association in the article’s text, using this distinction to defend his interpretation of the article and, by extension, the decision to publish it as part of the scientific record. Like Murch, Thomson, and Walker-Smith (1998), Horton also noted that, in contrast to what critics—such as Chen and Destafano (1998)—warned, early media coverage urged cautious interpretations of the Wakefield study and encouraged continued vaccinations. Through his defense of the journal’s decision and the article itself, Horton rejected the interpretation that critics of the Wakefield et al. article promoted.

Opposing Interpretations

The respondents who defended the Wakefield et al. (1998) article (Horton, 1998; Murch, Thomson, & Walker-Smith, 1998; Wakefield, 1998) took the article at face value. They read it in the context of a technical sphere and assumed a technical reader who would understand the limitations of the study and also be familiar with how to interpret the hedges contained in the article. Those promoting such a reading argued that the article’s true narrative contributed a unique and noteworthy scientific finding. They also used the contents of the text itself, including the explicit denial of proving an association and the hedges within the article, to defend their classification of the article as worthy of publication.

Thus, in the aftermath of the article’s publication, two opposing interpretations, both grounded in the contents of the original article, surfaced among Wakefield’s colleagues within the technical realm. The discursive gaps left by the hedges and other rhetorical aspects of the article allowed for both interpretations to be “correct.” One interpretation held that the article was designed to imply a causal link between the MMR vaccine and autism, whereas the other emphasized that the article made no such claim but rather contributed significant scientific
findings worthy of publication. Eventually, the interpretation of the article as implying, or even establishing, a causal link won out.

**REINTERPRETATION WORK**

Myers (1990) argued, “The fate of a claim is not decided when it is published, even when it is published in Nature or Science; it depends on who reads it, how it is read, and how it is used” (p. 100). In the media, the claims of the Wakefield et al. (1998) article were, for the most part, read as determining a link between MMR and autism (e.g., see BBC, 1998; Bedford & Elliman, 1998; “MMR vaccination comes,” 1998; Royal Free Hospital School of Medicine, 1998). (For more recent examples, see de Lange, 2011; Godlee, Smith, & Marcovitch, 2011; Shapiro, 2011.) Despite claims from Horton (1998) and others that early media coverage urged caution in interpreting Wakefield’s article, continuing media coverage amplified Wakefield’s implications about a link between autism and the MMR vaccine. In coverage of the Wakefield et al. article and subsequent press conference, headlines and lead-in paragraphs tended to focus on announcing claims of a link between MMR and autism, while the more nuanced details of the research, such as its limitations or acknowledgement of the need to continue vaccinating, appeared in the final sentences of stories (BBC, 1998; “MMR vaccination comes,” 1998). Given the journalistic convention of the inverted pyramid writing style that frontloads those details seen as most important to the story, placing such information at the end of the article deemphasized those facts.

In one article (Bedford & Elliman, 1998), the first sentence noted, “The media excitement and public concern after a Lancet report linking measles, mumps, and rubella (MMR) vaccine with autism kindles a sense of déjà vu” (p. 715). Despite the denial in the Wakefield et al. (1998) article, this news story described the article as establishing a link. Meanwhile, the BBC News story carried the headline “Child Vaccine Linked to Autism” (BBC, 1998). Although at the press conference, several of Wakefield’s coauthors emphasized the lack of scientific support for Wakefield’s comments and stated that they believed continued use of the MMR was safe, media coverage focused on Wakefield’s comments (Laurence, 1998). For example, The Independent’s article on the press conference (Laurence) clearly stated that Wakefield alone made the comments questioning the safety of the MMR; however, the headline for the article—“Doctors Warn of a New Child Vaccine Danger”—failed to make this distinction, using the more abstract and plural term “doctors” and thereby implying broader support for questioning the vaccine’s safety. Also, despite more nuanced coverage later in the article, the lead-in highlighted “danger” (para. 1) and thereby implied a link between autism and the MMR vaccine. For readers only skimming the headline or the first few paragraphs, the story was a warning about the MMR vaccine, not the difference of opinion between Wakefield and his coauthors. These headlines and lead-ins dropped the hedges of the original article, broadening Wakefield’s qualified, speculative claims about the possibility of a link to declarative statements about the existence of such a connection.

Yet another interpretation of the Wakefield et al. (1998) article surfaced in 2004 when journalist Brian Deer published an investigative report that raised doubts about the study by uncovering a conflict of interest on Wakefield’s part (see Deer, 2004, 2011a, 2011b, 2011c). Deer’s report revealed that, while conducting the 12-child case study, Wakefield received money from a lawyer building a legal case against MMR manufacturers for parents of autistic
children (Deer, 2011b, p. 136). This new information instigated the longest trial in the General Medical Council’s history and the eventual striking of the Wakefield et al. article from the scientific record as well as a revocation of Wakefield’s medical license (Deer, 2011b p. 139; General Medical Council, 2010). Following Deer’s report, Horton (2004) issued a statement regarding the publication of the Wakefield et al. article (see also Deer, 2011c). In that statement, Horton acknowledged regret that Wakefield did not fully reveal his conflict of interest to the editorial board. Horton stated, “We judge that all this information would have been material to our decision-making about the paper’s suitability, credibility, and validity for publication” (p. 821). That same year, 10 of Wakefield’s 12 original coauthors issued a ‘‘Retraction of an Interpretation’’ to explicitly renge the suggestion of a link between MMR and autism (Murch et al., 2004).

Six years later, The Lancet officially retracted the Wakefield et al. (1998) article, stating,

It has become clear that several elements of the 1998 paper by Wakefield et al. are incorrect...the claims in the original paper that children were ‘‘consecutively referred’’ and that investigations were ‘‘approved’’ by the local ethics committee have been proven to be false (Editors of The Lancet, 2010, p. 445).

The Lancet editors claimed procedural violations as the basis for official retraction of the Wakefield et al. article. In part, because none of the concerns about Wakefield’s motivations or bias directly contradicted the data of the report, the AVC persists in the public sphere.

Additionally, Wakefield continues to defend his work and the 1998 article specifically. In an interview on Good Morning America (Stephanopoulos & Wakefield, 2011), Wakefield stressed that the link between the MMR vaccine and autism came from parent reporting, not the scientific information his article established. He also maintained the validity of a more narrow reading of the 1998 article. Along with two original coauthors, he wrote a letter to The Lancet in response to the 2004 “Retraction of an Interpretation” article by the majority of his coauthors. In the letter, Wakefield, Harvey, and Linnell (2004) stated,

Since no interpretation of the possible MMR/autism link was offered in the original 1998 Lancet report, other than to state that the data did not constitute evidence of an association and suggest that further research was required, it is difficult to know quite what has been retracted. (p. 1328)

A particular, careful reading of the article supports this claim. However, a different, but equally plausible, reading of the 1998 article implies a different story, leading to an interpretation of that text as arguing for such a link.

As Lyne and Howe (1990) pointed out, “Imagery and rhetoric do work that analysis cannot do, implying conclusions for which authors need take no direct responsibility” (p. 145). The explicit message of the text provided Wakefield with a defense, whereas the rhetorical aspects of the text allowed for the same article to serve as the basis for an international science-based controversy in the public sphere. In their study of E. O. Wilson’s rhetorical positioning in the sociobiology debate, Lyne and Howe claimed that repeated attacks against Wilson for taking up a position of genetic determinism supplied the best evidence that he did so, even if Wilson himself denied that he did (p. 149). The same can be said for Wakefield: Despite his claims that the 1998 article did not establish a link between the MMR vaccine and ASD, many read the article that way, as demonstrated not only by those scientists who responded to the initial
publication but also by the journalistic response this article received and the science-based controversy it spawned.

**CONCLUSION**

Part of the continuing influence of the Wakefield et al. (1998) article comes from Wakefield’s utilization of the very norms of scientific writing—particularly hedges and passive voice—in combination with strategic word choice to create an ambiguous text open to conflicting interpretations. Thus, this article illuminates the potential harm associated with the very practices of science publication practices meant to protect it from authorizing unproven claims. Hedging to qualify Wakefield’s claims aided in the creation of a scientifically acceptable text. At the same time, these hedges left discursive gaps that, after publication, Wakefield used to make unsupported comments about the MMR vaccine. Additionally, the use of passive voice allowed Wakefield to grant parent reporting the appearance of scientific findings whereas word choice and other rhetorical devices, such as procatalepsis, helped subtly convey implicit claims that Wakefield explicitly denied elsewhere in the article.

In his study on how scientific knowledge gets created through texts, Myers (1990) argued, “What is not printed cannot be cited” (p. 96). This observation notes the central place of publication in the expansion of scientific knowledge. However, as evidenced by the Wakefield et al. (1998) article, publication represents only the beginning in the rhetorical life of scientific knowledge. As I have shown, what is cited or credited to a particular article occasionally may differ significantly from what is explicitly printed. Various parties—including the media, concerned scientists, and parents—reference the Wakefield et al. article for an idea not clearly stated. More troubling, though, the AVC demonstrates a variation of Myers’s statement—that what is printed can always be cited. Even after a retraction by the majority of the article’s authors as well as an official retraction by the publishing journal, Wakefield and this article continue to carry a certain force in ongoing conversations about the AVC. Although Myers’s comments related to the importance of publication for the purposes of citation within the scientific community, scientific knowledge does not remain within the vacuum of a technical context. Although the Wakefield et al. article has been thoroughly discredited for a technical audience and no longer holds validity in that realm, it continues to circulate in certain public discourse communities. Scientific publications typically receive little notice among the general public, but some studies do grab the public’s attention. As the ongoing debate over the AVC illustrates, scientists may need to think more carefully about the different interpretations of their claims that might emerge among different audiences in different contexts.

Additionally, the case of the Wakefield et al. (1998) article draws attention to problems with the increasing tendency of scientists to bypass community checks and engage in “science by press conference” (Moore, 2006). The discursive gaps created by hedging may be easy to take advantage of as information passes from a technical context into a public context, such as when promoting scientific publications through press conferences. Similar to Wakefield using the press conference for the 1998 *Lancet* article to make unsubstantiated claims regarding the MMR vaccine, other scientists use that format to extend their contributions to “science.” For example, Haran and Kitzinger (2009) studied the rhetoric surrounding another case of scientific fraud, the stem cell hoaxes committed by South Korean scientist Hwang Woo-suk. Their analysis shows how Hwang utilized the media to serve as a virtual witness, verifying the
authenticity of his work to a broader public audience. Similar to the Hwang case, Wakefield utilized the media, through a press conference, to extend his scientific authenticity and promote his “findings” (Deer, n.d.).

The confluence of the 24/7 news cycle alongside ever-increasing pressure in the scientific realm to be first in establishing a particular finding creates a perfect storm for shifting the traditions of science communication, particularly initial announcements of findings, more and more to a public context. With the AVC, Wakefield shared his “theory” about MMR with the public the day before the official publication of the article in *The Lancet*. Given the different interpretive practices employed in each realm, this simultaneous communication created problems. Whereas a like-minded technical audience well versed in communicating uncertainty should understand the speculative nature of hedged claims and the need for additional research to substantiate them, a public audience less familiar with the discursive norms of scientific rhetoric may interpret such statements as established claims. This “science by press conference” process causes concern because it creates opportunities for researchers to present information that extends beyond what the reviewers thought they were authorizing in approving a piece for publication.

As science by press conference practices expand, the chances of bad science, like Wakefield’s research, reaching a public audience increase. As Moore (2006) noted, “Issuing press releases and holding press conferences on the publication of a ‘sexy’ paper are commonplace. The science that enters the public consciousness in this way does so without a thorough examination by the scientific community” (p. 1194). As a result, questionable or controversial findings will increasingly enter public discourse before the scientific community (beyond a few reviewers and an editor) can thoroughly investigate them. As the AVC demonstrates, once these controversies take hold, they can be quite difficult to resolve, even after the scientific community has settled the issue from a technical standpoint. This shift in communicating science to the public means that more science-based controversies may take hold, stirring up debate and possibly undermining public trust in science. More research into the rhetorical dynamics and effects of science by press conference is needed to better understand the impact this communicative practice has on the relationship between science and society. Studying the reception of the AVC among the public may be one particularly promising place to start.

The role of the Wakefield et al. (1998) article in the origins of the AVC reveals the importance of scientific peer review not just in monitoring the expansion of scientific knowledge but also in influencing the ebb and flow of public discourse about science. In this case, the peer-review process failed because it assumed a transparent text (Leff, 1986). Wakefield’s use of scientific discursive norms and inclusion of an explicit denial regarding proving a link between the MMR vaccine and autism allowed the article to successfully pass through the peer-review process and into the scientific record. However, as Wander (1976) noted, “A scientific research report is not just a giving of information; it is a persuasive act as well” (p. 230). As the Wakefield et al. article demonstrated, the rhetorical elements of a scientific article can matter as much as those in a work of literature or a political speech.

My reading of this case suggests that rhetorical analysis of the original article and consideration of possible interpretations, not just by a technical audience but also by the general public, probably would have led to a rejection of Wakefield’s article during the peer-review process and the possible avoidance of this entire affair. With increasing transparency demands, expanding online availability of research reports, and shifts to publicly promoting scientific findings, media and citizens continue to gain even greater access to scientific information without the additional
training for proper interpretation. We cannot assume that the traditions of scientific publishing provide sufficient protection for keeping the scientific record safe from those who might seek to manipulate the authority of a scientific ethos for personal or political gain. Rhetorical devices, such as hedging, that introduce flexibility in meaning may easily subvert a peer-review process that operates from an assumption of objectivity and straightforward information, increasing the chances of bad science, like Wakefield’s research, reaching a public audience.

ACKNOWLEDGMENTS

The author thanks Leah Ceccarelli for her helpful comments and ongoing feedback on this piece and especially for pointing out how Wakefield’s “beyond doubt” hedge during his press conference comments worked to increase the supposed strength of the findings reported in the Lancet article. The author would also like to thank the two anonymous TCQ reviewers for their invaluable feedback, which helped strengthen the clarity of some of the arguments presented here.

REFERENCES

doi:10.1016/S0140-6736(05)70317-2
doi:10.1016/S0140-6736(05)70320-2


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