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Chapter 7

***“The Science is Clear!”* Media Uptake of Health Research into Vaccine Hesitancy**

Maya J. Goldenberg and Christopher McCron

While the movement from research to practice in medicine and health policy is well studied in the philosophy of medicine, an underresearched component of this knowledge-to-action trajectory has been the influence of media reporting on newsworthy health research. Media analysis has characteristically been a focus of communications and not philosophical research. However, the epistemic and rhetorical impact of science and health reporting warrants attention by philosophers as another facet of the complex science-values relationship in healthcare. Science journalism [of which health makes up roughly 50% of its content (Hargreaves 2012)] shapes public understanding and engagement, which in turn influences patient choice as well as organizational and policy decisions. All the while, science reporting is frequently criticized for sensationalizing new findings and omitting the uncertainty of novel research, thereby misleading the public¹ into thinking that new scientific ideas are fully established (see, for example, Abola and Prasad 2016). In this chapter, we highlight many of these issues in our presentation of an original case study of media uptake of scientific research addressing a politically charged issue: vaccine hesitancy.

In early 2014, news media jumped on the pre-print publication of a study into the effectiveness of vaccine information messaging in the journal *Pediatrics* by political scientists Brendan Nyhan and colleagues. The study measured the effect of a variety of pro-vaccine messages designed to reduce vaccine misperception and increase rates of childhood vaccination against measles, mumps, and rubella (MMR) by vaccine-hesitant parents. Media and public interest was strong as this timely study was published in the same year that the United States experienced a 20-year high in incidences of measles—a worrisome situation that was attributed to geographical pockets of willfully unvaccinated children (Pugh 2014). These outbreaks occurred despite several

decades of active public health efforts to counter vaccine fears among the general population. Many observers despaired over this potentially disastrous public health threat.

While it is typically positive research findings that are sensationalized, this study was picked up enthusiastically by the press for its *negative* findings: none of the tested vaccine messages were effective in improving attitudes toward immunization among the subsample of vaccine-hesitant parents. Indeed, a “backfire effect” was noted—some vaccine-hesitant parents responded to the corrective information by becoming *less* likely to vaccinate their children. A fatalistic conclusion was quickly drawn by the press; headlines read “You Can’t Change an Anti-Vaxxers Mind” (Mooney 2014a) and “Nothing, Not Even Hard Facts, Can Make Anti-Vaxxers Change Their Minds” (Alter 2014).

This conclusion made for a gripping news story at a time when public frustration over vaccine-refusing parents was high. The news coverage suggested that anti-vaxxers were not only irresponsible and selfish (which was the popular thinking on the subject), but were now also incapable of reason. This media rush also came out at a time when many states and other jurisdictions were considering controversial measures to end personal belief exemptions for school-aged children. These allegedly conclusive scientific findings that people could not be convinced to vaccinate their children were offered in the press to bolster this and other liberty-limiting measures on parental choice.

All the while, this fatalistic conclusion did not follow from the research. Our analysis of the news coverage of Nyhan et al.’s research reveals frequent mischaracterizations of the research findings, which made for a more interesting news story that was used to promote political ends. This case study underscores the importance of careful media communications in order to promote public understanding of science by illustrating the trajectory of misinformation that can arise when communication channels are poorly maintained.

MEDIA SHAPING OF PUBLIC UNDERSTANDING OF SCIENCE

It is somewhat surprising to find that the influence of the media on the medical research-to-practice trajectory is an underresearched area of philosophy of medicine, given the field’s attentiveness to the science-values interface. Health journalism is the access point for most of the publics to engage with health research and policy initiatives; the journalistic narratives shape understanding and attitudes, which influence patient choice as well as organizational and policy decisions.

Communications research offers some important insights. News media is understood to possess an “agenda-setting function” (McCombs and

Shaw 1972) insofar as journalism directs public attention to issues (see [McCombs and Shaw 1972](#); Rogers, Dearing and Chang 1991) and frames those issues ([Entman 2007](#); 2010). When news media assigns responsibility for causing and fixing social problems, it can inform the judgments and actions of citizens and policymakers (Iyengar 1996; Kim and Willis 2007; Weiner 2006).

Communications studies also offers a small body of research addressing how media shapes public understanding of science. The most comprehensive effort comes from Hargreaves et al.’s (2012) recent study, *Toward a Better Map: Science, the Public, and the Media*, which undertook media content analysis of climate change, MMR vaccine, and genetic research coverage in the British press in 2002. The team also conducted two nationally representative surveys in 2002 of over 1,000 adults in Britain to measure their understanding of those same issues relative to their news consumption habits. The researchers’ aim was to find out “what people knew about those science issues regularly in the news, and where there is public interest involved” (Hargreaves et al. 2012).

Hargreaves et al. (2012) were able to conclude that news media plays a role in informing people’s understanding of scientific issues. However, those inputs are incomplete. Survey respondents retained the main themes or frameworks of news coverage of science-related stories, while (sometimes important) informational details were not remembered. The research team proposed that those themes or frameworks are used as building blocks for people to make sense of an issue. While these frames sometimes allowed news consumers to make informed guesses about those issues, they could also generate misunderstandings. People will use whatever information they have to make sense of the world, often filling in “gaps” with unfounded beliefs. Related research corroborates the previous finding that most people consume news inattentively, thereby taking in only certain aspects of a story. The information that *does* stick is often based on repeated associations (Lewis 2001).

Thus, the media’s framing of controversial issues like vaccine safety warrants scrutiny—what gets said, how it is said, and what gets left out. The framing of news stories has significant public impact in terms of general understanding and mobilizing action. Prior coverage of the MMR vaccine controversy demonstrates this well. Indeed, the media shouldered some blame for lowered vaccination rates in Europe due to the poor handling of the initial MMR-autism scare that exploded into the papers in 1998 with the publication of the infamous study by Dr. Andrew Wakefield et al. (1998) alleging a causal link ([Holton et al. 2012](#); see also Begg et al. 1998). Science journalist Seth Mnookin’s (2011) review of the media uptake surrounding the publication recounts the London press’s enthusiastic uptake of the “lone wolf” narrative of a humble doctor fighting the establishment, a story that was animated by emotional stories of mothers, struggling to raise children with

autism, who were now convinced that the MMR vaccine had caused their children's conditions. The ample data already mounted against Wakefield's claims and credibility received far less mention in the papers.

The media also courted the vaccine-autism controversy by actively reporting both sides of the debate. While offering both sides of the story is a journalistic norm—a practice meant to encourage “fair and balanced” reporting—this standard of best journalistic practice came under fire for paradoxically misleading the public by giving the impression that the two sides held equal weight (Dixon and Clarke 2012; Clarke 2008; Lewis and Speers 2003; Offit and Coffin 2006). The two sides were misconstrued as there was insufficient mention of how marginal the vaccine skeptical position was against the weighty scientific consensus that vaccines had no correlation to autism. And where the strong consensus on vaccine safety was mentioned, it did not receive a suitable level of prominence insofar as it was typically offered as *post hoc* reassurance to the newsworthy concerns of parents (Lewis and Speers 2003). To illustrate:

The following [news reporting] examples are typical: “The government has mounted campaigns to persuade parents the MMR jab is safe after some research linked it to autism and bowel disorders in children” and “Ministers continue to insist the MMR jab, which some doctors have linked to autism, is the best way of protecting children.” (ibid.)

A content analysis of 279 news articles in U.S. and UK papers from 1998 to 1999 found the majority to offer so-called balanced reporting of the MMR-autism link. Specifically, reporters presented the opposing claims that supported and refuted a connection and often left the reader to decipher who to believe (Clarke 2008). Cunningham (2003) has noted that reporters are often discouraged from adjudicating competing claims or providing sufficient context for readers to assess the claims. To editorialize can be perceived as bias (worthy of opinion pieces rather than news reporting) and a failure on the part of the reporter to be “objective” in her journalism. That standard of “objectivity” has become heavily contested and is commonly debated in journalism ethics forums (Cunningham 2003; Part IV of Meyers 2010; chapter 4 of Ward 2011).

With characteristically inattentive news consumers repeatedly hearing associations of vaccines and autism in the framing of vaccine safety as controversial, it should not be surprising that Hargreaves et al. (2012) found many of their survey respondents to believe that vaccines cause autism. They also found that efforts made by the press to deny that association, that is, by reporting that the link has not been established, had only a minimal effect.

Broadsheet readers, who had more exposure to criticism of the vaccine-autism association than tabloid readers, were only slightly more likely to deny the claim that vaccines cause autism. In the end, “what people appear to have heard was simply that there were two sides to the debate” (Hargreaves et al. 2012). Thus, it was the broad pattern of media coverage, specifically the framing of the MMR-autism controversy as a legitimate debate, rather than the informational details, that were effectively communicated. This led 54% of Hargreaves et al.’s (2012) October 2002 survey respondents to think that “since both sides got roughly equal coverage, they must correspond to roughly equal bodies of evidence” (ibid.).

And so, media communications have created bias by way of balanced reporting.² Additionally, the press must heavily consider the collateral of reporting “public interest” stories. Health reporters often encounter health scares and exciting “breakthroughs.” Hargreaves et al. (2012) advised cautious communications in light of their investigation into MMR-autism coverage:

In brief, while Wakefield’s claims are of legitimate public interest, our report does give credence to the view that research questioning the safety of something that is widely used should be approached with caution, both by scientists publishing that research and journalists covering it. This is especially the case if any decline in public confidence has negative consequences for public health.

Health reporters have reflected on the fall-out from news coverage of the Wakefield controversy, alleging that they have learned important lessons about careful reporting. But with the uncertainty of emerging science and the pressure of tight newsroom deadlines, that cautious approach proves difficult to exercise. Reporter Julia Belluz (2015b) has reflected on how the Wakefield incident “scared the media away from covering vaccine side effects.”³ She cites the underreporting of rare cases of narcolepsy following Pandemrix influenza vaccinations in Europe in 2009–2010 (see Centers for Disease Control and Prevention 2015) as illustrative of this problem for health reporters. Instead, she writes, there is pressure for reporters to be vaccine “cheerleaders” (Belluz 2015b). This challenge not only underscores how difficult it can be to report on controversial research topics but also highlights how important it is to strike that difficult balance of responsible reporting. While journalists are held to standards of accuracy, there is no meaningful way to report “just the facts” (indeed, there is no such thing), and it is not clear how much responsibility journalists must hold for passive news consumption habits that make readers prone to misunderstanding important issues. These considerations deserve more time and attention than we can offer here.

THE CASE: “EFFECTIVE MESSAGES IN VACCINE PROMOTION: A RANDOMIZED TRIAL”

“Effective Messages in Vaccine Promotion: A Randomized Trial” (Nyhan et al. 2014) tested the effectiveness of several typical vaccine-promoting messages used by public health agencies to persuade parents. The researchers concluded that no single vaccine message effectively motivated parents to vaccinate their children. In fact, there was a measurable “backfire effect” insofar as some parents became *less* inclined to have their children immunized after exposure to the promotional materials (Nyhan et al. 2014).

Two online surveys were administered using a nationally representative sample of parents over the age of 18 with one or more children younger than 17 ($n = 1759$). While the first survey established baseline measures, such as current attitudes toward vaccines and health, the second survey randomly assigned parents into one of four different interventions or a control group. In each of these interventions, parents were exposed to a specific type of message that is commonly used in vaccine health communication, while the control group was exposed to a message about the pros and cons of bird feeding. The first intervention, called “autism correction,” aimed to debunk the myth that vaccines cause autism by presenting scientific evidence that refuted the vaccine-autism link. A second intervention, entitled “disease risks,” presented information about the symptoms and risks associated with diseases prevented by the MMR vaccine. “Disease narrative,” the third intervention, told a dramatic story of a child nearly dying from measles. The fourth and final intervention was “disease images,” which featured photos of young children suffering from measles, mumps, or rubella. To increase the generalizability of the results, the autism correction, disease risks, and the disease narrative were all adapted from the Center for Disease Control and Prevention’s (CDC) website nearly word-for-word. However, the source information of the CDC materials was withheld from the parents in order to avoid having them tie their interpretations of the materials to prior views about the organization. In wave one of the study, subjects read the intervention materials. In wave two, Nyhan and colleagues measured three dependent variables of interest: (1) parents’ perceptions of whether the MMR vaccine could cause autism in a healthy child, (2) parents’ opinions of the likelihood of a child suffering serious side effects from an MMR vaccine, and (3) parents’ intentions to have their own child vaccinated.

The final results of the study disappointingly showed that none of the interventions increased parent’s intentions to have their child vaccinated (see fig. 1). Also, when parents were informed about the risks of preventable diseases, it did not significantly affect their perceptions regarding the apparent risks of autism or serious vaccine side effects. The autism correction

Table 7.1 Results from Nyhan et al. 2014

<i>Intervention</i>	<i>Belief that Vaccines Cause Autism</i>	<i>Fear of Vaccine Side Effects</i>	<i>Intention to Vaccinate</i>	AQ 5: Perhaps, change all capitalized terms to lowercase, italicized if emphasis is intended? Please confirm.
Autism correction	LOWERED	Same	Same and LOWERED (“backfire effect”)	
Disease risks	Same	Same	Same	
Disease narrative	Same	INCREASED	Same	
Disease images	INCREASED	Same	Same	

intervention succeeded in reducing the perceived risks of a healthy child becoming autistic, but it did not create a significant reduction in concern for other serious side effects. Furthermore, some of the findings showed that the interventions could be detrimental in some ways. For instance, the disease narrative intervention increased parent’s concerns regarding the risk of serious side effects from vaccines. Paradoxically, among the parents that were initially most opposed to vaccination, the autism correction decreased belief in autism being caused by vaccines, but it also further reduced their intentions to vaccinate their own child. While 70% of the control group’s most hesitant parents claimed to be “very likely” to vaccinate their children, only 45% of the equally hesitant parents who had been exposed to the autism correction claimed to be “very likely” to vaccinate. Nyhan and colleagues referred to this phenomenon as a “backfire effect”; when confronting evidence that debunked the vaccine-autism link, “respondents brought to mind other concerns about vaccines to defend their anti-vaccine attitudes” (Nyhan et al. 2014, p. 840). The researchers figured that parents employed motivated reasoning,⁴ a cognitive process driven by the desire to avoid cognitive dissonance, whereby subjects might “move the goalpost” (Haelle 2014) or develop other elaborate rationalizations in order to justify maintaining their prior beliefs about vaccines being unsafe.

Media and public interest in the research were strong amidst widespread public alarm over vaccine refusal and disease outbreaks. Because public health outreach had been ineffective in its concerted efforts to sway public opinion on vaccine safety (Goldenberg 2016; Macdonald et al. 2012; Black and Rappouli 2010), there was strong interest in radically changing the parameters of the discourse. A review of the media uptake suggests that this research was regarded as a means for doing so.

AN ANALYSIS OF MEDIA REPORTS ON THE STUDY

In order to study media uptake of Nyhan et al.’s (2014) MMR vaccine communications study, we searched Google News for news items that referenced

either the study or Nyhan. We collected until saturation⁵ was achieved. Our examination of 36 news items reporting directly on Nyhan et al.'s (2014) MMR messaging study or citing it in the context of other vaccine-related story lines revealed a consistent media focus on two aspects of the research findings: (1) that none of the vaccine interventions achieved the intended goal of increasing parents' intention to immunize their children and (2) that such efforts could backfire insofar as some vaccine hesitators became less likely to comply with vaccine recommendations. The reports were negative in tone (see Abrams 2014; Aleccia 2014; Mooney 2014a; Konnikova 2014; Bouie 2015; Stafford 2015; Selbig 2015) and sometimes fatalistic in the claim that the study demonstrated that *nothing* would change an anti-vaccinator's mind (Abrams 2014; Aleccia 2014; Alter 2014; Mooney 2014a). These anxiety-inducing story lines, with provocative headlines like "Trying to Convince Parents to Vaccinate Their Kids Just Makes the Problem Worse" (Aleccia 2014), misrepresented the study's findings. The conclusion that nothing could change a vaccine-hesitant parent's mind did not follow from the study results, nor was it suggested in the discussion section of the publication.⁶ Only four specific messages were tested, three of which came from the same anonymized source (the CDC). And while they did represent typical messaging employed by public health agencies, the researchers made no suggestion that their sample represented the gamut of vaccine communications strategies.

A number of other articles stopped short of such a fatalistic conclusion that *nothing* worked but still pushed the claims of the study too far. For example, one news headline stated "Study Shows Michigan's Vaccine Education Program Could Backfire" despite obvious differences between the Michigan program and the interventions tested by [Nyhan et al. \(2014\)](#). The Michigan program involved conversation with a public health nurse for parents requesting philosophical exemptions for vaccines (Selbig 2015). The CDC interventions that had been tested were, in contrast, textual in format and were not delivered by a trusted medical professional.⁷ Furthermore, the study had not evaluated parental attitudes toward philosophical exemptions specifically. The reporter proposed that it *may* even be impossible to change the minds of "anti-vaxxers," a claim that, while only suggestive, is not supported by the study's findings. Other news reports overextended the study findings to claim that people with anti-vaccine views were immune to *facts, science, and reason*. King (2015) misinterpreted the study findings by suggesting that the backfire effect was experienced by all parents in the study. He also misunderstood a statement made by Nyhan in an interview—"Throwing facts and evidence at people rarely changes their minds, particularly when it comes to issues we care about"—to mean that vaccine hesitators cannot be educated. This led him to ask rhetorically, "But if facts

can't fight anti-vaccination myths, then what can?" Similarly, *The Conversation* ran the headline "Throwing science at anti-vaxxers just makes them more hardline" (Stafford 2015). Bouie (2015), writing in *Slate*, added that "reason doesn't work either." The study had not, of course, examined facts, science, or reason.

These sorts of extreme claims would often be preceded by factual errors in the reporting of the study; these errors lent credibility to those conclusions. There were several instances of conflation of textual information with other forms of persuasive communication such as conversation (Selbig 2015; Mooney 2014a; Wolfe 2015). The study did not test verbal persuasion, yet Wolfe (2015) reports that Nyhan et al.'s findings show the backfire effect could occur in the context of conversation with one's doctor (Wolfe 2015). Nyhan and colleagues actually suggest that pediatricians might be our best hope for persuading vaccine-hesitant parents (Nyhan et al. 2014; Nyhan in Barton 2014; Nyhan in Tremonti 2015; Nyhan in Belluz 2015a).

Another common error was misrepresenting the sample population, or failing to report that only the participants with the most negative vaccine attitudes experienced the backfire effect (see Bernstein 2015; King 2015; Johnson 2015; Wolfe 2015). This omission creates the false impression that the entire study sample experienced some degree of the backfire effect. Another news item incorrectly reported that *all* interventions caused a backfire effect (French 2015), when in fact hardened anti-vaccine views arose only among some of the participants in three intervention arms. Other journalists oversimplified the study findings with such statements as "They found that, when you tried to use evidence to make a case, it backfired: Anti-vaccination convictions deepened" (Johnson 2015). Instead, different interventions had different effects. The combination of negativity and fatalism, reporting errors, and extreme wording tended to detract from and distort Nyhan and colleague's final conclusion that "these results suggest the need to carefully test vaccination messaging before making it public" (Nyhan et al. 2014, p. 841). Instead, the resonant message captured in the media coverage was that the hope of effective pro-vaccine communications had been proven (nearly or completely) futile.

One year later, we saw similarly overblown press coverage of a new study by Nyhan and Reifler (2015) testing flu shot communications that yielded similar findings to the MMR vaccine study. Once again, media coverage conveyed dismay over dire findings. This study investigated the myth that the flu shot can give you the flu and how it influenced participants' intentions to vaccinate. Again, the study surveyed a nationally representative sample in two waves before and after reading CDC materials that debunked the flu shot myth. Among participants with the highest concerns of serious vaccine side effects, the flu myth intervention reduced misconceptions surrounding

the influenza vaccine, but it also decreased the participants' intentions to vaccinate against the flu in the future. Nyhan and Reifler had succeeded in replicating the backfire effect.

In media coverage of the flu study, journalists adopted similar extreme wording and somber conclusions (for example, Mooney 2015b). For instance, one reporter asked, "If correcting misinformation doesn't work—what does?" (Romm 2015). Another wrote, "It's nigh impossible to change hearts and minds on vaccines" (Ingraham 2015). Similar to the MMR study, the flu shot study had tested only a few CDC textual interventions and had not concluded that all corrective information did not work. Yet readers were informed that "it seems that telling people the truth about common misconceptions about the flu vaccine is actually a bad idea" (Burks 2015). News reports were similarly prone to factual errors in their coverage of the study and offered misleading headlines. For instance, "Disproving Flu Vaccine Myths Doesn't Convince People to Get Vaccinated" (Burks 2014) and "Debunking Vaccine Junk Science Won't Change People's Minds" (Belluz 2015a). These titles read as if the findings of the flu shot study had definitively disproven the efficacy of corrective information. Textual information used in the study was also similarly conflated with face-to-face conversation (Burks 2014). One author declared that "a recent study found that, when vaccine-fearing patients heard the real facts *from their doctors*, they were actually more reluctant to get their flu shots" (Strauss 2014; emphasis added). There were, of course, no doctors involved in the flu shot study. In a similar manner, Ingraham (2015) claimed that the correction to the flu myth resulted in "reinforced views," which is the opposite of what the study found. Participants' misconceptions of the flu shot were in fact corrected; their intention to vaccinate, however, decreased.

In closing, the media coverage of Nyhan and colleague's vaccine communications studies was marked by frequent reporting errors and misleading extreme wording and the fatalistic conclusion that nothing can be done to convince vaccine skeptics (see fig. 2). In all of the news articles reviewed, only one discussed the limitations of either MMR or flu study (Oxenham 2015), an important means for having the reader understand the full implications of the study (see fig. 2). These narratives made for a provocative story arc in the context of high public anxiety over vaccine-preventable disease outbreaks occurring in the United States at the time. Concurrent to the public fears amidst worrisome measles outbreaks in 2014 and 2015 (Centers for Disease Control and Prevention 2016) was heated public debate over proposed policy measures—some radical—to curtail vaccine resistance. We will now further argue that some of the reports of the study findings were enlisted to spuriously defend policy positions on vaccine exemptions. The research findings were thereby manipulated to serve political ends.

AQ 2: Please provide image for "Figure 2" if applicable.

Table 7.2 Summary of Findings from Media Analysis of 36 News Items Reporting on Nyhan et al. (2014) Study AQ 6: Please provide text for the superscript Note cues.

Negative or fatalistic tone	17/36 ¹
Misrepresented study findings (i.e., contained reporting errors, misrepresented backfire effect)	15/36 ²
Presented limitations of the study	1/36 ³
Discussed legislative action	10/36 ⁴
Uncategorized	7/36 ⁵

ADVANCING POLITICAL ARGUMENTS

Within this context of increased vaccine-preventable disease outbreaks (Centers for Disease Control and Prevention 2016) and heightened public anger over the actions of the vaccine-refusing minority (Healy and Paulson 2015; Aldhous 2015a; Aldhous 2015b), 2015 became an active year for legislators to challenge their state’s nonmedical exemption laws permitting personal belief/philosophical and religious grounds for vaccine refusal.⁸ Legislators came to see that where nonmedical exemptions had previously assisted in maintaining strong vaccine programs by placating vaccine resistance, these exemptions, particularly the slightly ambiguous “personal belief” allowance, had become a problem. In California, for instance, personal belief exemptions had doubled since 2007, thereby creating the conditions for numerous whooping cough and measles outbreaks within the state in recent years ([Majumder et al. 2015](#); [Mello et al. 2015](#)). These legislative efforts to curtail nonmedical exemptions would not be easy, but the political climate was right for dramatic measures to delimit individual parental choice in support of enforced measures to protect the common good.

While the fight in California was the most high profile—due in part to the national attention received by the “Disneyland” outbreak that affected people in 17 states and also Senate Bill 277’s dramatic reform measures—no less than 18 states introduced various bills to either tighten requirements, make the process more cumbersome, publicize school immunization rates, or, most drastically, eliminate some forms of vaccine exemptions (National Conference of State Legislatures 2016). President Obama, Speaker of the House John Boehner, and Republican leadership candidates Chris Christie and Paul Rand publicly commented on these legislative efforts, thereby bringing the issue of vaccine legislation into sharper public focus. Media pundits joined in the heated debates over personal freedoms versus community protection, with some drawing on Nyhan et al.’s research to bolster their arguments.

While appealing to relevant scientific research in the face of political fracas—not to resolve the debate but to assist in evaluating some of the

competing claims (Goldenberg 2016)—is a credible journalistic practice, misappropriating those findings to bolster pet theories falls outside of the ethical norms of accuracy and accountability for journalists (see, for example, Canadian Association of Journalists 2015; American Society for Newsroom Editors 1975). Nyhan et al.'s research was at times mischaracterized or misapplied in order to bolster journalists' own positions regarding vaccine legislation.

In our data set, 10 out of 36 articles included some discussion of the warrants and efficacy of stricter rules surrounding personal exemption. Bouie's (2015) mischaracterization of Nyhan et al.'s research finding that reasoning with vaccine hesitator does not work was used to support the view that coercion was thereby justified. He writes that he would like to persuade vaccine-hesitant parents on the safety and efficacy of vaccines, but points to the research in anticipation of failed effort. He concludes, "If persuasion doesn't work, then I'm OK with coercion, too." Had Bouie consulted Nyhan on this conclusion or paid attention to public statements made by the researcher on this topic (Nyhan in Aliferis 2015; Nyhan in Forman 2015; Nyhan 2015), he would have found Nyhan to be unsupportive of this legislative effort. In those statements, Nyhan refers to some policy experts' warnings that mandatory vaccination laws are likely to backfire by further galvanizing anti-vaccine sentiment and that less coercive measures may be more effective (Ropiek 2015; [Omer et al. 2012](#)). Bouie did not consult any of that research into the merits of coercive public health measures. Coercion was a foregone conclusion given his mischaracterization of vaccine-hesitant parents.

Forman (2015) and Aliferis (2015), in contrast, utilized Nyhan et al.'s research to support an alternative legislative measure to mandatory vaccination. Forman drew on the team's positive finding that informing parents that vaccines do not cause autism *did* successfully reduce belief in the myth itself as well as the finding that parents with the least favorable attitudes became *less* likely to vaccinate their children, to support the "nudge" approach of increasing the administrative burden placed on parents seeking nonmedical exemptions. The thinking behind nudge theory (Thaler and Sunstein 2008) is that non-incentivizing an unwanted behavior will create nonforced compliance more effectively than direct instruction or enforcement.⁹ The more effort that needs to be put into acquiring a vaccine exemption, the less likely it is for parents to exercise that choice. Research confirms this: studies comparing vaccine legislation and rates of exemption show that American states with more cumbersome administrative requirements for ascertaining nonmedical exemptions have far lower use of this exemption ([Omer et al. 2012](#)).¹⁰ Aliferis (2015) represents the research accurately, using it, along with other sources in favor of the "nudge" approach, to present a one-sided endorsement of administrative procedures over mandatory vaccination requirement.

Nyhan has expressed support for nudge efforts like requiring face-to-face education interventions with one’s physician in order to obtain a signed exemption (in Forman 2015). He explains that even if the education does not convince the listener, the additional burden of having to visit a doctor could be motivating enough to change behavior. Among the mildly hesitant or time-constrained population, the difference between, say, clicking a box on a screen and meeting with a health care provider to obtain a signed exemption document can change vaccine compliance. With heavier administrative burdens in place, vaccination rates can rise without stoking public anger by eliminating exemptions entirely.

Reviewing the remaining articles utilizing Nyhan’s research to promote policy positions, we found more misappropriation of the research findings. Selbig (2015), discussed earlier, offered a misreading of Nyhan’s research in order to argue against Michigan’s educational effort to increase vaccine compliance. Johnson (2015) overstates Nyhan et al.’s research conclusions regarding the ineffectiveness of persuasion techniques in order to support legislative efforts to change behavior.

Thus, the frequent mischaracterizations of Nyhan et al.’s research findings seemed to do much more than offer an exciting narrative for a competitive news market; they were utilized to promote political ends. Amidst heated debate over restricting nonmedical exemptions for school- and daycare-entry vaccines, and thereby curtailing parents’ right to choose, the fatalistic reporting of the research being demonstrative that *nothing* could change an anti-vaccinator’s mind was utilized to support controversial legislation.

CONCLUSION

As philosophy of medicine and science increasingly explores the values at play not just within scientific knowledge formation, but also in the interpretation and uptake of research findings in the clinical, organizational, and policy context, more attention is being given to the complex social terrain in which science and the publics meet. It is with this in mind that we presented an original case study into media uptake of recent vaccine communications research where we tracked the construction of the dismal conclusion that “You Can’t Change an Anti-Vaxxer’s Mind.”

Our review of media uptake of Nyhan et al.’s 2014 MMR vaccine communications study found negative framing of the findings, with emphasis on what certain communications *failed* to achieve with respect to behavioral changes, rather than what had succeeded (i.e., diminished misperception of an vaccine-autism link), and how future communications could be improved in light of these findings. Some news reports drew the inaccurate headline-grabbing

conclusion that no intervention could change beliefs and behaviors. This was the message that would most likely be remembered by the readership, as news consumers are known to retain only the amplified features of news stories.

This shocking finding that *nothing* could convince vaccine hesitators otherwise made for an exciting story line at a time when public frustration over vaccine refusal was high. Further, these news reports surfaced as political momentum was growing in favor of controversial legislation to restrict or eliminate nonmedical exemptions for school-entry vaccine requirements. The alleged conclusiveness of the scientific findings lent support to these efforts by discredited persuasion techniques as a viable alternative to enforcement and arguably made the harms associated with restricting parental rights more palatable by framing those “anti-vaxxer” parents as incapable of reasonable judgment. The case for the common good trumping individual liberties was easier to make in the face of an irrational group of people.

Media institutions play significant roles in mediating the science-publics interface. We have focused on the roles played by news organizations in engaging and educating the publics. Other important research has attended to the equally weighty task of keeping scientific and governmental institutions accountable (for example, Mulgan 2003). When provocative headlines like “The Science Is Clear: Anti-Vaxxers Are Immune to the Truth” (Editors 2015) appear in a national broadsheet amidst a climate of successive disease outbreaks and increasing public anger directed at “anti-vaxxers,” the media is serving to inflame rather than inform the publics. Doing this keeps the publics from being able to engage meaningfully in informed discourse regarding issues that are important to us all.

NOTES

1. Science and communications studies prefer use of the term “the publics” instead of “the public” or “public sphere” in order to deny the notion that there is a unified body of lay people that interacts singularly with expert science. Instead, there are a plurality of non-expert modes of engaging with science.

2. The same criticism of “balance as bias” has been made in the context of news coverage of the so-called climate debate in the United States (see Boycoff and Boycoff [2004], Oreskes [2004], and Malka et al. [2009]).

3. See also Borel (2015) on being criticized for raising concern about the financial conflicts of interests held by Kevin Folta, a prominent scientist and vocal GMO advocate.

4. See Mooney (2011).

5. Saturation is a term used in qualitative research to refer to the point where nothing new appears through further collection of data.

6. Nor did Nyhan, the primary researcher, ever raise that possibility that no vaccine communication intervention would work in the considerable media he did in surrounding the publication.

7. Research has found medical professionals to be the most trusted source of vaccine information for parents (Omer et al. 2009; Freed et al. 2011). In interviews, Nyhan, the primary investigator, recommended conversations with physicians as a good vaccine intervention on numerous occasions in interviews regarding the study (Tremonti 2015; Barton 2014; Belluz 2015a).

8. Despite being available in almost all U.S. states, national records show religious exemptions make up less than half of nonmedical exemptions. This is because they are, in many states, more difficult to obtain than other nonmedical exemptions. In many, but not all states, obtaining a religious exemption to vaccines require parents to cite and explain the religious doctrine in question. States with philosophical exemptions have 2.5 times the rate of exemptions than states with only religious exemptions (Vestal 2015). The more widely utilized personal belief/philosophical exemption was only available in 20 states in 2015. Starting June 2016, only 18 states will permit personal belief exemptions, with legislation successfully passed in California and Vermont to strike that option. California defined “personal belief exemption” broadly to include religious exemptions, thereby making the state’s bill the most sweeping from all other reform measures introduced in 2015.

9. To define the term “nudge,” Thaler and Sunstein write: “A nudge, as we will use the term, is any aspect of the choice architecture that alters people’s behavior in a predictable way without forbidding any options or significantly changing their economic incentives. To count as a mere nudge, the intervention must be easy and cheap to avoid. Nudges are not mandates. Putting fruit at eye level counts as a nudge. Banning junk food does not” (Thaler and Sunstein 2008).

10. In what appears to be unfortunate oversight, it was easier for Californians to obtain a vaccine exemption than to obtain a child’s vaccine records for school entry until some changes to legislation were enacted in 2014 (Nyhan 2015).

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