

Vaccines Going Viral: Peripheral Public Discussion of Scientifically Justified Policies

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Word count

7,721

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This article examines Reddit-user's ("redditors") responses to a story concerning proposed legislation that would require parents considering not vaccinating their children to participate in a public-health delivered education session on the science of immunization. In theorizing Reddit as a "peripheral public" venue and attending to its use of algorithms to sort content and commentary, this case study uses a mixed qualitative and quantitative approach to explore the rhetorical strategies employed by redditors as they discuss the proposed legislation and the scientific controversy behind it—suggesting new strategies for investigating participatory media, as well as insights for key stakeholders in the vaccine controversy.

When Rhetoric and Reddit Collide

In response to the growing public health concerns raised by the anti-vaccination (colloquially referred to as "anti-vaxxer") movement, and as the number of vaccine-preventable outbreaks across North America continued to rise in number, the Ministry of Health and Long-Term Care in the Canadian Province of Ontario proposed legislation that would affect parents who are considering not vaccinating their children.¹ On September 1, 2017, the proposed legislation passed into law, and now parents who wish to opt out of vaccinating their child for conscience or religious belief must complete an education session on vaccines delivered by their local public health unit prior to receiving vaccine exemptions ([Vaccines for Children at School](#)). Such legislation is a growing trend, with other Canadian provinces, American states, and countries around the world proposing and passing vaccine-related legislation intended to combat waning immunization rates. Polarized debates erupted in response to Ontario's proposed legislation as some praised the government for taking action while others balked at the

possibility of governmental intervention in private decisions. Online, the debates between these positions fill comment sections of newspapers, twitter feeds, and other conversational spaces. Examining the online response to the proposed legislation in Ontario provides an important case to begin understanding what rhetorical responses such laws might engender. The reaction to the then-breaking story about Ontario's proposed legislation by users of the news aggregating site, Reddit, was more measured than other online sources, and for this reason provides a particularly significant index of public response that is worthy of examination.

Since the emergence of the rhetoric of science as a field of research in the mid-1980s (Harris 9), rhetoricians have recognized that while science may be perceived as an infallible field of knowledge characterized by its reliance on nothing but empirical evidence and the vaunted scientific method, the realm of science is mediated, even constituted by language. The common misperception of science as an exclusively empirical and non-rhetorical construct is more apparent than ever before with the affordances of new media that dissolve geographic boundaries, accelerate the pace of communication, and accommodate a multiplicity of voices from both science and other publics. The digital age has made clear that the scientific enterprise is as a fluid domain shaped by social forces as science communication flows across virtual platforms, and is ventriloquized, politicized, and metamorphosized by a mosaic of publics.

The Internet's changing of how science is both conducted and communicated has resulted in a growing niche in rhetorical scholarship exploring the relationship between science and the web. Alan G. Gross and Johnathon Buehl's edited collection Science and the Internet: Communicating Knowledge in a Digital Age, James Wynn's Citizen Science in the Digital Age: Rhetoric, Science, and Public Engagement, and Ashley Rose Mehlenbacher's Science Communication Online: Engaging Experts and Publics on the Internet, are reflective of the

growing demand on rhetoricians to identify the variety of ways that the internet reconstitutes science; all include case studies that explore the rhetoric of science in the context of social media networks, blogging platforms, podcasts, and online science journals, to name a few. Moreover, Randy Allen Harris has recently published a second edition of the seminal Landmark Essays on Rhetoric of Science; of the four new landmark essays added to the collection, two place the role of the Internet front and center (see: Mehlenbacher and Miller; Sidler). Although Reddit has received limited treatment in rhetorical studies, technical communication researchers and rhetoricians of science have been the first to turn their attention to the site.

Such scholarship, however, has focused on specific subreddits, rather than viral content that reaches the “front page” of Reddit (the default page on www.reddit.com that receives the most views), which is the defining feature of Reddit as illustrated by the site’s self-professed description and slogan: “the front page of the internet.” In the closely allied field of technical communication, Ehren Helmut Pflugfelder focuses on the “Explain Like I’m Five” (r/ELI5) subreddit as a venue for crowdsourced explanations that take the form of technical communication work. Lauren E. Cagle and Carl Herndl examine deliberation about climate change and the rhetorical magic that can happen within the “Change My View” (r/cmV) subreddit. And my own work, collaborating with Mehlenbacher, attends to the r/science Ask-Me-Anything series, describing how Reddit-users (“redditors”) assess the expertise of scientists participating in the forum. Viral artifacts curated on the site, however, remain unexamined. Viral posts and the discussion that they generate on the Reddit platform are a result of the site’s deeply democratic structure and heavily linguistic form—two hallmarks of rhetoric as a discipline—and can act as a litmus test of public opinion, informing scientists and policymakers about citizen’s thoughts, fears, and concerns surrounding scientifically-justified public policies.

At the center of this case study is a news story from the National Post, a Canadian newspaper, concerning proposed, scientifically-justified vaccine-related legislation by the Province of Ontario. A post containing a link to the National Post article went viral on Reddit—an online social voting community—resulting in engaged discussion about the legislation on the site (see Figure 1). Founded in 2005 by then-college roommates Alexis Ohanian and Steve Huffman, and now a subsidiary of Advance Publications, Reddit is a site that allows users to submit both original and hyperlinked content. With an interface reminiscent of the messaging-boards of the 90s, Reddit enables users to comment on submitted content, and respond directly to other comments. Both comments and content can be upvoted or downvoted by users which then become more or less visible on the site based on sorting algorithms that consider the voting behavior of redditors. Since 2008, redditors have been able create their own topical communities on the site, known as “subreddits” (e.g. r/politics, r/AskScience, r/DunderMifflin), of which there are now over 1 million (Ritcher).²

By exploring the affordances of the Reddit platform, the exigencies that contributed to this content going viral, and the attending commentary by redditors in response to this viral content, a clearer picture emerges of the need to leverage the suasive dimensions of social voting platforms to promote a deliberative democracy that encourages rhetorical citizenship in matters involving both science and public policy. In attending to the discourse generated by redditors, this case study draws attention to the government’s lack of attunement to the “peripheral public” – a theoretical concept that I’ll describe shortly – that they serve.

The dissolution of boundaries made possible by the Internet should, in theory, remove barriers to communication and promote a clearer understanding of the ideological allegiances held by key stakeholders – in this case, the government, pharmaceutical industries, and the

public – but you have to know where to look, and how. The discussion on Reddit reveals the government’s striking misunderstanding of the concerns and beliefs of the public as they relate to vaccines and science. Further, this case reveals the potential of the Reddit platform for rhetorical mining in the area of public policy, notably including policies in science and medicine. Reddit made possible a sophisticated discussion of key issues surrounding the proposed vaccination policy, illustrating how the intersection of commenting, voting, and algorithmic sorting, can improve argumentation and reveal consensus amongst redditors, making the most salient arguments more visible and accessible. Finally, and perhaps most importantly, I conclude with an explication of the position that redditors seem to come to a consensus on, namely, that the proposed policy will not achieve the desired outcome of increasing vaccination rates.

Reddit as a Democratic Peripheral Public

To date, the rhetorical analyses of public scientific controversies, “disputes about scientific knowledge that arise when technical authority intersects with public interests within salient political exigencies”³ (Crick and Gabriel 202), have been concerned in many respects with the “major players”: scientists or scientific communities, government, and the public. In this context, “the public” is viewed as a relatively homogeneous audience, constructed on the basis of shared beliefs, values, and attitudes; but these are active publics comprised of actively engaged citizens who work to be seen and heard within the political realm of scientific controversy. Take for example, Miles C. Coleman’s study of online vaccination discourse that maps “two fragmented publics: one of vaccine denialism and the other of pro-vaccination” (204). Examining clearly demarcated active publics may be an unintended consequence of Gross’s work on the contextual case study model that “implies an active public: it requires a rhetoric of reconstruction in which public understanding is the joint creation of scientific and local

knowledge” (6); and so, rhetoricians have looked to where the public is most obviously active. Moreover, in reviewing work on scientific controversies in the rhetoric of science, Lynda Walsh and S. Scott Graham found that the boundary work done in “synchronic” cases – those typically “staging controversies as policy disputes” (197), is “designed to create unity between diverse communities and worldviews” (199). In the case of vaccine controversies, anti-vaccination parents act as that unified portion of the active public, a public, in this case, that acts in opposition to prevailing scientific understanding. But, there are varying levels of activity, and here I suggest an activity-continuum with peripherally active publics falling on one – often unexamined – end.

What I will collectively refer to as the peripheral public, is comprised of citizens with few vested interests in a topic and none that are actively engaged—citizens who may have an opinion, are likely to join in watercooler talk, and who make personal decisions in light of these opinions and discussions, but are unlikely to show up at a protest, peruse science journals looking for evidence to support their position, or write letters to their legislators. This theoretical perspective supposes that the immensely active publics who constitute “the public” in case studies on scientific controversies, are segments of the public comprised of members who engage in purposeful political action with the intention of contributing to political change. The peripheral public on the other hand, contains the majority of the citizenry, who are not apathetic per se, but are not socially invested in the political issue at hand and thus they fall towards one, less visible end of the activity continuum. They are not peripheral in the sense of their beliefs and their personal actions (voting, or not; recycling, or not; vaccinating their children, or not). In fact, they are the majority. But their public actions are peripheral, and consequently those beliefs and personal actions are much less easy to gauge. As scholars, we often metonymically substitute

active publics comprised of a few, as representative of a much broader public at large, failing to give attention to “average” voices of the peripheral public that are representative of the many.

Reddit provides a unique and much needed vantage on these peripheral publics.

Boasting over one-and-a-half billion unique visitors each month (Clement), Reddit allows users to share, vote on, and discuss user-submitted content, and acts as a virtual platform that can create instantaneous, dynamic communities that come together in a discursive flurry to discuss, shape, and create viral content, and then dissolve just as quickly, leaving behind a tangible record of the experience through the comments posted to the forum. Reddit aggregates user-submitted content and ranks it in terms of popularity based on how other users vote (upvote or downvote). Content is sorted using the “hot” algorithm, while comments are sorted via the “best” algorithm.⁴ Posts “go viral” when they get to the “front page” based on Reddit’s hot algorithm that takes into account the age of the post (newer stories are more visible than older ones), as well as the number of upvotes and downvotes the post receives; the proportion of upvotes to downvotes is particularly important as stories that receive a similar number of upvotes and downvotes will rank lower than a story that receives mostly upvotes. The hot ranking also makes use of the logarithm function, weighting first votes more heavily than the rest (Salihefendic). Similarly, redditors can comment on content or on other comments, and these comments can also be upvoted or downvoted. By default, comments responding to content are displayed from the highest to the lowest ranked based on Reddit’s “best” algorithm, which takes into account upvotes and downvotes, but not the age of the comment. This sophisticated algorithm also “treats the vote count as a statistical sampling of a hypothetical full vote by everyone, much as in an opinion poll,” which prevents an age-of-comment bias that could position mediocre comments at the top simply because they were posted earlier and received a

higher number of votes (Munroe). Responses to comments (called “children”) are ranked in the same manner below the comment to which they are responding. As a voting-dependent virtual platform, Reddit operates as a unique, democratically managed peripheral public, where the front page reflects the interests of its users.

In the rhetoric of science, small, active publics often come to be representative of “the public” at large; a move which further silences the faint voices of the peripheral publics. Rhetoricians, in their quest to untangle the rhetorical happenings that occur at the nexus of scientific controversies, often ignore the multiplicity of voices that surround them by attending only to the most vocal. This issue was in part addressed in Gross’s 1994 article on “The roles of rhetoric in the public understanding of science,” where he noted that most scholars employ a “deficit” model of the public understanding of science, one that “depicts communication as a one-way flow from science to its publics” (6), and advocated for a fuller, more “contextual” model of understanding, one in which communication flows both ways, and “public understanding is the joint product of scientific and local knowledge” (19). For Gross, meaningful scholarship on the public understanding of science requires research through case studies, a “particular case of an interaction between science and the public” (19).

Gross’s call to action has resulted in scholarship over the past two decades that makes use of the epistemological value of case studies, although many of them are judgement-focused, “opposition-based” works in which science needs to be contained or restrained by the rhetoric (Condit et al. 391). “Challenges to science,” Celeste Condit and colleagues note, can “move from debunking [science] toward overt hostility in studies arguing that science is not only governed by social forces, but allied with oppressive forces” (389). This dichotomy, science and its moral other, combined with the dissolving boundaries of expertise afforded by the Internet, has made

case studies focused primarily on either the public realm or the technical realm of science largely a thing of the past. Reviewing seventeen years of scholarship on the public understanding of science, Condit et al. conclude that “[f]urther studies of reaction to, and protest against, scientific and medical policies might be helpful in more fully charting how publics engage with scientifically-justified policies. . .” (394).

I suggest that peripheral publics, like the one we see coming together on Reddit to discuss the proposed legislation concerning vaccines, are adjacent to the core discussions of scientific controversy involving active publics, scientists, and government. The front page of Reddit, as a peripheral public venue, offers valuable knowledge in redditors’ reactions to scientifically-justified policies because the rhetorical exigency of commenting on a viral link is much different from that of a highly motivated public member who may, for example, be actively protesting the legislation. The front page of Reddit assumes of its users no particular position on any issue at hand, only, by its very presence, suggesting that participants may find interest in it. As such, redditors generate meaningful conversation from a multiplicity of perspectives that often includes insights that scholars and policymakers would otherwise not be exposed to.

Case Study: Viral Content as Exigency

As the fourth most popular site in the U.S. (Richter), Reddit is a rhetorical powerhouse. Research attending to the site’s role in successful fundraising campaigns and political protests finds that “redditors’ practices and actions through the site can. . . affect actual political change at the level of policy” (Springer 265). Nearly 8 in 10 redditors (78%) access news on the site, with r/news and r/worldnews (the latter being the subreddit to which the link to the [National Post](#) article on vaccines was originally posted), ranking ninth and tenth for subreddits that attract the most comments overall (Barthel et al.). The rapidity with which comments accumulate - and

comments on comments on comments - leads to an especially fecund ecosystem for the co-creation of argumentation and meaning, frequently resulting in the collaborative construction of arguments, one redditor furthering another's line of reasoning so that they become rhetorically more effective as the comments are read together.

On May 12, 2016, the Province of Ontario introduced legislation that, if passed, “would require parents and guardians who are considering not immunizing their children for non-medical reasons to participate in an education session delivered by their local public health unit” (Ontario Strengthening Requirements). The announcement came when public attention and criticism of anti-vaccination, or “anti-vaxxer” parents was at an all-time high in the wake of a measles outbreak at Disneyland (Kaplan), an increasing number of vaccine-preventable outbreaks all over North America (“Vaccine preventable disease outbreaks”), and, in Canada, the recent death of a toddler from viral-meningitis in the Province of Alberta—his parents had chosen not to immunize him and pursued folkloric remedies, like hot peppers and horseradish, to conventional medical treatment (Gerson). The day after the legislation was announced, a redditor posted a new story to Reddit titled “Ontario parents who object to vaccines could be forced to take a class in science of immunization,” that linked to a National Post article of the same title that had picked up the story on the proposed legislation (NZT-48Rules; Csanady). The post was widely shared, being promoted to the elusive “front page” of Reddit and at the time of analysis had accrued over 4,400 comments on the Reddit platform, compared to a mere 579 comments on the National Post site itself.

The vaccine post on Reddit is an object of study in which reactions to the proposed Ontario legislation are discussed. The unique opportunity to view bottom-up, citizen-driven discourse is well suited to a rhetorical analysis that explores how peripheral publics interact with

scientifically-justified policies in an informal public sphere. This article will reveal how the relatively anonymous, low-stakes participation within a virtual public, where comments are ranked through the democratic system of voting, produces discourse of epistemological value that should be taken seriously by scholars and policymakers alike.

Methodology

An initial review of the comments revealed that the majority of discussion regarding the proposed legislation emerged in comment threads near the top of the discussion board in response to the best-ranked comments (threads refer to the grouping of responses to a comment, which on Reddit are displayed in a nested arrangement). Not only was there more commenting, but top comments facilitated actual back-and-forth discussion as well as thematic response threads, and generally comments of higher caliber; there was a sharp drop-off, and the bottom-ranked comments generated very few, if any, responses. A statistical analysis supported these impressions, revealing that the top three comments generated 66% of the discussion on Reddit (2,922 comments), with the first, second, and third comments resulting in 39%, 25%, and 2% of the responses, respectively. Meanwhile, the bottom 20% of comments (893) included 559 comments responding directly to the story, which generated a mere 334 responses. As such, the comment-ranking structure of Reddit does not lend itself readily to a random-sampling method that one might use for a comprehensive overview. Moreover, I am not examining comments that other users don't engage with or actively push to the bottom, because I am most interested in the comments and responses that demonstrate engagement and consensus in peripheral publics. In making these selections, I place my marker on the activity continuum containing the peripheral public, but not so far to one side that this analysis would be overwhelmed by the deluge of independent and unrelated comments that are not indicative of the kind of deliberative

democracy valued by rhetoricians (see: Cagle and Herndl; Kock and Villadsen). Indeed, a review of the bottom 20% of comments reveals that comments that are unrelated, repetitive, or are simply posted past the post's "primetime" on the front page get downvoted or ignored, and generate very little discussion. These observations lead to the following questions: what characteristics do top comments have, why do they facilitate engagement and discussion, and what are the heavily engaged participants talking about? These questions are best answered through a close rhetorical analysis of the top comment that generated most of the discussion, as well as the top two ranked responses and the corresponding comment threads, since these are reflective of what redditors deem to be the important conversations.

Analysis

Using the default "best" algorithm to sort comments, the first-appearing comment on the posted link to the article, by Artist_1, garnered 2,381 points. It is short and sweet:

Anti-vaxxers are predominantly from an affluent, educated class. Somehow.

<http://news.discovery.com/human/psychology/anti-vaccination-parents-richer-better-educated-151231.htm>.

Although not explicitly stated, the comment appears to be enthymematically evoking the irony that offering a course on the science of immunization to the well-educated and affluent is counter intuitive. Artist_1 bolsters this claim with a link to an article that redditors can follow if they wish. Of course, redditors need not actually follow the link as the presumed title included in the link, "Anti-vaccination parents richer, better educated," provides a succinct summary of what the article is about, and the observation that the reputable science and exploration media network Discovery is the domain lends ethos to that claim. This top comment offers very little in the way

of discussion; it's a statement of fact, paired with a citation and a single-word stated ironically that hints at an opinion. The top ranked responses however, give more insight into what makes the top comment generative in terms of the sheer amount of discussion that followed.

With 3,108 points and generating 1,470 responses, the top response to Artist_1's comment is where imadragonrider muses

Here's what the typical person doesn't understand about the anti vax crowd (atleast [sic] some seemingly relevant portion). The problem isn't a lack of education. It's a distrust of authority. Scientific studies don't mean shit to me if I believe they're being manipulated for the sake of a hidden agenda. Of [sic] I can believe the studies, but distrust what's actually being injected.

This response obviously resonated with redditors because it received a higher number of points than the comment to which it was attached; that is, more redditors upvoted it. Further, most of the discussion took place beneath imadragonrider's comment, accounting for 85% of the discussion taking place under Artist_1's initial comment, indicating that more redditors chose to respond directly to imadragonrider's comment, or to comments below imadragonrider's comment, than responded directly to Artist_1. But it is important to realize that imadragonrider's response depends on the context that Artist_1's comment engenders, and, once it is posted and "attached" via upvoting, Artist_1's comment is no longer simply an independent remark on the article (that is, on the legislation discussed in the article). Artist_1 and imadragonrider co-create an argument: the assumed proposition laid out by Artist_1 is that anti-vaxxers are educated, the second premise by imadragonrider is that anti-vaxxers distrust authority, and imadragonrider's conclusion then, is that further education by distrusted authority will not address the issue of

anti-vaccination. imadragonrider also brings up that many are suspicious of scientific studies, which is especially relevant to the anti-vaccination argument; as one LafayetteLever commented within this thread, “The irony being, that this whole [anti-vax] movement was started by a fraudulent scientist attempting to make a profit.”⁵ Further responses to imadragonrider cluster around the theme of distrust:

I'm sure forced re-education programs will do wonders with their distrust of authority
(moeburn)

They'll just believe the teacher / scientist is lying to them, since the class was mandated
by the government (Artist_1)

I know from experience in the Pharma industry that study data is flawed and manipulated
as fuck so I kind of see where they're coming from in their distrust (tandemlee)

. . .I am very highly educated. I well understand and trust the science of vaccinations. I
have very little trust of the political/corporate interests who tell me I need to administer
an ever-increasing list of vaccines to my children (Prof_Beezy)

Many comments invoke texts like Clockwork Orange and 1984 in allusive arguments that link the proposed legislation to dystopian societies and government reeducation programs. Related work in the rhetoric of science concerning manufactured scientific controversies (Ceccarelli) has emphasized distrust of political and corporate institutions that use science - albeit, bad science - to justify their policies and practices. Take, for example, the HIV/AIDS manufactured scientific controversy, in which the South African government rejected scientific consensus and aligned itself with the few scientific dissenters, enacting policies that resulted in an estimated 330,000 deaths (Ceccarelli 160). Such work has focused on the institutions bound up with science, and a

pervasive suspicion of the role power plays in making and disseminating scientific knowledge, particularly when aligned with government or industry interests, runs throughout the literature.

But normally in public controversies about science, of which the vaccine controversy is a unique form, industry operates in opposition to mainstream science to gather support for policies that favor their profitable business practices but are damaging to society; such is the case with global warming skepticism, the anti-GMO movement, and even intelligent design advocacy. In the case of vaccines however, the scientific majority is on the side of vaccines, and therefore on the side of big pharma and the government, an alliance about which publics have been conditioned to be suspicious. And while scholars working in the rhetoric of science have studied public uncertainty in the context of manufactured scientific controversy, suggesting topoi for scientists and rhetoricians to better engage with the public debate on such matters (see especially Ceccarelli), the case may be, as redditors suggest, that individuals harbor not an uncertainty of the science itself, but a distrust of the political and corporate interests that are enmeshed with the science. Topoi that encourage a defense of scientific orthodoxy are ineffective in addressing this type of distrust – since it’s the ethos of sponsoring sources and not science or its disciplinary practices that are in doubt – and thus, policymakers, scientists, and rhetoricians have been engaging with a vocal, but relatively small portion of the anti-vaccination rhetoric by refuting claims with evidence validated by scientific consensus. By continuing to focus on the science of immunizations, the distrust that underlies skepticism of science when wielded by the government and pharmaceutical industries remains unacknowledged and ironically, reinforced.

The second highest ranked comment in response to Artist_1 is by ageekyninja who draws on personal experience. ageekyninja’s comment only accrued 193 points and 46 responses, suggesting that its themes—the supposed ignorance and self-serving motivations of anti-

vaxxers—were not as successful in stimulating conversation as imadragonrider’s theme of distrust. “Yeah, and most of these guys know fuck-all about medicine too,” ageekyninja remarks:

Affluent + educated tends to equal a certain amount of ego. My dad is one of the people who is anti-vax. He frequently references his IQ when trying to give his argument. For them, standing up for a cause that most people disagree with makes them stand out, and makes them feel they have a better understanding of something than other people. It also makes them somewhat of a warrior for something they perceive as good. Warrior syndrome and having a big head is a big part of this. Why would they question their own views? They know theyre [sic] right. This all dims out their bullshit filter.

My dad [sic] also very paranoid when it comes to all things in life, so theres [sic] that too.

Emphasizing the role of education and a high IQ, ageekyninja uses personal narrative to suggest expertise on the argumentation style of people who are affluent, educated, and anti-vaxx. This appeal to phronesis (practical wisdom) is dependent on inductive reasoning where the experience with their father’s arguments becomes representative of “them,” the affluent, educated, and anti-vaxx. In an ironic twist, OldWolf2 engages in an informal rhetorical exercise, criticizing ageekyninja’s father’s line of reasoning:

Maybe point out to him that referencing his IQ is an appeal to authority (and using yourself as the authority in an argument you are participating in is obviously fucked up). Can he not win an argument using evidence, without appealing to his IQ?

The irony here is that a similar criticism can be made of a geekyninja's argument against that of their father, being that their reasoning activates a sort of appeal to authority as well, their own personal experience with one particular anti-vaxxer, rather than independent and broadly distributed evidence. Interestingly, and perhaps most importantly, OldWolf2 avoids the generalizations, and remarks only on the anecdote; for the most part, all other respondents follow suit. ageekyninja and OldWolf2 go back and forth, and a few other redditors join in the question and response with ageekyninja, each successive answer garnering fewer and fewer points. What this suggests, is not so much that many redditors agreed with ageekyninja's broad generalizations on the argumentation of anti-vaxxers, but that they are interested in hearing more about ageekyninja's father, his arguments against vaccination, and the context surrounding his beliefs. Some_one498 writes "I'm sure you have asked him for facts other than that bullshit paper by that shill of a doctor. If you have a min I would be interested where his reasoning comes from," to which ageekyninja responds with a story about their parent's divorce, their autistic brother, and how vaccines were at the crux of it all. In the engaged discussion with ageekyninja, redditors appear to be genuinely curious as to what anti-vaxxer's arguments are and demonstrate a desire to understand why anti-vaxxers believe what they do, which demonstrates engaged inquiry on the part of redditors.

Also popular in this comment thread is the referencing of other subreddits (which are automatically hyperlinked when referenced): for example, one redditor quoted a comment directly from r/skeptic, and ageekyninja reflected on a study that had been discussed in r/science. This linking to other subreddits is a signal that their argument can be championed by a whole other Reddit community, while the hyperlinked affordance can immediately direct other redditors reading the comment to that subreddit source. This strategy is also at its core a

synecdoche, where the naming of the subreddit is meant to represent the collective ethos of that subreddit. This argumentation technique is unique to Reddit, because it leverages Reddit-curated subreddits and the canon of content that's been created and curated by redditors in those subreddits. Because each subreddit has its own reputation within the site, linking to them is an ethotic appeal that is only effective if users are familiar with the site.

Discussion

Inherent in the Reddit ranking algorithms for both stories and comments, is a kairotic appeal. Kairos, which Carolyn Miller identifies as a “particularly useful critical concept for exploring the rhetoric of science” (311), emphasizes the rhetorical context and “appears as a critical occasion for decision or action” (312); a rhetor must consider the specific context and select topics and appeals that are appropriate for the moment. For a story to go viral on Reddit, redditors must show interest in the story in a short amount of time by actively upvoting it in the subreddit in which it appears; it must then exceed an algorithmic threshold which catapults the story to the front page of Reddit, suggesting that user-engagement has demanded a wider audience, and the topic is one that is important to discuss right now. Further, comments are upvoted and downvoted with “best” comments appearing first, illustrating that the comments displayed at the top are indicative of what redditors believe to be the most appropriate claims and arguments on the topic at hand. Through the act of voting, redditors democratically determine what is important to talk about. In the case presented here, redditors determined that Ontario's proposed vaccine legislation is a matter that demands attention. Although Artist_1's top comment was brief, it acted as a dialectical starting point, the initial node of invention, for redditors to respond to the proposed legislation. Redditors could agree that the educated and affluent are more likely to be anti-vaccine because Artist_1 provided evidence to that effect.

What follows are thematic discussion threads exploring the link between being affluent and educated and being anti-vaccine.

In the top two responses, two central themes emerged: the first concerned distrust of political institutions and corporate organizations, while the second proved to be an informal rhetorical analysis of an anti-vaxxer argument provided by ageekyninja. These emerging themes suggest consensus in terms of what is important to discuss, but consensus does not preclude dissent, on Reddit as elsewhere. Indeed, many redditors who expressed an opinion within the studied thread were pro-vaccine, anti-vaccine, and what one redditor identified as “anti-vaxxer-adjacent” (Prof_Beezy). Unlike a neatly demarcated active public, the peripheral public in Reddit is not one comprised on the basis of shared attitudes, values, and beliefs, but one that is formed only on shared interest in the topic, meaning that dissent is common in this deliberative democracy.

The Reddit platform lends itself to the co-creation and mutual calibration of arguments, as redditors extend, refute, and interrogate the commentary of other redditors, and the effectiveness of these arguments can be ranked through the affordance of voting. Redditors also show a propensity for the self-organization of discourse, as the emergence of thematic topics within comment threads indicates that redditors keep their comments in line with the theme that’s been established by the first commenter. Reddit also offers the unique rhetorical strategy of appealing to other subreddits to bolster claims. Thus, the peripheral public discussion of the viral vaccine article on Reddit fosters democratic deliberation that produces easily accessible content of epistemological value for rhetoricians and policymakers.

The discussion around the top comment suggests an intrinsic preoccupation with whether or not a science of immunization class would be successful in encouraging more people to

vaccinate their kids, and the resounding answer from redditors appears to be “not a chance.” Further, redditor’s responses to the proposed vaccine legislation elicits the following important questions for rhetoricians and policymakers: will a class on the science of immunization actually result in higher vaccination rates, or will it reinforce distrust amongst Ontarians who are anti-vaccine? Will the administrators of these courses be equipped to deal with public dissent that is critical of government intervention in private decisions? Will course administrators have topoi they can draw on to refute arguments based on appeals to education and IQ? Would transparency policies regarding partnerships between branches of government and the pharmaceutical industry better combat anti-vaccination?

Since the Reddit discussion took place, the vaccine legislation was quietly passed with significantly less media coverage and public interest than when it was first proposed, and officially took effect in September 2017. Alarming, Public Health Ontario’s Immunization Coverage Report for School Pupils in Ontario: 2017-18 School Year indicates that since they began tracking non-medical immunization exemptions in 2013-14, exemption rates have either remained stable or increased for every single immunization for a disease designated under Ontario’s Immunization of School Pupils Act, including for 2017-2018 (38). Moreover, reports from public health units indicate that the program has been largely unsuccessful in persuading parents to vaccinate. The National Post conducted a survey of Ontario’s 35 public health units and found that at each unit, few, if any, parents have changed their mind after attending the education session and collecting their “Vaccine Education Certificate” (Kirkey). In fact, “the majority of parents double down after vaccine education sessions,” and any “new information tends to be interpreted in a way that supports what they already believe” (Kirkey). The concerns made salient by redditors have been largely validated; in summarizing parents’ responses to the

education session, Ted Kuntz, Vice-President of Vaccine Choice Canada remarked that “Parents stated that they have already extensively researched the topic of vaccine safety and effectiveness and that they found it insulting to have the government force them to be ‘re-educated’” (qtd. in Kirkey). These emerging reports and responses raise important questions about the audience that the education sessions are designed to persuade: whether they are intended for skeptical anti-vaxxers, or parents who have naïve reservations about vaccinations and are looking to be assured by sound science.

If Perelman and Olbrecht-Tyteca’s observations about value-saturated rhetoric have taught us anything, it’s that arguments for a universal audience will do little to persuade particular audiences, and thus no amount of empirical evidence and demonstrable facts concerning the science of immunizations will refute the beliefs and values held dear by many of those attending the education sessions. Work on the “backfire effect” in social psychology lends support to Perelman and Olbrecht-Tyteca’s perspective and explains why parents “double down after vaccine education sessions” (Kirkey). The well-documented “backfire effect” phenomenon finds that individuals who receive information that conflicts with their ideology do “not simply resist challenges to their views. Instead, they may come to support their original opinion even more strongly” (Nyhan and Reifler 307; original emphasis). Thus, a vaccine education session may unintentionally be reinforcing the beliefs of anti-vaxxers.

Final Remarks

Work on vaccine controversy is not new to the rhetoric of science, but an emphasis on boundary work has resulted in scholarship focused on clearly demarcated active publics (see: Walsh & Graham; Coleman). This work is important, but the analysis of the Reddit case study here shows us why peripheral publics demand serious study as well. My analysis of the top

comment and the discussions it generated in response to a viral article on proposed vaccine legislation in Ontario is but a small, initial sample of the kind of work that Reddit necessitates in rhetorical studies. This study reveals how the virtual platform that is Reddit is integral to understanding peripheral public engagement with the proposed vaccine legislation specifically, but from a more general perspective, it illustrates how viral artifacts foster unsolicited, thoughtful, and engaged deliberation within a peripheral public comprised of redditors who possess a multiplicity of perspectives. Observing relevant discussions that emerge in response to viral stories gives rhetoricians and policymakers the opportunity to measure public opinion to determine what the public thinks about scientifically justified public policies and legislation.

In the introduction to Rhetorical Citizenship and Public Deliberation, Christian Kock and Lisa Villadsen make a case for “rhetorical citizenship,” where rhetoric is at the core of citizenry in a deliberative democracy. The democratic affordances offered by Reddit, paired with the discursive deliberation that organically unfolds on this site, is the epitome of this kind of rhetorical citizenship. As this study illustrates, Reddit operates as a peripheral public venue and the affordances of this site can foster rhetorical citizenship, meaning that further research concerning how Reddit may contribute to a healthy, and functioning democracy is warranted.

¹ I would like to express my gratitude to the Rhetoric Review reviewers, Erika Sparby and Michael Zerbe, for their generosity of time and generative feedback throughout the revision process. I am also appreciative of the helpful critiques provided by Randy Allen Harris and Ashley Rose Mehlenbacher on earlier drafts of this manuscript.

² The introduction to Adrienne Massanari's Participatory Culture, Community, and Play: learning from reddit provides a useful orientation to the site and its history.

³ "Public scientific controversies" differ from "scientific controversies," as the latter refers to dissent or disputes amongst scientists, and do not involve the public.

⁴ At the time that the vaccine story went viral, the "hot" algorithm was used to populate the front page. However, in March 2018 Reddit introduced another "best" algorithm as the default content-sorting mechanism to give redditors who are logged in a more customized experience. The hot ranking remains the default content-sorting algorithm for individuals who are not logged in and continues to be a popular option for sorting content for those who are logged in (see: cryptolemur).

⁵ A now discredited study from 1998 that indicated a robust correlation between the MMR vaccine and autism, contrived with financial motivations in mind (Deer 78), has continued to perpetuate the anti-vaccination movement for complementary reasons: 1) because some continue to claim that vaccines cause autism, and 2) the study acts as evidence that scientific studies can fudge the science because of ulterior motives.

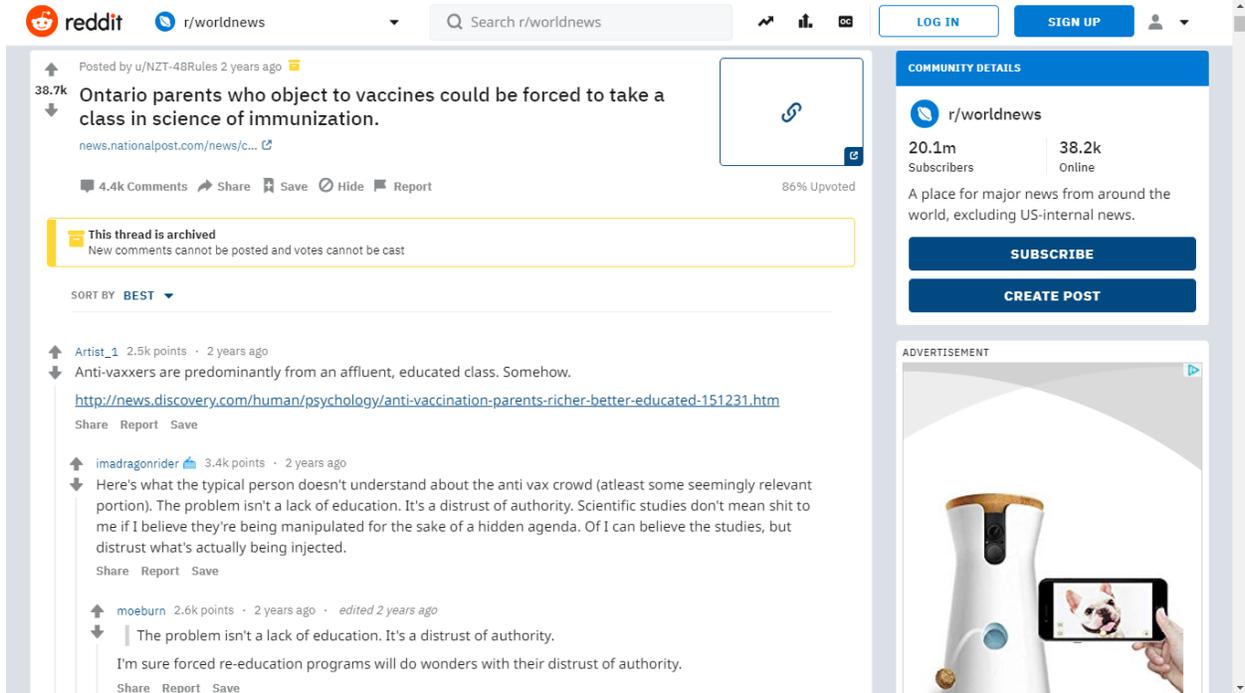


Figure 1. A screen capture of the story that went viral on Reddit. Notable are the number of points attributed to the post (that is, the number of upvotes minus the number of downvotes, a metric of the post's popularity); the hyperlink to the National Post article found directly below the title; the number of points attributed to comments; and the subreddit to which the story is posted (r/worldnews). The post is now archived, meaning that no new comments can be posted, and no new votes cast.

Works Cited

- Barthel, Michael, et al. "Reddit news users more likely to be male, young and digital in their news preferences." Pew Research Center's Journalism Project, Pew Research Center, 25 Feb. 2016. Web.
- Cagle, Lauren E., and Carl Herndl. "Shades of Denialism: Discovering Possibilities for a More Nuanced Deliberation about Climate Change in Online Discussion Forums." Communication Design Quarterly, vol. 7, no. 1, 2019, pp. 22-39.
- Ceccarelli, Leah. "Manufactured Scientific Controversy: Science, Rhetoric, and Public Debate." Harris, pp. 160-184.
- Clement, Jessica. "Total global visitor traffic to Reddit.com 2019." Statista, 23 May 2019. Web.
- Coleman, Miles C. "Rhetorical Logic Bombs and Fragmented Online Publics of Vaccine Science." Journal of Contemporary Rhetoric, vol. 7, no. 4, pp. 203-216.
- Condit, Celeste, et al. "Recent Rhetorical Studies in Public Understanding of Science: Multiple Purposes and Strengths." Public Understanding of Science, vol. 21, no. 4, 2012, pp. 386-400.
- Crick, Nathan, and Joseph Gabriel. "The Conduit between Lifeworld and System: Habermas and the Rhetoric of Public Scientific Controversies." Rhetoric Society Quarterly, vol. 40, no. 3, 2010, pp. 201-223.
- cryptolemur. "Best is the New Hotness." Reddit r/changelog, 24 Jan. 2018. Web.

Csanady, Ashley. "Ontario Parents Who Object to Vaccines could be Forced to Take a Class in Science of Immunization." National Post. Web.

Deer, Brian. "How the Case Against the MMR Vaccine was Fixed." BMJ: British Medical Journal, vol. 342, no. 7788, 2011, pp. 77-82.

Gerson, Jen. "Two martyrs and one child victim for the anti-vaccination cause." National Post, 24 Jun. 2016. Web.

Gross, Alan G., and Jonathan Buehl, editors. Science and the Internet: Communicating Knowledge in a Digital Age. Baywood Publishing Company, 2016.

Gross, Alan. "The Roles of Rhetoric in the Public Understanding of Science." Public Understanding of Science, vol. 3, no.1, 1994, pp. 3-23.

Harris, Randy Allen, editor. Landmark Essays on Rhetoric of Science: Case Studies. 2nd ed., Routledge, 2018.

Immunization Coverage Report for School Pupils in Ontario: 2017-18 School Year. Ontario Agency for Health Protection and Promotion (Public Health Ontario), May 2019. Web.

Kaplan, Karen. "Vaccine refusal helped fuel Disneyland measles outbreak, study says." Los Angeles Times, 16 Mar. 2015. Web.

Kirkey, Sharon. "Ontario's mandatory class for parents seeking vaccine exemptions has 'zero conversions.'" National Post, 15 Mar. 2019. Web.

Kock, Christian and Lisa Villadsen, editors. Rhetorical Citizenship and Public Deliberation. The Pennsylvania State University Press, 2012.

Massanari, Adrienne L. Participatory Culture, Community, and Play: learning from reddit. Peter Lang, 2015.

Mehlenbacher, Ashley R. Science Communication Online: Engaging Experts and Publics on the Internet. Ohio State University Press, 2019.

Mehlenbacher, Ashley R., and Carolyn R. Miller. "Intersections: Scientific and Parascientific Communication on the Internet." Harris, pp. 239-260.

Miller, Carolyn R. "Kairos in the Rhetoric of Science." A Rhetoric of Doing: Essays on Written Discourse in Honour of James L. Kinneavy, edited by Stephen Paul Witte, Neil Nakadate, and Roger Dennis Cherry. Southern Illinois University Press, 1992, pp. 310-327.

Moriarty, Devon and Ashley R. Mehlenbacher. "The Coaxing Architecture of Reddit's r/science: Adopting Ethos-Assessment Heuristics to Evaluate Science Experts on the Internet." Social Epistemology, 2019, 11pgs.

Munroe, Randall. "reddit's new comment sorting system." blog.reddit, 15 Oct. 2009. Web.

Nyhan, Brendan and Jason Reifler. "When Corrections Fail: The Persistence of Political Misperceptions." Political Behavior, vol. 32, no. 2, 2010, pp. 303-330.

NZT-48Rules. "Ontario Parents Who Object to Vaccines could be Forced to Take a Class in Science of Immunization." Reddit r/worldnews, 13 May 2016, <https://redd.it/4j3zg2>.

Ontario Strengthening Requirements for School Vaccine Exemptions: Province Improving how Vaccines are Reported. Ministry of Health and Long-Term Care, Government of Ontario, 12 May 2016. Web.

Perelman, Chaïm and Lucie Olbrechts-Tyteca. The New Rhetoric: A Treatise on Argumentation. Translated by John Wilkinson and Purcell Weaver, University of Notre Dame Press, 1973.

Pflugfelder, Ehren H. "Reddit's "Explain Like I'm Five": Technical Descriptions in the Wild." Technical Communication Quarterly, vol. 26, no. 1, 2017, pp. 25-41.

Ritcher, Felix. "The Explosive Growth of Reddit's Community." Statista, 17 Nov. 2017. Web.

Salihefendic, Amir. "How Reddit ranking algorithms work." Medium, 8 Dec. 2015. Web.

Sidler, Michelle. "The Chemistry Liveblogging Event: The Web Refigures Peer Review." Harris, pp. 307-322.

Springer, Noah Jerome. Publics and Counterpublics on the Front Page of the Internet: The Cultural Practices, Technological Affordances, Hybrid Economics and Politics of Reddit's Public Sphere. Dissertation, Ph.D. Journalism and Mass Communication University of Colorado at Boulder, 2015.

"Vaccine preventable disease outbreaks." Gavi, the Vaccine Alliance. Web.

Vaccines for Children at School. Ontario Ministry of Health and Long-Term Care, updated 10 Jun. 2019. Web.

Walsh, Lynda and S. Scott Graham. “There’s No Such Thing as a Scientific Controversy.”

Technical Communication Quarterly, vol. 28, no. 3, 2019, pp. 192-206.

Wynn, James. Citizen Science in the Digital Age: Rhetoric, Science, and Public Engagement.

University of Alabama Press, 2017.

Index of Reddit Comments

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https://www.reddit.com/r/worldnews/comments/4j3zg2/ontario_parents_who_object_to_vaccines_could_be/d33qwad/.

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OldWolf2.

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Prof_Beezy.

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Devon Moriarty (devon.moriarty@uwaterloo.ca) is a Ph.D. Candidate in the Department of English Language and Literature at the University of Waterloo. Her research, supported by the Social Science and Humanities Research Council of Canada's Talent Program, examines science communication as it unfolds on Reddit. Her work as Lead Research Assistant, on Ashley Rose Mehlenbacher's Networked Expertise Project, pairs the rhetoric of science and technology with rhetorical genre studies to explore how expertise is performed, adjudicated, and communicated in both multidisciplinary teams and public spaces. Moriarty's writing has also appeared in journals including Technical Communication Quarterly and Social Epistemology.