Analyzing Social Media's Influence on Vaccination Misinformation Through Haidt's Perspective on Human "Groupishness"

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By

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On my honor as a University student, I have neither given nor received unauthorized aid on this assignment as defined by the Honor Guidelines for Thesis-Related Assignments.

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Introduction

Vaccinations are one of the most successful achievements of modern medicine. With its use debilitating disease such as polio and small pox have been irradicated. Currently immunization prevent 2 to 3 million deaths every year around the world from vaccine preventable diseases ("Vaccination Statistics," 2020). The World Health Organization (WHO) estimates that 1.5 million deaths per year could be prevented if there was global vaccination coverage (Philadelphia, 2014). Also, in 2019 the American Osteopathic Association found that 45% for Americans doubt vaccine safety. There has been a growing mistrust in vaccinations causing some countries to fall below the 95 percent requirement for herd immunity ("Boris Johnson Orders Action to Stop Measles Spread," 2019). Effectively, this causes diseases that were irradicated to come back from the dead. There are many reasons for the rise is vaccine hesitance. A growing reason is misinformation surrounding vaccines. However, the mechanisms for this growth are not fully understood.

Vaccine hesitancy has been labeled by WHO as one of the top ten threats to global health in 2019 (Geoghegan et al., 2020). A major contributor to vaccine hesitancy is a distrust of the science as well as health care providers (Geoghegan et al., 2020). Geoghegab et al. says that "parents and patients have … fears that adjunctants like aluminum … and simply the shear number of vaccines might be overwhelming, weakening, or perturbing the immune system." One of the many fears that cause distrust is the antivaccination community which uses unsubstantiated claims such as vaccines cause autism. An outlet for anti-vaccination groups are social media sites that allow people to spread their ideas to a large number of people quickly. This information is not fact checked and is leading to a lot of misinformation (*Establishing the*

Truth: Vaccines, Social Media, and the Spread of Misinformation | Executive and Continuing Professional Education | Harvard T.H. Chan School of Public Health, n.d.). A potential effect social media has could be due to what Haidt calls groupish. Haidt believes that humans have an innate desire to be part of a group and can adopt the group's sentiments with less evidence. Social media also tends to show people what they agree with. This could concentrate the information a user receives making them more likely to agree with it which could be explained through Haidt's idea of groupishness. In this paper I argue that an influencing factor for antivaxxers effectiveness on social media is partly due to humans' desire to be part of a larger group.

The gap in knowledge on anti-vaccination groups and misinformation

Much of the modern concerns cited by the antivaccination community originate from a study in 1998 by Wakefield et al. The researchers alleged that the measles, mumps, and rubella (MMR) vaccine could cause autism and bowel disease (Wakefield et al., 1998). The autism link was particularly alarming; by 2002, 20-25 percent of Americans believed that the MMR vaccine caused autism (Lewandowsky et al., 2012). Many parents refused to vaccinate their children. In 2010 *The Lancet* retracted the study on grounds of falsified data and other improprieties (GIS, n.d.). In follow-up studies, researchers found no link between the MMR vaccine and autism or bowel disease (Buie et al., 2010), yet misinformation spread by the Wakefield article has continued to deter vaccination.

Many parents use Vaccine Adverse Event Reporting System (VAERS), a voluntary database for adverse reactions to vaccines, to better understand the frequency of side effects and sometimes conclude that vaccines are too risky (Healthline, n.d.). However, because VAERS is voluntary, there are invalid causal claims. For example, when a girl died after receiving the

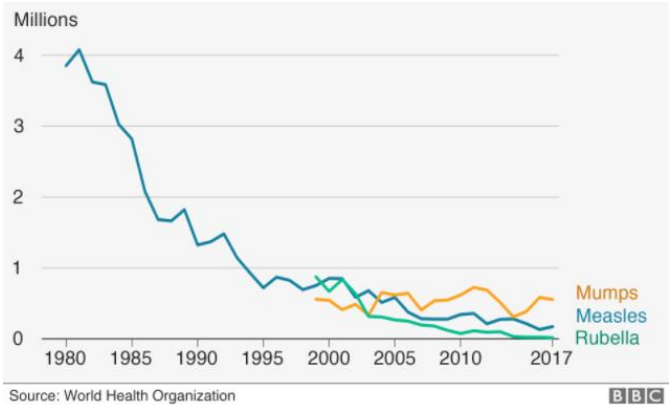

Figure 1: Vaccination reduced global Cases of measles, mumps, and rubella: Illustrates the decrease in cases every year since the MMR vaccination came out. ("What Are Vaccines, How Do They Work and Why Are People Sceptical?," 2019)

human papillomavirus vaccine, the case was recorded in VAERS (Healthline, n.d.). However, the girl was actually killed by a car crash (Healthline, n.d.). Some distrust of vaccinations is not ideological. Parents may simply be confused by the quantity and variety of information. According to Dr. Peter Hotez, "Most parents" are "just scared and inundated with misinformation" ("In the Age of Vaccine Skepticism, Doctors Are Developing a New Skill," 2019). Through negativity bias, undesirable but extremely rare events, including adverse vaccination reactions, may draw undue attention (Müller-Pinzler et al., 2019). This bias could intensify the effects of misinformation. Housset (2019) Montella found that a lot of anti-vaccination publicity invokes fear which, due to negativity bias, can cause that fact to have more weight.

Anti-vaccination groups also use some scientific information for their beliefs. As previously suggested by Geoghegan et al. (2020) some advocacies oppose vaccination on grounds of safety. The Informed Consent Action Network (ICAN) alleges that "fewer than one percent of vaccine adverse events are reported" to VAERS and that the measles vaccine can

cause cancer (ICAN, n.d.). ICAN also alleges that people who contract measles are less susceptible to lymphoma (Montella et al., 2006, n.p). Age of Autism, another advocacy, claims that in the rush to develop a Covid-19 vaccination, medical professionals are willing to "take more risks," and that the U.S. Food and Drug Administration (FDA) evaluates only short-term risks (Age of Autism, n.d.). Age of Autism has also alleged an association between vaccination and ADHD (Age of Autism, n.d.). Physicians for Informed Consent (PIC) claims that though 22 aluminum-containing vaccines are recommended for children, FDA and the Agency for Toxic Substances and Disease Registry have found evidence that aluminum exposure can cause nerve damage that impairs motor skills and damage the nervous system (*Education: Aluminum Vaccine Risk Statement*, n.d.). So, antivaccination groups use both logic, such as scientific research, and psychology, like negativity bias, to further their arguments.

Social media is a platform that they can use to reach people across the world. For example, a study done on antivaccination on Facebook that focused on a local pediatrician clinic in the USA had commentators from 36 states and eight nations (Hoffman et al., 2019). Also, these people can comment from anywhere in the world and they do not have to be legitimate people. During the Ebola outbreaks of 2014 and 2019 in the Democratic Republic of the Congo there were Russian bot network spreading disinformation campaigns that foreign medical workers were spreading the disease. This resulted in dozens of health worker deaths (*Disinformation and Disease*, n.d.). Vaccine misinformation is not only causing harm to the people that refuse to take it but also innocence that are caught in the crossfire. Disinformation campaigns are also taking their toll on some countries. In 2019 the British Prime Minister outlined a plan to meet with social media firms to discuss promoting accurate information about vaccines ("Boris Johnson Orders Action to Stop Measles Spread," 2019). One of the reasons for

this is because WHO no longer recognized the UK to have eliminated measles. This is because the MMR vaccine fell from 95 percent of the population to 87 percent ("Boris Johnson Orders Action to Stop Measles Spread," 2019). Social media has aided the anti-vaccination movement by giving them access to the entire world. It is not bad to have a discussion of the safety of vaccines, however, there may not be much of a discussion happening on some social media sites.

A specific aspect of social media that is affecting public opinion on vaccines is the creation of echo chambers. This is when users only hear or read information that agrees with their view on the world (Cinelli et al., 2021). This reinforces people's opinions because they only hear from other likeminded people that share similar information (Cinelli et al., 2021). In one study they analyzed 298,018 Facebook posts over 7 years and found that the echo chamber that is caused by Facebook's algorithm may be the reason that accurate information about vaccination had a limited reach (Schmidt et al., 2018). A study found that Facebook produces an echo chamber through two methods. The first is through their algorithms which show users what they want to see. Secondly, they rely on user's tendency to interact with people that share their own beliefs (DeLaire, 2020). This illustrates that Facebook implemented their algorithm to maximize profit. It just so happens that it also aids antivaxxers as well. Some social media sites are more prone to echo chambering than other. Cinelli et al. (2020) found that Facebook and Twitter present clear echo chambers whereas Reddit and Gab did not. They suggested that this may be due to the fact that Facebook and Twitter have more news-based content than both Reddit and Gab. Dhaliwal & Mannon (2020) found that some articles on Facebook that were shared by users promoted vaccine hesitancy. In these articles the vaccines were blamed for afflictions such as autism, cancer, and infertility (Dhaliwal & Mannion, 2020). This echo

chamber effect is a problem because it hinders useful discussions and gives users information that they want to hear rather than information that may be useful to them.

When dissenting information is introduced in a subgroup it can cause backfire that reinforces the pre-existing opinions (Schmidt et al., 2018). Alternatively, a higher concentration of the same information can cause someone's opinion to shift to agree with the "consensus". Another study analyzed twitter posts and measured whether these posts were negative, positive or neutral about the human papillomavirus (HPV) vaccine. In their research if a person was exposed to mainly negative opinions of HPV vaccines they were more likely to tweet negatively about HPV compared to users that were exposed to neutral or positive opinions (Dunn et al., 2015). This tendency to agree with a person's group can be explained by Jonathan Haidt's idea of human groupishness.

Part II: Utilizing Haidt's Group Selection Idea to Analyze Social Behavior

In a book called The Righteous Mind the author Jonathan Haidt presents the idea that humans are "groupish". What this means is that people want to belong to a group and, under the right circumstances, will assimilate their beliefs with those of the group. Haidt believes that humans are not wholly selfish. We have evolved to communicate with other humans and find belonging in tribes or groups. Unlike other similar animals, such as apes, we not only form groups but we find identity in them. Adjusting what we believe to better fit in with likeminded people.

Haidt starts his argument by acknowledging that, like all living creatures, humans are selfish. He says that most of moral psychology can be understood by using Darwinian natural selection at the individual level. Evolution is selfish and selfish genes can make us strategically altruistic. However, Haidt believes that while humans a certainly self-serving we can also be

groupish. Meaning that we also contain a variety of mental mechanisms that make us adapt to our group's interests. This could be simply due to a natural selection where groups that worked well together outcompeted groups who were more individualistic. If this is the case though then people should only care about the appearance of loyalty. In this chapter he uses four examples to argue that group selection is an important aspect to understanding human morality.

In Darwin's original natural selection theory, he believed that group selection was a part of human development and could explain why humans are social today. Darwin believed that after a certain point in evolutionary development people began to work together in small groups to gather and hunt more effectively. These "social instincts" then slowly developed into an emotional attachment to groups. This attachment caused people to act in ways that were better for the group as a whole. If people did not conform to the social expectation there where shunned causing them to be less likely to mate.

For many hundreds of years people accepted this evolutionary path for human society. However, in the 1970 this idea of group selection was rejected. Haidt believes that this was a mistake. The reason science rejected the idea of group level adaptation is that most animal behavior can be explained through observing individuals of the species. Haidt thinks that while most animals' behavior can be explained this way certain species, such as bees and humans, have particular traits that could only be developed though group level selection. Bees all share a hive where they function as a unit. They forage and defend their home in unison. Also, they bring the queen bee the food required for her to reproduce. In a hive there is no boss the queen is just the reproductive system. He compares human to bees because they both moved from selfish tendencies to groupish hives that prosper. Many animals are social, but Haidt says that there are very few that are "ultrasocial". This is defined as "[creatures] that live in very large groups

that… reap the benefits of division of labor" (Haidt, 2013, p.159) Biologists Holldobler and Wilson found three factors that make species ultrasocial. Their behavior protects an invaluable resource, like a hive, they need to defend their offspring for an extended period, and intergroup conflict. These three factors apply to humans. Our ancestors were territorial creatures that defended places such as cave, our offspring require enormous amounts of time and energy to care for, and tribes were under threats from other humans. Therefore, our ancestors developed similarly to bees and other ultrasocial creature.

Haidt also uses shared intentionality to illustrate the differences between us and chimps. Shared intentionality is when two humans work together for a common goal. For example, humans work together to build a house to save time and energy. Genetic relatives such as chimps would never do that. An expert in chimpanzee cognition said "It is inconceivable that you would ever see two chimpanzees carrying a log together." Illustrating that chimps do not work together to accomplish a goal. They are also awful at sharing food after a hunt. In many scenarios the chimps must use force to in order to obtain meat from a hunt. Figure 2 illustrates that chimps and man diverged 5 to 7 million years ago. From an evolutionary perspective 5 to 7 million years is nothing. So, it would be expected that we would still be very similar to chimps. However, Haidt believes that due to a combination of ultrasocial behaviors and shared intentionality Haidt argues that humans have surpassed our ape counterparts. To Haidt this also illustrates that, unlike other animals, humans have been influenced by group selection, and it explains why we a groupish. We have evolved to be highly social creatures and to be a part of something larger than ourselves (Haidt, 2013).

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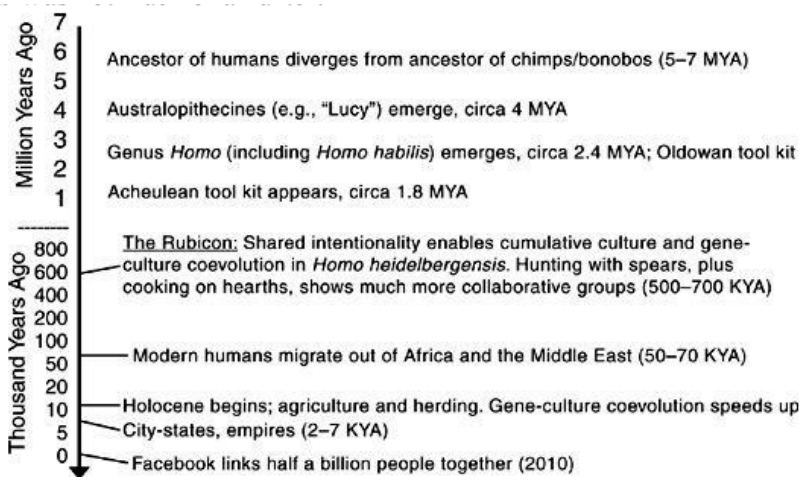

Figure 2: Time Line of Major Events in Human Evolution MYA = million years ago; KYA = thousand years ago. (Haidt, 2013, p.164)

Haidt's assertion that we are social creatures that seek belonging in groups can be applied to anti vaccination groups. Specifically, social media helps anti-vaccination groups put out information that misleads others in the group. Looking at it through Haidt's lens the antivaccination groups are partially successful on social media because they give people a sense of belonging and a place where they feel heard.

Part III: Analyzing social media's effect on anti-vaccination groups though using Haidt's Ideas

Social media has caused an increased spread in the misinformation campaigns. The extent to which it effects vaccination is still being studied. However, it is clear that it is affecting people's opinions on immunization. This section illustrates the different ways that social media has contributed to an increase in the spread of misinformation though the lens of Haidt's idea of groupishness.

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Social medias' influence through the echo chamber

As previously discussed, these social media algorithms feed people other likeminded posts and new articles. Therefore, a person's news feed will contain mostly similar viewpoints to their own. Dunn et al. (2015) found that a person's posts are more likely to align with the views that they commonly see in their feed. This positive feedback loop will lower a person's likelihood to see a differing view that may challenge their own. In the case of anti-vaccination this is a problem because any counter points made by pro-vaccination groups will have a low likelihood to reach the antivaxxers. This vacuum of outside evidence causes people to be ignorant to the full story. A psychological effect known a group think can also encourage people not question the information provided by the group. This psychological effect is due to a desire to be like the group, which is exactly Haidt's argument (*Groupthink | Psychology Today*, n.d.). Groupthink more commonly appears when there are mental or physical threats to the person's identity and it can form a strong "us vs. them" mentality. A common method for breaking group think is by simply providing opposing information (*Groupthink | Psychology Today*, n.d.). The idea of groupthink links heavily with Haidt's argument that humans have evolved to be social creature that have a strong affinity to join groups that share their thought and feeling.

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Confirmation bias in social media

Schmidt et al. (2018), as previously discussed, found that anti-vaccine groups become more defensive when information supporting vaccines was shown to them. This is peculiar because they are clearly interested in vaccines, so new information should stimulate them to research the claim. However, in some circumstances people will experience a psychological effect know as confirmation bias (Meppelink et al., 2019). Confirmation bias shows that people listen more to evidence that supports their view compared to when the evidence does not. In anti-

vaccination groups it is common place for them to find only articles that agree with their perspective. More specifically, antivaxxer groups rely on weak or fraudulent scientific data to advance their agenda. Social media can enhance the effect of conformation bias because anti-vaxxers would only see like-minded posts so their belief in their group strengthens.

Conclusion

Antivaccination is affected by social media's algorithms and social biases. When analyzing social media's affect through Haidt model of social evolution, it was found that some methods used by social media cultivate anti vaccination misinformation. The algorithms used by some sites create an echo chamber that concentrates the information that people see. This concentration of homogenous information gives validity to anti vaccination claims. This research can help social media sites to regulate the echo chamber created through their algorithms and aid in better distribution of current vaccination information.

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