



Some Underlying Psychological Mechanisms of the Anti Vaccination Movement

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Abstract

The Anti Vaccination Movement grew out as a result of Andrew Wakefield's claims regarding the link between autism and vaccines. Although his claims have been massively refuted, and it was later evident that he engaged in gross ethical misconduct, adherents to the Anti Vaccination Movement persist in their belief that vaccines cause autism. In this article, I explore three psychological mechanisms that partly explain why the Anti Vaccination Movement keeps its strength. First, conditioning: most parents of autistic children discover their child's condition at around the same time they receive vaccines shots, and this facilitates the association of those two events in their minds. Second, modeling: the endorsement of the Anti Vaccination Movement by celebrities encourages people to believe in their mistaken theories. Third, agency detection: the Anti Vaccination Movement relies on conspiratorial thinking, and this way of thinking is based on the natural tendency of all humans to attribute agency to purposeless events.

KeyWords: Autism; Vaccines; Anti Vaccination Movement; Psychological Mechanisms; Behavior.

Introduction

Vaccines have never been free of controversies. But, in the last couple of decades, the controversy has been especially acute, given Andrew Wakefield's claims regarding vaccines and their alleged link to autism. Although it was eventually discovered that Wakefield's research was fraudulent, and medical associations have invariably denied any association between autism and vaccines, the Anti Vaccination Movement keeps its strength.

This is quite worrying, as the risks of not vaccinating children are high, and by any rational standard, the benefits of vaccination far outweigh its alleged risks, especially taking into account that these alleged risks have never been documented.

Physicians and activists from the autism community do well to counter the misinformation provided by the Anti Vaccination Movement. But, they should not be overly judgmental. For, the Anti Vaccination Movement is not entirely capricious. There are some important underlying psychological mechanisms that account for the origin of their beliefs. In this article, I will explore three of those mechanisms, widely studied and researched in the history of Psychology: conditioning, modeling, and agency detection.

By highlighting the underlying psychological mechanisms of the Anti Vaccination Movement, I believe, we will be in a better position to persuade them to abandon their mistaken views.

1. Do vaccines cause autism?

For the past two decades, there has been concern about an apparent increase in the epidemiology of autism. Researchers are not absolutely sure whether this is a real phenomenon. It actually appears to be that, as the public is becoming increasingly educated, and there is higher awareness (in large measure due to more media exposure) of Autism Spectrum Disorder, it is more frequently diagnosed now (Wright, 2017). In the past, it may have been present, but parents were not aware that this in fact a neurodevelopmental disorder, and it may have been significantly underdiagnosed.

However, this is only a working hypothesis, and there have been other attempts to explain the rise of autism cases over the last 20 years. In 1998, a well-publicized study ventured to explore some causal factors that turned out to be very controversial.

Dr. Andrew Wakefield (1998), along with 12 other authors, published an article reporting the case studies of 12 children in the United Kingdom. These children were diagnosed with some developmental disorders, autism being the most common. The children's parents reported that they began to notice the symptoms of developmental disorders in children soon after receiving administration of the Measles, Mumps and Rubella (MMR) vaccine.

Wakefield then proceeded to perform intestinal biopsies on the subjects, and the results came out positive for inflammation. According to Wakefield et al, vaccines were causing this intestinal inflammation. The proposed mechanism was as follows: due to intestinal inflammation, proteins from nutritional intake can make their way to the brain, thus causing autism.

The study had some considerable methodological flaws. Some of the patients' parents reported that their children had symptoms of autism before symptoms of bowel disease. This fact does not cohere well with Wakefield's theory. If autism is a result of intestinal inflammation, then it would be normal to expect that symptoms of the latter would actually appear first; yet, that was not the case.

Wakefield never specified what specific protein is the cause of autism. He ventured to claim that a, due to intestinal inflammation, the protein would make its way to the brain, but he was never precise as to what the particular protein may be. No researcher has been able to identify that hypothetical protein.

Some other studies have found evidence that, yet again, does not cohere well with Wakefield's original hypothesis. Vaccination rates have been steady (Kaye et al, 2001), yet the incidence of autism had increased. If vaccines were truly the cause of autism, we should expect that, along with the rise of autism rate, there should have been a rise of vaccination rates. Yet, that is not the case.

Further studies have failed to find evidence in support of Wakefield's original hypothesis. A study of 473 children in London comparing vaccinated and unvaccinated cohorts, did not find an association between developmental disorders and gastrointestinal symptoms (Taylor et al, 2002). A cross sectional study of 262 children diagnosed with autism found no relationship between the diagnosis and appearance of symptoms after the administration of the MMR vaccine (Fombonne and Chakrabarti, 2001). In yet another study done in the United Kingdom, 71 children were subject to study, and no link with vaccination was found (DeWilde et al, 2001).

Perhaps the most complete study on the relationship between autism and vaccines was a Finnish study of 1.8 million children who received the MMR vaccine (Wise, 2001). The study did not find a single case of autism related to vaccines. These studies provide massive data that vaccines do not cause autism, especially when compared to the 12 cases on which Wakefield's study relied.

Furthermore, it later became public that there were very serious ethical issues with Wakefield's original study. In 2004, 10 of the authors of Wakefield's original article retracted. According to some journalistic investigations by Brian Deer (2011), Wakefield received financial incentives from lawyers of parents of autistic children, who had the intention of taking legal action against the companies that manufactured the MMR vaccine. Wakefield never disclosed this conflict of interest. Furthermore, Wakefield had the intention of registering a patent for a vaccine that, if launched in the market, would have competed with the conventional MMR vaccine. Wakefield was also accused of needlessly performing lumbar punctures on three of the children he studied, and of selectively choosing subjects for his study, in order to make sure that he would get the results he anticipated.

In light of these ethical misconducts, Wakefield was ultimately removed from the Medical Registry in the United Kingdom. The Lancet (the journal in which Wakefield's article was originally published) then retracted the original article (Eggerston, 2010).

It can be safely said, then, that the alleged link between vaccines and autism, has been totally debunked. Despite the fact that, in countries such as the US, public opinion supports vaccination programs, the Anti Vaccination Movement still keeps its strength. Its major argument against vaccines is the alleged relation between vaccines and autism.

This presents an interesting psychological question: why does the Anti Vaccination Movement keep its strength, if the evidence supporting its claims is so fragile, and the evidence opposing them is overwhelming? We may explore a threefold answer to this question, exploring three possible psychological mechanisms (widely studied and theorized in the history of Psychology) that underlie the Anti Vaccination Movement: Conditioning, Modeling, and Agency Detection.

2. Conditioning

Any introductory course on Psychology will present Ivan Pavlov's famous experiments at the turn of the 20th Century, to the point that the phrase "Pavlovian dog" has become somewhat of a cliché, far beyond the limits of academia. But, if such experiments have become clichés, it is because of their tremendous importance in studying behavior, eventually giving rise to the behaviorist school of thought in Psychology. And, for the purposes of understanding the psychological mechanisms underlying the Anti Vaccination Movement, these experiments, along with the conceptual framework that they built (i.e., conditioning), are very useful.

Pavlov was interested in studying the digestive system of dogs, and salivation. He realized that dogs began to salivate at the mere sight of food. Some of the dogs even began to salivate as the experimenter approached them. Pavlov then sought to further investigate this phenomenon, by ringing a bell every time the experimenters provided the dogs food. After several trials, the dogs began to salivate at the mere sound of the bell (Britt, 2016: 20).

These experiments proved what eventually came to be known as "classical conditioning". The dogs were conditioned to respond to a particular stimulus that, in normal circumstances, would have never elicited such responses. The anticipation of food was associated with the bell, due to previous experiences pairing both stimuli. Pavlov only experimentally confirmed a philosophical insight that had been reflected upon two centuries early, by the Empiricist school in philosophy (Locke, Hume, and Berkeley): knowledge comes from experience, and it operates on the basis of association of sensory stimuli and ideas.

Inspired by this philosophical tradition, anthropologist J.G. Frazer (1998) formulated an influential theory on the psychology of magical thinking: most magical procedures can be reduced to laws of sympathy. Practitioners of magic come to believe that, things that have some resemblance are actually the same (the law of similarity; e.g., putting needles on a doll that resembles the intended victim of the curse), or things that were once in contact are actually the same (the law of contagion; e.g., burning the belongings of a particular person, with the underlying assumption that, inasmuch as the person was in contact with those belongings, she will also be burned). According to Frazer's theory, then, magical thinking ultimately relies on past experiences that are mistakenly associated. This association will likely arise from the conditioning process that Pavlov demonstrated in his experiments.

The Anti Vaccination Movement relies on magical thinking. Let us recall that, according to Frazer, magical thinking is essentially a mistaken association of ideas and past experiences. There is no causal relation between vaccines and autism, and yet, anti-vaccination activists insist that there is. How does this idea come up in their minds? Basically, via the same mechanism that made Pavlov's dogs salivate upon hearing the bell; i.e., conditioning. Vaccines and autism become associated in their minds, due to fortuitous coincidences in past experiences.

In Wakefield's original study, parents reported the first symptoms of autism when their children were between two and three years old. This is the same age when, under medical protocols, most children receive the MMR vaccine. In the same manner the Pavlovian dog associates the bell and food because they seem to come together, these parents came to associate the MMR vaccine and autism because they seem to come together.

In fact, symptoms of autism appear much earlier, but untrained parents may not be able to recognize them. In some studies on homemade video recordings of parties celebrating many children's first birthday, some very accurate predictions about future diagnoses of autism have been made. These studies have demonstrated that by the time autistic children turn one year old, they already have abnormal behavior when it comes to eye contact, showing objects, pointing, and orienting to name (Osterling and Dawson, 1994). The symptoms thus appear much earlier than the period when the vaccines are administered. Hence, the link between autism and vaccines is, yet again, proven to be nonexistent.

Yet, the symptoms of autism become much more evident when children reach an age, during which parents expect them to interact more. Prior to this, it has not occurred to untrained parents that their children may be autistic. And thus, when the diagnosis is made, the emotional impact of this experience makes them vulnerable to make an association between this unfortunate moment, and some event that recently took place, i.e., MMR vaccination.

Phobias largely come up as a result of classical conditioning. In another very famous experiment in the history of Psychology, John B. Watson (2013) successfully instilled a fear of white objects in a nine month old boy, Little Albert. At first, Watson provided Albert with a white rat, and the boy did not seem to fear the rat. But, subsequently, Watson paired the giving of the rat with a very frightening sound. After several trials pairing the nasty sound and the rat, Albert became terrified, not only of the rat, but of many other white objects as well.

The ethics of this experiment has been called into question. But, leaving this important issue aside, it must be acknowledged that the experiment is a major milestone in the history of psychology, for it proved that classical conditioning also occurs in human beings, and that it accounts for many phobias in human behavior. A person may experience a traumatic experience, and due to classical conditioning, may ultimately come to fear objects, situations or concepts that, fortuitously, were associated with that particular experience.

The fifth edition of the Diagnostic and Statistical Manual of Mental Disorders (2013:197) defines a phobia as a “marked and persistent fear that is excessive or unreasonable”. In many patients, phobias can be rationalized, in large measure as a defense mechanism, and patients may become to believe that it is quite reasonable to fear a particular object or situation (Nazir, 2008: 30). In a sense, believing that vaccines cause autism is a phobia. Vaccines are unreasonably feared, as they are attributed with harmful effects, despite evidence to the contrary. Very much as in other phobias, the fear of vaccines can be rationalized.

This is not to say that people who have this belief should be pathologized. The Diagnostic and Statistical Manual of Mental Disorders (2013: 197) clearly states that one diagnostic criterion for Specific Phobia is that the fear “causes clinically significant distress or impairment in social, occupational, or other important areas of functioning”. This is clearly not the case in adherents to the Anti Vaccination Movement. But, the point is that, the same psychological mechanism that ultimately produces phobias in many patients also produces the belief that vaccines cause autism. Little Albert came to fear the rat because in his experience, it was fortuitously associated with the nasty sound; parents of some autistic children come to fear vaccines because in their experience, vaccines were fortuitously associated with the occasion when the first symptoms of autism became evident.

We should not rush to be judgmental of these parents. If anything, we should have great sympathies for them, as they engage in a cognitive bias that, ultimately, most people at some point in their life fall prey to. It has been present throughout much of human history, and even the Romans had a name for it: Post hoc ergo propter hoc, (after this, therefore because of this). A raw example illustrates this bias: one may think that, because sunrise follows the rooster crowing, then the rooster causes sunrise. Because the signs of autism followed the application of the MMR vaccine, then the parent may think that the vaccines cause autism.

In our everyday thinking, we are all susceptible to committing this fallacy at some point. The scientific method goes to great lengths to try to avoid this, by controlling variables that may not be visible at first, in order to make sure that the causal relations are properly studied. Philosophically speaking, David Hume famously argued that not even with the scientific method can we be sure that one thing causes another (Wright, 1983). Be that as it may, enough studies have been done, and by properly controlling variables, the evidence is quite strong in favor of the idea that, indeed, vaccines do not cause autism.

Classical conditioning is about the pairing of events that ultimately condition some behaviors (dogs salivating, children fearing white rats, etc.). In yet another milestone in the history of Psychology, B.F. Skinner designed an experiment to explore a new type of conditioning, “operant conditioning” (Kalat, 2010:216). In this experiment, a rat was placed in a box. If a rat pulled a lever, it would receive food; if it pressed a button, it would receive electric shocks. After a few trials, the rat invariably pulled the lever and avoided pressing the button. With this experiment, Skinner proved that through a program of reinforcements, behaviors can be modified.

Operant conditioning is also at work in the reinforcement of many of the beliefs of the Anti Vaccination Movement. Despite the fact that their claims have been debunked by evidence coming from massive studies, the movement’s leaders do not give up. What keeps them motivated? To some extent, they have been positively reinforced in their behavior. Although things have changed since Wakefield’s gross ethical misconduct became clear, during the first years after his infamous study came out, the media gave sensationalist credence to his claims. In our digital world, the so-called 15 minutes of fame are a strong reinforcement of behavior. And thus, even if the Anti Vaccination Movement’s allegations were ridiculous in the face of overwhelming evidence to the contrary, they were rewarded by the media, thus increasing the likelihood that the voicing of these beliefs would continue.

Skinner believed that operant conditioning is the main psychological mechanism underlying superstitious behavior, a corollary of magical thinking. To prove it, he designed an experiment that, yet again, became immensely famous in the history of Psychology (Skinner, 2013). Skinner placed a hungry pigeon in a box where a feeder automatically provided food every fifteen seconds. Inasmuch as they did not control the feeder, the pigeon’s best strategy to receive food would have been to just wait for it to come every fifteen seconds. However, the pigeons became very active, developing distinctive rituals. One walked around in circles, another bobbed its head up and down. In Skinner’s interpretation, the accidental pairing of some random act by the pigeon, with the presentation of the food, was enough to reinforce these behaviors.

According to Skinner, the pigeons’ behavior can be described as “superstitious”, and it is basically the same psychological mechanism that explains superstitious behavior in human beings. Randomly, a baseball player will wear a particular pair of socks. If at the time he wears those socks, he hits a homerun, then he will likely come to believe that the socks are related to the homerun, and he will wear those socks over and over again. Somehow, the socks cause the homerun; post hoc ergo propter hoc. In fact, George Gmelch (1992) wrote a notorious article explaining superstitions in baseball, using Skinner’s theoretical approach.

Skinner received criticisms from ethologists who believed that the pigeons’ behavior did not appear as a result of operant conditioning, but rather, they were normal evolutionary behaviors in bird species. However, Skinner’s experiment has

been tried on human beings, and they come out with the same result; i.e., superstitious behavior. A study by Koichi Ono (1987) presented subjects with three levers and a signal light. They were told they were not required to do anything, but they could get points. The light would be turned on at various rates, but independently of the subjects' behaviors. Nevertheless, very much as Skinner's pigeons, the subjects began to develop particular routines.

The idea that vaccines cause autism is not a superstition per se. No active behavior is encouraged. It is more a belief that two independent events that come together somehow have a causal relationship. However, regarding the treatment of autism, there have been some behaviors that ultimately rely on the same psychological mechanisms that underlie superstitions.

Consider, for example, secretin. In 1996, Parker Beck, an autistic child, was taken by his mother, Victoria, to a gastroenterologist to treat intestinal problems. In order to perform some tests, the physician administered secretin (a hormone derived from pigs). Ten days after the procedure, Victoria Beck began to notice some improvements in her child's behaviors, especially in the development of language. She actively campaigned for the promotion of secretin as a treatment for autism (Offit, 2010:14).

After many trials, results prove that secretin is not efficient beyond the placebo effect. Yet, Beck and many other parents of autistic children continue to believe that, indeed, secretin is a significant treatment for autism. The administration of secretin to autistic children is a behavior that is superstitious in the same sense as the experiments that I referenced previously: some behavior is performed, and something good follows; i.e., it is reinforced. We come to believe that the fortunate occurrence is somehow causally related to the original behavior, and thus, the probability that we will repeat that behavior is increased.

Again, we should not be judgmental of parents who engage in this type of behavior. By considering these psychological mechanisms, we understand much better the parents' reactions, and the motivations of the Anti Vaccine Movement. In fact, Bronislaw Malinowski (another famous anthropologist of magic) notoriously claimed that magical thinking increases in the face of stress. During his fieldwork with Trobriand Islanders, Malinowski (2015) observed that the islanders would perform magic rituals when preparing to fish in the ferocious open ocean, but would not do so when preparing to fish in the lagoon's calmed waters. Being the parent of an autistic child is significantly stressful; it is thus perfectly understandable that they may resort to erroneous beliefs and superstitious practices. Science is out there to correct the biases that we all fall into, due to different stressful circumstances.

3. Modeling

Within the behaviorist movement in Psychology, some scholars sought to find additional processes in which behavior can be learned. In both classical and operant conditioning, it is assumed that the subject's own experience is crucial in shaping behavior. But, Albert Bandura (2013) sought to prove that behaviors can be learned indirectly, i.e. by observing other people behave in a specific pattern, and observing the way that behavior is reinforced in others. His approach came to be called "Social Learning Theory".

In a series of well-known experiments, Bandura placed children in a room. A group of children would watch through a window how, in another room, an adult struck and shouted at a Bobo doll (a doll that, upon being hit, is knocked down, but then makes its way back). When these children then went to play with the Bobo doll, they would imitate the aggressive behavior they had previously watched. In contrast, another group of children watched adults behave gently with the doll, and when it was their turn to play with the doll, they did not display aggression towards it.

Bandura introduced an important new cognitive aspect in the study of how human beings learn new behaviors. As opposed to other animals, humans have the sufficient cognitive capacity to observe and process information of events that are happening to others, and with that information, respond with a particular behavior.

In his time, Bandura's experiments caused some controversy, because his studies were used by crusaders who wanted tougher censorship on media violence. According to their argument, if upon watching an adult hitting a Bobo doll, children become more aggressive, then we may expect that violence in television will have significant effects on children's behavior. As a result of the dramatic rise of shooting incidents in schools in the US, some of which seem to be related to media violence, this debate has only increased.

The jury is still out on the question of whether or not violent videogames and television programs actually result in real violence. Those who believe that media violence is not an important factor in real aggression have criticized Bandura's experiments and theories on various grounds. The children could have been motivated to please the adults' previous expectation that they would hit the Bobo doll. The children could have also understood that hitting a Bobo doll is not the same as hitting an actual human being.

But, even if Bandura's experiments and theories may be partly flawed, it is pretty much out of question that people do learn by modeling, and that media does influence behavior to some extent. Psychologists have long studied the phenomenon of "parasocial interaction", i.e., the way audience members develop one-sided relationships with the media

being consumed. Survey research has found that fans come to feel that celebrities and fictional characters are perceived as personal close friends, by people who consume media products (Frederick et al, 2013).

In parasocial relations, subjects not only believe that celebrities are their close friends, but are also vulnerable to imitate their behaviors and follow their opinions. The Anti Vaccination Movement has gained strength, in part due to this psychological mechanism. The list of celebrities who believe that vaccines cause autism seems to be growing. The foremost celebrity in this regard is Jennifer McCarthy, whose son is autistic. She has actively campaigned in favor of the idea that the MMR vaccine is the cause of the rise of autism rates.

McCarthy is a very attractive woman. Research has shown that beauty is an important aspect in parasocial relation, especially when the celebrity is a woman (Tal-Or, 2017: 1450). Her looks have added credence to the idea that there is a causal link between vaccines and autism. Social critics, such as Neil Postman (2005), have long argued that the entertainment industry has had some serious effects on the dis-intellectualization of society. Due to media effects, the wider public is increasingly persuaded by charm, physical beauty and catchy sound bites, than by thoughtful argument and detailed data.

Unfortunately, McCarthy is not the only celebrity to endorse Wakefield's original claims. Jim Carrey, Bill Maher, Robert De Niro, Alicia Silverstone, and Charlie Sheen, among others, have also expressed the idea that vaccines may cause autism (Merlan, 2015). If, as Bandura claimed, learning has a socially cognitive aspect, then the fact that many celebrities seem to support the Anti Vaccination Movement is another important underlying psychological mechanism.

4. Agency detection

During its heyday, most behaviorist theoreticians operated under the assumption of *tabula rasa* i.e. the idea that, fundamentally, there is no human nature, and most (if not all) of human behavior can be shaped through conditioning. Very much as the empiricist philosophers of the 18th Century claimed, behaviorists now claimed that the mind is a blank slate at birth, and experiences leave their marks on it. Watson (1958: 82) famously (or, infamously, as some would have it) stated: "Give me a dozen healthy infants, well-formed, and my own specified world to bring them up and I'll guarantee to take any one at random and train him to become any type of specialist I might select—doctor, lawyer, artist, merchant, chief, and yes, even beggar-man and thief".

Most psychologists today find this to be an outrageous statement. Behavioral genetics has come a long way, and there is now sufficient evidence to support the hypothesis that many behaviors have varying genetic bases. Twin studies are particularly relevant in this regard, and we know now that autism does indeed have a genetic base (in most studies, it is calculated to have a heritability between 56% and 95%) (Colvert, 2015).

There are good reasons to believe that human beings have genes for behaviors and cognitive tendencies that, ultimately, serve as underlying psychological mechanisms for the growth of the Anti Vaccination Movement. A particularly important genetically based behavior in this regard is agency detection.

In a much celebrated experiment, Fritz Heider and Mary-Ann Simmel presented subjects with an animation of simple geometrical figures roaming around the screen (Van Slyke, 2016). When asked what they observed, the subjects used language that expressed the idea that the figures were purposely moving in pursuit, planning and escape, as if they were characters. This experiment seemed to prove that human beings have an inherent tendency to attribute agency to purposeless phenomena.

Evolutionary psychologists have relied on these experiments to hypothesize that this tendency must have been evolutionarily advantageous (Barrett, 2012). In the African savannah, it paid off to be hyperalert in the wild. A movement of grass leaves could be caused by the wind, but it may also be caused by a leopard. To be on the watch was advantageous, because it protected against predators, even if, occasionally, there would be false alarms.

However, this advantage also comes with a side effect: our natural tendency for agency detection inclines us towards paranoia. And hence, we may frequently attribute agency to phenomena that is purposeless. This psychological mechanism is at work in conspiracy theories. Various studies have provided evidence that individuals with more inclination to detect agency, also have a higher tendency to believe in conspiracy theories.

Analysts have long observed that American politics is dominated by the "paranoid style" (Hofstadter, 2012). Whether it's the assassination of John F. Kennedy, or the Roswell incident, plenty of politicians, with the support of media and public opinion, voice their concern that someone with great power is pulling the strings, and that things are not as they seem. Conspiracy thinking is rampant in American political life.

The Anti Vaccination Movement is part of this conspiratorial mindset. In their narrative, the American people are being lied to, and most likely, the interests of the big pharmaceutical industry are at stake. They are the ones truly pulling the strings behind politicians who seem to go soft on the MMR vaccines. It is all part of a big lie in which the highest spheres of power are involved.

Although the “paranoid style” has been present in American politics for most of the 20th Century, many analysts and commentators (Cilliza, 2017) coincide in their belief that President Donald Trump has taken it to a new level: at some point, he believed Barack Obama’s birth certificate was fake, and that the concern over global warming is a hoax invented by the Chinese. Similarly, prior to the start of his political career, President Trump also believed that vaccines caused autism.

It is no coincidence that Wakefield has gained the support of conspiracy theorists that for years have been on the fringes, due to the extremity of their views. For example, Wakefield has made appearances on Alex Jones’ radio program, in which wild conspiracy theories are routinely supported.

Some conspiracy theorists may actually not believe what they claim, and they may just voice their wild allegations, to cynically exploit political advantages and gain media attention. But, given our natural tendencies for agency detection, it is quite reasonable to affirm that, in fact, most conspiracy theorists do believe in their own claims. Agency detection is yet another psychological mechanism underlying the Anti Vaccination Movement.

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