### 1AC Core

#### Plan: In a democracy, a free press ought to prioritize objectivity over advocacy when reporting on vaccines.

#### Objective journalism is not blind transcription but rather necessitates a commitment to the facts that solves misinformation.

Alan Sunderland, 9-9-2015, [Alan Sunderland is the ABC's head of editorial policy, having previously worked as the head of policy and staff development with ABC News. A journalist for 32 years, he began as an ABC cadet in 1979 before spending more than 20 years as an on-the-road reporter with the ABC and SBS. His experience includes five years as political editor with SBS in Canberra, and two Walkley Awards for news reporting. He returned to the ABC, and to news management, in 2005.], "Objective reporting: It has never been more necessary," ABC News, <https://www.abc.net.au/news/2015-09-10/sunderland-objective-reporting-has-never-been-more-necessary/6764320> //SLC PK

I very rarely disagree with my esteemed former colleague Jonathan Holmes ([Objective reporting: It's a thing of the past](http://www.theage.com.au/comment/the-objective-middle-ground-is-death-for-modern-media-20150907-gjhamh.html)) on matters of journalism, but it's time to speak up for the endangered and misunderstood discipline of objective reporting.

On one matter, Jonathan is absolutely right. The notion of objective reporting is seen by many as out of fashion and out of date. Fine in theory, but in the real world it is either impossible to achieve or 'too bloody dull'.

It is often parodied as a recitation of facts devoid of context or colour, leading to 'he said/she said' stories that list the views of the usual suspects on a topic but leave the reader, listener or viewer none the wiser about who's right and who's wrong. The reporter responsible for such stories is employing the 'view from nowhere', pretending they neither know nor care about the matters they are reciting.

That is certainly a problem, and we see plenty of examples of it. But that's not objective journalism, that's just bad journalism. Anyone who simply collects facts and sets them down is not a reporter. That's not journalism, it's stenography.

It has always been the case that reporters need to sift through facts, weigh them up, make editorial judgements about their relative strength and importance, and then present them in a way that illuminates the truth of a matter. It's not called 'editorial' content for nothing.

This process of making editorial judgements about facts is fundamental to great journalism. It explains why a program like Four Corners can expose what is going on inside the greyhound racing industry or 7-11 stores without in any way compromising its commitment to objective journalism. Or why 7.30 can deliver a series of stories exposing underpayment and exploitation of postal workers. The journalism is passionate, compelling and influential. It also happens to be in the best tradition of objective journalism.

It doesn't involve abandoning a commitment to impartiality and following your own whims and preoccupations. Nor does it involve handing out undigested facts by the truckload and leaving a bewildered audience to try and make sense of it.

What it does involve is gathering information without fear or favour, weighing and assessing that information and then reaching a conclusion based on the evidence. It involves a conscious and disciplined process where the evidence is not misrepresented or suppressed if it doesn't suit a preconceived opinion. A process where the reporter examines and challenges his or her own assumptions and blind spots as well as everyone else's.

Conclusions arrived at using this process are all the stronger for it. The passion and purpose that drives good journalism comes from the facts and not from rhetoric, spin or sophistry.

The key here is what tools a reporter uses in this process of weighing the evidence. You can rely on your own prejudices and preconceptions, picking the facts that support your opinion and ignoring the ones that don't. Or you can try to set aside your own views and instead be led by the facts, by what you uncover as you turn over an issue and examine all sides.

I say 'try' deliberately, as this kind of work is hard. Being objective as a reporter is not a state of perfection like sainthood or barracking for Richmond. It is a discipline. Like so many important skills, it takes constant practice and can always be improved. At the ABC we are committed to this discipline, and we are always looking for ways to reflect on it and improve it. But at its best it means that the passion and power of what we produce is driven by the facts we uncover, not by the personal views we hold.

After all, we expect scientists to examine the evidence on issues like climate change or cancer research, and reach conclusions based on rigorous and professional judgements rather than their opinions or their hunches. We expect a similar objectivity from our judicial system, from our police and from many other professionals who serve the public. I haven't heard too many calls for us to accept, for example, that judges will always have their own views on matters and so they might as well just decide cases based on their own opinions rather than the evidence. We know they are fallible human beings like the rest of us, but we ask them to do their best to set their views aside and do their job.

We should ask no less of reporters. It is difficult and we should continue to expect failures along the way. But in this information rich, connected world, it has never been more important. We are assailed on all sides by information presented to us by those with hidden agendas, causes to push and products to sell. To wade into the ocean of digital information these days is to feel manipulated, pressured and overwhelmed by 'facts' that have been twisted and misrepresented to suit someone else's opinion. What we need are at least some people who are trying to cut through the manipulation and the spin and let the facts do the talking.

If media organisations need to stand for something, that'll do for me.

#### Specifically in the context of COVID—debunking alternative facts and providing balanced preemptive and reactive analysis solves.

Stephan Lewandowsky and Philipp Schmid, 10-22-2021, [Stephan Lewandowsky is the Chair in Cognitive Science at the University of Bristol. Philipp Schmid is a psychologist and postdoctoral researcher at the University of Erfurt, Germany], “How to fight COVID vaccine misinformation?, ”How to fight COVID vaccine misinformation?”, Al Jazeera, <https://www.aljazeera.com/opinions/2021/10/22/fighting-vaccine-misinformation> //SLC PK

Opposition to vaccination is as old as vaccination itself. Although vaccines save five lives every minute, and even though 85 percent of children worldwide are vaccinated against diphtheria, tetanus, and whooping cough, some people are resisting the life-saving shots. A range of factors contribute to vaccine opposition – from fear of needles or side effects to conspiracy theories involving governments or the pharmaceutical industry.

Although anti-vaccination activists ultimately have never prevailed, when they find a temporary foothold in a society, vaccination rates can decline, and preventable illnesses increase.

The COVID-19 pandemic illustrates everything we know about vaccines and opposition to vaccines. The development of safe COVID-19 vaccines has provided us with the tools to combat the pandemic, and with 6.5 billion doses already administered, and more being administered at the rate of 22 million per day, there is light at the end of a dark tunnel.

On the other side of the ledger, the pandemic not only caused the death of millions, but it also created a toxic legacy of misinformation and conspiracy theories that has mobilised opposition to vaccinations. This is unsurprising based on what we know about human behaviour. When people suffer a loss of control over their lives or feel threatened, they invariably become more vulnerable to believing conspiracies. And if there is one thing a pandemic is good at, it is to create fear and loss of control.

Although this opposition has not prevented many countries from reaching very high vaccine uptake – for example in Spain, nearly 80 percent of the population has been fully vaccinated, with Italy and France not far behind – it cannot be ignored because anti-vaccination activists are increasingly resorting to intimidation and threats of violence against healthcare personnel. In the United Kingdom, police are now protecting some mobile vaccination stations, and in Germany, a man attacked healthcare workers because they refused to issue him a vaccination certificate without giving him the shot.

In the United States, attitudes towards vaccinations have become so politicised, with several Republican leaders voicing opposition to vaccines, that there is now a striking gap in uptake between states depending on which way they vote. States that lean towards the Democrats have high uptake, with Massachusetts and Vermont topping at 78 percent, whereas those that lean Republican lag behind, with West Virginia bringing up the rear at 48 percent. Perhaps most concerning, there are growing signs that American anti-vaccination campaigners have joined forces with the extreme right and other conspiracy theorists.

Given the obvious risk to public health posed by anti-vaccination movements, what can communicators and politicians do to respond?

First, leadership matters. When deciding about a complex issue like vaccination, laypeople generally rely on advice from trusted opinion leaders, which may be experts, media personalities or politicians. However, when issues become politically polarised, the question of whom to trust may become a matter of partisanship rather than expertise. In fact, evidence shows that the willingness to get vaccinated against COVID-19 among Republicans varies as a function of who recommends getting vaccinated – Donald Trump or Joe Biden. Thus, it is crucial that opinion leaders understand their effect on individuals’ health decision-making and put public health before partisan divide. It is therefore important that some Republicans speak out in favour of vaccination.

Nonetheless, even when leaders issue clear messages, some individuals will carry on with publicly questioning the effectiveness and safety of vaccinations, almost inevitably by spreading information that is outright false or highly misleading. The messages of these science deniers do the most damage when left uncorrected.

Fortunately, research shows that the effect of messages of science deniers can be mitigated by providing fact-based corrections or by unmasking logical flaws. The recent Debunking Handbook provides hands-on advice for practitioners on how to structure debunkings and write promising corrections. The importance of debunking has been recognised by various health authorities around the globe. For example, the World Health Organization debunks emerging myths surrounding COVID-19 on its website and through its social media channels as part of its Myth Busters initiative.

Reactive approaches like debunking can only be one building block in the fight against misinformation. In analogy to fighting a virus, policymakers should not rely on treatments alone but should invest in prevention measures: psychological vaccines against misinformation exist that warn individuals about the threat of disinformation and provide people with strong counterarguments.

In numerous experiments, those psychological vaccines have been shown to build up resistance to misinformation. Psychological vaccines have been developed in the form of simple text-based warnings or short videos, as well as appealing online games. For example, the free-to-play Go Viral! game confronts players with myths surrounding COVID-19 in a playful manner and thus prepares players for real dangers.

Psychological vaccines are crucial as a prevention measure.

Unfortunately, these approaches have not been implemented on a wide scale at the beginning of the pandemic. Therefore, to minimise damage, it is sometimes necessary to remove false information from users’ information channels – that is, “deplatforming” matters. For example, YouTube is taking down conspiratorial material that targets individuals. One conspiratorial video that gathered millions of views when first posted became irrelevant within two weeks of it being removed by YouTube.

Finally, fighting misinformation is also about providing more high-quality information. It is crucial to report potential side effects of vaccinations accurately. However, communicators, including journalists should weigh evidence and focus on the bigger threat for public health, that is, the risk of the disease.

In fact, information about individual risks of COVID-19 can influence even strongly hesitant people. Moreover, risk communication should also highlight social benefits. Showing people what the pandemic means for members of risk groups targets people’s natural empathy and evidently increases the willingness to participate in prevention measures. Stories about the tragedies of this pandemic can make people experience what all the abstract numbers mean. Again, not all stories work the same in all audiences. That is why tailored communication approaches were and are central to effective health communication in times of crisis.

#### Vaccine skepticism is still on the rise—latest and most comprehensive studies show a robust statistical trend. Only engagement with scientific, fact-based reporting solves misinformation.

Stephen R. Neely PhD et. al, Christina Eldredge PhD, Robin Ersing PhD, Christa Remington PhD, 10-20-2021, [Neely is the Undergraduate Program Coordinator & Associate Professor at the SPA at USF, Eldredge is the Assistant Professor of Health Informatics at USF, Ersing is the School Director & Associate Professor at the SPA at USF, Remington is the Assistant Professor of Public Administration at the USF], “Vaccine Hesitancy and Exposure to Misinformation: a Survey Analysis”, Journal of General Internal Medicine, <https://link.springer.com/article/10.1007/s11606-021-07171-z#author-information> //SLC PK

In the pre-pandemic era, the World Health Organization (WHO) labeled vaccine hesitancy as one of the “top ten threats to global health” in 2019.[20](https://www.ncbi.nlm.nih.gov/pmc/articles/PMC8528483/#CR20) Despite being one of the most effective methods for infectious disease control, Americans have become increasingly skeptical of vaccinations, with vaccine rates declining notably in the past decade.[21](https://www.ncbi.nlm.nih.gov/pmc/articles/PMC8528483/#CR21) Factors such as a previous study correlating MMR vaccination with autism, and the misinformation which followed, may have played a role in this trend.[22](https://www.ncbi.nlm.nih.gov/pmc/articles/PMC8528483/#CR22) Our study found that only 57.8% of survey respondents were fully vaccinated at the time of their participation in this survey. Herd immunity vaccination percentage requirements for COVID-19 in a population is an area of emerging research; however, the observed 57.8% is far less than required for herd immunity in diseases such as measles (95%) and polio (80%) according to the WHO. Furthermore, the WHO considers herd immunity by pathogen exposure unethical due to potential suffering and mortality.[23](https://www.ncbi.nlm.nih.gov/pmc/articles/PMC8528483/#CR23)

Understanding the reasoning behind vaccine hesitancy is an important step in effectively targeting public health messaging. Our survey found that the three most common reasons that respondents give for holding off on receiving the COVID-19 vaccine are (1) the potential for side effects, (2) the speed at which the vaccine was created, and (3) surprisingly, a lack of confidence in the vaccine’s effectiveness. While the potential for side effects is a reasonable concern, the benefits of COVID-19 vaccines have shown to be greater than the potential risks. Furthermore, despite the speed at which the vaccine was developed, the Center for Disease and Control notes that the safety monitoring of the COVID-19 vaccine development was “the most intense safety monitoring in U.S. history”.[24](https://www.ncbi.nlm.nih.gov/pmc/articles/PMC8528483/#CR24) The findings suggest that amplifying these messages will continue to be an important task for public health professionals moving forward.

Interestingly, 20.6% of the survey respondents felt that vaccines were not effective despite the positive clinical trial results and “real world” research to support their efficacy.[25](https://www.ncbi.nlm.nih.gov/pmc/articles/PMC8528483/#CR25) It is not clear whether this belief itself is related to misinformation; however, it does indicate that current methods of public health messaging regarding vaccination efficacy may be inadequate. Given that 24.3% of unvaccinated respondents in this study indicated they were unsure whether they would undergo vaccination, increasing public health messaging efforts to reach this portion of the population who are “open” to considering vaccination should be paramount.

Our findings also suggest that vaccine hesitancy may be driven in large part by the increasing politicization of public health policy, which appears to have reached its zenith in the case of COVID-19.[7](https://www.ncbi.nlm.nih.gov/pmc/articles/PMC8528483/#CR7),[26](https://www.ncbi.nlm.nih.gov/pmc/articles/PMC8528483/#CR26) Our survey results highlighted a significant difference in the rate of vaccination based on political affiliation, with nearly three-quarters of self-identified Democrats being vaccinated (73.4%), compared with less than two-thirds of Republicans (58.5%) and political Independents (56.5%). Even when accounting for additional demographic factors and misinformation exposure, political affiliation was a very strong predictor of vaccination. This presents a unique challenge for public health messaging, as politicization makes it more likely that consumers will seek informational cues from political thought leaders rather than health professionals.

Furthermore, our findings affirm that widespread exposure to misinformation is a barrier to consumer health education on the vaccine and its benefits. In the survey results, those health information consumers with more exposure to misinformation regarding the COVID-19 vaccine were less likely to be vaccinated. Furthermore, the rate of vaccination among respondents continued to decline with exposure to two or more misinformation themes. Although the timing of misinformation exposure could not be determined by the survey, the results suggest that misinformation may play a very important role in vaccination status. This conclusion is consistent with other research on COVID-19 vaccine hesitancy. For example, a recent study found a 6.4% point decline in vaccination with exposure to misinformation in the USA and a 6.2% point decline in the UK.[27](https://www.ncbi.nlm.nih.gov/pmc/articles/PMC8528483/#CR27)

Of particular concern is the proliferation of political and conspiratorial misinformation, which we found to have the most substantial relationship to vaccine hesitancy. In some cases, we found a 20% lower rate of vaccination among those exposed to specific conspiratorial claims, such as the COVID-19 virus being created to increase vaccine sales and the Russian president’s daughter dying from a COVID-19 vaccine. The strong relationship between these claims and vaccine hesitancy further underscores the effects of politicization on the COVID-19 pandemic (and public health efforts in general). The tendency of conspiratorial claims to be circulated and amplified among closed circles of like-minded partisans means that these types of misinformation are often difficult for public health officials to identify, and even more difficult to combat.[28](https://www.ncbi.nlm.nih.gov/pmc/articles/PMC8528483/#CR28) The documented propensity of information consumers to self-select partisan media sources[29](https://www.ncbi.nlm.nih.gov/pmc/articles/PMC8528483/#CR29),[30](https://www.ncbi.nlm.nih.gov/pmc/articles/PMC8528483/#CR30) is believed to result in political echo chambers wherein these types of misinformation are easily amplified.[31](https://www.ncbi.nlm.nih.gov/pmc/articles/PMC8528483/#CR31) Strategic and targeted messaging will be essential in order to increase vaccine acceptance among individuals exposed to these types of misinformation.

With these findings in mind, we note that public health officials and healthcare providers should remain diligent in their efforts to identify and understand evolving objections, both rational and misinformed, that patients have about the COVID-19 vaccine. To address patient concerns about vaccine safety, they may opt to facilitate open discussions about vaccine fears through community outreach efforts or via social media and other outlets. Research has shown that acknowledging fears regarding difficult issues can promote trust in the messenger of the information.[32](https://www.ncbi.nlm.nih.gov/pmc/articles/PMC8528483/#CR32) Trust in public health messaging is especially important during public health emergencies when information is dynamic and rapidly evolving. Because political affiliation is so strongly correlated with vaccine hesitancy, this means that utilizing political figures to promote reliable information may be an essential means of increasing vaccination rates within those ideological groups.

In this instance, targeted and consistent messaging from Republican leaders in particular will be necessary to overcome politicized vaccine hesitancy.[33](https://www.ncbi.nlm.nih.gov/pmc/articles/PMC8528483/#CR33) While reporting shows that many Republican political leaders have been vaccinated against COVID-19, they have thus far been less inclined to promote vaccination among their political adherents. Recent attempts to promote vaccination on the part of Republican thought leaders such as Sean Hannity and Senate Minority Leader Mitch McConnell have been a positive step,[34](https://www.ncbi.nlm.nih.gov/pmc/articles/PMC8528483/#CR34) though these messages have been somewhat muted by simultaneous rhetoric and efforts against vaccine and mask mandates in various high-risk settings.[35](https://www.ncbi.nlm.nih.gov/pmc/articles/PMC8528483/#CR35) More consistent messaging on the part of Republican leaders will be necessary to ensure increased rates of vaccine acceptance. Public health officials can help to facilitate these efforts by partnering with willing political leaders at the local, state, and national levels.

Another potential strategy may include encouraging hesitant patients to reengage with their primary care providers, who are well-positioned to communicate reliable vaccine-related information. Recent studies have found personal appeals from practicing physicians to be more effective than institutional communications for promoting public health guidance.[36](https://www.ncbi.nlm.nih.gov/pmc/articles/PMC8528483/#CR36) However, only 32.3% of respondents to this survey reported having a conversation with their own primary care provider about COVID-19 vaccination. Among other factors, the politicization of the COVID-19 pandemic has resulted in increased reliance on “political cues” on the part of many information consumers, at the expense of conversations that would typically be sought with one’s most trusted healthcare providers. A proactive campaign on the part of public health officials and political leaders to direct patients back toward these provider-patient conversations may help to overcome some cases of vaccine hesitancy.

Lastly, we note that the increased role of social media in health information seeking has likely also played a significant role in the widespread exposure to misinformation observed in our study. Evidence from recent studies show that health consumers have relied heavily on social media to learn and stay informed about the COVID-19 pandemic.[10](https://www.ncbi.nlm.nih.gov/pmc/articles/PMC8528483/#CR10),[37](https://www.ncbi.nlm.nih.gov/pmc/articles/PMC8528483/#CR37) Studies have also found alarming rates of misinformation about COVID-19— both medical and political — being circulated on social media platforms such as Facebook and Twitter.[38](https://www.ncbi.nlm.nih.gov/pmc/articles/PMC8528483/#CR38),[39](https://www.ncbi.nlm.nih.gov/pmc/articles/PMC8528483/#CR39) In order to counteract these trends, public health professionals will need to become increasingly savvy in their use of social media to anticipate, identify, and respond to health-related misinformation. Preliminary evidence suggests that such interventions may be effective. For example, one study found that corrective infographics created by the World Health Organization were effective in reducing scientific misperceptions about COVID-19 prevention.[40](https://www.ncbi.nlm.nih.gov/pmc/articles/PMC8528483/#CR40) In another study from early 2021, those engaging with more credible, scientific sources on social media reported a greater likelihood of undergoing vaccination.[10](https://www.ncbi.nlm.nih.gov/pmc/articles/PMC8528483/#CR10) Expanding social media presence on the part of both public health organizations and individual practitioners may help at least in part to offset the rapid spread of misinformation associated with social networking sites.

#### This is not just true of COVID—misinformation harms trust in vaccines writ large.

Heidi J. Larson, 10-16-2018, [Heidi J. Larson is professor of anthropology, risk and decision science at the London School of Hygiene & Tropical Medicine.], "The biggest pandemic risk? Viral misinformation," Nature, <https://www.nature.com/articles/d41586-018-07034-4> //BC+PK

A hundred years ago this month, the death rate from the 1918 influenza was at its peak. An estimated 500 million people were infected over the course of the pandemic; between 50 million and 100 million died, around 3% of the global population at the time.

A century on, advances in vaccines have made massive outbreaks of flu — and measles, rubella, diphtheria and polio — rare. But people still discount their risks of disease. Few realize that flu and its complications caused an estimated 80,000 deaths in the United States alone this past winter, mainly in the elderly and infirm. Of the 183 children whose deaths were confirmed as flu-related, 80% had not been vaccinated that season, according to the US Centers for Disease Control and Prevention.

I predict that the next major outbreak — whether of a highly fatal strain of influenza or something else — will not be due to a lack of preventive technologies. Instead, emotional contagion, digitally enabled, could erode trust in vaccines so much as to render them moot. The deluge of conflicting information, misinformation and manipulated information on social media should be recognized as a global public-health threat.

So, what is to be done? The Vaccine Confidence Project, which I direct, works to detect early signals of rumours and scares about vaccines, and so to address them before they snowball. The international team comprises experts in anthropology, epidemiology, statistics, political science and more. We monitor news and social media, and we survey attitudes. We have also developed a Vaccine Confidence Index, similar to a consumer-confidence index, to track attitudes.

Emotions around vaccines are volatile, making vigilance and monitoring crucial for effective public outreach. In 2016, our project identified Europe as the region with the highest scepticism around vaccine safety (H. J. Larson et al. EBioMedicine 12, 295–301; 2016). The European Union commissioned us to re-run the survey this summer; results will be released this month. In the Philippines, confidence in vaccine safety dropped from 82% in 2015 to 21% in 2018 (H. J. Larson et al. Hum. Vaccines Immunother. https://doi.org/10.1080/21645515.2018.1522468; 2018), after legitimate concerns arose about new dengue vaccines. Immunization rates for established vaccines for tetanus, polio, tetanus and more also plummeted.

We have found that it is useful to categorize misinformation into several levels. Among the most damaging is bad science: people with medical credentials stoking overblown or unfounded fears. The canonical example is the 1998 publication by infamous former physician Andrew Wakefield purporting to show a link between autism and the measles, mumps and rubella (MMR) vaccine. Despite having his licence revoked and his work retracted, Wakefield persists in campaigning against the vaccine. Expert consensus alleges that his efforts have contributed to persistent vaccine anxieties and refusals, including a 2017 measles outbreak in Minnesota. Had Wakefield been disciplined and his article retracted 12 months after publication rather than 12 years, we might not be remarking that this year marks the twentieth anniversary of its publication.

The second-most-dangerous category includes those who see anti-vaccine debates as a financial opportunity for selling books, services, or other products. (Wakefield, who maintains that financial concerns have not affected his research and that he has been unfairly vilified, gave paid testimony against the vaccine and filed a patent that allegedly stood to become more valuable were the vaccine to be discredited.)

The next tier of damaging misinformation comes from those who see anti-vaccine debates as a political opportunity, a wedge with which to polarize society. Multiple reports this year found that Russian trolls and bots used emotional, angry language to spread misinformation and exacerbate the divisions between those for and against vaccines (see D. A. Broniatowski et al. Am. J. Pub. Health 108, 1378–1384; 2018).

Next are ‘super-spreaders’, who propagate misinformation through social media to like-minded vaccine-questioners. A common claim is that suspected adverse reactions to vaccines (typically coincidences) are confirmed reactions. Finally, there is misunderstood or inadequate information that might be circulating generally.

Targeted social media can combat misinformation. Both Denmark and Ireland faced groups broadcasting testimonies on social media and television news of young girls alleged to have been harmed by human papillomavirus (HPV) vaccination. In Denmark, national immunization rates fell from over 90% in 2000 to under 20% in 2005.

In response, Danish public-health officials emphasized the risk of disease, and promoted stories of people who had lost wives and mothers to cervical cancer. They also created a Facebook page for answering parents’ questions. Ireland’s social-media efforts used similar tactics to rebuild HPV-vaccine confidence; numbers for 2018 show an increase of 6% for vaccine uptake from 2017.

No single strategy works for all types of misinformation, particularly among those who are already sceptical. Educational materials and resources are important, but limited; health officials and educational campaigns often fall short because they craft messages based on what they want to promote, without addressing existing perceptions. Dialogue matters. Strategies must include listening and engagement. We have to get better at this: if a strain as deadly as the 1918 influenza emerges and people’s hesitancy to get vaccinated remains at the level it is today, a debilitating and fatal disease will spread.

#### COVID vaccine skepticism supercharges the internal link—it specifically spills outwards into broader vaccine mistrust.

Chloe Taylor, 1-26-2022, [Chloe is a news assistant at CNBC], “Covid vaccine skepticism may be fueling ‘worrisome’ rise in wider anti-vax sentiment, doctors say”, CNBC, <https://www.cnbc.com/2022/01/26/covid-vaccine-skepticism-fueling-wider-anti-vax-sentiment-doctors-say.html> //BC+PK

Skepticism toward Covid-19 vaccines could be fueling a “worrisome” rise in broader anti-vax sentiment, doctors have said.

Professor Liam Smeeth, a physician and director of the London School of Hygiene and Tropical Medicine, told CNBC he was concerned that vaccine hesitancy around Covid was “creeping into” sentiment toward other vaccines.

“I’m concerned it’s making people think: ‘oh, well, maybe the measles vaccine isn’t great either, and maybe these other vaccines aren’t great,’” Smeeth said in a phone call. “And we don’t have to see much of a drop in measles vaccine coverage in the U.K. to get measles outbreaks.”

He noted that there had been outbreaks of the disease when vaccination rates dropped in Britain in the 1990s and early 2000s.

In the late 1990s, claims that vaccines caused autism “turned tens of thousands of parents around the world against the measles, mumps and rubella vaccine,” according to the Lancet medical journal. In 2010, the journal retracted a 12-year-old article linking vaccines to autism, and studies have proven vaccines do not cause Autism Spectrum Disorder.

‘Jar full of wasps’

London-based Smeeth said measles vaccination rates only needed to drop a little below 90% for the disease to become a problem.

Measles is a highly contagious, serious viral illness that can lead to complications such as pneumonia and inflammation of the brain. Before widespread use of the measles vaccine, major epidemics broke out approximately every two to three years and the disease caused an estimated 2.6 million deaths each year, according to the WHO.

In the U.K. last year, 90.3% of two-year-olds were vaccinated against measles, mumps and rubella. A year earlier, 90.6% of children of the same age had been given the vaccine.

In the U.S., 90% of children were vaccinated against measles by the age of two in 2019, according to figures from the World Bank, marking a decrease of 2 percentage points from a year earlier. More recent data for the U.S. is not available.

Between 1988 and 1992, that figure fell from 98% to 83% in the U.S., and stayed below 90% for four years. In the U.K., the measles vaccination rate for two-year-olds dipped below 90% in the late 1990s and did not recover until 2011.

“Measles is like a jam jar full of wasps that is raging to get out,” Smeeth warned. “The minute vaccine coverage drops, measles will reappear. So that is a worry, that that [Covid anti-vax sentiment] and that dent in confidence is seeping across into other vaccines. That is a real worry.”

‘Devastating’ changes

Gretchen LaSalle, a physician and clinical assistant professor at Washington State University’s Elson S. Floyd College of Medicine, told CNBC that the politicization of Covid and its vaccines, as well as a lack of understanding of vaccine ingredients and public health, had had “devastating” effects.

In 2020, LaSalle completed the American Academy of Family Physicians Vaccine Science Fellowship. As part of the program, she helped carry out a survey of more than 2,200 people, tracking their attitudes toward immunizations.

Covid vaccines were first administered in December 2020 in the United States.

“In living through the Covid-19 pandemic and seeing the devastating effects on lives and livelihoods with their own eyes, our theory was that people would be reminded of the vital importance of vaccination and that their confidence would increase,” LaSalle told CNBC in an email.

But 20% of respondents told LaSalle’s team they had become less confident in vaccines during the pandemic.

“This decrease is worrisome,” LaSalle said. “For illnesses like measles that require a very high percentage of the population (typically around 95%) to be immune in order to limit the spread, a decrease in vaccination percentages by even 5 to 10% could be devastating.”

#### Vaccines solve future pandemic outbreaks but mass vaccination is key.

Shantell M. Kirkendoll, 7-7-2021, [University Communications], "New universal coronavirus vaccine could prevent future pandemics," University of North Carolina at Chapel Hill, <https://www.unc.edu/posts/2021/07/07/new-universal-coronavirus-vaccine-could-prevent-future-pandemics/> //BC+PK

Scientists at the University of North Carolina Gillings School of Global Public Health have developed a vaccine that could be effective against COVID-19, its variants — and a future coronavirus pandemic.

While no one knows which virus may cause the next outbreak, coronaviruses remain a threat after causing the SARS outbreak in 2003 and the global COVID-19 pandemic.

According to a study published June 22 in Science, the vaccine designed at UNC-Chapel Hill protected mice from the current SARS-CoV-2 coronavirus, plus a group of coronaviruses known to make the jump from animals to humans.

The lead study authors are David R. Martinez, a postdoctoral researcher at UNC Gillings School of Global Public Health and a Hanna H. Gray Fellow at the Howard Hughes Medical Institute, and Ralph Baric, an epidemiologist at UNC Gillings School of Global Public Health and professor of immunology and microbiology at the UNC School of Medicine, whose research has led to new therapies to fight emerging infectious diseases.

“Our findings look bright for the future because they suggest we can design more universal pan coronavirus vaccines to proactively guard against viruses we know are at risk for emerging in humans,” Martinez said. “With this strategy, perhaps we can prevent a SARS-CoV-3.”

Researchers at UNC-Chapel Hill are playing a key role in coronavirus vaccine development. After testing the effectiveness of the first generation of COVID-19 vaccines, they pivoted to look at a second-generation vaccine: one that targets sarbecoviruses, Baric said.

Sarbecoviruses, part of the large family of coronaviruses, are a priority for virologists after two caused devastating diseases in the past two decades: SARS and COVID-19.

The team’s approach started with mRNA, which is similar to the Pfizer and Moderna vaccines used today. But instead of including the mRNA code for only one virus, they welded together mRNA from multiple coronaviruses.

When given to mice, the hybrid vaccine effectively generated neutralizing antibodies against multiple spike proteins, which viruses use to latch onto healthy cells, including one associated with the Delta variant B.1.351, first discovered in South Africa.

“The vaccine has the potential to prevent outbreaks when used as a variant is detected,” said Baric, a trailblazer in pandemic preparedness who advocates proactive, rather than reactive, tracking of emerging coronaviruses.

The paper includes data from mice infected with SARS-CoV and related coronaviruses and the vaccine prevented infection and lung damage in mice. Further studies could put the vaccine on track for human clinical trials next year.

The lead authors worked with a team of scientists from UNC-Chapel Hill, Duke University School of Medicine and the University of Pennsylvania Perelman School of Medicine.

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#### Otherwise, future pandemics and bioterrorism cause extinction.

Walter Dodds, 12-3-19, [Division of Biology, Kansas State University], "Disease Now and Potential Future Pandemics," PubMed Central (PMC), <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC7120200/> //BC+PK

Emergent Pandemics and Superbugs

One of the worst worldwide pandemics was the “Spanish” flu that started in 1918. It killed about 3% of the world population and infected about 1/6 of all people. The bubonic plague in the 1300s infected about 1/4 of the Earth’s human population and killed an estimated 13%. The “swine” flu (H1N1) started in 2009 and infected about 1/4 of humanity but killed less than a hundredth of 1% of our population. Scientists have traced the first widespread series of cases of HIV/AIDS to 1981, but the disease probably jumped into humans in the early 1900s. Since then, about 1% of people on Earth are living with HIV, and about 1.5 million people per year die because of AIDS. About 2% of the human population deaths each year is from AIDS-related causes worldwide. Waves of disease are a regular occurrence throughout human history and becoming more common.

Recently the world has been concerned (terrified) about Ebola. Symptoms include fever, severe headache, muscle pain, weakness, fatigue, diarrhea, vomiting, abdominal (stomach) pain, unexplained hemorrhage (bleeding or bruising), and death. This disease has been simmering in Africa for decades. Outbreaks have occurred in sub-Saharan Africa regularly since 1976; in 2014, an outbreak started in Guinea and jumped to other African countries in weeks and then to countries around the world killing over 10,000 people. In 2019 almost 2000 people died in the Democratic Republic of the Congo, and stopping the disease there has been difficult because of warfare; this outbreak has spread to Uganda. The ease of global movement and increased travel continue to increase the potential for spread of the disease. What if this disease evolves to an even more easily transmitted form? There is no treatment or vaccine (although some promising vaccines are being developed).

Disease epidemics that do not kill a large proportion of the human population are common. In the 1700s there were 13 epidemics and in the 1800s 12, with 5 pandemic influenza epidemics in the 1900s. The data suggest that roughly every 10–20 years, there are epidemics with some mortality that infect a quarter to a third of the world’s population.

You could argue that disease has not wiped out humans yet, so it will not in the future. Unfortunately, science has documented cases where diseases cause the extinction of an entire species. For example, people have inadvertently moved a fungal disease around the world that kills amphibians (frogs and salamanders). This disease is leading to numerous species extinctions globally. I have seen the effects of this disease first hand in Panama.

We studied the consequences of the fungal disease killing all adult frogs leading to loss of all the tadpoles in Panamanian mountain streams. Scientists had already documented that the disease was moving through North America to South America through Central America. The disease kills frogs in high-elevation areas and moves through lower-elevation areas without killing most animals. We knew that the area we were working in was going in the direct path of the disease, so we set up a before-after experiment to understand the effects.

On our first visit to the mountain stream, there were frogs everywhere. We needed to be careful not to step on them as we walked the trails. Each square yard of stream bottom had up to a hundred tadpoles. Twenty frog species used the streams for reproduction, and many of these species were entirely restricted to cooler areas with high altitude on this particular volcanic mountain. From sunset to sunrise, the jungle was a riot of frog choruses. There were fantastically colored adult frogs including the stunning black and white Panamanian Golden Frog, a species that has special meaning for Panamanians. We made our measurements on the stream, and enjoyed the frogs.

Two years later the disease had swept through as it progressed through the country from Costa Rica. When we drove up to the stream for the “after disease infection” experiment, it was immediately clear that it was different. Hoping against hope, I went down to the stream, but there were no tadpoles and no adult frogs on the banks. It was very quiet and sad. The stream had dense growths of algae because no tadpoles were eating it and the absence of the tadpoles fundamentally changed the way the stream functioned. In the end, maybe 100 species will go extinct from this disease.

Through this and other examples, we know that some diseases have driven animals and plants to extinction [31]. In Hawaii, 16 cases of bird extinctions have come about at least in part because of diseases. Numerous mammals and birds have gone extinct from diseases alone or in combination with other factors such as habitat loss [32]. Thus, it is not impossible that humans could suffer the same fate. The conditions that could lead to such a tragedy are making it more likely that such a disease could infect the human population.

Throughout human history, new nasty diseases have arisen. Many of them have jumped into humans from other species. Whenever a particularly virulent disease has infected a human, and killed most of the people exposed to it, the population of people infected was small and disconnected from the rest of humanity. Epidemiology tells us that the incidents that were formerly isolated now have the potential to sweep across the globe and cause massive death and suffering.

We are increasing the conditions under which such diseases can arise and transmit to people (ever more intimate contact with wildlife, dense livestock production). Losses of biodiversity caused by humans also are predicted to increase the transmission of infectious human diseases [33]. It is no wonder that new diseases like Avian flu, H1N1 , Ebola, and SARS are popping up with alarming regularity. Adding to the worry, viral evolution is unpredictable, and a new deadly strain of virus could arise from laboratories working on viruses that are presumably safe and contained. In this case a newly virulent strain could arise, escape, and become a pandemic [34].

At the same time, new diseases challenge the safety of people and the ability to treat such diseases increases. We can develop vaccines rapidly. Antiviral drugs are available that work at least well enough to decrease mortality. However, only those people in developed countries are able to afford or even have access to methods to protect from sickness and death from these infections. As usual, the poorer people of the world will suffer the worst of globalization, increased population, greater chance of new diseases, and unequal distribution of basic health care.

Go to:

Bioterrorism, Biological Warfare, and Accidents

In late 2011 and early 2012, two laboratories, one at the University of Wisconsin-Madison, USA, and the other at Erasmus MC in Rotterdam, the Netherlands, found out how to make avian flu (H5N1) transmissible in ferrets. This research ignited a firestorm of controversy because the deadly virus could also spread among humans much more easily. The researchers submitted the work for publication but journals held up the release of the papers because of fears that people with bad intent (bioterrorists or countries willing to employ biological warfare) could use the information to transform this and other viruses to more deadly forms. Ultimately, the journals published the work, as eventually the information would get out. This is the way science works, once the general concept for an important idea is out, somebody else is certain to replicate the experiment. Thus, information on how to create a deadly disease is ever more available.

Accidental release from existing research facilities is also a concern. The deadliest diseases known to humanity are stored and researched in containment facilities found around the world. Smallpox has killed people for at least 3000 years, and following vaccination, it was completely eradicated from human populations in the 1970s. A number of laboratories still keep cultures. In 1978, one person died from exposure to the virus in a British laboratory. After that, scientists transferred all cultures to two laboratories, one in Russia and one in the United States. Entire generations have reached adulthood with no exposure to the disease; if smallpox was ever released by accident or on purpose (a scientist with PhD-level training could potentially re-create it from the known genetic sequence), it could cause massive mortality.

In 1979, the Sverdlovsk military facility accidentally released anthrax causing 100 human deaths. Soviet researchers probably isolated this highly virulent strain of anthrax from rodents in the Soviet city of Kirov. The facility had likely accidentally released the bacterium at least once previously. Anthrax is able to survive as dry spores, and Soviets were presumably producing it to arm biological weapons.

While research on diseases is necessary to learn about causes and cures of the diseases that influence humans, such research comes with a cost. The ability to contain these diseases in research settings is plagued with the problem of potential human error. In addition, the possibility of terrorist attacks on such facilities is perhaps remote, but real.

In 1984, followers of Bhagwan Shree Rajneesh in Oregon released salmonella into 10 restaurant salad bars sickening 751 people in an attempt to keep them from voting in a local election in which the cult had candidates. Luckily, nobody died in this incident, but it does illustrate that people can be capable of bioterrorism.

In June of 1993, members of the Aum Shinrikyo cult sprayed anthrax from the top of an eight-story building in the heart of Tokyo. Fortunately, the disease did not take hold. The strain they used was not very deadly, and they had problems with a sprayer so the dispersion of the disease was not as effective as they had hoped. This group had previously set up multiple laboratories and had experimented with the toxin for botulism, cholera, and Q fever (a dangerous bacterial disease carried by livestock). They also previously sponsored a trip to the Democratic Republic of Congo that was an attempt to bring back an isolate of Ebola. This apocalyptic cult eventually released the chemical weapon Sarin in the Tokyo subway killing 12 people and sickening thousands.

While both these examples are unusual cases, we are entering a world where a few crazy people or one crazy country could do tremendous damage to humanity if they had access to the right materials and knowledge. Such knowledge is becoming commonplace. Every year academia cranks out numerous PhDs around the world with the technical expertise to build a deadly virus with the right equipment, chemicals (reagents), and knowledge of the sequence. At the same time, technology to work with DNA sequences is getting cheaper, easier to use, and more broadly available. With a million dollars and proper training, it is now possible to create designer diseases.

We should consider motives in this discussion as well. A terrorist who wanted to kill many people but wanted to discriminate victims would not only need to create a disease but also vaccinate or protect all the people they did not want to die. While a few doses of a disease placed appropriately could quickly spread around the world, creating many doses of vaccine is a far more daunting and expensive task. Thus, it seems unlikely that any of the major terrorist groups would be able to create a disease and vaccinate large numbers of people before releasing the disease without being detected first. Such a task is not completely out of the question for a small country such as North Korea.

There are insane people who just might try to take down the entire human race. The mass shooting in a movie theater in Denver in 2012 was carried out by a neuroscience PhD student. This individual could have had the technical ability to create a novel disease. A scenario where such a person creates and releases a deadly virus is conceivable. Quite a bit of preparation and disaster training would be necessary to stop transmission of an infectious agent once it was released [35].

### FW

#### The standard is maximizing expected wellbeing.

#### Prefer it:

#### 1] Death is bad and outweighs – a] agents can’t act if they fear for their bodily security which constrains every ethical theory, b] it destroys the subject itself – kills any ability to achieve value in ethics since life is a prerequisite which means it’s a side constraint since we can’t reach the end goal of ethics without life

#### 2] Neuroscience- pleasure and pain *are* intrinsic value and disvalue – everything else regresses.

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**Pleasure** is not only one of the three primary reward functions but it also **defines reward.** As homeostasis explains the functions of only a limited number of rewards, the principal reason why particular stimuli, objects, events, situations, and activities are rewarding may be due to pleasure. This applies first of all to sex and to the primary homeostatic rewards of food and liquid and extends to money, taste, beauty, social encounters and nonmaterial, internally set, and intrinsic rewards. Pleasure, as the primary effect of rewards, drives the prime reward functions of learning, approach behavior, and decision making and provides the **basis for hedonic theories** of reward function. We are attracted by most rewards and exert intense efforts to obtain them, just because they are enjoyable [10].

Pleasure is a passive reaction that derives from the experience or prediction of reward and may lead to a long-lasting state of happiness. The word happiness is difficult to define. In fact, just obtaining physical pleasure may not be enough. One key to happiness involves a network of good friends. However, it is not obvious how the higher forms of satisfaction and pleasure are related to an ice cream cone, or to your team winning a sporting event. Recent multidisciplinary research, using both humans and detailed invasive brain analysis of animals has discovered some critical ways that the brain processes pleasure [14].

Pleasure as a hallmark of reward is sufficient for defining a reward, but it may not be necessary. A reward may generate positive learning and approach behavior simply because it contains substances that are essential for body function. When we are hungry, we may eat bad and unpleasant meals. A monkey who receives hundreds of small drops of water every morning in the laboratory is unlikely to feel a rush of pleasure every time it gets the 0.1 ml. Nevertheless, with these precautions in mind, we may define any stimulus, object, event, activity, or situation that has the potential to produce pleasure as a reward. In the context of reward deficiency or for disorders of addiction, homeostasis pursues pharmacological treatments: drugs to treat drug addiction, obesity, and other compulsive behaviors. The theory of allostasis suggests broader approaches - such as re-expanding the range of possible pleasures and providing opportunities to expend effort in their pursuit. [15]. It is noteworthy, the first animal studies eliciting approach behavior by electrical brain stimulation interpreted their findings as a discovery of the brain’s pleasure centers [16] which were later partly associated with midbrain dopamine neurons [17–19] despite the notorious difficulties of identifying emotions in animals.

Evolutionary theories of pleasure: The love connection BO:D

Charles Darwin and other biological scientists that have examined the biological evolution and its basic principles found various mechanisms that steer behavior and biological development. Besides their theory on natural selection, it was particularly the sexual selection process that gained significance in the latter context over the last century, especially when it comes to the question of what makes us “what we are,” i.e., human. However, the capacity to sexually select and evolve is not at all a human accomplishment alone or a sign of our uniqueness; yet, we humans, as it seems, are ingenious in fooling ourselves and others–when we are in love or desperately search for it.

It is well established that modern biological theory conjectures that **organisms are** the **result of evolutionary competition.** In fact, Richard Dawkins stresses gene survival and propagation as the basic mechanism of life [20]. Only genes that lead to the fittest phenotype will make it. It is noteworthy that the phenotype is selected based on behavior that maximizes gene propagation. To do so, the phenotype must survive and generate offspring, and be better at it than its competitors. Thus, the ultimate, distal function of rewards is to increase evolutionary fitness by ensuring the survival of the organism and reproduction. It is agreed that learning, approach, economic decisions, and positive emotions are the proximal functions through which phenotypes obtain other necessary nutrients for survival, mating, and care for offspring.

Behavioral reward functions have evolved to help individuals to survive and propagate their genes. Apparently, people need to live well and long enough to reproduce. Most would agree that homo-sapiens do so by ingesting the substances that make their bodies function properly. For this reason, foods and drinks are rewards. Additional rewards, including those used for economic exchanges, ensure sufficient palatable food and drink supply. Mating and gene propagation is supported by powerful sexual attraction. Additional properties, like body form, augment the chance to mate and nourish and defend offspring and are therefore also rewards. Care for offspring until they can reproduce themselves helps gene propagation and is rewarding; otherwise, many believe mating is useless. According to David E Comings, as any small edge will ultimately result in evolutionary advantage [21], additional reward mechanisms like novelty seeking and exploration widen the spectrum of available rewards and thus enhance the chance for survival, reproduction, and ultimate gene propagation. These functions may help us to obtain the benefits of distant rewards that are determined by our own interests and not immediately available in the environment. Thus the distal reward function in gene propagation and evolutionary fitness defines the proximal reward functions that we see in everyday behavior. That is why foods, drinks, mates, and offspring are rewarding.

There have been theories linking pleasure as a required component of health benefits salutogenesis, (salugenesis). In essence, under these terms, pleasure is described as a state or feeling of happiness and satisfaction resulting from an experience that one enjoys. Regarding pleasure, it is a double-edged sword, on the one hand, it promotes positive feelings (like mindfulness) and even better cognition, possibly through the release of dopamine [22]. But on the other hand, pleasure simultaneously encourages addiction and other negative behaviors, i.e., motivational toxicity. It is a complex neurobiological phenomenon, relying on reward circuitry or limbic activity. It is important to realize that through the “Brain Reward Cascade” (BRC) endorphin and endogenous morphinergic mechanisms may play a role [23]. While natural rewards are essential for survival and appetitive motivation leading to beneficial biological behaviors like eating, sex, and reproduction, crucial social interactions seem to further facilitate the positive effects exerted by pleasurable experiences. Indeed, experimentation with addictive drugs is capable of directly acting on reward pathways and causing deterioration of these systems promoting hypodopaminergia [24]. Most would agree that pleasurable activities can stimulate personal growth and may help to induce healthy behavioral changes, including stress management [25]. The work of Esch and Stefano [26] concerning the link between compassion and love implicate the brain reward system, and pleasure induction suggests that social contact in general, i.e., love, attachment, and compassion, can be highly effective in stress reduction, survival, and overall health.

Understanding the role of neurotransmission and pleasurable states both positive and negative have been adequately studied over many decades [26–37], but comparative anatomical and neurobiological function between animals and homo sapiens appear to be required and seem to be in an infancy stage.

Finding happiness is different between apes and humans

As stated earlier in this expert opinion one key to happiness involves a network of good friends [38]. However, it is not entirely clear exactly how the higher forms of satisfaction and pleasure are related to a sugar rush, winning a sports event or even sky diving, all of which augment dopamine release at the reward brain site. Recent multidisciplinary research, using both humans and detailed invasive brain analysis of animals has discovered some critical ways that the brain processes pleasure.

Remarkably, there are pathways for ordinary liking and pleasure, which are limited in scope as described above in this commentary. However, there are **many brain regions**, often termed hot and cold spots, that significantly **modulate** (increase or decrease) our **pleasure or** even produce **the opposite** of pleasure— that is disgust and fear [39]. One specific region of the nucleus accumbens is organized like a computer keyboard, with particular stimulus triggers in rows— producing an increase and decrease of pleasure and disgust. Moreover, the cortex has unique roles in the cognitive evaluation of our feelings of pleasure [40]. Importantly, the interplay of these multiple triggers and the higher brain centers in the prefrontal cortex are very intricate and are just being uncovered.

Desire and reward centers

It is surprising that many different sources of pleasure activate the same circuits between the mesocorticolimbic regions (Figure 1). Reward and desire are two aspects pleasure induction and have a very widespread, large circuit. Some part of this circuit distinguishes between desire and dread. The so-called pleasure circuitry called “REWARD” involves a well-known dopamine pathway in the mesolimbic system that can influence both pleasure and motivation.

In simplest terms, the well-established mesolimbic system is a dopamine circuit for reward. It starts in the ventral tegmental area (VTA) of the midbrain and travels to the nucleus accumbens (Figure 2). It is the cornerstone target to all addictions. The VTA is encompassed with neurons using glutamate, GABA, and dopamine. The nucleus accumbens (NAc) is located within the ventral striatum and is divided into two sub-regions—the motor and limbic regions associated with its core and shell, respectively. The NAc has spiny neurons that receive dopamine from the VTA and glutamate (a dopamine driver) from the hippocampus, amygdala and medial prefrontal cortex. Subsequently, the NAc projects GABA signals to an area termed the ventral pallidum (VP). The region is a relay station in the limbic loop of the basal ganglia, critical for motivation, behavior, emotions and the “Feel Good” response. This defined system of the brain is involved in all addictions –substance, and non –substance related. In 1995, our laboratory coined the term “Reward Deficiency Syndrome” (RDS) to describe genetic and epigenetic induced hypodopaminergia in the “Brain Reward Cascade” that contribute to addiction and compulsive behaviors [3,6,41].

Furthermore, ordinary “liking” of something, or pure pleasure, is represented by small regions mainly in the limbic system (old reptilian part of the brain). These may be part of larger neural circuits. In Latin, hedus is the term for “sweet”; and in Greek, hodone is the term for “pleasure.” Thus, the word Hedonic is now referring to various subcomponents of pleasure: some associated with purely sensory and others with more complex emotions involving morals, aesthetics, and social interactions. The capacity to have pleasure is part of being healthy and may even extend life, especially if linked to optimism as a dopaminergic response [42].

Psychiatric illness often includes symptoms of an abnormal inability to experience pleasure, referred to as anhedonia. A negative feeling state is called dysphoria, which can consist of many emotions such as pain, depression, anxiety, fear, and disgust. Previously many scientists used animal research to uncover the complex mechanisms of pleasure, liking, motivation and even emotions like panic and fear, as discussed above [43]. However, as a significant amount of related research about the specific brain regions of pleasure/reward circuitry has been derived from invasive studies of animals, these cannot be directly compared with subjective states experienced by humans.

In an attempt to resolve the controversy regarding the causal contributions of mesolimbic dopamine systems to reward, we have previously evaluated the three-main competing explanatory categories: “liking,” “learning,” and “wanting” [3]. That is, dopamine may mediate (a) liking: the hedonic impact of reward, (b) learning: learned predictions about rewarding effects, or (c) wanting: the pursuit of rewards by attributing incentive salience to reward-related stimuli [44]. We have evaluated these hypotheses, especially as they relate to the RDS, and we find that the incentive salience or “wanting” hypothesis of dopaminergic functioning is supported by a majority of the scientific evidence. Various neuroimaging studies have shown that anticipated behaviors such as sex and gaming, delicious foods and drugs of abuse all affect brain regions associated with reward networks, and may not be unidirectional. Drugs of abuse enhance dopamine signaling which sensitizes mesolimbic brain mechanisms that apparently evolved explicitly to attribute incentive salience to various rewards [45].

Addictive substances are voluntarily self-administered, and they enhance (directly or indirectly) dopaminergic synaptic function in the NAc. This activation of the brain reward networks (producing the ecstatic “high” that users seek). Although these circuits were initially thought to encode a set point of hedonic tone, it is now being considered to be far more complicated in function, also encoding attention, reward expectancy, disconfirmation of reward expectancy, and incentive motivation [46]. The argument about addiction as a disease may be confused with a predisposition to substance and nonsubstance rewards relative to the extreme effect of drugs of abuse on brain neurochemistry. The former sets up an individual to be at high risk through both genetic polymorphisms in reward genes as well as harmful epigenetic insult. Some Psychologists, even with all the data, still infer that addiction is not a disease [47]. Elevated stress levels, together with polymorphisms (genetic variations) of various dopaminergic genes and the genes related to other neurotransmitters (and their genetic variants), and may have an additive effect on vulnerability to various addictions [48]. In this regard, Vanyukov, et al. [48] suggested based on review that whereas the gateway hypothesis does not specify mechanistic connections between “stages,” and does not extend to the risks for addictions the concept of common liability to addictions may be more parsimonious. The latter theory is grounded in genetic theory and supported by data identifying common sources of variation in the risk for specific addictions (e.g., RDS). This commonality has identifiable neurobiological substrate and plausible evolutionary explanations.

Over many years the controversy of dopamine involvement in especially “pleasure” has led to confusion concerning separating motivation from actual pleasure (wanting versus liking) [49]. We take the position that animal studies cannot provide real clinical information as described by self-reports in humans. As mentioned earlier and in the abstract, on November 23rd, 2017, evidence for our concerns was discovered [50]

In essence, although nonhuman primate brains are similar to our own, the disparity between other primates and those of human cognitive abilities tells us that surface similarity is not the whole story. Sousa et al. [50] small case found various differentially expressed genes, to associate with pleasure related systems. Furthermore, the dopaminergic interneurons located in the human neocortex were absent from the neocortex of nonhuman African apes. Such differences in neuronal transcriptional programs may underlie a variety of neurodevelopmental disorders.

In simpler terms, the system controls the production of dopamine, a chemical messenger that plays a significant role in pleasure and rewards. The senior author, Dr. Nenad Sestan from Yale, stated: “Humans have evolved a dopamine system that is different than the one in chimpanzees.” This may explain why the behavior of humans is so unique from that of non-human primates, even though our brains are so surprisingly similar, Sestan said: “It might also shed light on why people are vulnerable to mental disorders such as autism (possibly even addiction).” Remarkably, this research finding emerged from an extensive, multicenter collaboration to compare the brains across several species. These researchers examined 247 specimens of neural tissue from six humans, five chimpanzees, and five macaque monkeys. Moreover, these investigators analyzed which genes were turned on or off in 16 regions of the brain. While the differences among species were subtle, **there was** a **remarkable contrast in** the **neocortices**, specifically in an area of the brain that is much more developed in humans than in chimpanzees. In fact, these researchers found that a gene called tyrosine hydroxylase (TH) for the enzyme, responsible for the production of dopamine, was expressed in the neocortex of humans, but not chimpanzees. As discussed earlier, dopamine is best known for its essential role within the brain’s reward system; the very system that responds to everything from sex, to gambling, to food, and to addictive drugs. However, dopamine also assists in regulating emotional responses, memory, and movement. Notably, abnormal dopamine levels have been linked to disorders including Parkinson’s, schizophrenia and spectrum disorders such as autism and addiction or RDS.

#### 3] Apocalyptic images challenge dominant power structures – they contest the implausibility of inequitable structures producing catastrophe and generate imagination of futures of social justice outside of current narratives

Jessica Hurley 17, Assistant Professor in the Humanities at the University of Chicago, “Impossible Futures: Fictions of Risk in the Longue Durée”, Duke University Press, <https://read.dukeupress.edu/american-literature/article/89/4/761/132823/Impossible-Futures-Fictions-of-Risk-in-the-Longue>

* Squo power structures (i.e. what the K criticizes) paint themselves as stable/inevitable to project their power and maintain dominance
* Questioning that stability thru extinction narratives questions squo world orders bc it calls into ques the idea of squo world stability which allows us to envision alternative worlds/future i.e. one where it fails and causes extinction
* Justifies extinction focus and preventing extinction in the name of changing those squo structures

If contemporary ecocriticism has a shared premise about environmental risk it is that genre is the key to both perceiving and, possibly, correcting ecological crisis. Frederick Buell’s 2003 From Apocalypse to Way of Life: Environmental Crisis in the American Century has established one of the most central oppositions of this paradigm. As his title suggests, Buell tells the story of a discourse that began in the apocalyptic mode in the 1960s and 70s, when discussions of “the immanent end of nature” most commonly took the form of “prophecy, revelation, climax, and extermination” before turning away from apocalypse when the prophesied ends failed to arrive (112, 78). Buell offers his suggestion for the appropriate literary mode for life lived within a crisis that is both unceasing and inescapable: new voices, “if wise enough….will abandon apocalypse for a sadder realism that looks closely at social and environmental changes in process and recognizes crisis as a place where people dwell” (202-3). In a world of threat, Buell demands a realism that might help us see risks more clearly and aid our survival.¶ Buell’s argument has become a broadly held view in contemporary risk theory and ecocriticism, overlapping fields in the social sciences and humanities that address the foundational question of second modernity: “how do you live when you are at such risk?” (Woodward 2009, 205).1 Such an assertion, however, assumes both that realism is a neutral descriptive practice and that apocalypse is not something that is happening now in places that we might not see, or cannot hear. This essay argues for the continuing importance of apocalyptic narrative forms in representations of environmental risk to disrupt conservative realisms that maintain the statusquo. Taking the ecological disaster of nuclear waste as my case study, I examine two fictional treatments of nuclear waste dumps that create different temporal structures within which the colonial history of the United States plays out. The first, a set of Department of Energy documents that use statistical modeling and fictional description to predict a set of realistic futures for the site of the Waste Isolation Pilot Plant in New Mexico (1991), creates a present that is fully knowable and a future that is fully predictable. Such an approach, I suggest, perpetuates the state logics of implausibility that have long undergirded settler colonialism in the United States. In contrast, Leslie Marmon Silko’s contemporaneous novel Almanac of the Dead (1991) uses its apocalyptic form to deconstruct the claims to verisimilitude that undergird state realism, transforming nuclear waste into a prophecy of the end of the United States rather than a means for imagining its continuation. In Almanac of the Dead, the presence of nuclear waste introjects a deep-time perspective into contemporary America, transforming the present into a speculative space where environmental catastrophe produces not only unevenly distributed damage but also revolutionary forms of social justice that insist on a truth that probability modeling cannot contain: that the future will be unimaginably different from the present, while the present, too, might yet be utterly different from the real that we think we know.¶ Nuclear waste is rarely treated in ecocriticism or risk theory, for several reasons: it is too manmade to be ecological; its catastrophes are ongoing, intentionally produced situations rather than sudden disasters; and it does not support the narrative that subtends ecocritical accounts of risk perception in which the nuclear threat gives rise to an awareness of other kinds of threat before reaching the end of its relevance at the end of the Cold War.2 In what follows, I argue that the failure of nuclear waste to fit into the critical frames created by ecocriticism and risk theory to date offers an opportunity to expand those frames and overcome some of their limitations, especially the impulse towards a paranoid, totalizing realism that Peter van Wyck (2005) has described as central to ecocriticism in the risk society. Nuclear waste has durational forms that dwarf the human. It therefore dwells less in the economy of risk as it is currently conceptualized and more in the blown-out realm of deep time. Inhabiting the temporal scale that has recently been christened the Anthropocene, the geological era defined by the impact of human activities on the world’s geology and climate, nuclear waste unsettles any attempt at realist description, unveiling the limits of human imagination at every turn.3 By analyzing risk society through a heuristic of nuclear waste, this essay offers a critique of nuclear colonialism and environmental racism. At the same time, it shows how the apocalyptic mode in deep time allows narratives of environmental harm and danger to move beyond the paranoid logic of risk. In the world of deep time, all that might come to pass will come to pass, sooner or later. The endless maybes of risk become certainties. The impossibilities of our own deaths and the deaths of everything else will come. But so too will other impossibilities: talking macaws and alien visitors; the end of the colonial occupation of North America, perhaps, or a sudden human determination to let the world live. The end of capitalism may yet become more thinkable than the end of the world. Just wait long enough. Stranger things will happen.¶

#### 4] Extinction reps are egalitarian.

Khan 18 (Risalat, activist and entrepreneur from Bangladesh passionate about addressing climate change, biodiversity loss, and other existential challenges. He was featured by The Guardian as one of the “young climate campaigners to watch” (2015). As a campaigner with the global civic movement Avaaz (2014-17), Risalat was part of a small core team that spearheaded the largest climate marches in history with a turnout of over 800,000 across 2,000 cities. After fighting for the Paris Agreement, Risalat led a campaign joined by over a million people to stop the Rampal coal plant in Bangladesh to protect the Sundarbans World Heritage forest, and elicited criticism of the plant from Crédit Agricolé through targeted advocacy. Currently, Risalat is pursuing an MPA in Environmental Science and Policy at Columbia University as a SIPA Environmental Fellow, “5 reasons why we need to start talking about existential risks,” https://www.weforum.org/agenda/2018/01/5-reasons-start-talking-existential-risks-extinction-moriori/)

Infinite future possibilities I find the story of the Moriori profound. It teaches me two lessons. Firstly, that human culture is far from immutable. That we can struggle against our baser instincts. That we can master them and rise to unprecedented challenges. Secondly, that even this does not make us masters of our own destiny. We can make visionary choices, but the future can still surprise us. This is a humbling realization. Because faced with an uncertain future, the only wise thing we can do is prepare for possibilities. Standing at the launch pad of the Fourth Industrial Revolution, the possibilities seem endless. They range from an era of abundance to the end of humanity, and everything in between. How do we navigate such a wide and divergent spectrum? I am an optimist. From my bubble of privilege, life feels like a rollercoaster ride full of ever more impressive wonders, even as I try to fight the many social injustices that still blight us. However, the accelerating pace of change amid uncertainty elicits one fundamental observation. Among the infinite future possibilities, only one outcome is truly irreversible: extinction. Concerns about extinction are often dismissed as apocalyptic alarmism. Sometimes, they are. But repeating that mankind is still here after 70 years of existential warning about nuclear warfare is a straw man argument. The fact that a 1000-year flood has not happened does not negate its possibility. And there have been far too many nuclear near-misses to rest easy. As the World Economic Forum’s Annual Meeting in Davos discusses how to create a shared future in a fractured world, here are five reasons why the possibility of existential risks should raise the stakes of conversation: 1. Extinction is the rule, not the exception More than 99.9% of all the species that ever existed are gone. Deep time is unfathomable to the human brain. But if one cares to take a tour of the billions of years of life’s history, we find a litany of forgotten species. And we have only discovered a mere fraction of the extinct species that once roamed the planet. In the speck of time since the first humans evolved, more than 99.9% of all the distinct human cultures that have ever existed are extinct. Each hunter-gatherer tribe had its own mythologies, traditions and norms. They wiped each other out, or coalesced into larger formations following the agricultural revolution. However, as major civilizations emerged, even those that reached incredible heights, such as the Egyptians and the Romans, eventually collapsed. It is only in the very recent past that we became a truly global civilization. Our interconnectedness continues to grow rapidly. “Stand or fall, we are the last civilization”, as Ricken Patel, the founder of the global civic movement Avaaz, put it. 2. Environmental pressures can drive extinction More than 15,000 scientists just issued a ‘warning to humanity’. They called on us to reduce our impact on the biosphere, 25 years after their first such appeal. The warning notes that we are far outstripping the capacity of our planet in all but one measure of ozone depletion, including emissions, biodiversity, freshwater availability and more. The scientists, not a crowd known to overstate facts, conclude: “soon it will be too late to shift course away from our failing trajectory, and time is running out”. In his 2005 book Collapse, Jared Diamond charts the history of past societies. He makes the case that overpopulation and resource use beyond the carrying capacity have often been important, if not the only, drivers of collapse. Even though we are making important incremental progress in battles such as climate change, we must still achieve tremendous step changes in our response to several major environmental crises. We must do this even while the world’s population continues to grow. These pressures are bound to exert great stress on our global civilization. 3. Superintelligence: unplanned obsolescence? Imagine a monkey society that foresaw the ascendance of humans. Fearing a loss of status and power, it decided to kill the proverbial Adam and Eve. It crafted the most ingenious plan it could: starve the humans by taking away all their bananas. Foolproof plan, right? This story describes the fundamental difficulty with superintelligence. A superintelligent being may always do something entirely different from what we, with our mere mortal intelligence, can foresee. In his 2014 book Superintelligence, Swedish philosopher Nick Bostrom presents the challenge in thought-provoking detail, and advises caution. Bostrom cites a survey of industry experts that projected a 50% chance of the development of artificial superintelligence by 2050, and a 90% chance by 2075. The latter date is within the life expectancy of many alive today. Visionaries like Stephen Hawking and Elon Musk have warned of the existential risks from artificial superintelligence. Their opposite camp includes Larry Page and Mark Zuckerberg. But on an issue that concerns the future of humanity, is it really wise to ignore the guy who explained the nature of space to us and another guy who just put a reusable rocket in it? 4. Technology: known knowns and unknown unknowns Many fundamentally disruptive technologies are coming of age, from bioengineering to quantum computing, 3-D printing, robotics, nanotechnology and more. Lord Martin Rees describes potential existential challenges from some of these technologies, such as a bioengineered pandemic, in his book Our Final Century. Imagine if North Korea, feeling secure in its isolation, could release a virulent strain of Ebola, engineered to be airborne. Would it do it? Would ISIS? Projecting decades forward, we will likely develop capabilities that are unthinkable even now. The unknown unknowns of our technological path are profoundly humbling. 5. 'The Trump Factor' Despite our scientific ingenuity, we are still a confused and confusing species. Think back to two years ago, and how you thought the world worked then. Has that not been upended by the election of Donald Trump as US President, and everything that has happened since? The mix of billions of messy humans will forever be unpredictable. When the combustible forces described above are added to this melee, we find ourselves on a tightrope. What choices must we now make now to create a shared future, in which we are not at perpetual risk of destroying ourselves? Common enemy to common cause Throughout history, we have rallied against the ‘other’. Tribes have overpowered tribes, empires have conquered rivals. Even today, our fiercest displays of unity typically happen at wartime. We give our lives for our motherland and defend nationalistic pride like a wounded lion. But like the early Morioris, we 21st-century citizens find ourselves on an increasingly unstable island. We may have a violent past, but we have no more dangerous enemy than ourselves. Our task is to find our own Nunuku’s Law. Our own shared contract, based on equity, would help us navigate safely. It would ensure a future that unleashes the full potential of our still-budding human civilization, in all its diversity. We cannot do this unless we are humbly grounded in the possibility of our own destruction. Survival is life’s primal instinct. In the absence of a common enemy, we must find common cause in survival. Our future may depend on whether we realize this.