# 1AC

### 1AC Core

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

#### Objective journalism is not sight neutral 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 The notion of objective reporting is seen by many as out of fashion and out of date.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 vaccines—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.

#### Best studies conclude aff – misinformation independently causes disease spread, but “immunization” against “fake news” solves.

Brainard & Hunter ’19 [Julii Brainard – Dr, Senior Research Associate, Norwich Medical School Honorary Research Fellow, Norwich Medical School Member, Epidemiology and Public Health Member, Public Health and Health Services Research, Paul Hunter - Professor in Medicine, Norwich Medical School Member, Water Security Research Centre Member, Epidemiology and Public Health Member, Public Health and Health Services Research, “Misinformation making a disease outbreak worse: outcomes compared for influenza, monkeypox, and norovirus”, 11-12-2019, https://journals.sagepub.com/doi/full/10.1177/0037549719885021]//pranav

No previous studies have integrated information spread with disease spread to the level of sophistication that we have done. Prior models often considered information spread in disease outbreak development, but information awareness was typically equally available to all agents, and benign at worst. Thus, information spread in the models nearly always led to greater protective measures (such as increasing vaccine uptake or decreasing contact rates41–50). Most previous similar disease and awareness spread models had awareness increases that could only happen following physical contact or as a result of global conditions.42,45,48,50–55 Our modeling is unusual because information spread was individual and separated from the physical interactions that could transmit disease. Our model is unique and original in attempting to consider the potentially deleterious role of information sharing with stochastic and individually assigned elements. The need for research such as ours has been recognized before.17,56

More sophisticated information sharing networks than we tried to create could make these models more credible. There exist more sophisticated models on rumor spread that we could possibly replicate for the information spreading process,57–59 and simultaneously merge with existing sophisticated disease spread models. More ambitious models than ours would describe more agents and more complicated movement patterns, such as including flight as a behavior option. Many rumor spreading models have borrowed ideas and methods from epidemiological models,60,61 but not many (if any) previous models have integrated both rumor and disease spread as separate but interacting processes into one unified probabilistic model.

This study describes the spread of three viral diseases; misinformation affecting the spread of bacterial diseases could be modeled equally well. The ideas could be applied to non-communicable diseases and health outcomes, but it would be necessary to change the time scale to be much longer to model chronic and lifestyle diseases and how their incidence might change in response to circulating misinformation. A much longer time scale would mean incorporating many other lifestyle factors into the models.

Model construction relied heavily on a small number of existing studies about such factors as number of contact rates, social contacts (i.e.., Dunbar numbers), how much bad or good advice can change behavior, and the propensity to believe in misinformation (the finding that on average, British people believe in 38.9% of conspiracy theories that they are exposed to). More reliably estimating any of these and many of the other factors would also increase the credibility of our results. Our threshold for a “worse” outbreak situation was r0 being 40% worse or the number of generations of disease transmission increased from 4 to 7; these thresholds were decided for convenience in this set of demonstration models.

Given our definition of stage 2 as an outbreak “made worse by circulating misinformation,” stage 3.1 modeling concluded for all three diseases that a ratio of about 60:40 good:bad advice circulating would reduce the stage 2 conditions to those of stage 1. The models also suggested that “immunizing” about 20% of the population against misinformation was likely to revert stage 2 to stage 1 conditions (for all diseases, stage 3.3). Since these apparent consistencies could be artefacts of shared model design, tests to explore the true consistency of these findings for multiple diseases would be worthwhile. It is possible that more sophisticated, detailed, or larger models or more flexible modeling software62 would facilitate better insights into risk distributions and behavior choices.

There is uncertainty in the reliability of these findings because the models are experimental and have not been tested in real world situations. There is a general lack of reliable quantification for how much misinformation spread impacts real life risk-taking behavior with regard to communicable diseases.

5. Conclusions

We applied three stages of modeling (1 = no misinformation spread, 2 = misinformation making outbreaks worse, and 3 = strategies to reduce the influence of misinformation). Our modeling approach and design is adaptable to many different types of diseases. Controlling spread of misinformation or susceptibility to it could reduce communicable disease burdens. Our stage 3.1 modeling found that a ratio of about 60:40 good:bad circulating advice reduced stage 2 conditions to those of stage 1 in three types of disease. “Immunizing” about 20% of the population against misinformation (stage 3.3) was likely to revert stage 2 to stage 1 conditions (for all diseases). The feasibility of implementing these types of strategies (“immunization” or changing the proportions of types of advice in circulation) should be explored. The efficacy of implementing such strategies to fight “fake news” needs to be tested in real world settings, with costs and benefits ideally compared with real world disease reduction.

#### 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.

The National Institutes of Allergy and Infectious Disease at the National Institutes of Health and the North Carolina Policy Collaboratory, with funding from the North Carolina General Assembly, supported the study.

#### 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].

#### Democratic support for vaccines in East Asia are key to deter Chinese aggression in India and Africa and rising power but low vaccination rates prevents success

Ramani 7/23 [(Samuel, a tutor of politics and international relations at the University of Oxford, where he received a doctorate in 2021. He is the author of a forthcoming book on Russia’s foreign policy toward Africa.) “Vaccines Are Japan’s New Tool to Counter China” Foreign Policy, 7/23/2021. https://foreignpolicy.com/2021/07/23/vaccine-diplomacy-covid-japan-china-competition/] BC

Despite the worsening pandemic at home, Japan’s vaccine diplomacy has gained traction thanks to the country’s desire to burnish its image as a humanitarian aid donor and capitalize on China’s faltering vaccine diplomacy. On June 16, Japan supplied 1 million locally produced AstraZeneca vaccine doses to Vietnam. A week later, the country pledged 2 million additional AstraZeneca doses to Taiwan and Vietnam, and 1 million doses each to Thailand, Malaysia, Indonesia, and the Philippines. Japan has also provided $14.8 million in medical equipment to India and donated another $9.3 million in cold storage facilities for India’s vaccines. Beyond the Indo-Pacific region, Japan has provided $39 million in grants to the United Nations Children’s Fund, which expands Africa and Latin America’s access to vaccines, and recently unveiled the COVID-19 Crisis Response Emergency Support Loan for developing countries.

Although Japan’s vaccine diplomacy has gained much less attention than Russia or China’s efforts, Tokyo’s vaccine and medical aid provisions could have profound geopolitical consequences. Japan’s public health assistance has amplified its challenge against China in Southeast Asia, further consolidated its partnerships with India and sub-Saharan Africa, and could increase the appeal of its signature governance model, which prizes individual responsibility and limited government interference. These trends will likely persist beyond the pandemic and pave the way for more intense competition between China and Japan over the next decade.

Japan’s vaccine delivery announcement to Southeast Asia followed major setbacks for China’s vaccine diplomacy in the region. China’s Sinovac vaccine provides only 50 percent protection in contrast to its U.S.-made counterparts. Meanwhile, Beijing’s “Health Silk Road” vision, which included Indonesia as a major hub for vaccine clinical trials, faltered during the first half of this year. Sinovac’s vaccine production reached only half of its expected level, resulting in smaller-than-expected shipments to Cambodia, Laos, Thailand, and the Philippines. The rapid upsurge of COVID-19 cases in Indonesia, which included the deaths of at least 10 doctors who were fully vaccinated by Sinovac, shook public trust in Chinese-made vaccines throughout Southeast Asia. Filipino President Rodrigo Duterte, who was an early champion of Chinese-made vaccines, apologized for taking the unapproved Sinopharm vaccine and asked the Chinese ambassador in Manila to send back 1,000 doses of the jab.

As confidence in Chinese vaccines waned, the Quadrilateral Security Dialogue (or the “Quad”)—comprised of Japan, India, the United States, and Australia—devised plans to export vaccines across the Indo-Pacific. During the March 12 Quad meeting, the four countries agreed to ship 1 billion vaccine doses to the Indo-Pacific region by the end of 2022. India was the Quad’s leading vaccine distributor in early 2021, but its spiraling infection rates in the spring gave Japan the chance to assume this mantle.

Japan has used its influence in the Quad to encourage the equitable and apolitical distribution of vaccines, distinguishing it from China.

Japan has used its influence in the Quad to encourage the equitable and apolitical distribution of vaccines, distinguishing it from China, which has pressured vaccine recipients over their relations with Taiwan. Japanese Foreign Minister Motegi Toshimitsu has insisted vaccine deliveries be decoupled from diplomatic goals. The country has also championed the “fair distribution” of vaccines regardless of whether the recipient countries are allies or partners. Japan’s policy prescriptions were broadly accepted by Quad countries, although the Biden administration’s initial prioritization of vaccine deliveries to U.S. allies blurred this consensus.

Since China and Japan’s vaccine diplomacy campaigns often target the same countries, they sharpen preexisting competition between the two nations for infrastructure projects and access to local manufacturing sectors. Japan has used its networks with Southeast Asia’s major economic powers, such as Thailand, Indonesia, and the Philippines, to thwart their entry into a Chinese-led economic order. Meanwhile, former Japanese Prime Minister Shinzo Abe’s “quality infrastructure” vision abroad has allowed Japan to preserve its investment advantage over China’s Belt and Road Initiative in Southeast Asia. Doubts about the quality and production efficiency of Chinese manufacturing, which were exposed by China’s botched vaccine deliveries in Southeast Asia, could spill over to construction and infrastructure as well as bolster the advantage of Japanese companies.

Vaccine deliveries have strengthened Japan’s image as a reliable partner for Southeast Asian countries and led to more comprehensive security cooperation. A 2017 Ipsos Indonesia poll revealed 89 percent of Association of Southeast Asian Nations (ASEAN) residents view Japan as a friendly country and 91 percent of ASEAN residents regard Japan as a reliable friend. For instance, Duterte’s praise of the “deep friendship” between Japan and the Philippines, which followed Japan’s donation of 1 million AstraZeneca vaccines earlier this month, aids Tokyo’s efforts to frame itself as a crisis-proof partner for Southeast Asian countries. Duterte’s friendship rhetoric was followed by the first air-to-air training exercises between Japan and the Philippines.

Although Japan’s vaccine distributions are concentrated in Southeast Asia, its medical aid provisions could strengthen its partnership with India and boost its image relative to China in Africa.

Japan’s COVID-19 medical assistance to India has further ensconced its image in New Delhi as an aid donor and partner in times of crisis. Development assistance has played an instrumental role in strengthening cooperation between the two countries. In 1958, India became the first country in the world to receive Japanese official development assistance, and in 2004, India became its largest recipient. After Japan supplied emergency aid to India this April, Indian Prime Minister Narendra Modi asked Suga to visit New Delhi once the situation stabilized and claimed the India-Japan partnership will strengthen international stability in the post-pandemic world order. This contrasts with tensions between China and India, which have persisted in spite of their de-escalation agreement on the Ladakh border.

Vaccine deliveries have strengthened Japan’s image as a reliable partner for Southeast Asian countries and led to more comprehensive security cooperation.

The goodwill created by Japan’s solidarity with India could spill over to the economic and security spheres. As Western countries seek to reduce their dependence on Chinese pharmaceuticals, Japan and India are likely to work together on creating an integrated alternative supply chain. And as Japan-India cooperation on public health occurs within the Quad, it will strengthen the bloc’s cohesion. It has also facilitated the expansion of Tokyo-New Delhi cooperation on Indian Ocean security. The India-Japan maritime bilateral exercise in the northern Arabian Sea last September and the “Free and Open Indo-Pacific” drill this June underscore Japan and India’s use of bilateral security cooperation to complement Quad exercises.

Meanwhile, due to Western countries’ delayed response to Africa’s COVID-19 outbreak, China’s vaccine diplomacy has gained traction throughout the continent. But it hasn’t always boosted China’s image. The upsurge of COVID-19 cases in Seychelles, for instance, which relied extensively on Chinese-made vaccines, mirrors trends observed in Southeast Asia.

Japan is stepping in. It bucked the trend of G-7 disengagement from COVID-19 in Africa by donating $1 million to fight the pandemic under the auspices of the African Union’s Joint Continental Strategy and making strides toward its goal of training 120,000 African health care workers. The Noguchi Memorial Institute for Medical Research in Accra, Ghana, which combatted Ebola, also expanded its role in combatting infectious disease in West Africa. This builds on Japan’s longstanding track record of providing development assistance in Africa, which began with the establishment of the Tokyo International Conference on African Development in 1993.

Japanese public health investments also strengthen the Asia-Africa Growth Corridor—an economic partnership agreement among India, Japan, and multiple African countries—which seeks to reduce the dependence of African countries on Chinese development assistance. As African countries, such as Kenya and Zambia, struggle to pay off their mounting debt burdens to China, Japan’s focus on building strategic partnerships in Africa and no-strings-attached humanitarian assistance during the COVID-19 pandemic could expound on the breakthroughs it has made on the continent.

Japan’s medical diplomacy complements the growing appeal of its governance model in the Global South. As Japan had the lowest COVID-19 infection and mortality rate of any G-7 country, it has actively promoted its success on the international stage. In May 2020, Abe hailed the “Japan model,” which slowed COVID-19’s spread in six weeks. The Japan model emphasized individual responsibility by relying on personal compliance with mask-wearing recommendations and contact-tracing guidelines, and it eschewed sweeping government interventions, such as lockdowns. Hitoshi Oshitani, a prominent Japanese virologist, became the Japan model’s global ambassador and extolled its Three Cs—avoiding close spaces, crowds, and close-contact situations—through regular speeches and interviews. This model appeals to entrenched views in countries throughout the Global South—such as Sri Lanka and Malaysia, which tend to view lockdowns as unnecessarily disruptive to economic development—and is unlikely to be discredited by Japan’s recent uptick in COVID-19 cases.

The contrast between Japan’s pandemic mitigation model and China’s use of stringent lockdowns sharpens the rivalry between both countries on international governance. Japan’s governance model hinges on the premise that safety and freedom can coexist, which differs markedly from China’s sacrifice of liberty for security. Although the efficacy of China’s pandemic mitigation measures received widespread praise in the Middle East and Africa during the early stages of the pandemic, the opacity of China’s COVID-19 response and uncertainties about the virus’s origins have tarnished its success. A 14-country Pew Research Center survey last October revealed negative perceptions of China were their highest on record. In addition to bolstering its time-tested reputation as an international aid donor, which crystallized during the 1980s, Japan’s synthesis of effective pandemic management at home and medical aid allows it to capitalize on negative impressions of China’s COVID-19 response.

Notwithstanding Japan’s low vaccination rates and upsurge of cases ahead of the Tokyo Olympics, Japanese medical diplomacy during the pandemic has been a resounding success. As China’s vaccine diplomacy falters and soft power erodes, Japan’s vaccine and medical assistance provisions could deepen its partnerships in the Global South and enhance the prestige of its flagship governance model.

#### Rise sparks US China war.

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Ryan, "The Tipping Point: Has the U.S.-China Relationship Passed the Point of No Return?," Oct 26, nationalinterest.org/feature/the-tipping-point-has-the-us-china-relationship-passed-the-14168?page=3

Conflict between a rising power and an established power is not inevitable as most realist scholars suggest. However, in every relationship, there is a tipping point or a point of no return, and China and the United States are rapidly approaching this point. As traditional diplomatic outlets have done little to resolve the more challenging issues presently affecting the Sino-American relationship, these two great powers have been increasingly relying on their military capabilities and hard power tactics. That’s especially true in the South China Sea, which is one of the single greatest points of contention between China and the United States. While there is a realization on both sides of the Pacific that a kind of strategic stability is necessary to prevent great power conflict, both China and the United States remain unwilling to compromise and make the kind of meaningful concessions required to move the relationship further from confrontation and conflict and closer to cooperation and rapprochement. Instead, these two countries are drawing lines in the sand and preparing for the worst. Failed pursuit of strategic stability China’s proposed solution to the Sino-American strategic stability issue is the “new model of major-country relations,” which encourages the United States and China to avoid confrontation and conflict, respect one another’s political systems and national interests—specifically China’s core interests—and pursue win-win cooperation. China is exceptionally enthusiastic about this proposal and brings it up at every high-level Sino-American meeting. Chinese enthusiasm for the “new model of major-country relations” can be explained in a number of different ways. American acceptance of China’s proposal would facilitate Beijing’s rise, legitimize the Chinese Communist Party (CCP) as a leader for national strength and revival and reduce the likelihood of American containment. As acceptance of the “new model of major-country relations” would create an international environment conducive to China’s rise, it would essentially allow China to become the preeminent power in Asia without great power competition or conflict. This proposal also has the potential to put China on par with the United States, to elevate it to an equal status, one acknowledged by the United States. Not only would American recognition of China’s strength and power have effects abroad, but it would also stoke Chinese nationalism and strengthen CCP leadership at home. Furthermore, this new model is a means of establishing a new code of conduct for the Sino-American relationship that is more in line with Chinese national interests, opening the door for the creation of a Chinese sphere of influence in Asia and, potentially, a Sino-centric regional order. Prior to the recent meeting between Xi Jinping and Barack Obama, Xi announced that China’s proposed “new model of major-country-relations” would be an important discussion point for the meeting, but, while this proposal was brought up during the meeting, no clear progress was made. Because U.S. leaders believe that the “new model of major-country relations” is not in America’s best interests, the United States has repeatedly dismissed China’s proposal. As the hegemonic power, the United States maintains its power by dominating global politics; to accept a geopolitical framework alternative proposed by a strategic rival requires sacrificing a certain amount of power and influence. Along those same lines, acceptance of China’s proposal might give other states in the international system the impression that the United States is in decline and on the losing end of the classic “Thucydides trap.” Outside of traditional power politics, the call for the United States to respect China’s “core interests”— as many Chinese and foreign scholars have noted—is a loaded statement. While the United States is not opposed to respecting a state’s national interests, it tends to be unwilling to respect national interests which are highly contested, which is the situation for the majority of China’s “core interests.” In addition to traditional Chinese national interests, such as Taiwan, Tibet, and Xinjiang, China’s “core interests” also cover most of its territorial claims in Asia. The United States is concerned that China’s “new model of major-country relations” is a ploy designed to trick the United States into acknowledging China’s extensive territorial claims and undercutting the interests of American allies

and long-time strategic partners in the Asia-Pacific region, which would likely result in the weakening of the American-led “hub-and-spoke” security structure, a security framework China hopes to replace with its New Asian Security Concept. There are also suspicions in the United States that China’s proposal is a call for the creation of spheres of influence, a concept to which the Obama administration has been consistently opposed. America’s approach to Sino-American strategic stability is to have China and the United States focus on cooperation and agree to avoid letting competition in one area affect cooperation and collaboration in others. In many ways, this resembles China’s old “shelving disputes and pursuing joint development” strategy for Asia. As this kind of strategy is the geopolitical equivalent of sweeping dirt under the rug, it is only effective to a point. Eventually, the dirt spills out. Sooner or later, unaddressed problems surface. At best, this approach is only a temporary stop on the road to functional strategic stability. At worst, this approach has already outlived its usefulness. China views this strategy as an attempt by the United States to avoid addressing China’s demands that the United States acknowledge China’s rise to great power status and redefine the relationship accordingly, which only encourages the already strong Chinese desire to push forward the “new model of major-country relations.” China and the United States are at an impasse regarding strategic stability. While both states have made commitments and promises to prevent great power conflict, neither China nor the United States has developed a reasonable or implementable solution for Sino-American strategic stability. Thus, competition continues unmanaged, unchecked and confrontation is steadily evolving into conflict. Drawing Lines in the “Sea” The problems pushing the Sino-American relationship towards conflict are numerous and diverse, but if you are looking for the issue most likely to cause conflict, you need look no further than the South China Sea. China perceives the territorial disputes in this area as issues in which aggressive foreign state actors led by the United States are threatening China’s territorial sovereignty. For China, because of its history, territorial sovereignty issues implicate regime survival in a way that transcends all other quarrels and disagreements. The United States, on the other hand, views China’s territorial claims and actions to bolster those claims as Chinese expansionism, aggression against American allies and strategic partners, and a threat to the guiding principles of the liberal world order—which the United States views as crucial for the preservation of America’s global hegemonic power. The situation in the South China Sea has been steadily escalating for several years now. In April, 2014, American defense secretary Chuck Hagel met with Chinese defense minister Chang Wanquan. During the meeting, Hagel said, “All parties should refrain from provocative actions and the use of intimidation, coercion, or aggression to advance their claims. Such disputes must be resolved peacefully and in accordance with international law.” Chang replied, “I’d like to reiterate that the territorial sovereignty issue is a Chinese core interest. On this issue, we will make no compromises, no concessions. Not even a tiny bit of violation will be allowed.” The inability to discuss openly or compromise on this issue has made it impossible to resolve and has led to escalation and increased tension. In the aftermath of this meeting, China began investing heavily in island construction and land reclamation activities in disputed waters. As these activities have stirred up a lot of dust in the region, the United States has demanded that China abandon its present course of action, insisting that it is provocative and negatively impacting regional peace and stability. Not only has China dismissed America’s demands, it has also increased its military presence in contested areas in order to establish anti-access zones. While China claims that its actions are within the scope of international law, the United States asserts that Chinese actions are in violation of the law of the sea and laws for the regulation of the international commons. China argues that the South China Sea issue is a territorial sovereignty issue, yet the United States regards this issue as a freedom of navigation dispute, as well as a fight for the preservation of the international legal system—a cornerstone for the American-led liberal world order. In August of this year, the United States launched its new Asia-Pacific Maritime Security Strategy, which aims “to safeguard the freedom of the seas, deter conflict and escalation, and promote adherence to international law and standards.” The Asia-Pacific region is now at the heart of the American naval security agenda. In response, Chinese foreign ministry spokesperson Hong Lei said that China “opposes any country’s attempt to challenge China’s territorial sovereignty and security under the pretext of safeguarding navigation freedom.” Responding to Chinese criticisms of America’s new regional maritime security strategy, American Defense Secretary Ashton Carter stated, “Make no mistake, we will fly, sail, and operate wherever international law permits…We will do that at times and places of our choosing.” In 2014, the United States carried out “freedom of navigation” exercises in various parts of the world and challenged the territorial claims of 18 different countries; however, the United States has yet to officially challenge China’s claims in the South China Sea. But, that may soon change, as the United States is currently considering sending American naval vessels within 12 nautical miles of China’s artificial islands in order to force China to end its land reclamation activities. Such plans are considered aggressive, dangerous and extremely provocative by the Chinese. A recent Global Times editorial read, “China mustn’t tolerate rampant US violations of China’s adjacent waters and the skies over these expanding islands. The Chinese military should be ready to launch countermeasures according to Washington’s level of provocation.” The article further stated, “If the US encroaches on China’s core interests, the Chinese military will stand up and use force to stop it.” The article stated plainly, “If the US adopts an aggressive approach, it will breach China’s bottom line, and China will not sit idly by.” Other reports from this newspaper, a state-sponsored Chinese media outlet, have made it clear that if the bottom line for the United States is that China must end all of its land reclamation activities in the South China Sea, then war is inevitable, which suggests that this issue may be the tipping point for the Sino-American relationship. How the United States and China choose to move forward on this issue will permanently redefine the relationship between these two great powers. Granted, this may just be saber rattling, but even if that is the case, this issue is still decidedly zero-sum—which increases the likelihood of conflict. For China, political preservation and a potential Chinese sphere of influence are on the line, and for the United States, the liberal world order and American hegemony are at stake. Sooner or later, this trying issue will need to be resolved, and regardless of whether it is resolved through diplomacy or military force, it will take a toll on the geopolitical influence of either one or both countries. Were the international institutions for collective security strong enough to handle situations like this when they arise—and if China and the United States were willing to establish a new relationship model which addresses each country’s respective security concerns and encourages effective collaboration—it might actually be possible to resolve this issue peacefully. But given current circumstances, this is little more than idealism and wishful thinking. As there is currently no clear solution to this problem that would allow both countries to walk out of this situation with their heads held high, these two states are pondering the unthinkable. Depending on each country’s level of commitment and resolve, this situation may have already passed the tipping point. The outcome of the geopolitical power struggle between China and the United States will almost certainly be decided in the South China Sea. Some have suggested that the South China Sea issue is not a Sino-American issue. On the contrary, it is the most pressing Sino-American issue. One side will either choose to back down or be forced to back down. No matter how everything plays out in the South China Sea, geopolitics in the Asia-Pacific region will never be the same again.

#### China conflict goes nuclear – threat’s underrated, and the US uses bad war planning so don’t assume the perfect strategy during first strike

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As China’s power has grown in recent years, so, too, has the risk of war with the United States. Under President Xi Jinping, China has increased its political and economic pressure on Taiwan and built military installations on coral reefs in the South China Sea, fueling Washington’s fears that Chinese expansionism will threaten U.S. allies and influence in the region. U.S. destroyers have transited the Taiwan Strait, to loud protests from Beijing. American policymakers have wondered aloud whether they should send an aircraft carrier through the strait as well. Chinese fighter jets have intercepted U.S. aircraft in the skies above the South China Sea. Meanwhile, U.S. President Donald Trump has brought long-simmering economic disputes to a rolling boil.

A war between the two countries remains unlikely, but the prospect of a military confrontation—resulting, for example, from a Chinese campaign against Taiwan—no longer seems as implausible as it once did. And the odds of such a confrontation going nuclear are higher than most policymakers and analysts think.

Members of China’s strategic com­munity tend to dismiss such concerns. Likewise, U.S. studies of a potential war with China often excluduclear weapons from the analysis entirely, treating them as basically irrelevant to the course of a conflict. Asked about the issue in 2015, Dennis Blair, the former commander of U.S. forces in the Indo-Pacific, estimated the likelihood of a U.S.-Chinese nuclear crisis as “somewhere between nil and zero.”

This assurance is misguided. If deployed against China, the Pentagon’s preferred style of conventional warfare would be a potential recipe for nuclear escalation. Since the end of the Cold War, the United States’ signature approach to war has been simple: punch deep into enemy territory in order to rapidly knock out the opponent’s key military assets at minimal cost. But the Pentagon developed this formula in wars against Afghanistan, Iraq, Libya, and Serbia, none of which was a nuclear power.

#### Nuke war causes extinction AND outweighs other existential risks

PND 16. internally citing Zbigniew Brzezinski, Council of Foreign Relations and former national security adviser to President Carter, Toon and Robock’s 2012 study on nuclear winter in the Bulletin of Atomic Scientists, Gareth Evans’ International Commission on Nuclear Non-proliferation and Disarmament Report, Congressional EMP studies, studies on nuclear winter by Seth Baum of the Global Catastrophic Risk Institute and Martin Hellman of Stanford University, and U.S. and Russian former Defense Secretaries and former heads of nuclear missile forces, brief submitted to the United Nations General Assembly, Open-Ended Working Group on nuclear risks. A/AC.286/NGO/13. 05-03-2016. <http://www.reachingcriticalwill.org/images/documents/Disarmament-fora/OEWG/2016/Documents/NGO13.pdf> //Re-cut by Elmer

Consequences human survival 12. Even if the 'other' side does NOT launch in response the smoke from 'their' burning cities (incinerated by 'us') will still make 'our' country (and the rest of the world) uninhabitable, potentially inducing global famine lasting up to decades. Toon and Robock note in ‘Self Assured Destruction’, in the Bulletin of Atomic Scientists 68/5, 2012, that: 13. “A nuclear war between Russia and the United States, even after the arsenal reductions planned under New START, could produce a nuclear winter. Hence, an attack by either side could be suicidal, resulting in self assured destruction. Even a 'small' nuclear war between India and Pakistan, with each country detonating 50 Hiroshima-size atom bombs--only about 0.03 percent of the global nuclear arsenal's explosive power--as air bursts in urban areas, could produce so much smoke that temperatures would fall below those of the Little Ice Age of the fourteenth to nineteenth centuries, shortening the growing season around the world and threatening the global food supply. Furthermore, there would be massive ozone depletion, allowing more ultraviolet radiation to reach Earth's surface. Recent studies predict that agricultural production in parts of the United States and China would decline by about **20 percent** for four years, and by 10 percent for a decade.” 14. A conflagration involving USA/NATO forces and those of Russian federation would most likely cause the deaths of most/nearly all/all humans (and severely impact/extinguish other species) as well as destroying the delicate interwoven techno-structure on which latter-day 'civilization' has come to depend. Temperatures would drop to below those of the last ice-age for up to 30 years as a result of the lofting of up to 180 million tonnes of very black soot into the stratosphere where it would remain for decades. 15. Though human ingenuity and resilience shouldn't be underestimated, human survival itself is arguably problematic, to put it mildly, under a 2000+ warhead USA/Russian federation scenario. 16. The Joint Statement on Catastrophic Humanitarian Consequences signed October 2013 by 146 governments mentioned 'Human Survival' no less than 5 times. The most recent (December 2014) one gives it a highly prominent place. Gareth Evans’ ICNND (International Commission on Nuclear Non-proliferation and Disarmament) Report made it clear that it saw the threat posed by nuclear weapons use as one that at least threatens what we now call 'civilization' and that potentially threatens human survival with an immediacy that even climate change does not, though we can see the results of climate change here and now and of course the immediate post-nuclear results for Hiroshima and Nagasaki as well.

### FW

#### Synthetic a posteriori moral naturalism is the basis of ethics:

#### The normative supervenes on the natural – natural facts like whether brains develop to permit rationality or subjectivity determine whether non naturalist moral facts can be premised on things like capacity for reason

**Lutz and Lenman 18.** Lutz, Matthew and Lenman, James, "Moral Naturalism", The Stanford Encyclopedia of Philosophy (Fall 2018 Edition), Edward N. Zalta (ed.), URL = <https://plato.stanford.edu/archives/fall2018/entries/naturalism-moral/>. //Massa

The first argument against normative non-naturalism concerns normative supervenience. **The normative supervenes on the natural; in all** metaphysically **possible worlds in which the natural facts are the same as** they are in **the actual world, the moral facts are the same** as well. **This** claim **has been called the “least controversial thesis in metaethics”** (Rosen forthcoming); **it is very widely accepted.** But it is also a striking fact that stands in need of some explanation. **For naturalists**, such an explanation is easy to provide: **the moral facts just are natural facts, so when we consider worlds that are naturally the same** as the actual world, **we will ipso facto be considering worlds that are morally the same** as the actual world. But for the non-naturalist, no such explanation seems available. In fact, **it seems** to be in principle **impossible for a non-naturalist to explain how the moral supervenes on the natural.** And if the non-naturalist can offer no explanation of this phenomenon that demands explanation, this is a heavy mark against non-naturalism (McPherson 2012).

#### Next, phenomenal introspection can bridge the gap from experiential natural facts to moral truths and necessitates hedonism. When I observe a lemon’s yellowness shifting my visual fields from darker to lighter shades, I can introspect on that experience and identify brightness as an intrinsic property of seeing a lemon. Similarly, when I feel pleasure, I can introspect on the shift in hedonic tones and identify that goodness is an intrinsic property of the pleasure that was increased.

#### This connection between pain and pleasure and phenomenal conceptions of intrinsic value and disvalue is irrefutable – everything else regresses – robust neuroscience proves. The standard is consistency with hedonic act utilitarianism

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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.

Nora Volkow, the director of NIDA, pointed out that one alluring possibility is that the neurotransmitter dopamine plays a substantial role in humans’ ability to pursue various rewards that are perhaps months or even years away in the future. This same idea has been suggested by Dr. Robert Sapolsky, a professor of biology and neurology at Stanford University. Dr. Sapolsky cited evidence that dopamine levels rise dramatically in humans when we anticipate potential rewards that are uncertain and even far off in our futures, such as retirement or even the possible alterlife. This may explain what often motivates people to work for things that have no apparent short-term benefit [51]. In similar work, Volkow and Bale [52] proposed a model in which dopamine can favor NOW processes through phasic signaling in reward circuits or LATER processes through tonic signaling in control circuits. Specifically, they suggest that through its modulation of the orbitofrontal cortex, which processes salience attribution, dopamine also enables shilting from NOW to LATER, while its modulation of the insula, which processes interoceptive information, influences the probability of selecting NOW versus LATER actions based on an individual’s physiological state. This hypothesis further supports the concept that disruptions along these circuits contribute to diverse pathologies, including obesity and addiction or RDS.