



The Urgent Need for Coordinated and Comprehensive Efforts to Combat Misinformation

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Misinformation is by no means a new topic. Documented efforts to misinform date back as far as 44 BC with a political smear campaign against Mark Antony carved on coins. Advances in communication technology, ranging from the invention of the printing press

to the explosion of social media platforms, have accelerated the speed with which misinformation can travel and its global reach.¹

Research has revealed numerous diverse contributors to our susceptibility to misinformation, including cognitive processing factors or reasoning styles; characteristics of the information and source; ease of consumption; political ideology; and demographic factors.¹ Dr. Shurney elaborates on some of these factors later in this issue.

Misinformation about the COVID-19 pandemic has been rampant since the outset,² particularly with regard to mask-wearing¹ and vaccines.^{1,3} In fact, the World Health Organization and other global health organizations⁴ called on the world leaders and other stakeholders to take action to manage the parallel *infodemic* (ie, overabundance of information that includes incorrect information to undermine the public health response). The first Surgeon General’s Advisory issued during the Biden Administration was released by Dr. Vivek Murthy in July, 2021 to caution the American public about the urgent threat of health misinformation.⁵ The Surgeon General warned that misinformation (ie, information that is false, inaccurate, or misleading based on the best evidence available) “can cause confusion, sow mistrust, and undermine public health efforts, including our ongoing work to end the COVID-19 pandemic.”⁵

Misinformation has also led to the use of unproven – and potentially dangerous – treatments for COVID-19, including ivermectin,⁶ an antiparasitic drug used to deworm animals. In addition to overdoses that required hospitalization in some cases, people’s use of this baseless treatment has caused a shortage of the drug for animals who need it.⁷ Research has uncovered links between hundreds of deaths and thousands of hospitalizations globally and misinformation about other untested COVID-19 treatments.⁸ Beyond the pandemic, misinformation also has very real and dire consequences in other areas, not the least of which is its potential to influence voting behavior and spur violence.¹

Addressing the threat of misinformation will require coordinated and comprehensive efforts on the part of the media; health care

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providers and systems; government entities and policy makers; researchers; and educators to assist individuals, families, and communities in more easily recognizing it and limiting its spread.^{1,5} In this issue, Dr. Lindsey Leininger and her esteemed co-authors outline the core communication principles their multidisciplinary team derived from the inspiring and successful social media public education campaign they launched in response to the infodemic.

Researchers have examined the effects of multiple types of other interventions to counter misinformation, including humor and emotion,⁹ narratives,¹⁰ and efforts to change mental representations in ways that are connected to values.¹¹ In this issue, Drs. Roozenbeek and Van der Linden explain that the research on psychological interventions to combat the spread of misinformation has produced mixed results, a theme underscored by others.¹² They eloquently capture the benefits and potential drawbacks of 3 psychological solutions and underscore the need to employ a range of solutions.

Much of the literature acknowledges that the impact of misinformation can persist even despite corrective actions.¹² The Surgeon General also underscored the critical role technology and social media companies have in stemming the tidal wave of misinformation on their platforms.⁵ These companies have numerous tools at their disposal to curtail misinformation, but the efforts will need to be evidence-based and carefully implemented to be effective. A recent review of misinformation interventions¹³ reveals that many of the Americans who have been exposed to such interventions (eg, credibility labels, removal, downranking) fundamentally misunderstood how the interventions were being applied – 40% mistakenly believed that most or all content on online platforms is checked. The authors underscored the importance of clearly explaining the process behind interventions and re-evaluating how platforms operate (eg, additional external oversight). Despite promises to stem the tide of falsehoods about the coronavirus and vaccines, at least 1 whistleblower reported that Facebook is not capable of stopping misinformation.¹⁴ It is important to note that there are differing levels of support for misinformation interventions by political party.¹³

Another critical element in the battle against misinformation is building trust,¹⁵ in part because trust in institutions is a predictor of support for misinformation interventions.¹³ In their article, Calac and Southwell make a compelling case for the need to better integrate thinking about trust and organizational relationships into the emerging scholarship on misinformation. The importance of trust is further highlighted in the final article in this issue by Mr. Udoh, who explains that mistrust for authority is a major contributor to vaccine hesitancy in South Sudan and shares the success Angola has had using trusted volunteer community mobilisers to address vaccine hesitancy related to stigma and misinformation at the community level. In a previous paper, Southwell et al¹⁵ emphasized that patients must feel empowered to raise concerns or ideas – even if they are concerned that the health care provider with whom they are interacting will perceive their idea to be controversial. They recommended that health care providers invite and encourage patients to engage in a dialogue about topics rife with misinformation by utilizing open-ended questions to assess what patients have already heard or learned about that topic.

In addition to those suggestions, Dr. Shurney provides several practical tips about how employers can address misinformation within their organizations.

“The misinformation crisis exemplified and intensified by the COVID-19 pandemic lays a gauntlet at the door of all science communicators.”¹²

The disturbing pervasiveness and wide-reaching impacts of misinformation are indicative that combatting it will indeed require a coordinated global effort.¹ In addition to the insights the contributors to this issue have shared, additional resources and tools can be found on the following sites:

- *A Community Toolkit for Addressing Misinformation* from the Office of the Surgeon General <https://www.hhs.gov/sites/default/files/health-misinformation-toolkit-english.pdf>
- *Based on Science* from the National Academies of Science, Engineering, and Medicine <https://www.nationalacademies.org/based-on-science> which offers timely, evidence-based information about health and science questions that are commonly plagued by misinformation (eg COVID-19, climate change, weight loss, cannabis)
- *The Harvard Kennedy School Misinformation Review*, a new format of peer-reviewed, scholarly publication in which content is rapidly reviewed by experts before being released as open-access (<https://misinforeview.hks.harvard.edu/>)
- *News Literacy Project* (<https://newsliit.org/>), a non-partisan national education non-profit that provides resources for educators and the public to foster news literacy
- *First Draft*, a nonprofit group whose mission is to empower society with the knowledge, understanding, and tools needed to outsmart false and misleading information <https://firstdraftnews.org/>

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How Misinformation Research Can Mask Relationship Gaps that Undermine Public Health Response

Alec J. Calac, BS¹ and Brian G. Southwell, PhD^{2,3}



Public health journals such as the *American Journal of Health Promotion* have spotlighted health misinformation in recent years as a cause for concern.^{1,2} Researchers have noted the diffusion of health misinformation as well as its tendency to complicate decision making by patients and their families. Although undoubtedly the availability of misinformation is notable and unlikely to be helpful, some of our academic focus on misinformation may also distract us from relationship dynamics that pose significant challenges for public health prevention efforts. Just tracking what falsehoods appear in public settings, in other words, may not tell us all we need to know about who is listening to whom and whether health care organizations enjoy trusted relationships with local community members.

Themes in Recent Health Misinformation Research

Amidst the abundance of recent health misinformation research, we can find ample descriptions of various types of misinformation, the diffusion of misinformation online, and evidence on the potential to correct misperceptions.^{1,3-8} Roughly 2 decades ago, Veronin and Ramirez⁴ offered an example of misinformation classification of the sort that some articles still present today. They analyzed claims related to the herb *Opuntia* online and found the majority appeared without any link to peer-reviewed literature. More recently, researchers have looked at Pinterest content related to influenza vaccination and false claims in media coverage of sugar-sweetened beverage tax debates.^{1,3} Work on misinformation correction tends to consider possibilities for overturning misperceptions stemming from

exposure to inaccurate claims and which settings are opportune for debunking misinformation.⁹

Some research has described potential demographic differences in health misinformation acceptance and tendency to share health misinformation. For example, Burel et al¹⁰ assessed whether user gender identity affected health misinformation sharing and also looked for differences between individual vs institutional accounts in misinformation sharing. In a different example, Pan et al¹¹ analyzed health misinformation acceptance with a survey and explored whether sex, age, education level, or income predicted acceptance of health misinformation.

Much health misinformation research tracks online content, likely in part because of the availability of such material for content analysis or to serve as study stimuli. Relatively little of this work, however, assesses the nature of interpersonal relationships in which misinformation (as well as accurate information) is shared. Similarly, available work on misinformation tends to not formally consider patient perceptions of healthcare providers and organizations as a mitigating or amplifying factor accounting for misinformation acceptance, per se. There is a robust literature on trust in patient and provider relationships,

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but the potential intersection of that work with misinformation research warrants more attention than it has received historically.

Roles for Trust in Mitigating Misinformation

We can see the importance of trust in the context of vaccine development involving Native American populations, especially with efforts to enroll members of the Navajo Nation (spanning Arizona, New Mexico, and Utah) in early clinical trials of the COVID-19 vaccine.¹² Although the Navajo Nation Human Research Review Board approved a randomized clinical trial with Pfizer-BioNTech, some tribal members expressed concerns about the pace at which the study was being implemented without extensive in-person consultation with community members, likely necessitated by community-wide lockdowns across the reservation. To promote the trial and answer questions about COVID-19 response efforts, the Navajo Nation held a townhall on Facebook Live with Dr. Anthony Fauci, one of the primary leaders for the country's response to the pandemic. Calac et al.¹³ examined engagement with this event by capturing comments from Facebook users accessing the live stream; comments included at least some misinformation specific to Native American research engagement and lifestyles. The effort to contextualize comments in this case is useful. Research regarding vaccine acceptance in this context could have solely tracked the diffusion of vaccine myths online in that region but any such research that also overlooked generational differences in medical mistrust and tribal member relationships with trial sponsors (eg, Indian Health Service, academic partners) or even community leaders (eg, tribal government) would miss an important component of the situation. In resource-limited settings, such as a Native American reservation, investment in local networks and local resources – rather than simply tracking myths appearing online – can be useful. Community health workers can increase local capacity to address misinformation during times of crisis and continue to promote positive health behavior change in community-based settings.^{14,15}

Importantly, orienting our conceptual understanding of prevention behavior to account for information source considerations and interpersonal relationships might help us avoid stereotyping patient perspectives as somehow being inherently in conflict with preventive medicine. An investigation of vaccine hesitancy found that acceptance of alternative medicine generally did not displace acceptance of vaccines to nearly the same extent as *distrust* of conventional Western medicine did.¹⁶ Their results suggest that institutional relationships likely matter in some cases as much as a particular ideology or mindset regarding medical practice. An often-overlooked consideration is the influence of researcher positionality in cross-cultural and public health literature—the personal views, values, and beliefs of the researcher and the relationship (or lack thereof) that the researcher has with their research participants.¹⁷ Research in community-based settings should be linked to community priorities, not just those of a funder, institution, or even the researcher. We can see this in the work of Indigenous researchers who have proposed several frameworks and mechanisms for the responsible conduct of research with Indigenous communities.^{18,19}

Healthcare professionals and public health workers who are concerned about the prevalence of misinformation in the digital era and seek ways to address the situation could consider on-the-ground trust-building efforts as a path forward. Insofar as improved patient-provider communication and trust helps steer patients away from misinformation they might encounter when not talking with a provider,

efforts to maintain and bolster trust offer a potential remedy to the dilemma of misinformation that we face.²⁰ These efforts may be expedited by increasing patient-provider racial concordance or partnering with a diverse array of messengers. A review on patient-provider communication found that while differences in cultural values can matter problems of miscommunication often stem from racism, biases, linguistic barriers, or different relationship expectations between patients and providers.²¹ When considering that attitudes and beliefs about vaccines and vaccination are influenced by political, cultural, and social influences, this should especially motivate efforts to train providers from groups underrepresented in healthcare.^{9,22}

Conclusion

Our burgeoning literature on health misinformation documents an important facet of our current information environment. The tendency of that literature to focus on what false claims are circulating and who accepts and shares those claims, however, poses a potential distraction from questions about existing and potential relationships between patients, healthcare professionals, and healthcare organizations. Insofar as building and rebuilding trust between patients and healthcare professionals may help patients avoid the pitfalls of health misinformation, we should seek to better integrate thinking about trust and organizational relationships into the emerging scholarship on misinformation as a public health threat.

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Fight Like a Nerdy Girl: The Dear Pandemic Playbook for Combating Health Misinformation

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Raging alongside the COVID-19 pandemic, a parallel “infodemic” – an overwhelming swirl of information, both good and bad – has seriously compromised pandemic response.¹ Medical falsehood is not a new problem; in the words of medical sociologist Nikolas Christakis, “everywhere you see the spread of germs, for the last few thousand years, you see right behind it the spread of lies.”² But its ability to scale thanks to modern digital platforms represents a new and greatly intensified threat. Indeed, the impact of harmful information during the pandemic has been so profound that premier scientific leaders including the Director-General of the World Health Organization and the U.S. Surgeon General have issued urgent calls for the health sector workforce to proactively fight back.^{3,4} Like many other scientists, our all-woman team of “Nerdy Girls” took seriously this call. In March 2020 we launched a public education campaign on social media to do our part to fight the infodemic. Over 18 months and more than two thousand Facebook posts later, we have refined a set of core communication principles and named them with the mnemonic LET’S LEARN. We anticipate that these principles will feel

intuitively familiar to health promotion professionals. Formalizing them into a framework provides shared language with which we can

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support each other as we navigate the new professional frontier of infodemic management.

Background

What is Dear Pandemic and Who are Those Nerdy Girls?

We started Dear Pandemic in early March 2020 because we were asked to. At that early moment in the pandemic, colleagues, friends, and relatives were sending questions by the hundreds to our inboxes. They devoured our individual emails and Facebook posts and encouraged us to fill the information void for a broader audience. At that point in time, we saw few sources of timely, trustworthy, comprehensive information available to help people navigate the pandemic overwhelm – especially on Facebook, our primary platform. After a friend called us “Those Nerdy Girls,” we embraced the identity and launched Dear Pandemic – a play on the “Dear Abby” advice columns.

Our organic following grew, and in July 2020 we formally launched a non-profit designed specifically to help people cope with health information overwhelm. Our team now includes scientists with expertise ranging from immunology to epidemiology to mental health. We have disseminated over 2000 evidence-based posts about staying safe and staying sane during the defining global health crisis of a century. Dear Pandemic has garnered over 170 000 followers across social media and stewarded a website frequented by clinicians, journalists, and other professionals seeking well-curated answers to common COVID-19 questions. Our website was selected for the Library of Congress’ (planned) digital pandemic archive. The Nerdy Girls have done hundreds of media appearances, presented everywhere from middle school classrooms to the halls of Congress, and donated hundreds of hours advising community organizations.

Through prototyping and iterating on Dear Pandemic’s educational content, we have grown our way towards a set of communication principles that now anchor our efforts.

Let’s Learn

L – Listening and Empathy Come First

In the Dear Pandemic community, learning is a two-way street. Our readers are among our best teachers. We have created a system for soliciting questions via a simple form on the Dear Pandemic website and use its contents to generate post topic sentences. These topics use a question-and-answer format, providing an easy way to build rapport with our community. It has also disciplined us to center the information needs of readers in creating our content. Through dedicated listening to the website form entries and to comments left by readers across our social media platforms, we have learned that our community appreciates practical information delivered with a friendly and calming tone. They look to us to turn down the volume on the fear and anxiety often provoked by attention-grabbing headlines and political squabbling.

Cultivating a two-way dialogue, termed “social listening” in infodemiology research,⁵ is also considered a best practice in the broader health communication and promotion literatures,^{6,7} and is already familiar to and embodied by health promotion professionals. Methodological approaches can range from our simple Q&A format to the World Health Organization’s highly

sophisticated machine learning-driven social listening of large social media platforms.⁵ Our methods provide proof-of-concept that even simple efforts to elicit community feedback can reap great benefits if done with intention.

A trio of nurse-scientist Nerdy Girls led the adoption of an empathy-first communication style. Trained in the art and science of developing therapeutic relationships, nurses are uniquely skilled at communicating health information in a respectful manner, prioritizing patient autonomy and a harm reduction approach.⁸ Communicating with kindness is a Dear Pandemic core value. It does, however, present a trade-off with potential reach of our content. Behavioral science demonstrates what media and marketing professionals know instinctively: Content evoking extreme emotions, such as anger and outrage, drive higher levels of online engagement compared to less hyperbolic content.⁹ While our readership has sought out a calmer platform (as mentioned earlier), this approach may limit the “viral” potential of our posts and ability to reach new audiences.

E – Engage Partners






Trust is the key currency in health communication.⁷ Aligning with the broader literature,¹⁰ we have found that finding the right messenger(s) is typically more important than crafting the perfect message in effectively serving a community’s information needs. We appreciate that the Nerdy Girls are not the appropriate messenger for many communities we care deeply about, and we actively seek to scale our impact partnering with other science communicators who speak to communities different than our own. To facilitate dialogue, we brought together a “Nerdy Neighborhood” of fellow science communicators who speak to online and geographic communities across North America, South America, and Europe. Like others seeking to push out credible health information on social media, all of us struggle to break out of social media echo chambers. Much of our bridge-building to other audiences, therefore, has necessarily taken place offline. Whenever possible, we try to match the right Nerdy Girl with the right topic and audience for these efforts. A few examples: Philadelphia-area team members have collaborated with the Philadelphia Department of Health; Wisconsin-based team members serve as regular radio and news sources across the state; the Editor-in-Chief of *Querida Pandemia*, our Spanish-language Facebook page, regularly serves as a resource for Telemundo; and the business school team member collaborates with a variety of employers and industry groups (eg, U.S. Chamber of Commerce Foundation).

We have learned that our online and offline efforts are mutually reinforcing. Offline events spark interest in our online content, and vice-versa. Interestingly, our partner organization IMPACT4HC adopted a geography-first approach to fighting the infodemic, bringing together a coalition of Chicago-based health care providers, and have found that their place-based infodemic management efforts have yielded appreciable online spillovers.¹¹

T – Transparency is Non-negotiable

The rapidly evolving crisis, advances in scientific understanding, and the mismatch between the speed of the news cycle and the speed of science requires us to continuously update and amend topics we have covered before. Early on, we shared a concern that ibuprofen

Table 1. LEARN(ing) Science Tactics.

Tactic	Dear Pandemic Example
 L Look Use images alongside text Learning science concept: Combining images with text boosts understanding relative to using either mode alone. ¹⁸	Prioritizing graphic design. We use our scarce financial resources to pay for a professional designer experienced in science communication
 E Examples Use worked examples Learning science concept: Concrete examples facilitate learning better than abstract definitions. ¹⁹	Providing a sample conversation in a post discussing evidence-based tips for combatting conspiracy theories
 A Analogies Use analogies Learning science concept: Our brains learn new information best by comparing and contrasting with existing knowledge. ²⁰	Frequently referring to the popular “Swiss Cheese” analogy of non-pharmaceutical interventions. This analogy reinforces the core message that while no one mitigation layer is perfect on its own, a combination of layers creates solid protection
 R Rule Use the “Rule of three,” then Repeat Learning science concepts: <ul style="list-style-type: none"> • “chunking” content into three categories honors working memory constraints²¹ • spaced repetition of core content solidifies understanding²⁰ 	Communicating basic principles in 3s. For example, our “Laws of infodemiology,” include: <ol style="list-style-type: none"> 1. Demand extraordinary vetting for extraordinary claims; 2. Proactively seek out competing views; 3. Amplify good information and cut off the oxygen to the toxic stuff Repeating our SMARTS framework consistently and across varying contexts. S: Keep your space! M: Mask up! A: Airflow - keep it fresh! R: Restrict your social bubble! T: Time - keep it short! S: Shots - get vaccinated!
 N Narrative Use stories Learning science concept: Stories build connection and are psychologically privileged in memory. ²²	Sharing our personal stories as moms to build trust and relatability. We also celebrate and share stories of inspiring women scientists

may exacerbate COVID symptoms, a hypothesis that was subsequently overturned. Like many other science communicators, we got it wrong on masks initially, too. Often our readers catch typos and provide necessary notes of context. We update the posts accordingly to include their contributions, always noting when original posts have been changed. Although message consistency is considered a best practice in risk communication,¹² this ideal is not always feasible in crisis contexts characterized by high levels of uncertainty. Unfortunately, shifting scientific guidance has been weaponized against public health leaders during the pandemic, requiring those of us on the information frontlines to tackle it head on. For example, we wrote updated posts correcting the ibuprofen confusion and have continuously stayed on the ever-evolving mask beat (To mask or not to mask? Cloth or medical? Double up? KN95 for the general public?).¹³ While openly admitting uncertainty makes audiences uncomfortable – referred to as “ambiguity aversion” in behavioral science¹⁴ – this frustration can be lessened somewhat via consistently normalizing it.¹⁵ Moreover, in our

experience, short-term ambiguity aversion is a small price to pay for a long-term increase in audience trust that comes from honestly communicating about unknowns.

S – Source and Vet Data Rigorously

We strive to be open and voracious learners. We peer review each others’ posts and require that they be sufficiently well-referenced. Our readers often note that they appreciate the reference lists at the bottom of our posts, even if they do not make the time to go check out the technical citations themselves. As scientists and clinicians, we fell naturally into a reporting style that aligns with the core journalistic ethics of source verification, provision of sufficient context, avoidance of conflict-of-interest, and accountability.¹⁶

We also write a dedicated beat on “information hygiene,” which shares news and media literacy tools along with making explicit scientific habits of mind. Example posts include “How to Think Like a Scientist”; “Prebunking’ Offers Strong Immunity to Fake News”;

and “How Can I Stand Up for Science on Social Media?”¹⁷ Over time we have learned that blending content focused on scientific literacy with media literacy is a core requirement for our work.

LEARN(ing) Science Guides Content Production

We Nerdy Girls hold sacred our educational mission. As educators, we are committed to grounding our content in the following set of learning science tactics displayed in Table 1.

Conclusion

Access to trustworthy, relatable, and well-curated health information is a fundamental determinant of health,²³ as is the ability to discern fact from falsehood. The success of the Dear Pandemic campaign demonstrates that the health promotion toolkit – synthesizing complicated science for lay audiences, translating evidence into actionable behaviors and policies, and communicating with empathy – is powerful for building effective and resilient health information networks.

What’s next for the Nerdy Girls? We have recently launched a research lab contributing to the newly invigorated scientific discipline of infodemiology. Intentionally bringing together many disciplines to share perspectives – including data science, health communication, behavioral science, and epidemiology – infodemiology seeks to provide a robust evidence base supporting infodemic monitoring, detection, intervention, and evaluation.²⁴ Our hope is that by combining infodemic practice and research, we can be helpful to fellow health professionals working hard to amplify the impact of good health information and lessen the impact of the bad.

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The Role of Employers as Guardians Against the Growing Assault on Truth

Dexter Shurney, MD, MBA, MPH^{1,2}

Truth is being challenged today throughout the world and in our country. The workplace is no exception. Employers have workforces deeply divided with workers polarized on opposing sides on topics that range from global warming to mask wearing. And it is no wonder. With so much conflicting information available on these and other topics, many people no longer know what to believe. This poses a real problem when people no longer know the best way to protect their health and well-being. While employers may have limited authority to change what their employees do outside of work, they are in a unique position to guard and promote the truth in the workplace, especially when this can improve the health and well-being of their workers.

The anti-vaxxer movement is a prominent example of how people gravitate toward a cause based on strong beliefs not necessarily based on science. Fueling the passion of both the anti-vaxxers and COVID vaccine proponents is the belief by each side that they are right based on what they believe is true. Everywhere you look today, there is a war on the truth. In such a tangle, it is hard for people to figure out who or what to believe and to hone in on the truth that's based on facts. Even in scientific communities, there is often disagreement, so the issue goes deeper than ascertaining truth based on intelligence.

The war on truth is not new. Weight loss miracles from decades past, even quackery and snake oils from the last century, are proof that the problem has been around for quite some time. COVID-19, however, has certainly exacerbated the issue and brought into clear focus the dangerous consequences that can result when seemingly sensible-minded, intelligent people become mistrustful of scientific data and instead rely on perceived "truths" — beliefs they have developed based on sources like social media, their circle of friends, or their favorite politicians. Technology and social media, as well as the decline of traditional news outlets like daily newspapers, contribute to the overall problem. Virtually anyone with internet access can now publish information out to the world instantaneously — no fact-checking required.

With the problem so large, employers may wonder what they can possibly do to help their employees identify good, reliable information based on facts and backed by science so that they can make better decisions, especially when it comes to their health and well-being. The good news is that employers are ideally positioned to serve as guardians against the growing assault on truth

because their workforces are captive audiences that can be engaged on demand. When employees make better decisions about their health because they have weighed the best information available, the return on investment will benefit their workers, their organizations, and even have potential impacts far beyond the workplace.

Understanding How Our Brains Are Wired

Before engaging employees, it is important first for employers to understand that our brains are wired the way they are based on millions of years of evolution. Conformity bias — the tendency to conform with and shape our beliefs based on what our peers believe, for example, is based on survival instinct. Sticking with the herd means survival, while those who stray from the pack and wander off on their own are more likely to be targeted by predators. Because of conformity bias, it is easier for people to go with the flow and believe something that everyone around us believes rather than think for ourselves.

The 3Line Experiment, also known as the Asch Conformity Experiment, is a classic example of how strongly people are affected by conformity bias.¹ In this 1951 experiment, social psychology pioneer Solomon Asch devised a vision test that challenged participants to correctly identify which of 3 lines matched the "target line" of 3 inches. One line exactly matched the length of the target line, while 1 was obviously shorter and the other longer. Unbeknownst to participants, the 7 other people in the room with them during the experiment were working in collaboration with Asch and had been told to choose an incorrect answer. The true participant sat at the table with the "stooge" participants and were always asked to give their answer last. The results: about 32% or one-third of participants gave the same

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answer as the stooges even though it was clearly evident based on their own sense of sight that their answer was incorrect. Over a total of 12 clinical trials where stooges gave the wrong answer, 75% of real participants gave a wrong answer at least 1 time; whereas in a control group with no stooges but only real participants, only 1% gave the wrong answer.²

In interviews after the trials, the majority of participants said they knew their answer was wrong when they gave it but wanted to go along with the group, leading Asche to conclude that group pressure had influenced their behavior. The study had revealed 2 important “truths about human psychology: we do not like to disagree with others, and we often trust the judgments of others over our own,” said Cailin O’Connor and James Owen Weatherall in *The Misinformation Age*.³

Confirmation bias is another tendency that we have developed as humans during the evolutionary process. Research shows that confirmation bias causes a person to engage and believe information and things that conform to their existing values and worldview, and on the contrary, to avoid information that challenges or threatens their beliefs.

Here’s a simplified example of confirmation bias at work. If a person believes in God, when positive things happen in their lives, they often attribute these occurrences to divine influence from their higher power. Whereas an atheist might simply write off the same events as coincidence or luck. In other words, the religious person will look for signs in their everyday life that their God is there at work because that supports what they already believe.

Confirmation bias not only has humans searching for and cherry picking the information that confirms what they already regard as truth, but also causes us to weight information higher if it supports our values and beliefs.

What other tendencies have we developed through evolution? Here are 3 that are powerful and worthy of noting.

- We want to be “in the know” to prove that we are smart, unique or superior in some way. Recent research showed that approximately 65% of Americans believe that their IQ is higher than average, even though statistics do not support this as truth. To prove that we are smart, we have a basic desire to seek out information that others do not know. It is comparable to insider trading — we gravitate to the kind of information that gives us an advantage or edge over someone else.
- We love sensationalism, and why not? Fiction is often much more fascinating than fact. Facts can be boring, while fiction is often novel, entertaining, and tantalizing. There’s a reason bad news dominates headlines. People gravitate towards sensational stories more than factual ones.
- People love good news about their bad habits. In other words, it is easy to believe something is true if you want it to be true. Sometimes people support a theory because it reinforces the beliefs they have or the lifestyle they already live. If a person loves to eat butter or bacon, for example, they will tend to believe an article that says bacon and butter is good for them, while dismissing information, even from reliable sources, that says these foods are unhealthy as misinformation.

Misinformation vs Disinformation: What’s the Difference?

Misinformation and disinformation both disseminate inaccurate data, but there is a marked difference between the 2. Disinformation is

intentional and relies on the use of specific tactics usually to push a hidden agenda. For example, tobacco companies started their own research organizations to publish studies that indicated tobacco use was not harmful so that consumers would continue to buy and use their products. Their fabricated findings contradicted scientific research that proved that tobacco use was harmful. These contradictions, designed to confuse, raised questions in the minds of consumers, leaving them unclear about what the truth was. Likewise, today disinformation about the climate, COVID-19 vaccines, and diet and nutrition seems to be everywhere we look.

While not intentional, misinformation can be potentially as harmful as disinformation, by muddying the water between proven science and myths. This causes people to question science-based fact and become confused about what exactly the real truth is, leading them to make unhealthy decisions.

Opposing information about climate change, what constitutes a healthy diet, and how to best manage COVID-19 are relevant examples of issues where the truth seems unclear today. Misinformation and disinformation have both raised questions that make it difficult for the average person to discern the truth from false statements. Some people may even go so far as to admit they are clueless about what the real truth is because they believe science is not clear, when in fact, the proven scientific facts are often very clear. It is just hard to identify them with so much bad information available.

Why Do People Fall for Disinformation?

Those who are pushing disinformation in the interest of hidden agendas understand very well the way the human brain is wired, and they rely on our evolutionary instincts to make us think a certain way.

For example, they use conformity bias to sway our thinking by confirming what we want to believe in the first place. They tantalize us with interesting albeit false data. And they lead us to believe that everyone else we know agrees with their information so it must be true. Social media is a sophisticated tool that can be used to promote the hidden agenda of disinformation disseminators. And after all, if that influencer that we love on Facebook holds a tenet to be true — the COVID-19 vaccine is going to alter our DNA, for instance — then there must be some truth to it, even when common sense tells us the opposite.

Here are 3 popular disinformation tactics that you can rest assured that quacks and politicians know equally well and will shamelessly use. Think of these as the “tools of the trade” that enable the promotion of disinformation.⁴

1. Poison the well: Bring into question the integrity of the individual or organization presenting scientific information.
2. Create uncertainty: Flood the market with an overwhelming amount of contradictory research that causes people to be confused about what is true and what is not.
3. Polarization: Create an “us vs them” mentality that turns people against each other so that they will not listen to or believe anything the opposition says; for example, Republicans and Democrats in the current political climate.

The polarization caused by disinformation can be dangerous because it divides people and often pits 1 group of people against another. To demonstrate how powerful disinformation can be when it

comes to polarizing people, Henri Tajfel⁵ conducted a research study in the 1970s on discriminatory intergroup behavior. In the study, a group of teenage boys who knew each other were randomly separated into arbitrary groups and then fed false information about the differences between them and the boys in the other group. Rather than trying to maximize their own group's gains, the boys in the dominant group were willing to take actions not in their best interest if it caused even greater harm to the other groups. "Far from their behavior showing a pure desire to maximize their group's gains, they often gave their group less to increase the difference between them and the out-group," Tajfel discovered.^{6,7}

How Can Employers Guard the Truth and Promote the Best Science?

1. First, remember you are dealing with normal people. Condescension and patronizing behavior do not allow you to build mutual trust, respect, and cooperation. Instead, take a hard look at yourself. Some of your own beliefs – on religion, on UFOs, etc. – might be considered by others to be conspiracy theories.

When engaging employees, it is important for employers to be mindful of the way human brains are wired from an evolutionary perspective to formulate beliefs. If some employees hold beliefs that seem outrageous, it is not because they lack intelligence, it is more likely because of the onslaught of misinformation and disinformation that they are exposed to on a daily basis, combined with their tendencies to confirm with the group or to confirm their pre-existing beliefs. And never forget that there are forces at play, some intentional and some unintentional, that have caused employees to formulate their beliefs, even if they seem far-fetched.

2. Truth Matters. = Only share fact-based information from the most reliable sources. And be ready to back up what you say with clear specifics that most people can understand, such as statistics and other data presented in plain language. Visuals can help to get the point across, especially in a diverse work climate.
3. Rely on experts and trusted influencers to help promote health recommendations that are grounded in science and backed by strong data and research. Fortunately, health care experts are still trusted by the majority of people. One exception is the

Centers for Disease Control and Prevention (CDC). The CDC has traditionally been a trusted organization; however, since the COVID-19 pandemic, it is now mistrusted by some people who view it as being aligned with a political agenda different than their own.

4. Leverage team-building exercises to break down silos to reduce polarization and the "us vs them" mentality between employees who are divided on issues. Continue to drive home the fact that we all have more in common than we think, and that our commonalities are more significant than our differences.
5. Be patient. Getting people to change their mindsets and beliefs to rely more heavily on truth that's backed by science, especially if it is different than what they are hearing from friends and family, takes time. The challenge is even greater when you consider that we as humans want to be "in the know," that we seek out the sensational, and that we love good news about our bad habits. Simply put, change is not going to happen overnight, but it can occur over time with subtle nudges and by consistent promotion of truthful information that's backed by science.

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How to Combat Health Misinformation: A Psychological Approach

Jon Roozenbeek, PhD¹ and Sander van der Linden, PhD¹

During the COVID-19 pandemic, it has become increasingly clear that misinformation presents a significant threat to public health.^{1,2} A much-cited example is that of COVID-19 vaccine uptake: belief in false or misleading statements about COVID-19 has been linked to reduced intentions to get vaccinated,³ to the point of potentially threatening herd immunity.⁴ More broadly, the spread of

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vaccine misinformation, such as the false belief that vaccines are linked to the development of autism in children, has contributed to some parents opting out of childhood vaccinations.⁵

The spread of misinformation poses a challenge in other public health domains as well. To give some examples: misperceptions about autism and available treatments can contribute to opportunity costs and direct harm for people with autism and those around them.⁶ Exposure to misinformation about e-cigarettes can influence people's self-reported decision to purchase them.⁷ And, starting in the 1950s, major tobacco companies have sought to undermine, downplay, or discredit scientific evidence of the dangers of smoking tobacco products through aggressive marketing and public relations campaigns,⁸ and likely with some success: a study in which participants were shown YouTube videos containing misleading information about tobacco products showed that people who watched such a video subsequently had more positive attitudes towards such products than a control group.⁹

Given the scope of the problem, researchers have proposed and developed a variety of approaches to reduce the spread of and susceptibility to health-related misinformation.^{1,10} Such solutions can be technological (such as developing automated fact-checking methods),¹¹ educational,¹² legislative,¹³ and psychological² in nature.

In this article, our focus is on the latter. We will discuss 3 high-profile psychological solutions used to combat the spread of health misinformation: post-hoc corrections of misinformation or “debunking”; priming people to be mindful of accuracy, or “accuracy primes” (sometimes called “accuracy nudges” or “accuracy prompts”); and preemptively building resistance against future exposure to misinformation through psychological inoculation, also known as “prebunking”.

Debunking: Correcting Misinformation Post-Hoc

An intuitive approach to combating health misinformation is to correct misperceptions after they have gone viral, for example through fact-checking. Initially, researchers raised concerns over potential backfire effects¹⁴: could correcting misperceptions ironically strengthen people's belief in them? For example, because falsehoods are typically repeated when correcting them, people may become more likely to believe misinformation due to the “illusory truth effect”, which states that repeated false information is perceived as more accurate.^{15,16} This is thought to happen because repetition strengthens memory associations with the myth and people fail to encode the correction. More recent research, however, has found that the overall stability and prevalence of such backfire effects are unclear¹⁷ and thus the risk of side effects of debunking generally appears to be low.

However, while corrections may not frequently backfire, this does not mean that debunking is always effective. The perceived expertise and especially trustworthiness of the source of the fact-check, for example, matter for corrections of misinformation.^{18,19} The level of detail provided in the fact-check is also important: it is essential to provide an explanation of why the information that is being debunked is false, and what is true instead.²⁰ Because corrections leave a gap in people's memory, an alternative explanation should be provided when possible. For this reason, simply providing a warning saying “fact-checked and rated false”²¹ is unlikely to be effective. Indeed, a study on corrections of misinformation about autism found that

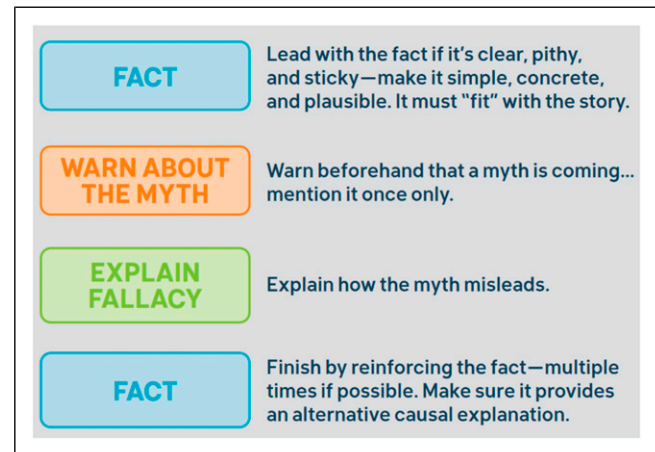


Figure 1. Optimised debunking strategies^{23(p12)}.

an optimal debunking strategy outperformed a less detailed debunking template in terms of reducing misperceptions.⁶

In light of these insights, a broad spectrum of researchers have recently collaborated on a series of “debunking handbooks”, which summarise the available literature and provide practical guidance on how to correct misinformation, including about health-related issues such as COVID-19 vaccines.^{22,23} Figure 1 shows an infographic from the *Debunking Handbook 2020*^{23(p12)} explaining how to optimise effective debunking for (health) practitioners.

Nonetheless, there are still several limitations to debunking. First, post-hoc corrections rarely reach the same number of people as the misinformation. For example, recent estimates show that the court-ordered corrective ad messages from the tobacco industry about their misinformation campaign only reached about 40% of smokers²⁴ and mostly failed to generate engagement on social media.²⁵ Second, people can continue to rely on misinformation even after it has been debunked, a phenomenon known as the “continued influence effect”.^{26,27} Third, due to the aforementioned “illusory truth effect”, if people see a piece of misinformation multiple times prior to correction, it may become more difficult to correct it. And fourth, source credibility matters, which means that fact-checks may be ineffective if the source is not trusted by those who see it.^{19,28} In other words, debunking alone is not sufficient, and proactive approaches are needed to supplement fact-checking as a way to combat health misinformation.

Accuracy Primes: Priming People to be Mindful of Accuracy

Effective anti-misinformation interventions require insight into the reasons why people believe and share misinformation in the first place. Some scholars argue that people's (political) identity predominantly influences whether they are likely to fall prey to misinformation, for example when it is congenial to their political beliefs.^{29,30} Others note that online echo chambers with reward and punishment mechanisms (eg, likes and dislikes) can bolster the spread of false content.³¹⁻³³ A third interpretation holds that people primarily fall for and share misinformation because they are not paying sufficient attention, for example because social media environments can be distracting.^{34,35} In line with this inattention account, researchers have proposed that priming people to be more attentive to

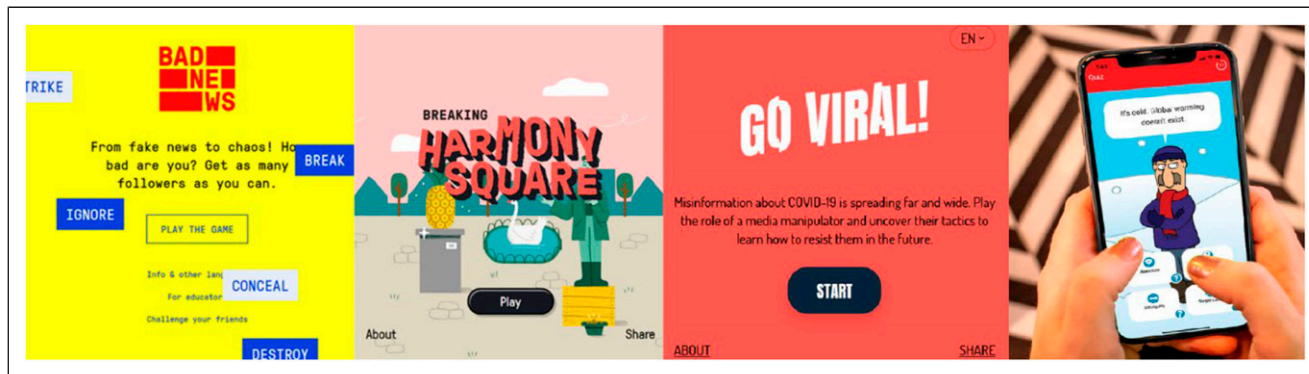


Figure 2. *Bad News* (www.getbadnews.com), *Harmony Square* (www.harmonysquare.game), *Go Viral!* (www.goviralgame.com) and *Cranky Uncle* (www.crankyuncle.com) game environments.

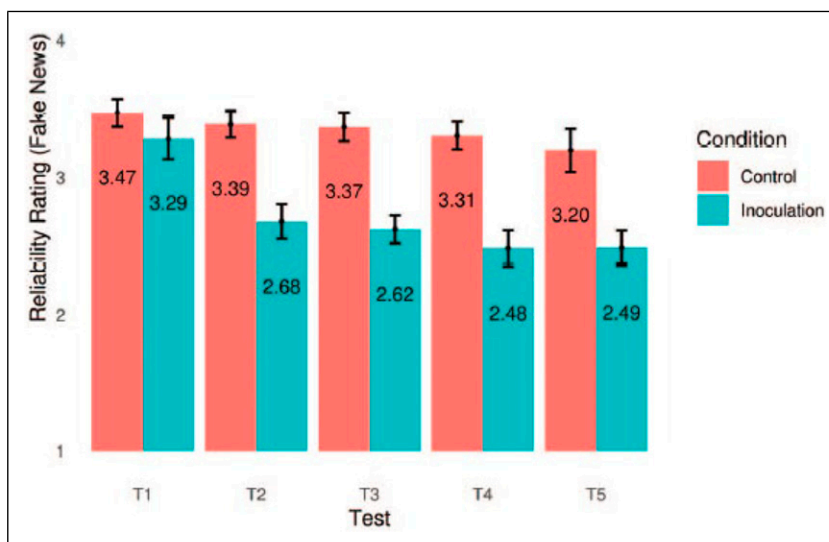


Figure 3. Perceived reliability of misinformation before the intervention (T1), immediately after the intervention (T2), and 1 (T3), 5 (T4) and 13 (T5) weeks after, for the inoculation (*Bad News* game players) and control (*Tetris* players) group. Error bars show 95% confidence intervals. Reprinted with permission from Maertens et al.⁵⁸

accuracy should mitigate this lack of attention, and therefore reduce misinformation sharing on social media. In a series of experiments, researchers found that subtly priming people to the notion of accuracy (by asking them whether a random headline is true or false) subsequently increased the quality of their “sharing decisions”^{36,37}: participants who had received such an “accuracy prime” (or “accuracy nudge”) were better at discriminating between true and false headlines about COVID-19 than people who had not.³⁶

However, a series of independent replications have revealed that accuracy primes suffer from several important limitations. First of all, attempts to replicate accuracy prime experiments are mixed and not consistently successful at reducing people’s willingness to share false headlines.^{38,39} Only after researchers collected a sample of about twice the size of the original experiments did they find a small effect, at about 50% of the original study’s effect size.³⁹ Second, accuracy

primes can be moderated by partisanship such that they appear to be ineffective for people who strongly identify as conservative, at least in the United States.³⁸⁻⁴⁰ Third, there is some indication that the effect conferred by accuracy primes occurs predominantly in the first few seconds after exposure (the treatment effect dissipated after participants rated about 7 headlines), although this initial finding requires further investigation.³⁹ Finally, a recent study into the performance of “nudge” interventions (which accuracy primes/nudges fall under) in controlled laboratory experiments compared to “in the wild”, found that the take-up effect of such interventions in the lab is about 6.2 times larger than in the field (8.7% vs 1.4%⁴¹). This implies that we may expect a significant additional impact reduction when accuracy primes are applied in, for instance, social media environments.¹ Thus, while accuracy primes have shown promise as a simple intervention to reduce the sharing of health misinformation, how effective they are in practice remains an open question.

Inoculation Theory and “Prebunking”

A third psychological approach to tackling health misinformation focuses on increasing people’s ability to resist it through pre-emptive debunking, or “prebunking”.⁴²⁻⁴⁴ The most commonly used framework for prebunking is inoculation theory,⁴⁵ which, following the biomedical analogy, posits that people can develop attitudinal resistance against unwanted persuasive attacks by pre-emptively exposing them to a “weakened dose” of the persuasive argument.^{45,46} Such a psychological “inoculation” treatment consists of 2 key components: (1) a forewarning of an impending attack on one’s belief or attitude, and (2) a pre-emptive refutation of the argument.⁴⁷

There are 2 dominant approaches within inoculation research: *issue-based* and *technique-based* inoculations.⁴³ Issue-based inoculations seek to confer psychological resistance against specific misleading arguments, such as about the level of scientific consensus on climate change.⁴⁸ Within the context of health misinformation, issue-based inoculations have shown to be more effective than post-hoc corrections at increasing people’s intentions to vaccinate a (fictional) child after being exposed to vaccine misinformation.⁴⁹

Technique-based inoculations focus on building resistance against the rhetorical techniques and strategies that are commonly used to mislead people, such as the use of emotionally manipulative language,⁵⁰ evoking outgroup animosity and polarisation,^{51,52} logical fallacies,⁵³ fake experts,^{54,55} or conspiratorial reasoning.^{56,57}

The “virtual needle” or type of intervention used to inoculate people against misinformation techniques can range from reading a simple text⁵⁴ or set of infographics,⁵⁵ to watching a video,^{53,58} or playing a game. Each type of intervention has its advantages and drawbacks: reading a short text is easy to implement at scale, but confer smaller effect sizes than videos and games, may not draw people’s attention, and effects may decay rapidly,⁵⁵ videos are also scalable and yield a substantial effect size, but are difficult and expensive to make and test and require cross-cultural adaptations,⁵⁸ and games yield large effect sizes and confer long-lasting effects,⁵⁹ but require a large buy-in (people need to want to play a game) and may be more difficult to scale.⁵³

Examples of interactive inoculation games (which simulate a social media feed) include *Bad News*, *Cranky Uncle* (about climate misinformation), *Harmony Square* (about political disinformation and polarisation), and, most relevant to public health, *Go Viral!* (about COVID-19 misinformation). See Figure 2.

Studies have shown that playing such inoculation games decreases the perceived reliability of misinformation^{60,61}; increases people’s confidence in their ability to spot misinformation^{62,63}; and reduces their willingness to share misinformation with others.^{55,64} These findings were replicated in multiple countries.^{55,65} Furthermore, a longitudinal study found that the decrease in the perceived reliability of misinformation remains significant for up to 3 months post-gameplay, provided people are given regular reminders or “booster shots”² of the inoculation lessons learned in the game.⁵⁹ Figure 3 shows this “decay effect” of the inoculation over time.

There are, however, several drawbacks to psychological inoculation interventions. First, they can be difficult to scale: not everyone is willing to play a game or watch a video, and some people may simply not pay much attention to it. The efficacy of inoculations therefore depends in part on voluntary adoption. However, social

media platforms like YouTube and Twitter have the ability to target inoculation messages at all users, for example, during elections.⁶⁶ Second, it is not always possible to anticipate or predict what kind of misinformation (or misinformation techniques) people will be exposed to, and so designing pre-emptive inoculation treatments is not always possible though many misinformation techniques are repeated over time and once inoculated against a general technique (eg, conspiracy) people can gain immunity to various related “strains”.⁵⁵ Third, there is currently little evidence available about how well inoculation interventions perform “in the wild”, for example in social media environments. More research is needed to address these open questions.

Conclusion

In this article, we have reviewed 3 common psychological approaches to countering health misinformation: debunking or fact-checking misinformation after it has spread, priming people to be more aware of accuracy in order to reduce misinformation sharing, and building psychological resistance through inoculation. We have discussed the advantages as well as disadvantages of each approach: debunking can be effective but people can continue to believe misinformation even post-correction; accuracy primes are simple and easy to implement but generally yield small effect sizes, can be moderated by partisanship, and may only be effective for the first few headlines; and although inoculation interventions often produce larger and longer-lasting effects, they can be difficult to scale and it is not always possible to predict what misinformation will go viral. A robust approach to tackling health misinformation therefore includes a range of methods, depending on the context: pre-emptive and post-hoc approaches can complement each other to produce maximum resilience against the spread of misinformation.

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Notes

1. However, other research which more explicitly asked people to pause and explain why they believe a headline is true or false (ie, not a prime) did reliably find that people were less likely to share false news.⁶⁷
2. These reminders can come in the form of a repeated item rating task (asking participants to assess a series of headlines in terms of their reliability), a short video, an infographic, or another game.

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Understanding Audience Beliefs and Values is Essential for Successful Organizational Health Policy Change

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Organizations across the globe are considering the benefits, costs, logistics, and policies associated with bringing staff back into shared workspaces as the COVID-19 pandemic rages on. As such, health, safety, and wellness have come to the forefront of decision-making across all institutional levels. For example, policies will need to address how organizations approach employee vaccination status issues, social distancing rules, masking, sanitation access, and meal/dining protocols. Racial and socioeconomic disparities in immunization access, vaccine uptake, and attitudes toward vaccines demonstrate how health equity and institutional policy may intersect.

Although the COVID-19 pandemic has spotlighted these issues, it is well established that several attributes shape the way institutional programs and policies might impact audiences. Promoting wellness within institutions relies on developing policies that promote health and well-being, then communicating about them in a way that makes the associated behaviors and structural changes attractive to as many team members as possible. For success, it is also important to anticipate how various stakeholders or demographic groups may respond to these programs and policies, what effect these policies may have on their lives (particularly those who suffer disproportionate health burdens), and what they might see changing around them.

At the same time, the development of institutional programs and policies often occurs at some distance from those who will be impacted by them. Leaders regularly develop wellness policies in consideration of the benefits to the organization and its collective membership at large, but not necessarily in consideration of the lived experience of all stakeholders within the organization. In doing so, leaders regularly make assumptions about responses to changes in organizational policies and procedures. However, misinformation or false assumptions about the beliefs and values of various stakeholder groups could lead to unnecessary, ineffective, or even counterproductive communication about the policies. It may also lead to broad opposition to the policy, lack of compliance, or leaving the organization altogether. Theory and practice

demonstrate that the quality of communication is key to both developing effective policies and securing support and compliance with wellness initiatives. Quality communication stems from understanding existing beliefs and attitudes about the issue at hand, the policy being proposed, and its alignment with broader values held by key audience segments.

It is also important to ascertain that structural support for employee/member/stakeholder health is communicated to show institutional investment in the beliefs and values of those who will be impacted in ways that may not be interpreted as purely positive. An echo chamber¹ describes a space where beliefs and attitudes are not challenged. To successfully communicate structural change within an institution, the comfort of the echo chamber should be left behind, and the messenger must steel themselves for critical feedback. Stepping away from dependence on one’s own experience also makes space to consider the varied impact initiatives might have on different groups, keeping in mind that social and cultural factors may also be associated with varied responsiveness to strategic communication.

The concept of Health in All Policies (HiAP) underscores the social determinants of health and the need to engage a diverse group of private and public actors when designing and implementing institutional policy.² The outcomes of policies may be experienced differently across segments of an institution, and sensitivity to this possibility before implementation is likely to promote a more positive experience and outcome for all. Considering equitable impacts (in this case, health equity) as a component of health-oriented institutional policy has the potential to elevate the health of those who face disproportionate risks or burdens. This elevation, in

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turn, can enhance both wellness and bottom-line factors like productivity and success.

When considering institutional goals, it is important to also consider the attributes and experiences that might influence how groups respond to strategic messages. Formative assessment or evaluation – an effort to better understand the perspective of the people who will be affected prior to implementing a change or communicating a message – is essential. We argue that one of the most important pieces to successfully promoting well-being is finding the intersection between people's existing values and the values associated with the structural change. Despite best intentions, wellness initiatives and programs may be poorly received or rejected if designed in a vacuum or communicated ineffectively. Grawitch et al.'s³ "Stimulating Health and Practice Effectiveness" (SHAPE) framework emphasizes the core role of communication in the successful promotion of institutional well-being. They argue that dynamic communication between managers/leaders and their teams/employees/stakeholders can help set the agenda for which health initiatives are most likely to be adopted. They further argue that communication is essential to making people aware of various wellness opportunities and that top-down clarity signals team members will be supported in their efforts to uptake the behavior.

In sum, strong and sustainable health and wellness policy and effective communication about that policy stem from understanding existing beliefs and attitudes about the issue at hand, the proposed policy, and its alignment with broader values held by key audience segments. To illustrate these points, we will draw on evidence from a recently published paper Cannon et al.⁴ that examined beliefs and values surrounding policies to increase the price of sugary drinks among populations who suffer the greatest health burdens of sugary drink consumption: low-income parents of young children (0-5). We segmented the audience by race/ethnicity in light of wide disparities in sugary drink consumption among Black, Latinx, and white low-income Americans. We illustrate how knowledge gained from systematic efforts to understand audience beliefs and values can inform strategic messaging to promote pricing policies that nudge parents toward healthier choices.

Three important steps can be taken to optimize communication across contexts. These steps are similar, though not identical, to a strategy described by Hornik and Woolf.⁵ First, identify as many potentially relevant arguments that may emerge in support or opposition of the proposed change. Second, seek feedback from key segments/stakeholder groups within the potential audience on which beliefs are most important in shaping support or opposition to the policy or program. Third, incorporate that feedback by developing strategic messages that emphasize important and factually accurate beliefs that drive support of the policy and/or offset beliefs strongly associated with its opposition. We offer additional detail on each step, and an empirical example, in the paragraphs below.

The first step is to identify an EXTENSIVE list of the relevant arguments surrounding your initiative. This step can be achieved through formal methods like content analysis of public discourse around the topic (eg, by analyzing news coverage or social media posts surrounding discussions of similar policies in other jurisdictions/organizations) or by convening a series of interviews or focus groups among a diverse group of stakeholders regarding what they have heard about the issue. If another team,

organization, or leader has attempted to promote a similar initiative, one can also ask them how it was received and what barriers they faced. This step is designed to understand the breadth of POSSIBLE beliefs and values related to the policy that various audiences may hold.

In Cannon et al (2021), we examined several sources for possible arguments. These ranged from published studies^{6,7} to campaign materials from recent public health and ballot initiatives.⁸⁻¹⁰ Team members with Berkeley Media Studies Group also analyzed 698 comments posted in response to a *New York Times* article about banning the use of food stamps for purchasing soda.¹¹ This process revealed twenty (20) discrete arguments about limiting sugary drinks and thirty-five (35) in support of price increases on sugary drinks via a penny-per-ounce tax. These included several arguments that the research team had not thought to include regarding cancer risks. It is also difficult to imagine simply sitting down and coming up with a list of this breadth without further investigation.

The second step is to assess the IMPORTANCE of various beliefs in shaping support or opposition to the policy, focusing on different audience segments. The key point here is that beliefs may resonate in dissimilar ways across different stakeholder groups. People tend to hold various beliefs about most issues – some of which may be false (misinformation) and some of which may be factually true. Yet, the mere presence of a false belief does not mean that the belief is the driving support or opposition to a program or initiative. Many beliefs are innocuous. The most important aspect of this step is identifying which beliefs are fundamental to understanding the overall attitude toward the policy and which merely sit in the background.

For example, many media outlets have reported that a non-trivial number of people believe that the COVID-19 vaccine contains microchips to track behavior. While this belief may seem on its face an easy candidate for rebuttal, we think it is unlikely to be driving vaccine hesitancy. People who believe that the vaccine contains microchips for tracking are almost certain to hold other beliefs that are likely more central: the government is an oppressive force seeking population control by exaggerating the risk of COVID-19 and pushing vaccination or that its messaging comes from a place of maleficence. It seems far more likely that these more deeply held beliefs about the institutions themselves, rather than the presence or absence of a microchip in the vaccine, are driving vaccine hesitancy. It is thus also highly unlikely that successful debunking of the belief about a microchip will change the larger, driving belief that an ill-intentioned government is trying to control the population. Thus, energy may not be well spent dispelling the notion of a microchip in the vaccine.

So how does one ascertain the centrality of beliefs in shaping support or opposition to a policy? In Cannon et al (2021), we chose to measure the perceived argument strength among our target audience using a scale ranging from an "extremely weak reason" to an "extremely strong reason." We chose this metric because communication theories like Competitive Framing Theory¹² and the Elaboration Likelihood Model¹³ indicate that the perceived strength of arguments is predictive of how a given audience will receive strategic messages. This survey approach also allowed us to understand the relationship between race/ethnicity and these perceptions. However, the approach to measurement may change depending on how one segments the audience and the resources one has available to reach various

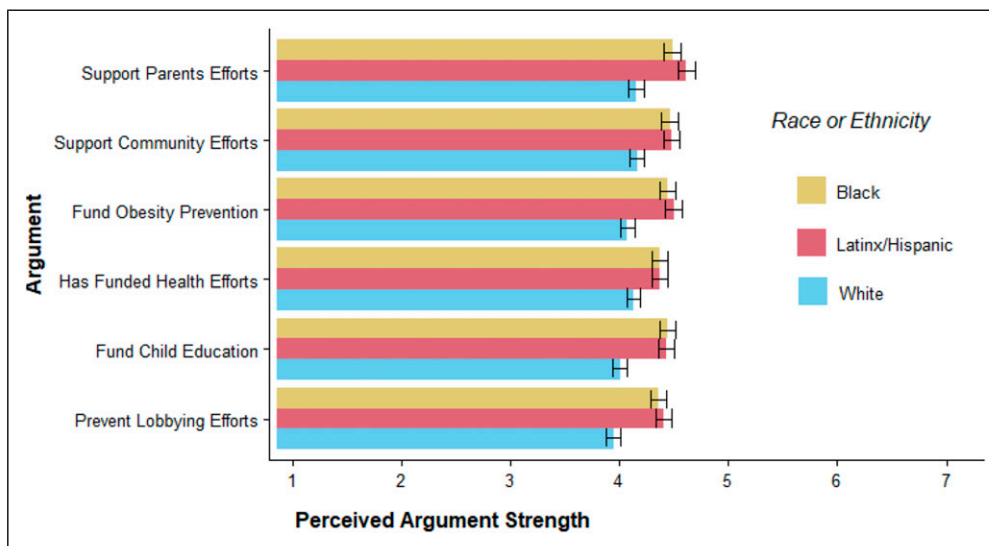


Figure 1. Perceived Strength of Arguments in Favor of a Pricing Change that were Perceived as Somewhat Strong Across Racial/Ethnic Groups. Note: Perceived argument strength was measured using a Likert scale where 1 represented an “Extremely Weak Reason” and 7 represented an “Extremely Strong Reason”; 4 indicates “Neither Strong nor Weak”. These values represent means within racial/ethnic groups and were derived from a sample of (n = 1485) lower-income parents of young children (0-5).

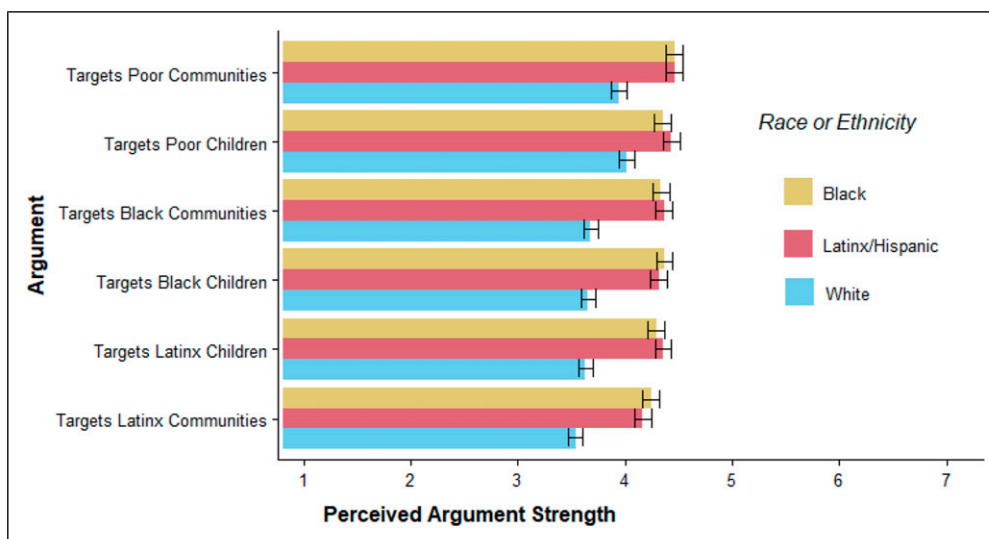


Figure 2. Perceived Strength of Arguments in Favor of a Pricing Change that Emphasized Industry Targeting Behavior Across Racial/Ethnic Groups. Note: Perceived argument strength was measured using a Likert scale where 1 represented an “Extremely Weak Reason” and 7 represented an “Extremely Strong Reason”; 4 indicates “Neither Strong nor Weak”. These values represent means within racial/ethnic groups and were derived from a sample of (n = 1485) lower-income parents of young children (0-5).

audiences. Qualitative assessments of perceived argument strength can also be incorporated into the first step of collecting information about the breadth of salient beliefs in interviews or focus groups. However, the limitation of these approaches lies in the degree to which results will generalize from relatively small samples to the larger population. Larger surveys safeguard against this possibility but are more time and resource-intensive.

The sugary drink pricing policy proposed in our study was not universally accepted by any segment of the audience, and perceptions of argument strength in support of the policy further suggested some ambivalence. As shown in Figures 1 and 2, the perceptions of discrete arguments that policy should be implemented due to the industry’s history of targeting Black and Latinx children varied widely by race/ethnicity; however, arguments that emphasized

that parents and communities need help and ways the policy could help them were rated stronger across racial and ethnic groups.

The third and final step involves assessing the APPROPRIATENESS and FEASIBILITY of using various arguments in support or opposition to a policy. Part of this step involves an assessment of the degree to which various beliefs held by the population are factually true. True arguments in favor of the policy may offer an opportunity to convey these messages while maintaining organizational integrity and trust. False arguments in favor of the policy should be ruled out a priori on ethical grounds. False arguments in opposition to the policy offer opportunities for debunking, though this strategy has its own pitfalls that are beyond the scope of this essay (see Nyhan et al¹⁴). True arguments in opposition to the policy bring different challenges, whereby the organization must find pro-policy arguments that are sufficiently strong to outweigh arguments in opposition to the policy among key stakeholders.

Another part of this step involves assessing the feasibility of messaging central beliefs. Some beliefs easily lend themselves to strategic messaging – for instance, those that are supported by data or personal anecdotes highlighting the effects of a policy in another context. Other beliefs may be more difficult message targets – for instance, those that reference social norms for which audience members may have more proximal sources of insight (eg, “most of your co-workers support this policy” – in cases where people know others who do not support it), or those that propose impacts of the policy without available evidence (eg, “this policy will improve your health” – in cases where no such data are available). Other beliefs may simply not be the type of messaging within the expertise or comfort of leadership (eg, “do this for your children” may not resonate when coming from an executive who has not had a particular interest in supporting other pro-parent policies in the workplace). Therefore, the messenger must consider the information about audience beliefs and values alongside broader strategic and practical considerations related to organizational culture, prior initiatives, and messaging.

In the context of messaging about sugary drink price increases, one could imagine producing a message emphasizing the support these changes would provide to communities and parents, while adding targeted messages among some audiences if needed. Extant communication theory can offer some guidance here. The Transtheoretical Model¹⁵ operates with the assumption that audiences or targets of strategic messaging are not homogenous, and communication goals should be set depending on where the audience sits on a trajectory of change. The audience should be engaged across stages, which underscores the requirement for dynamic communication and concerted effort to communicate opportunities for participation described in the SHAPE framework.³ For example, arguments that dealt directly with targeting behaviors in our study were perceived as fairly weak arguments by white parents but relatively strong among Black and Latinx parents. For white audiences, communicators might favor a message that simply argues that parents/communities need help. For Black and Latinx audiences, communicators might emphasize that such a policy would help parents and communities in their efforts to shield their children from predatory industry marketing behavior.

The comfort of echo chambers must be avoided to promote organizational wellness through policy change. It is also vital to emphasize health equity in organizational wellness initiatives, considering both policy and messaging impacts on groups who face disproportionate health burdens in organizations and beyond. Understanding the beliefs and values of various stakeholders in efforts to promote a culture of health and well-being in various organizational contexts will require a willingness to listen and learn from diverse points of view to understand how various programs and policies may be interpreted, bought into, and/or modified to enhance wellness across all organizational levels.

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COVID-19 Vaccine Hesitancy in South Sudan; What Lessons Can be Learned From Angola's Success Story?

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COVID-19 is a respiratory disease caused by Severe Acute Respiratory Syndrome Coronavirus 2 and although most people who contract the disease do not show any symptoms, some experience blood clots, multi-organ failure, and septic shock, which may lead to death.^{1,2} Globally, by 19th July 2021, there were 190 314 629 confirmed cases and 4 092 740 deaths, reported to World Health Organisation (WHO).³ Although in South Sudan, a country in East Africa, there were only 10 917 cases with 117 deaths (approximately .006% and .003% of global figures, respectively) by 23rd July 2021, it appears that these prevalence and mortality data may be understated, reflecting the limited surveillance, and testing capacities in the country.⁴

Like other countries, South Sudan's Ministry of Health has advocated for adherence to WHO-recommended preventive measures like handwashing, mask-wearing, and social-distancing, to curb the spread of COVID-19.⁵ However, poor adherence remains a challenge due to factors related to the country's history of civil conflicts including health system challenges such as insufficient health funding and human resources for health.⁵ Other factors like poverty and illiteracy, which are well-established predictors of poor adherence to public health prevention measures, are also prevalent in South Sudan, with 76% of the population living in poverty (ie, at US\$1.90 a day, 2011 purchasing power parity) and an adult literacy rate of 35%.⁵⁻⁸

Vaccine Hesitancy in South Sudan

Recently approved COVID-19 vaccines are safe and effective additions to existing COVID-19 prevention measures and in fact, recent soon-to-be published research examining their cost-effectiveness in 91 Low- and Middle-Income Countries (LMICs) found that over the course of 1 year, 20% vaccine coverage would prevent 2 million deaths and 294 million infections, saving 26 million years of life, at a cost of US\$6.4 billion.⁹ As such, South Sudan's fragile health system

will benefit from mass COVID-19 vaccination, ultimately saving lives and resources.⁵

However, vaccine hesitancy (the refusal or delay in vaccine uptake despite its accessibility) which has been a long-standing challenge in South Sudan appears to be a barrier to the uptake of the COVID-19 vaccine.¹⁰ By 18th July 2021, only 56 989 COVID-19 vaccine doses (out of the 3,568,861,733 doses administered globally) had been administered in South Sudan, a country with a population of 11,193,729 as at the last estimate in 2020.^{3,11} More so, recent media reports showed that by June 2021, South Sudan returned 72 000 of the 132 000 AstraZeneca COVID-19 vaccine doses, received through the COVID-19 Vaccines Global Access facility in March 2021, due to concerns that they would not be administered by their expiry date.¹²

While at the time this article was submitted for publication, empirical studies examining factors underpinning this low uptake of COVID-19 vaccines in South Sudan were not found, existing research on hesitancy towards other vaccines identified mistrust for authority, as a major issue in the country.¹⁰ In addition, stigma driven by anger, fear, misinformation, and low risk perception, which have been a problem globally, may also be contributing factors to COVID-19 vaccine hesitancy.¹³

South Sudan implemented a Risk Communication and Community Engagement (RCCE) strategy, as part of its COVID-19 response, to combat these factors at the beginning of the pandemic, reaching 3 380 000 at the end of May 2020.¹⁴ One of the main aims of the RCCE component includes improving awareness of the signs and symptoms of the disease as well as adherence to prevention

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measures such as handwashing and social-distancing.¹⁴ This initiative was supported by donors and partners and employed a variety of strategies which contributed to its effectiveness including high-level coordination (relying on existing Ebola Virus Disease structures), community leader engagement, and employment of diverse evidence-based communication techniques such as in-person discussions and media announcements.¹⁵ Yet, a review of the COVID-19 response in South Sudan identified that stigma underpinned by poor knowledge remains a problem and recommendations were made to address them.¹⁵ However, these recommendations did not explicitly outline measures to address vaccine hesitancy underpinned by stigma, misinformation, fear, and low risk perception, and at the time this article was submitted for publication, evidence was not found of such specific strategy.¹⁵

Angola's Success Story

Angola is a country in South-West Africa and like South Sudan, Angola endured decades of civil conflict. While the country is currently peaceful, its health system remains fragile and underdeveloped.^{16,17} Additionally, 50% of the population live in poverty (ie, at US\$1.90 a day, 2011 purchasing power parity) and the adult literacy rate is estimated at 66%.^{18,19} By 23 July 2021, there were 41 405 confirmed cases of COVID-19 in Angola and 977 deaths.³

Although Africa continues to lag behind the rest of the world in COVID-19 vaccination rates, 1 of the rare success stories within the continent is Angola.²⁰ By 18th July 2021, 1 592 537 vaccine doses had been administered in the country with a population of 32,866,268, making Angola 1 of the countries with the highest proportion of total doses administered per population in Africa.^{3,21} In fact, WHO described Angola's COVID-19 vaccination services as seamless and exemplary, in July 2021, suggesting that the strategies they employed to implement their COVID-19 vaccination program, may hold some important lessons for other African countries including South Sudan.²⁰

Like South Sudan, Angola initially focused its COVID-19 community engagement response on awareness creation and encouraging adherence to prevention measures such as handwashing and social distancing, however, this strategy was adapted to reflect vaccine introduction.²⁰ Angola's Ministry of Health collaborates with local NGOs to train and engage volunteer community mobilisers who address vaccine hesitancy related to stigma and misinformation, at community level, by providing accurate information about the COVID-19 vaccine (as well as other prevention measures) to people in their homes and communal areas like markets, as well as persuading them to take the vaccine.^{22,23} In addition, Angola's community engagement approach employs several strategies which appear to have contributed to its success including relying on donor and partner resources, targeting the most vulnerable, and employing digital registration platforms to eliminate convenience barriers among those who the mobilisers have convinced to receive vaccination.^{20,23} While further evidence is needed to generate and adapt strategies specific to the South Sudan context, Angola's approach offers useful inspiration and may (in addition to existing strategies), improve vaccine acceptability in South Sudan.

Declaration of Conflicting Interests

The author(s) declared the following potential conflicts of interest with respect to the research, authorship, and/or publication of this article: The views expressed in this op-ed are the author's own. Kelechi Udoh is a public health research specialist, with extensive experience leading public health research studies in different humanitarian settings including a recent COVID-19 study in South Sudan.

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