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Messaging Strategies for Mitigating COVID-19 Through Vaccination and Nonpharmaceutical Interventions

With new coronavirus disease 2019 (COVID-19) vaccines authorized by the U.S. Food and Drug Administration and likely more to come, the (extraordinarily complex) logistics of deploying them have gotten underway. Public health officials across the country face a daunting task: convincing the majority of individuals to queue up for shots while also maintaining a steady supply of doses and efficient appointment sign-ups.

This vaccine rollout may signal the beginning of the end of the pandemic, but the road ahead is still long. Nonpharmaceutical interventions (NPIs)—that is, such interventions as recommendations to wear masks and stay at least six feet apart and restrictions on activities in which social distancing is difficult—will continue to be critical to control COVID-19, and the vaccinations themselves will take many months to complete. Neither NPIs nor vaccines are effective unless they are actually used, which leads to the critical role of public health messaging strategies in mitigating COVID-19.

RAND CORPORATION

Public health communications officials at the Centers for Disease Control and Prevention, state and local public health agencies, and nongovernmental organizations advocating for the widespread adoption of NPIs and vaccinations have undoubtedly been observing significant resistance among some U.S. populations. In late 2020, the nonprofit Ad Council joined forces with the COVID Collaborative—a group of health, education, and economic experts—to create new advertising campaigns and toolkits aimed at addressing vaccine hesitancy (Harvard T.H. Chan School of Public Health, 2020).

Traditionally, public health messaging has set out to educate and explain the science as a way of motivating the desired behavior change. However, evidence suggests that such tactics as explanations of vaccine science and scare-tactic depictions of vaccine-preventable disease often have no effect on most people and may even reinforce resistance to such messaging among those who are already vaccine hesitant (Nyhan et al., 2014). This Perspective considers past research on public health messaging strategies and offers suggestions for how certain types of COVID-19 NPI and vaccination messages might best be matched to certain communicators and audiences.

A Threefold Approach to Message Strategies

It is unlikely that any single message or messaging strategy will be compelling to all, or even a majority, of the diverse U.S. population. Multiple approaches will be needed to reach as many populations as possible and reduce the spread of COVID-19.

> By using multiple messages each for different audiences, policymakers may be effective at increasing levels of adherence to NPIs and vaccination uptake for most or nearly all the population.

Targeting messages through audience segmentation—a strategy that marketers use to identify groups of people likely to be receptive to certain types of messages—will be only part of the solution. Effective messages arise from a three-way intersection of message content, specific audiences, and message senders. Who the sender is can make a big difference in how well the message is received: Not all messages will feel authentic or be credible from all senders. In some cases, the information infrastructure constrains who in federal, state, or local governments is legally capable of creating or otherwise have an incentive to create content that targets particular audience segments.

Prior research by the RAND Corporation and others shows that the messages tailored to variations among indi-
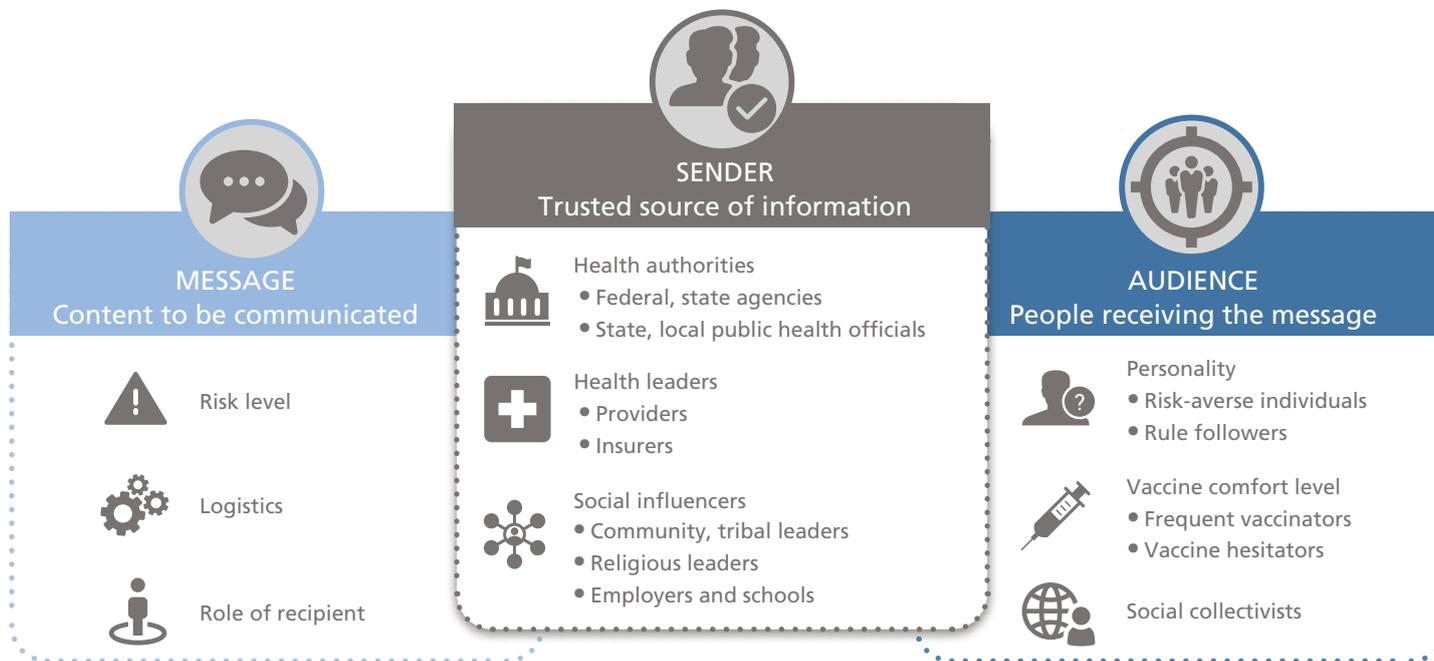
viduals and subcultures are likely to be effective for their respective portions of the population. By using multiple messages each for different audiences, policymakers may be effective at increasing levels of adherence to NPIs and vaccination uptake for most of or nearly all the population. We characterize each strategy within the threefold intersection of message, sender, and audience. Figure 1 summarizes elements of potential strategies.

Each section that follows identifies specific combinations of messages, senders, and audience segments that cross-disciplinary social science research suggests would be effective at motivating at least particular audience segments to receive COVID-19 vaccinations and comply with NPIs. We generally break these down by audience segment, but knowing an audience segment is useful only when combined with the effective messages and senders for that audience.

This Perspective focuses on which combinations of message, sender, and audience are likely to be effective given existing social science research. We are not predicting which steps policymakers are likely to take. When possible, we identify social or economic factors that might

FIGURE 1

Potential Messages, Senders, and Audiences for Targeted NPI and COVID-19 Vaccination Strategies

SENDER
Trusted source of information

Health authorities
• Federal, state agencies
• State, local public health officials

Health leaders
• Providers
• Insurers

Social influencers
• Community, tribal leaders
• Religious leaders
• Employers and schools

MESSAGE
Content to be communicated

Risk level

Logistics

Role of recipient

AUDIENCE
People receiving the message

Personality
• Risk-averse individuals
• Rule followers

Vaccine comfort level
• Frequent vaccinators
• Vaccine hesitators

Social collectivists

help speed adoption of effective communication strategies and barriers that might slow adoption. Removing such barriers is outside our scope, but recognizing effective communication strategies is at least the necessary first step. Finally, no effective communication will be implemented if policymakers simply lack the will to protect the population; for example, if they want to use health misinformation as a way to obtain popularity. To paraphrase Immanuel Kant, nothing is unequivocally good except the will to do good.
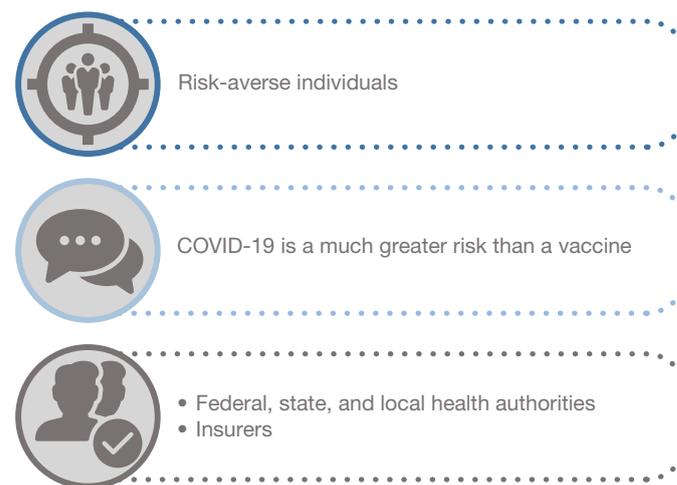
Variation Among Individuals

Some of the variation in vaccination behaviors is tied to differences between individuals based on their personal experiences rather than to differences across different sub-cultures within U.S. society. Individuals' risk perceptions and prior decisions are two such dimensions of variation in the audience that will affect their uptake of vaccination, even in response to the same messages.

Leverage Risk Perceptions

Surveys from RAND's American Life Panel, a nationally representative selection of adults who are surveyed regularly, found that individuals who had higher perceived risk of H1N1 disease were more likely to accept vaccination for the disease (Gidengil, Parker, and Zikmund-Fischer, 2012), a finding that extends to other self-protective behaviors, such as mask-wearing, and other diseases, such as COVID-19 (Reiter, Pennell, and Katz, 2020). Although individuals' perceptions induced vaccine acceptance, the research showed that those who perceived higher risk from H1N1 generally misestimated it in terms of actual risk, with their perceived

risk of death from H1N1 often being 100 times greater than their actual risk (Gidengil, Parker, and Zikmund-Fischer, 2012). More generally, higher perceived risk from COVID-19 or other diseases might derive from actual higher risk (e.g., due to existing health status), misperceptions of risk, or generalized risk aversion. Regardless of their origin, risk perceptions can be leveraged to induce vaccination and NPI use (see Figure 2). Messages that include risk estimates for disease transmission and severity may be an effective strategy for Americans who have higher perceived risk. While graphic depictions of disease have been shown to backfire in at least one study of parents who were being encouraged to vaccinate their children for measles, mumps, and rubella (Nyhan et al., 2014), risks can be scientifically and objectively discussed without graphic depictions. For

FIGURE 2

Leverage Risk Perceptions to Increase NPI and COVID-19 Vaccination Strategies

- Risk-averse individuals

- COVID-19 is a much greater risk than a vaccine

- Federal, state, and local health authorities
- Insurers

Broad public-service announcements are likely to be an effective means of delivering risk messages to risk-averse individuals but are unlikely to reach individuals willing to take on more risk.

example, messages might be able to communicate risks accurately and effectively by benchmarking them against better-known risks, such as the risk of a fatal car accident. Moreover, the backfire effect occurred primarily among the individuals who were least likely to get vaccinated, regardless of the message they received, and such a population will require a different strategy.

Broad public-service announcements are likely to be an effective means of delivering risk messages to risk-averse individuals but are unlikely to reach individuals willing to take on more risk. Direct mail or directed social media outreach may be a more effective way to deliver targeted messages based on risk aversion. For instance, behavioral profiles (based on prior social media or purchasing habits) for risk aversion may be purchased from vendors

who routinely sell such data to commercial marketers. The U.S. federal government may not be able to implement such a targeted campaign, given both American cultural norms and legal restrictions on the use of personally identifiable data. However, a targeted campaign approach could be a viable option for private insurance companies. Insurers may be in a position to cover the expense of a targeted campaign with their own capital reserves and would have an incentive to induce NPIs and COVID-19 vaccination, to the extent that they are on the hook to pay for the expenses of treatment for COVID-19 illness.

Leverage Prior Decisions and Behaviors

Prior decisions to vaccinate for seasonal influenza and other disease mitigation behaviors can be expected to predict individuals' willingness to engage in self-protective behaviors and COVID-19 vaccination. Research suggests that these behaviors generalize across diseases, at least for vaccination (Gidengil, Parker, and Zikmund-Fischer, 2012; Maurer et al., 2009). Linking prior protective behaviors to NPI and COVID-19 vaccination messages may be effective for some populations (see Figure 3). Health care providers and insurance companies already have the information needed to identify individuals who are routinely vaccinated, e.g., individuals who get an annual flu shot. Direct email or physical mail could be sent to individuals with a documented history of previous vaccinations, who likely need less convincing to pursue a vaccine and simply need to know where and when to get their shots.

FIGURE 3

Leverage Prior Decisions to Increase NPI and COVID-19 Vaccination Strategies

Frequent vaccinators

Where and/or how to obtain COVID-19 vaccine or NPI

• Health care providers
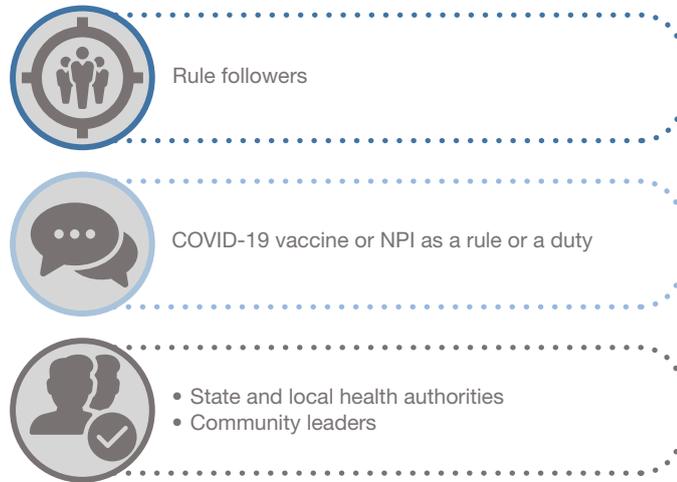• Insurers
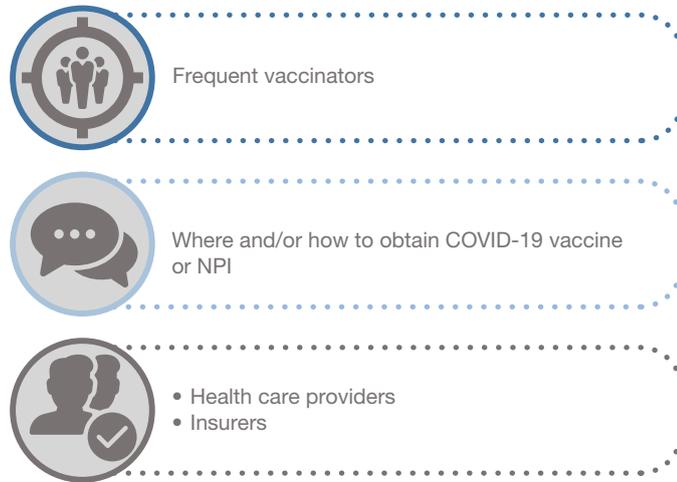
Variation Among Subcultures

Some variation in message receptivity will occur between subcultures, not just solely among individuals, because important beliefs and behavioral tendencies are shared among groups through social-learning processes. The most basic of these is individuals simply imitating their peers. Social learning may further involve teaching, selectively imitating prestigious individuals, or selectively imitating the majority behavior witnessed. Messages to promote COVID-19 response can be adapted to different subcultures through messages consistent with key cultural beliefs and that leverage influential individuals within the group, including business and religious leaders, local social networks, retailers, or athletes and entertainment celebrities.

Strategies that work within particular American subcultures might emphasize rule-following, focus on the good of the group, or address historical maltreatment or other antiestablishment viewpoints.

Emphasize Rule-Following

Individuals and societies vary in their tendency to value and follow rules for the sake of it. Cultural emphasis on rule-following ("tightness") has been shown within the United States to be related to higher social stability (i.e., less social mobility) and to lower drug and alcohol use. Individuals in tight societies produce more closed social networks with less mixing with relative strangers, which may increase in-group cooperation and has been hypothesized to be a cultural adaptation to mitigate ecological risks, including disease spread, that are exacerbated by more and freer social affiliations (Harrington and Gelfand, 2014; Gelfand et al., 2021). In patterns similar to tight versus loose countries, tight states within the United States have greater exposure to natural disasters, less abundant natural resources, and higher disease prevalence than loose ones. This supports the hypothesis that tightness evolved culturally as an adaptation to mitigate these ecological risks. While Americans are generally not part of a highly rule-following culture, some portions of the population will be motivated by messages that emphasize rules (see Figure 4). Many of the states that are more rule-following in terms of social norms regarding traditional marriage or respect for older generations are states that, in other ways, emphasize protection of individual liberty against the federal government (Harrington and Gelfand, 2014). To date, however, these individuals likely have not perceived their

FIGURE 4

Emphasize Rule-Following to Increase NPI and COVID-19 Vaccination Strategies

Rule followers

COVID-19 vaccine or NPI as a rule or a duty

- State and local health authorities
- Community leaders

lack of self-protective behaviors as breaking rules; rather, message senders credible to them have not articulated such behaviors as mask-wearing as rules. While federal health authorities might not be credible message senders for these individuals, particular leaders within federal, state, and local governments could be.

New messaging to promote rule-following for COVID-19 vaccination and NPI likely should emphasize both rules derived from reiterating what most people are doing (descriptive norms) and rules that state what individuals ought to do (injunctive norms) (Cialdini and Trost, 1998; Cialdini and Goldstein, 2004). Both descriptive and injunctive norms can influence behavior, likely work in concert, and even influence each other such that observing something is the case (descriptive norm) induces people to believe it ought to be the case (injunctive

norm) in a process named the *naturalistic fallacy* by philosopher David Hume (Eriksson, Strimling, and Coultas, 2015). For example, although former President Donald Trump stated an injunctive norm by telling people they ought to get a COVID-19 vaccine, he failed to amplify this with a descriptive norm by concealing his own vaccination for COVID-19. A more effective communication strategy would have leveraged both types of norms for rule-following.

Implementing this strategy at the federal level makes little sense, given the cultural variation in the United States, but implementation by individual states or communities could allow matching credible message senders and audience-specific messages. Rule-following popula-
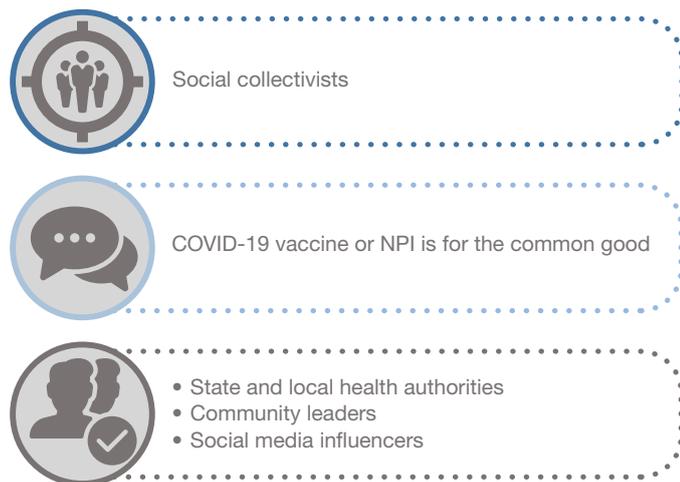
Messaging to promote rule-following likely should emphasize both rules derived from reiterating what most people are doing (descriptive norms) and rules that state what individuals ought to do (injunctive norms).

tions can receive a culturally appropriate message from their own leaders. Because such messages would tap into cultural patterns that are broader than variation among individuals, state and local governments or community-based organizations seem to be more appropriate message senders than health care providers or insurers.

Emphasize the Good of the Group

Research has shown that highly collectivist individuals and societies are more likely to engage in disease-mitigation behaviors, leading to quantitative reductions in disease outbreak and spread (Morand and Walther, 2018). Collectivist cultural norms emphasize the good of the group over individual liberty (see Figure 5). Relatedly, variation among individuals in the moral value they place

FIGURE 5

Emphasize the Good of the Group to Increase NPI and COVID-19 Vaccination Strategies

Social collectivists

COVID-19 vaccine or NPI is for the common good

• State and local health authorities
• Community leaders
• Social media influencers

Variation among individuals in the moral value they place on individual liberty appears to undergird at least some vaccine hesitancy in the United States.

on individual liberty appears to undergird at least some vaccine hesitancy in the United States (Amin et al., 2017). While Americans generally display fewer collectivist norms than people in many other societies, social science research supports that substantial portions of certain U.S. states could be mobilized into action through collectivist appeals. Regional tendencies toward collectivism or individualism in the United States cut across partisan political divides such that the highest collectivism values occur in the South and in states with high rates of immigration, such as California, New York, and New Jersey. The most individualist states include much of the upper West and parts of the "Rust Belt," while the Southwest and Northeast tend to be more centrist in their orientation toward individualism-collectivism (Vandello and Cohen, 1999).

As with appeals to rule-following, messages based in collectivist sensibilities likely would be best received from
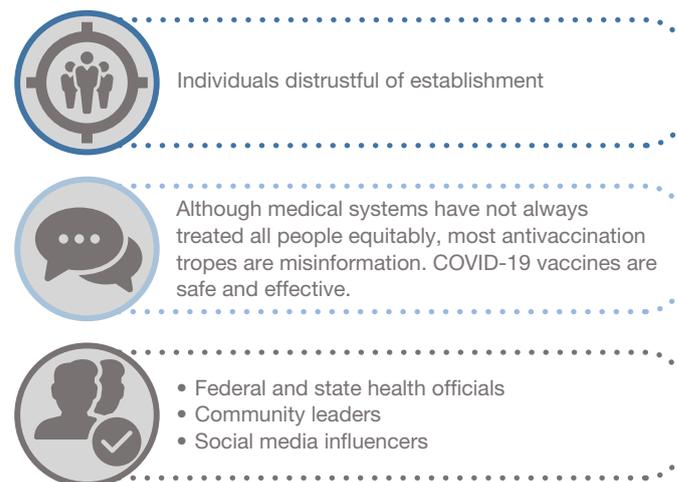
the health authorities of individual states or communities or community leaders, including religious leadership. Examples of collectivist messages are those that urge people to wear masks because doing so protects those around them. It should also be acknowledged that partnering with religious leadership would have to be done in ways that make sense within specific religious systems; for example, religious groups vary tremendously in how much a centralized leadership can promulgate rules for the group. They also vary in their relative connectedness to secular American culture, which will mediate the relative influence of the religious leaders themselves.

Address Hesitancy Rooted in Real Historical Maltreatment or Misinformation

Vaccine-hesitant beliefs and behaviors are known to be situated within a collection of beliefs and attitudes that reflect distrust of establishment institutions of American society, including the government, pharmaceutical companies, and health care providers (Gidengil et al., 2019). Some distrust of institutions arises from awareness of real abuses by these institutions, such as the Tuskegee syphilis study, but distrust also arises from conspiracy theories and beliefs in spurious vaccine side effects (Nowak et al., 2020). Federal health authorities have utilized this strategy when addressing vaccine hesitancy among Black Americans by explicitly acknowledging mistrust that arose from such events as Tuskegee (Centers for Disease Control and Prevention, 2021). The Biden administration is attempting an analogous outreach to address misinformation-based vaccine hesitancy among Republicans (Karni and Kanno-Youngs, 2021). Additionally, messages that use spokespeople whom

those with antiestablishment concerns regard highly (e.g., influencers on social media, community leaders) and/or that address concerns about side effects may be more effective than explanations of vaccine science for these populations (Brunson and Sobo, 2017). More-intensive efforts may be needed on this front, however, particularly because large proportions of the U.S. population who endorse misinformation may not trust (more than distrust) any traditional societal experts whom public health authorities could convince to promote COVID-19 vaccination or NPI (see Figure 6). For example, notorious conspiracy theorist Alex Jones is unlikely to be moved by the government to recant his decades-long dissemination of misinformation and to promote vaccination. Thus, the first necessary work might be to reestablish trusted brokers between the government

FIGURE 6

Address Hesitancy Rooted in Systemic Maltreatment and in Misinformation

Individuals distrustful of establishment

Although medical systems have not always treated all people equitably, most antivaccination tropes are misinformation. COVID-19 vaccines are safe and effective.

• Federal and state health officials
• Community leaders
• Social media influencers

and portions of the U.S. population before any messages that address misinformation can be disseminated.

Implementing Targeted Messaging

As described in each preceding section, messaging strategies will be most effective when the messages are matched to the appropriate senders and audiences. This raises a question: How do the message senders efficiently direct their messages to the appropriate audiences—high risk perceivers, collectivists, etc.?

Industry marketers using segmentation techniques place ads targeting different populations in television programs or other media outlets that a specific group is more likely view. The same approach is applicable to other forms of advertising, such as direct mail campaigns. Detailed market segmentations can be purchased for most Americans, along with their mailing addresses, so that direct mailers are sent to individuals most likely to be receptive to specific messages.

Although social media afford a much more dynamic interaction with customers, marketing through social media obeys the same principles. To prevent spamming, Twitter has a direct-outreach limit of about 1,000 handles (i.e., individual Twitter accounts) per day. This means that every direct outreach is a valuable commodity. Handles more likely to be receptive to particular messages can be discerned algorithmically based on their public behavior on the platform. RAND research has used algorithms to produce a market segmentation for tens of thousands of handles of real people on Twitter who engaged in posting about vaccines, and the algorithms can predict whether they are likely to be vaccine hesitant or not from their

endorsement of antiestablishment beliefs (Nowak et al., 2020). A public health entity, health care system, or advocacy organization could use such a market segmentation approach to direct alternative messages to specific handles or groups and/or to invite Twitter users at various points on the vaccine hesitancy continuum to follow the Twitter accounts of public health organizations.

Dealing with Misinformation

Most studies define *misinformation* as beliefs that are both false and weakly justified by evidence and that are believed and spread by people who genuinely believe them to be true (for a review of these studies, see Mazarr et al., 2019, Table 2.1). For NPI and COVID-19 vaccination outreach efforts, we recommend addressing misinformation directly rather than ignoring it in an attempt to avoid amplifying misinformed views. Avoiding restatement of misinformation beliefs was at one time a strong recommendation of social science research (Peter and Koch, 2016; Pluviano, Watt, and Della Sala, 2017), but just as new medical research at times reverses in its consensus, so too does social science.

Recent studies that used broader and more varied experimental contexts support that, on average, addressing misinformation directly is effective at changing opinions and reducing misinformation spread (Sullivan, 2019; Vraga, Bode, and Tully, 2020; Weber, Muehling, and Kareklas, 2019; Tully, Vraga, and Bode, 2020). For example, rather than ignoring a piece of misinformation, such as the belief that the CIA created HIV in Africa, current science supports addressing it directly. That particular belief is false and known to be intentional misinformation from

Soviet intelligence agents in the late 1980s (Garsd, 2018). Message senders can refute false beliefs, such as the one just mentioned, while still acknowledging actual historical misdeeds, such as the Tuskegee syphilis event. A recent meta-analysis across many studies concluded that the advantages of directly addressing misinformation outweigh potential backfire effects (Walter et al., 2020). Evidence suggests that addressing vaccine hesitancy directly does not induce more of it (World Health Organization, 2014). There has been too much concern about backfire effects in the past because experimental psychology studies showed it is unhelpful to repeat false statements, even to contradict them. These studies were methodologically sound as experiments but do not, in fact, generalize to natural settings in which the false beliefs are repeated many times outside the context of contradicting them. In the modern social media environment, misinformation ranging from conspiracy theories regarding birtherism or the deep state to false vaccine side effects are already repeated many times a day by real people who are not bots or state-sponsored trolls (Nowak et al., 2020). Later experiments that mimicked more-natural conditions flipped the causal relationship of repeating false claims to contradict them, which decreased belief in them in the context of many other repetitions of the same claims (e.g., Peter and Koch, 2016; Pluviano, Watt, and Della Sala, 2017).

Conclusion

Implementing successful NPI and COVID vaccine messaging strategies will require both identifying populations best mobilized by the strategies we have discussed and ensuring the reach of the needed messaging (e.g., targeted messaging to those vaccinated for influenza in the past). Given the availability of vaccines for COVID-19 and the urgent need to control transmission, leveraging all forms of media using a combination of communication strategies as quickly as possible with sustained effort will be critical to ensuring broad and rapid uptake of COVID-19 vaccines.

On average, addressing misinformation directly is effective at changing opinions and reducing misinformation spread.

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About This Perspective

This Perspective addresses the importance of effectively matching the message, the audience, and the sender to encourage people to get a COVID-19 vaccine and to perform other appropriate actions, such as wearing a mask. It offers suggestions about how to leverage variations between individuals in such factors as risk perception and variation among U.S. subcultures for tendencies to follow rules or act for the collective good. It further discusses how to deal with misinformation.

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