Comparing Climate Change Messaging and COVID-19 Messaging: A Case Study of the World Health Organization

by

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Abstract

Climate change is an existential threat to humankind. To communicate the level of the danger as well as possible solutions to it, decades of research has gone into how to make climate change communication and messaging more effective, in order to spur people to adapt individual behaviour and increase support for policy action to counter the threat. This thesis aims to draw parallels between climate change and the COVID-19 pandemic, arguing that both are wicked problems for which communication can be similarly addressed through a common lens. It identifies three widely used messaging strategies from a systematic literature review: scientific consensus messaging, inoculation messaging, and gain framing. The thesis will conduct a systematic document review and qualitative analysis of the World Health Organization's (WHO) COVID-19 messaging from January 2020 till August 2021, analyzing the extent to which these three communication strategies or any novel WHO communication strategies are present. It finds that there is some evidence of usage of both inoculation messaging and gain framing but, surprisingly, none of scientific consensus messaging. It also discovers that the most used messaging strategy is a novel WHO messaging strategy, which, for the thesis, is labeled as Information, Explanation, and Solution (IES). There are also large parts of WHO's COVID-19 communication that does not seem to deploy any messaging strategy at all but could benefit from such usage. The thesis shows examples of how current WHO messaging can be improved with all three messaging strategies and visualizes an integrated approach where the IES strategy is combined with others from climate change communication to maximize message efficiency. It goes on to illustrate broader lessons for COVID-19 messaging from climate change messaging and envisages a two-way street where lessons from COVID-19 messaging may also inform messaging campaigns for climate change and other comparable institutions.

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List of Abbreviations and Acronyms

CDC	Center for Disease Control and Prevention
ECDC	European Centre for Disease Prevention and Control
IES	Information + Explanation + Solution
IPCC	Intergovernmental Panel on Climate Change
UNFCCC	United Nations Framework Convention on Climate Change
WHO	World Health Organization

1 Introduction

1.1 COVID-19 – A Snapshot of the Global Pandemic

The world is currently in the grips of COVID-19, a viral pandemic that has upended life as we know it. Beginning in late 2019 in Wuhan, China, the virus spread to every part of the globe. In early 2020, the World Health Organization (WHO) deemed it a "public health emergency of international concern" and judged it a global pandemic on March 11, 2020.

As of October 27, 2021, there have been 180,817,269 confirmed cases of COVID-19, which include 4,941,039 deaths. The disease has forced the vast majority of countries around the world to impose national lockdowns. Restrictions, or, in some cases, outright bans, have been placed on socialization, travel, and work, effects that ripple outward and upset the very way we used to live and conduct our lives. Global trade and travel have fallen to unprecedented lows and the resultant economic shocks of the pandemic have caused recessions worldwide (Burns and John, 2020), one estimate of the cost of the pandemic places the value of forgone output at 10.3 trillion dollars (The Economist, 2021). Though numerous vaccines have been developed and have started circulation, there exists a stark inequity in global vaccination programs; the higher-income global north has most of the vaccination doses and supply while the global south is lagging significantly in both.

Despite these terrifying statistics, there still exists a considerable number of people worldwide who refuse to follow mandated guidelines such as wearing masks or social distancing to blunt the COVID-19 threat. A worrying number of people seem to believe that these basic protection measures are an undue threat to personal freedoms, that COVID-19 is no more dangerous than seasonal influenza, or that the pandemic is a conspiracy theory or a hoax (Lewis, 2020). Even with the proven efficacy of vaccines, backed up by numerous scientific studies and

real-world fall in infections/severity of diseases in regions that have conducted mass vaccinations (Mallapaty, 2021), there exists a considerable section of the global populace that is vaccine-hesitant (Durkee, 2021; Boynton; 2021; Hashim, 2021) or has fallen prey to misinformation about the vaccines and their effects.

One potential commonality with climate change is that messaging to educate the general populace on the threat that COVID-19 presents has not been effective enough. This is in terms of both convincing people of the threat that COVID-19 represents as well as convincing them to modify their behaviours to limit the spread of the disease and to shield themselves and their communities from COVID-19 as much as possible. This represents a critical failing in the fight against COVID-19, one that needs to be addressed to effectively marshal pandemic response.

1.2 Climate Change

Climate change is one of the biggest threats facing mankind in this current age (IPCC, 2015). There exists a consensus among scientists, through the Intergovernmental Panel on Climate Change (IPCC), that climate change's cause is anthropogenic—i.e., caused by humans (Cook et al., 2016). Even with a surfeit of data having been gathered since the beginning of the last century and a global scientific consensus since the 1980s (spearheaded by the IPCC), there has been negligible global action or coordination being undertaken to combat this existential threat that has the potential to upend life as we know it. Already, the world has begun to see heat waves, rising sea levels, increased glacial melt, warming oceans, and a higher frequency of drought and storms; given our current path, these phenomena will continue to rise in frequency and severity (Samenow and Patel, 2021).

While other reasons for collective inaction exist, one of the major reasons why the response to climate change has been so tepid and ineffective is due to the failure of climate change messaging. Even the debate surrounding climate change and its effects has become politicized, tribalized, and subject to an immense bombardment of misinformation, competing priorities, and, in some cases, outright denial, despite overwhelming scientific data proving it and the harm it is doing to our planet (Cook, 2019). The purpose of climate change messaging is to educate and inform the global public about the dangers of climate change as well as effect worldwide mobilization to mitigate and adapt to the crisis to ameliorate its effects. There is a considerable body of research on what makes climate change messaging effective along with what strategies can be employed to amplify its reach and convince the target audience to adapt their behaviours to deal with climate change. However, despite decades of climate communication research and the support of numerous credible scientific bodies, climate change messaging has failed to spur global action commensurate to the seriousness of the peril (Brunhuber, 2016).

Therefore, the objective of this thesis is to contrast climate change messaging with pandemic messaging and see if applying the lessons learned from decades of climate communication research can make pandemic messaging more successful.

1.3 Why Climate Change Messaging?

Before we begin, for the sake of clarity, it is important to define what messaging itself is. According to Nordquist (2019), “a message is defined as information conveyed by words (in speech or writing), and/or other signs and symbols. A message (verbal or nonverbal, or both) is the content of the communication process. The originator of the message in the communication process is the sender. The sender conveys the message to a receiver”.

Now, while it is true that COVID-19 is a global public health crisis and that general public health messaging strategies are thus an intuitive fit for analysis of COVID messaging strategies, they may manifest as a merely superficial lens for an incredibly complex problem. It is possible applying only a public health lens to COVID messaging could prove to be myopic in nature and limited in its analysis. Comparing and contrasting pandemic messaging with climate change messaging would, however, widen the scope of such an analysis and may result in mutually beneficial lessons for both frames of analysis. This was the initial state of mind that led me to choose climate change messaging as the contrasting scale for COVID-19 messaging.

Secondly, climate change hews close to what Rittel and Weber (1973) defined as a "wicked problem"—i.e., a nebulous problem that does not have a clear, well-defined solution, as opposed to the kind of problems natural sciences tend to excel at solving. Such a wicked problem does not have a one-size-fits-all, permanent solution; rather, solutions would be in constant flux, evolving in response to the changing definition and nature of the problem itself. Climate change has been classified as a "wicked problem" by numerous sources (FitzGibbon and Mensah, 2012; Stang and Ujvari, 2015; Saville, 2020). The COVID-19 crisis shares many characteristics of a "wicked problem" (Schiefloe, 2020; Klasche, 2021).

A wicked problem defies or resists stable definition (Rittel and Weber, 1973). Climate change possesses this property; although it refers to the warming of the Earth's surface and the accelerated change in climate variability due to human-caused activities, new developments consistently change our awareness of the problem and affect potential solutions. Some examples include the amount of carbon dioxide in the atmosphere reaching record levels as well as 2020 being the warmest year on record (Gerretsen, 2021). Similarly, COVID-19 is a problem whose nature is constantly evolving due to, for example, high transmission rates leading to a higher

chance of mutation and, in turn, to more contagious variants. This is evident in the number of coronavirus variants currently afflicting the globe. While this mutation was foreseen due to our previous understanding of the family of viruses to which COVID-19 belongs (coronavirus), what was not foreseen was the exact shape or form these new mutations would take. As of 2nd September 2021, according to the WHO, these 'variants of concern' are designated and tracked because they result in increased transmissibility, virulence or cause a decrease in the effectiveness of public health and social measures. These variants include B.1.1.7, the Alpha variant, B.1.351, the Beta variant, P.1, the Gamma variant, and B.1.617.2, the Delta variant. The WHO states that these variants have a faster rate of transmission and admits that due to the ever-varying, complex nature of the pandemic, it is currently being investigated how widely these variants have spread, how different the new variants of the disease are from other versions of the disease and what the effect of these mutations are on current treatment methods and vaccines.

Solutions to wicked problems cause their own unforeseen consequences, which means their effectiveness can be uncertain and complex. In the case of climate change, currently accepted global goals like keeping the temperature and carbon increase to a certain quantity are necessarily imprecise. An island in Pacific Micronesia will certainly face much more devastating consequences of such a solution as compared to a landlocked nation in the middle of a continent. There is no ultimate litmus test to determine the viability and success of a solution; various solutions have had differing results: Sweden managed to curb its greenhouse gas emissions by 16% from 2000-2012 using a carbon tax and emissions trading system (World Bank, 2014), the International Energy Agency claims that energy transitions will result in the share of renewables in global power generation to rise from 26% in 2019 to 30% in 2024 (Franke, 2019), leading to reduced carbon dioxide emissions, Kirchher and Urban (2018) estimate that outcomes of

technology transfer show mixed results with 1/3rd of the attempted transfers resulting in failure. Similarly, in the case of the pandemic, currently accepted solutions like lockdowns, isolation, and quarantine, which have proven to decrease the rate of spread and contain the devastating effects of mass infection, result in other consequences like ruinous shocks to the economy in the form of massive unemployment and downward spiraling growth rates. Even surer solutions like vaccination lead to social inequity caused by prioritizing certain groups of people for vaccination as well as uncertainty and hesitation around side effects. For example, after the AstraZeneca vaccine was approved for use in Europe, numerous members of the EU like France, Germany, Austria, Sweden, Norway, Denmark, Netherlands, and Spain only recommended the vaccine for people under the age of 65 whereas Italy and Belgium only recommended it for people under 55 (BBC, 2021).

A wicked problem does not have a precedent. This is evident in the case of climate change; human activity has never before caused a change in the climate on the pace and impact that it does right now. While this is less evident in the case of COVID-19, it is still applicable. The last modern global pandemic was the 2002-2004 SARS outbreak, which was minuscule in terms of infection and global impact compared to COVID-19. It caused 8,000 infections across 29 different countries and caused 774 deaths. In comparison, as of 27th October 2021, there have been more than 244 million confirmed cases of COVID-19 from almost every nation in the world and it has caused more than 4.9 million deaths (WHO). Clearly, the two pandemics are not comparable in scope. Going back even earlier, the last pandemics comparable with COVID-19 in terms of global infection and mortality rates were the 1957-58 Asian flu pandemic and the 1968 flu pandemic which spread to numerous continents and resulted in a million deaths each (Rosenwald, 2021). Even these are only useful as a minimal reference since the global stage and

medical advances have evolved so much in the ensuing half-century that it can be claimed that the COVID-19 pandemic has no modern precedent.

Wicked problems are also defined by the number of stakeholders involved. In the case of climate change, the stakeholders could be defined as literally the entire world. Complicating this facet is that all those stakeholders have different ideas about what form the ideal solution should take. In the case of climate change, this can be seen in the lack of global agreement beyond a vague pledge to limit temperature rises within a certain range. Despite all the time that has since global recognition of climate change as a problem, there are still no binding responsibilities for any nation. Similarly, COVID-19 is a global pandemic, which has spread to every part of the world. While there are shared global goals such as pandemic eradication and vaccine development, there are also competing ones. Economically strong nations can better withstand financial shocks and can endure longer more severe lockdowns. Developing countries are not able to extend the same privileges to their citizens and must contend with placing a greater emphasis on economic recovery and a return to normalcy unless they want the resultant economic downturn from lockdowns to cause even greater misery and loss of life than COVID-19 itself.

Therefore, the COVID-19 pandemic falls within the definition of a wicked problem: it has no clear well-defined solution, it keeps changing in the face of new data and numerous mutational variants (currently the Delta variant is the dominant strain globally), it has considerable complexity (comparing economic effects of the virus itself to the economic effects of a national lockdown, comparing restrictions on personal freedoms to the health of the public at large), and it has a considerable plurality of stakeholders (the global economy, the global public, etc.). Because of it being a wicked problem, the pandemic hews close in scope and effect to climate change.

Keeping all these similarities between climate change and COVID-19 in mind, I believe analyzing pandemic messaging through the lens of climate change messaging strategies will yield a rich, nuanced and effective result in terms of practical applicability. Since the two problems share so many common themes and threads, it might be of great benefit to attack the issue of COVID-19 messaging from the flanking angle of climate change messaging strategies rather than use an obvious and head-on comparison of public health messaging. Not only will this offer a novel perspective, given both the nature of analysis and relatively recent nature of the pandemic, but it will also help combine elements of two schools of research—i.e., public health messaging and climate change communication research. This combination, I believe, will result in superior research results to those that would be gleaned by solely applying the frame of public health messaging strategies. There is also the added benefit of there being a two-way flow of benefits; it is possible that the application of climate change messaging strategies to pandemic messaging will yield beneficial results and also that pandemic messaging strategies may have some useful lessons to offer climate change messaging.

1.4 Thesis Outline

There are five research questions that this thesis aims to answer.

- RQ1: What messaging strategies does the World Health Organization (WHO) employ for COVID-19?
- RQ2: Does the WHO employ proven climate change messaging strategies and, if so, to what extent are they employed?
- RQ3: Why does the WHO employ the messaging strategies it does?
- RQ4: How can the WHO improve and enhance its messaging strategies?

- RQ5: What lessons does the WHO's overall messaging strategy offer other COVID-19 messengers and comparable issues like climate change?

This thesis proceeds by first undertaking to understand what strategies are present in the climate change messaging toolbox and then attempts to link those with pandemic messaging. This will be the first step in isolating and selecting what strategies can best be modified and applied to augment pandemic messaging. The literature review will also conduct a cursory search of public health messaging strategies to acknowledge any potential overlap. Once a literature review has been conducted to get a broad understanding of climate change messaging strategies, identify best practices and provide an overview of the most common messaging strategies used, the thesis will select three strategies that will augment pandemic messaging.

The third chapter will lay out the research methodology and methods used. It will explain and justify the research questions along with the research goals for the thesis. The chapter will provide the details of the main data collection method, a systematic review of WHO's COVID-19 messaging strategy. Data analysis will be done by undertaking a qualitative analysis of the above-mentioned messaging strategies, using selected messaging strategies used in climate change communication as codes.

Chapter 4 will examine, in detail, the results of the research conducted on WHO messaging regarding COVID-19. The chapter will seek to answer the first two of the five research questions, which are more descriptive, dealing with the type of messaging strategies employed by WHO and seeking to identify what, if any, messaging strategies present in climate change communication literature which are also present in WHO messaging.

The next chapter will discuss the remaining three research questions, which are more explanatory and prescriptive. This discussion will explore the reasoning behind the WHO's selected messaging strategies, the possible ways in which it can improve existing messaging, and whether the lessons learned from WHO messaging can be potentially applied to other institutions and issues.

Finally, the thesis will conclude by presenting a summary of the research conducted and results found. It will also lay out possible directions to guide future research, describe the limitations of the research conducted in this thesis and expound upon the overall relevance of the research.

2 Literature Review

This chapter will analyze existing literature about public health messaging and climate change messaging and is divided into several sections. The first deals with an overview of public health messaging strategies. This was undertaken to make sure that the search for messaging strategies relevant to COVID-19 messaging was as exhaustive as possible and to understand the possible overlap between climate change messaging and public health messaging. These strategies are arrayed from the least relevant to the most relevant. The next section of the literature review deals with climate change messaging strategies and is divided into two main sections. The first of these comprises a general overview of climate change messaging strategies, best practices, and messaging principles. The second subsection provides a synthesis of the three messaging strategies selected for their suitability as well as adaptability for pandemic messaging, including their definitions, common criticisms, and applications. The specific methods used for the systematic review that yielded these three strategies selected are elaborated on in section 3.3. This chapter ends with a justification and rationale as to why these three strategies in particular were selected for this thesis.

2.1 Public Health Messaging Strategies

According to Rogers et al. (2018), social mobilization "refers specifically to principles that can be used to influence a large number of individuals in society to participate in an activity" (p. 357). Wray (2006) emphasizes the role of social mobilization as a public health strategy, claiming that such strategies "acknowledge the crucial role of the neighborhood and social network in guiding or obstructing social behaviors" (p. 53). He expounds on the success of social mobilization approaches that involve "recruitment, training, and empowerment of community leaders" and gives the example of a successful approach undertaken regarding family planning in

Bangladesh. This is tempered by the acknowledgment that a social mobilization approach is small in scope and is limited to the neighborhood or community. Given that this thesis is taking a holistic approach and targeting a global organization's messaging strategies, social mobilization is difficult to use for the context of this thesis simply because the scope is so large whereas the strategy is geared towards a much more intimate jurisdiction.

One very popular and effective health messaging strategy is tailored communication. There is a difference between targeted and tailored communication in health messaging. According to Kreuter and Wray (2003), targeted communication is "intended to reach some population subgroup based on characteristics presumed to be shared by the group's members, [while] tailored communication is intended to reach one specific individual, based on specific characteristics of that person that have been measured in a formal assessment" (p. S228). They go on to say that this method shares a similar rationale with targeted messaging, which is that greater knowledge of the intended recipient results in more effective communication. Further, they claim that tailored messages should have greater efficacy than targeted messaging where "there is significant variability within the target audience on key determinants of the communication's intended outcome" (p. S228). The key thrust of this messaging strategy is that increased knowledge about the target audience and moulding your message around that knowledge will result in increased efficacy since it causes the message to be more relevant to the audience. While it is conceivably possible for some level of targeted messaging campaign to be produced on a global scale, it would be both time and resource-intensive since it would have to consider all the variations and minutiae of the global population to make a relevant messaging strategy. It is possible that due to such constraints as well as the time-sensitivity of the matter that the WHO decided to opt out of such an approach. Therefore, while this is a successful messaging strategy,

applicability for this thesis is quite limited as both the pandemic and climate change are not limited to a specific locality or a particular target population.

Oate and Paasche-Orlow (2009), focusing on cardio-vascular patients and drawing on work done by Hironaka and Paasche-Orlow (2008) lay out guiding principles for clear communication strategies, which include: avoiding jargon, emphasizing specificity by using "clear action-oriented directives, stress concrete steps, minimize information about anatomy" (p. 1050), using different mediums such as pictures and interactive videos, and confirmation of comprehension. According to Oate and Paasche-Orlow (2009) all these principles, established and refined via practice and training, are intended to increase patient understanding and improve comprehension of the problems they face. Since they can be transplanted into both pandemic messaging and climate change messaging, these guiding principles lay a solid foundation to guide the development of a messaging strategy.

McGinty et al. (2018) evaluate various communication strategies for increasing support for mental illness and substance abuse disorder policies. They state that the use of sympathetic narratives—i.e., narratives that "humanize the experiences and struggles of individuals" (p. 138)—increased the conviction of the message, having a positive effect on stigma reduction and enhanced support for such policies. These narratives not only describe the human aspect of the problem but also lay blame on the societal and environmental factors that lead to the emergence of such a problem. McGinty et al. also found that messaging highlighting structural barriers to treatment has the potential to drum up support for potential treatment policies. Finally, they state that messages which focus on the effectiveness of treatment may reduce the shame accompanying mental illness but conclude that their effect on policy support is indeterminate. These evaluations are promising in the case of pandemic messaging due to the nature of COVID-19, where

infection leads to stigma and ostracization (Adom et al. 2020; Bao et al., 2020, Gunnell et al., 2020). This in turn may contribute to the problem of underreporting or ignoring symptoms for fear of being targeted or blamed for transmission. In such a scenario, where contact tracing and isolation are critical parts of slowing the spread and evaluating the danger of the disease, such messaging strategies can prove quite valuable to understand and humanize such experiences and lead to a much more effective response strategy.

Wallack and Dorfman (1996) expound on the importance of media advocacy to promote public health goals. They define media advocacy as "the strategic use of mass media to apply pressure to advance healthy public policy" (p. 298) and state that "media advocacy focuses primarily on the news media but also emphasizes paid advocacy advertising and the supportive use of talk radio, television and public affairs programing" (p. 298). It is not too much of a leap to update this definition by including the immense reach and power of social media. In fact, Schillinger et al. (2020) claim that "the popularity and technical sophistication of social media platforms have translated into health discourse becoming more ubiquitous; content becoming more creative, innovative, and engaging….and governments, regulatory authorities, corporate and sponsoring entities and social media platforms themselves having the capacity to control the content and flow of communications." (p. 1396). AlSadrah (2021) backs this assertion by showing results from a survey and claiming that "the patients/participants expressed a high acceptance of receiving public health promotion messages through SMPs [social media platforms]." (p.11). This serves to underline the potential of social media as a possible tool in media advocacy to promote public health goals.

Entman (1993) defines framing as a process which "essentially involves selection and salience" (p. 52). He goes on to describe "to frame is to select some aspects of a perceived reality

and make them more salient in a communicating text, in a way to promote a particular problem definition, causal interpretation, moral evaluation, and/or treatment recommendation for the item described." (p. 52). Wallack and Dorfman (1996) also underline the importance of framing, stating that media advocacy is organized around framing for access and framing for content—i.e., gaining access to news media as well as framing the content in a palatable manner through the use of "compelling images or pictures", "symbols that resonate with the basic values of the audience", and "appropriate media bites" (p. 299). Media advocacy is of clear relevance for this thesis, not only for increasing understanding and awareness of the problem but also for communicating public health measures such as social distancing, lockdowns, and vaccinations.

To summarize, while there exist numerous public health strategies that have been examined for this thesis, none of them are sufficient enough to be selected for applicability towards a global messaging strategy. Some are irrelevant due to the scale of the target audience, which is global, others are relevant but applicable as guiding principles but not effective as a strategy by themselves. There is also a distinction drawn between effective strategy i.e., a specific messaging format or strategy used to achieve a certain aim as opposed to guiding principles which is more generalized advice, applicable on a macro level, to messaging as a whole. It is also relevant to mention here that the scale and severity of both problems (climate change and COVID-19) are such that it would be unnecessarily restrictive to just curtail the search for messaging strategies to public health messaging. The problems demand a more open-ended search to identify the most relevant ones to ensure effective messaging.

2.2 Climate Change Messaging Strategies & Principles

The literature review conducted for this thesis began with a search of relevant databases for climate change messaging and utilized different keywords and phrases for that topic (e.g.,

climate change messaging, communication, framing, strategies). These strategies were selected on the basis of being the most relevant for this thesis via a systematic review (details in chapter 3). This section will begin the general overview of climate change messaging strategies.

Mah et. al (2020) say that there is no one magic bullet for effective climate change messaging; instead, there are certain helpful principles that can be used to bolster effective communication. They identify a series of best practices for communicators, which includes contextual factors and guidelines such as: the acknowledgment that providing sufficient information about risks is not an adequate catalyst for change, the limited effectiveness of emotional appeals, and the importance of the role of uncertainty. Schweizer et al. (2009) also offer a list of principles for effective climate change communication. These include knowing your audience and selecting a credible messenger, the value of connecting your message to cultural values, and crafting the message so it is empowering and meaningful.

Xue et. al (2016) claim that given the broad spectrum of audiences even within a single large city, it is not possible to devise a sole message that will be effective. Therefore, if time and resources allow, targeted messaging via audience segmentation is one possible way in which to overcome this obstacle. Dixon, Hmielowski, and Ma (2017) complement targeted messaging in their study, where they found that targeting American conservatives by emphasizing free-market solutions to climate change seemed to generate more favorable beliefs among their target audience, although they acknowledge that targeted messaging should not be the sole method for tackling the problem. This messaging strategy uses the same principles in the targeted messaging mentioned earlier in the public health messaging section of this chapter. Audience segmentation uses the same philosophy of knowing your target audience and then tailoring the messaging to ensure that the target audience perceives it to be relevant, thus making it more effective. For the

very same reason, since the scope of the problems that we are wrestling with in this thesis (global impact of COVID-19 and climate change) defies easy audience targeting, audience segmentation is of minimal relevance as a messaging strategy.

Corner, Markowitz, and Pidgeon (2014) review a body of work that explores human values in public engagement with climate change and conclude that highlighting certain human values in communication facilitates positive engagement with climate change, pointing specifically to what are referred to as "self-transcendent values" (i.e., altruism, benevolence, forgiveness, loyalty, etc.).

There has been a significant amount of research done with regards to message framing in climate change communication. Framing is the strategy of emphasizing specific aspects of a select issue to establish context and elicit a better response from the audience. Spence and Pidgeon (2010) discovered that if climate change outcomes were framed in terms of gains (for example, divesting from fossil fuels will save billions of dollars in long-term costs) it increased the audience's perceived severity of the impacts of climate change. Morton et al. (2011) augmented these findings by demonstrating that emphasizing loss frames in climate change communication gave the targeted audience less incentive to participate in pro-environmental behavior.

Using fear as a motivator in climate change messaging (focusing on the possible global havoc that climate change will cause) has yielded mixed results. Feinberg & Willer (2011) and O'Neill & Nicholson-Cole (2009) found fear appeals in messaging do not lead to people adopting pro-environmental behaviors. Chapman, Lickel, and Markowitz (2017) caution against the use of emotion-based communication strategies since such strategies may not adequately consider how

the target audience responds to such appeals. They advocate tailoring such messages to effectively interact with the target audience and warn that attempting this on a large scale will probably prove to be ineffective, stressing that the effectiveness of such messaging is hypothetical at best rather than a tried and tested strategy.

Evidence also shows that when climate change messaging is framed as a collective issue/communal responsibility, it elicits a greater tendency towards pro-environmental behaviors (Obradovich & Guenther. 2016) as opposed to when messaging focuses on individual responsibility for climate change. Guilt regarding inaction towards climate change is a much more complex subject, according to Butler (2010), individual responsibility leads to increased guilt but no changes in behavior whereas Mallett (2012) and Moore & Yang (2020) claim that eco-guilt motivates behaviour change.

Scannell & Gifford (2013) found that linking climate change messaging to local impacts may increase public engagement since the personal relevance of the local effects of climate change results in it being considered as a more tangible threat, as opposed to global effects being perceived as abstract and not personally relevant. Jones, Hine, and Marks (2017) claim that a considerable segment of the potential audience considers climate change to be "psychologically distant"—i.e., events that will occur in the future to people other than themselves. They suggest that crafting messaging where this psychological distance is reduced (for example, focusing on increased extreme weather events taking place currently rather than water scarcity in the future) will result in effective communication and influence pro-environmental behavior.

Poortvliet et al. (2020) investigate the effectiveness of climate change risk communication and its ability to enhance recipients' awareness and behavioral change by analyzing the summary

for policy makers of the fifth Intergovernmental Panel on Climate Change (IPCC) report (2014). They claim that the report has an imbalanced ratio of abstract to concrete message elements (7 to 44). This "may lead to a relatively large psychological distance between the audience and the subject of climate change, which could lead to a weak persuasive potential of the climate change risk information" (p. 9). They state that this can be overcome with coupling abstract climate change information with frames such as an economic frame, which would reduce psychological distance. They also found that "threat information (i.e., susceptibility and severity information) occurred more frequently than efficacy information (i.e., response efficacy and self-efficacy information)" (p. 8) as well as observing that the report contained differences in timing, with efficacy information being more present towards the end of the report. They state that presenting efficacy and threat information together would yield a more effective result since it would expose the readers to not only fear appeals but also to "risk-reducing behavioral options" (p. 8). In addition to this, Poortvliet et al. (2020) claim that risk communication can be augmented by showing the causal interconnections between efficacy and threat information and thus increasing their relevance to humans. Furthermore, the report comes in for criticism since it does not highlight successful examples of mitigation and adaptation, which Poortvliet et al. (2020) claim communicates efficacy. Therefore, according to the authors, a successful communication strategy regarding climate change would couple abstract information with specific frames, present threat and efficacy information jointly and incorporate successful examples of mitigation and adaptation methods.

Merzdorf, Pfeiffer, and Forbes (2019) provide an overview of strategies on how to effectively construct climate change messaging. These include techniques such as "framing (local impacts, heightened personal relevance, use of thematic frames); reducing psychological

distance; including emotional appeals; using efficacy cues, indicating weight-of-evidence and consensus messaging, using inoculation strategies for misinformation; and separating science from conspiracy theories." (p. 4). They state that the incorporation of these strategies into climate change messaging will increase public engagement with climate change as well as serve to bridge gaps within the public's understanding of climate science (p. 8).

The above guidelines, principles, and recommendations are relevant in the design of effective messaging strategies, it is crucial to note that to improve WHO's COVID-19 communication, a more in-depth understanding of some specialized messaging strategies is of utmost importance. With this in mind, a systematic review of the literature (full methodology described in chapter 3) has revealed three promising climate change messaging strategies that will be used for this thesis. These are scientific consensus messaging, inoculation-based messaging, and gain frames. These strategies were selected based on the best possible evidence as well as having the most persuasive support to best answer the research questions posed by this thesis.

2.3 Scientific Consensus Messaging

Van der Linden et al.'s (2015) study posits "perceived scientific agreement as a "gateway belief" that either supports or undermines other key beliefs about climate change" (p. 2). They state that an increase in the public perception on scientific consensus correspondingly relates to an increase in the belief that anthropogenic climate change is taking place. They go on to say that "changes in these key beliefs lead to increased support for public action" (p. 6). and state that consensus messaging acts as a "gateway belief model". In their study, Van der Linden et al. (2015) describe it as "an initial 'gateway' to changes in key beliefs about climate change, which in turn, influence support for public action" (p. 6). Simply put, belief in the scientific consensus

on a subject has a cascading effect, it initiates a belief in scientific consensus which then acts as a lever for the belief that the subject in question is a problem. These beliefs then lead to support for public action to counter the problem that the subject poses. The study highlights the effectiveness of consensus messaging as a communication strategy, claiming that "even a single, simple description of the scientific consensus significantly shifted public perceptions of the consensus and subsequent climate change beliefs and desire for action" (p. 7).

According to Bayes et al. (2020), the basic idea behind climate change consensus messaging is "that when the public comes to recognize the overwhelming level of expert agreement it will lead to an increase in a percentage of people who believe that it is human-caused which, will in turn, will increase overall support for taking steps to address climate change" (p. 2). They theorize a message stating that '97% of climate scientists believe in human-caused climate change' increases the accuracy of people's estimate of the level of expert consensus" (p. 2). This increased belief in the scientific consensus forms the basis for a cascading effect in people's beliefs about other climate change issues. Bolsen and Druckman (2018), find that such a statement regarding scientific consensus and the resultant belief that humans are causing climate change "is associated with increased support for climate mitigation policies" (p. 397) and link it further with van der Linden et al.'s (2015)'gateway belief model'. Van der Linden et al. (2019) also note that the communication of such a consensus will affect beliefs about the nature of the consensus. This is important since it also helps to stem the erosion of public confidence in the scientific consensus on climate change (van der Linden et al., 2017).

Scientific consensus messaging arouses considerable debate and criticism. Cook and Lewandowsky (2016) found that it is susceptible to backfiring and can cause increased disbelief, greater doubt in science, and lower support for policy measures to combat climate change. Pearce

et al. (2017) argue that it does not provide solutions to the general public about what to do with climate change and instead invites scrutiny and competing evidence. In addition, van der Linden et al. (2017) found evidence that when consensus messaging is disputed with misinformation, the positive benefits are significantly diluted or in some cases neutralized.

Despite all these criticisms of consensus messaging, Bayes et al. (2020) state that it provides "a valuable foundation for effective messaging" (p. 12) and acts as an important starting point for undertaking a comparison with other messaging strategies. While there are conflicting opinions on its effectiveness as a strategy, the nuanced conclusion is that it is a useful baseline and comparison point, which can act as a springboard for the analysis of other messaging methods and comparing their effectiveness in pandemic messaging.

2.4 Inoculation-based Messaging

Inoculation theory, supported by a vast repository of research, is considered to be the most established theory on persuasion resistance. According to Compton (2013), it works similar to a biological vaccine; via exposure to considerably weakened dosages of misinformation, it builds up resistance against misinformation. Maertens et al. (2020) demonstrate this by combining a scientific consensus message with inoculation treatment. The scientific consensus message delivered to the participants was "97% of climate scientists have concluded that human-caused climate change is happening" (p. 3). After a gap of one week, participants were then exposed to an "influential misinformation message" which took the form of a screenshot of a debunked petition which claimed that "31, 487 American scientists have signed a petition stating that human-caused climate change is not happening" (p. 3). The result was that the consensus message was resilient against misinformation and proved that the message can thus be 'inoculated' against the same. Cook et al. (2017) and van der Linden et al. (2017) have found that

inoculation shows considerable effectiveness in the case of contested issues like climate change and both studies show that inoculation messaging was successful at decreasing the effects of misinformation.

Inoculation-based messaging suffers from decay—i.e., decreasing effectiveness over time. Ivanov et al. (2018) demonstrated significant evidence that the inoculation effect decays as time goes by. One criticism is that the delay between the inoculation and the persuasion attempt in studies is a short period and therefore not reflective of real life. There is conflicting evidence with regards to the rate of decay (Banas & Rains, 2010; Ivanov et al., 2018). Ivanov (2017) suggests that increased frequency of the messages or "booster shots" can act as a barrier to decay.

As mentioned above, van der Linden et al. (2017) found that the benefits of consensus messaging were neutralized by misinformation; however, when consensus messaging was augmented by inoculation messaging, the study "found that much of the initial consensus-effect was preserved (up to two-thirds) by the inoculation messages" (p. 5). These results, impressively, were consistent along the political divide between American Republicans, Democrats, and Independents. A replication study by Williams and Bond (2020) backed up these findings.

This underlines the fact that consensus messaging, when combined with inoculation messaging, largely retains its benefits even when exposed to misinformation and to people with highly polarized political leanings, something that is of particular significance in the case of pandemic messaging.

2.5 Gain Frames

Outcome framing is an approach that attempts to dissuade individual harmful behavior/habits by framing effects in terms of gains or losses (Spence and Pidgeon, 2010). A gain frame is a frame where the information relayed focuses on the beneficial effects of undertaking a certain form of behavior (for example, Stanford University's recycling efforts reduced greenhouse gas emissions by 2447 metric tons carbon equivalent to conserving 1,009,626 gallons of gasoline) whereas a loss frame is where information communication relies on the deleterious effects of the same behavior (for example, extreme weather events due to climate change in 2021 have resulted in economic losses of over $334 billion). Edwards et al. (2001) found that affecting behavioral change via loss frames was more efficient in behaviors deemed risky whereas gain frames were more effective in safe behaviors.

Bertolotti and Catellani (2014) posited that climate change policy messaging cannot be confined to merely gain and loss framing. They found that gain frames were more persuasive when the messaging concerned renewable energy sources whereas messaging concerning greenhouse gas emissions was more persuasive when loss frames were used.

Spence and Pidgeon (2010) found that "gain-framed information was more effective than loss-framed information in promoting positive attitudes towards climate change mitigation" (p. 7). They elaborate that this is consistent with research conducted by Rothman et al. (2006): "when an outcome or frame is construed as low in risk, or safe, there is a systematic advantage when framing information about outcomes in terms of gains" (p. 7). The crucial component here is that the recipients of the information believe that prevention behaviors (in this study, climate mitigation) are interpreted as safe or being low-risk behaviors. Another interesting outcome of the Spence and Pidgeon (2010) research was that they found that "exposure to gain-framed

information also resulted in judgment of climate change impacts as more severe" (p. 7). This has interesting implications for this thesis since if the resultant effects from gain frames cause a more concrete understanding of the harmful consequences of climate change, this information can be used for the promotion of a more realistic understanding of pandemic messaging, possibly resulting in its greater efficacy.

Table 1. Messaging Strategies

Messaging Strategy	Explanation
Scientific Consensus Messaging	Highlighting the scientific consensus or collective expert opinion on a certain issue results in increased public perception about the issue and serves to enhance public support for addressing the said issue.
Inoculation Messaging	Inoculation messaging works on the basis that exposure to weakened bits of misinformation will increase resistance to misinformation in the future, thus decreasing its effects/influence on the subject.
Gain Framing	Gain framing is when a statement is phrased in a way that describes a choice in terms of its positive outcomes.

2.6 Justification

As described earlier in this chapter, there exists a multitude of messaging strategies used for climate change messaging. This subsection will explain the rationale behind the selection of the above-mentioned three strategies as the three most relevant ones for this thesis.

Scientific consensus messaging was chosen because of its value in preparing the foundation for more complex and issue-specific messaging. The literature is widely agreed that this is a useful and effective starting point to begin a messaging plan. The gateway belief model's criticisms—that it does not provide solutions and is susceptible to misinformation—can be countered, for the purposed of this thesis, by two simple points. The first is that that consensus messaging does not have to be used in isolation; the provision of solutions can be part of a broader messaging plan than includes it. Secondly, the susceptibility to misinformation can be dealt with through coupling with inoculation messaging, which will be explored in greater detail below. Given these points, I believe that scientific consensus messaging comprises a useful and possibly effective starting off point for comparison with WHO pandemic messaging.

Inoculation-based messaging was chosen specifically to counter the misinformation aspect which haunts the debate around both climate change and pandemic messaging. During the literature review, it stood out as the most effective counter against misinformation. This matters because misinformation and disinformation are such a plague in pandemic messaging (e.g., vaccination hesitancy, numerous myths, and falsehoods attributed to COVID-19's effects, spread, and causes). The literature shows a proven link between consensus-based messaging and inoculation messaging in reducing the effects of misinformation as well as creating a positive effect towards consensus messaging. Furthermore, inoculation-based messaging, when coupled with consensus-based messaging, retained its efficacy when targeted at people across political

divides. This bodes well for pandemic messaging, which is a highly politicized issue in certain jurisdictions, eliciting strong reactions from people based on their political leanings. I believe these to be encouraging signs for the complementary nature of the two strategies when used in concert and for suitability to this thesis. The main weakness of inoculation-based messaging—it suffers from decay—can be addressed with "booster shots" (Ivanov, 2017) i.e., repetition of inoculation or consensus messages, something that should not be particularly difficult given the nature of the pandemic, where people are being exposed to new messaging and guidelines relatively frequently.

Gain frames are also a good match given that the literature review found that they are more effective when the recipients believe that prevention behaviors are considered to be safe/low-risk behaviors. I believe this fits in well with the fact that the majority of pandemic control measures fall within this category. Wearing a mask, staying six feet away from other people in public, and frequent handwashing and sanitization and vaccinations are not behaviors that most people would find to be excessively dangerous or high risk, just inconvenient. Some of the literature found that gain frames can result in the recipients judging the impacts of the issue to be more severe. This could result in people taking the pandemic more seriously and having a better understanding of its deleterious effects, thus potentially setting up a feedback loop of taking preventative behaviors more seriously and adhering to them. Finally, gain frames were selected due to being a messaging strategy that promotes positive attitudes towards the issue in question. Given the restrictive nature of the actions required to control the pandemic (e.g., mask-wearing, decreased socialization, distancing), I believe that a messaging strategy that encourages positive attitudes towards actions would be of use in the context of COVID-19. The hope is that not only will this soften the resentment that people harbor towards having their lives upended and

their behaviors curtailed, but also make them more amenable towards actions that curtail the spread of the pandemic.

Given the literature, I believe there exists a possible gap where this thesis can supplement existing research. While there is conclusive research showing that there is no one messaging strategy that will be effective with a heterogeneous audience, thus necessitating the need for targeted/focused messaging along with other strategies, there is also a possible gap here regarding consideration of messaging for a general audience. Given the WHO's target audience (i.e., the entire globe), there conceivably exists an opening that this thesis can slot into. I speak here of the augmentation of general messaging where the messaging that WHO is doing for a planet-wide audience can be made more robust and effective before it transitions into localized or region/country-specific messaging. This will serve to increase the efficacy of the messaging for a general global audience which will lead to a smoother transition towards other more focused messaging strategies.

A crucial gap to highlight here is that there is little overlap between climate change messaging and public health messaging. This gap is made more glaring by the fact that they share certain similarities which classify them as wicked problems, especially in the context of the COVID-10 pandemic. Thus, it is hoped that this thesis will have some value to bridge the gap between the two fields and prove of some value to bring them together with the ultimate aim of benefiting both fields.

3 Data Collection Methods

This chapter will delve into the research methodology and research methods used in this thesis.

Firstly, in terms of overall research design, the chapter will define the research questions being asked and answered in the thesis project as well as elaborate on research goals. Next, it will detail the sample of messaging being analyzed, provide justification for the selected sample, and describe where the messaging was collected from.

Secondly, in terms of data collection, the chapter will discuss the systematic review conducted for this thesis. The systematic review can be better understood as having two halves. For the first half, comprising a systematic literature review (the results of which informed chapter 2), this chapter will outline: the research protocol and its development, database selection, search terms used, modifiers selected, elimination process for search results. The second half comprises a document review for WHO messaging (the results of which inform this and following chapters), including collection and sorting protocols for WHO messaging and documents present on their website and checking if WHO country-specific messaging is consistent with its international messaging. This chapter will also lay out the pandemic timeline that was selected for the thesis and justify its usage.

Finally, in terms of data analysis, the chapter will conclude with a discussion on the coding of data, including the various codes developed and identified before the data was analyzed as well as acknowledgement of the possible emergent codes that might appear during the analysis.

3.1 Research Goals and Research Questions

As mentioned in chapter 1, there are five main research questions that this thesis project aims to answer.

- RQ1: What messaging strategies does the World Health Organization (WHO) employ for COVID-19?
- RQ2: Does the WHO employ proven climate change messaging strategies and, if so, to what extent are they employed?
- RQ3: Why does the WHO employ the messaging strategies it does?
- RQ4: How can the WHO improve and enhance its messaging strategies?
- RQ5: What lessons does the WHO's overall messaging strategy offer other COVID-19 messengers and comparable issues like climate change?

RQ1 deals with the basic identification of WHO messaging strategies to lay a foundation for answering the rest of the research questions. By identifying what sort of messaging the WHO is using, we may begin to understand the angle of attack that is being employed to make the messaging effective to realize its eventual goal. This is necessary in order to determine how that messaging might be improved to better manage the pandemic.

RQ2 seeks to build upon the research conducted in the literature review section of this thesis. By reviewing WHO messaging and comparing it to the three messaging strategies selected in the literature review, the thesis aims to determine whether climate change messaging strategies that have been analyzed and evaluated, and have a successful track record in practical usage, are being used in the case of the pandemic, which might be expected due to the similarities between these two "wicked" problems (as explained in chapter 1).

RQ3 means to shed light on the limitations that the WHO faces in determining and delivering its messaging strategies. For example, the WHO's jurisdiction is the entire globe, so it cannot easily rely on focused, target-based messaging, a proven strategy in public health messaging. Similarly, because of the global audience, the WHO needs to make its messaging easily understood so that the central thrust of the message is not confused or misunderstood by any members of the intended audience (the public). Answering this question will help us appreciate the possibilities for change (or lack thereof) in global pandemic messaging.

RQ4 attempts to apply the lessons learned from decades of climate communication/messaging research and is a prescriptive exercise to see if those lessons can supplement existing WHO messaging. This will take place in the broader discussion after the initial messaging analysis and will deal with hypothetical examples as to how the WHO's COVID-19 messaging might be improved with those lessons applied.

RQ5 is a further consideration to stimulate discussion on whether the lessons between climate change messaging and pandemic messaging are one way or not—i.e., if pandemic messaging can also seek to inform climate change messaging to make it more effective and to perhaps reach a greater audience than it has before. It also allows for other lessons and guidelines whose possible emergence might inform other institutions facing complex problems.

These research questions flow from the basic problems afflicting both climate change and pandemic messaging—i.e., they have been polarized along political fault lines and subject to an intense barrage of misinformation and denial. The purpose of both forms of messaging is to educate/inform the general public about the dangers of the problem and influence behavioral change by providing solutions to such "wicked" problems. The research questions have been

designed to address issues that exist at the heart of both climate change and pandemic messaging. Thus, while RQ4 might lead to solutions to these issues, in order for that to happen, RQ1, RQ2, RQ3 need to be answered.

RQ2 and RQ4 are designed in mind to deal with the insidious problems of misinformation, disinformation, and denial. If RQ2 reveals that WHO uses climate change messaging strategies, RQ4 will be able to build on that foundation and perhaps suggest improvements to that usage. If RQ2 reveals that WHO does not use climate change messaging strategies, then RQ4 will lay out a potential path where they may be applied to WHO messaging.

RQ5 deals with a holistic vision of the problem and possible future research direction. If there emerges from this thesis research a way to possibly improve climate change messaging via the strategies being employed by WHO as well as provide possible improvements to other institutions facing complex problems, this question will address that. Due to the inherent limitations of the thesis project such as time and focus, the answer to RQ5 will be preliminary, but useful to provide a path to guide future research.

3.2 Research Design and Message Selection

As 6 and Bellamy (2012) instruct, "research…starts with a question"; similarly, the seed that grew into this thesis project was planted with a simple question "To what extent are climate change messaging strategies also used for pandemic messaging?" My initial hypothesis was that they are, due to the similarities between the two crises and how well established the field of climate change messaging is. But to limit this thesis project to a simple inductive or deductive approach would only serve to beggar the analysis that I hope to glean from the project. Therefore, a hybrid of both deductive and inductive methods was applied to the research design and the

research questions themselves. Thus, as per 6 and Bellamy (2012), two research design principles were combined in this case. These were “to identify trends for richer description” and “to make an inference to the best explanation” (6 and Bellamy). This is reflected in the research questions as well with RQ1 and RQ2 (deductive) posed to identify trends and RQ3 and RQ4 to “make an inference to the best explanation” (inductive).

Similarly, Agee (2009) was of incomparable help in beginning to narrow down and formulate the research questions that began with an idle flight of curiosity, especially with how to best frame the qualitative nature of the questions I wanted to ask from the thesis. Drawing further from Agee (2009), the initial “broad questions” (p. 434) I asked were “are climate change messaging strategies also used for pandemic messaging?” and “who uses climate change strategies in pandemic messaging?”. Agee (2009) helped inform the process from which more than one broad, unfocused question transformed into a form a more specific question: “does the WHO use climate change messaging for COVID-19 messaging?” This was later split into the specific research questions mentioned above.

To get a complete picture of pandemic messaging, WHO messaging was selected as the appropriate messaging source or “case” for this study. This was done for several reasons in mind, in addition to the above-mentioned scale. Since the WHO has global jurisdiction, it would not be constrained by region/nation/state/province-level messaging. Any of these would render the scope of the analysis a bit myopic as they would be specifically tailored to the needs of that target audience, at the expense of excluding the myriad of other jurisdictions that exist globally. For example, the Center for Disease Control and Prevention (CDC) in the United States of America will have messaging tailored to that specific country. Tailored messaging in lower-level jurisdictions is important, to be sure, but given that we know very little about the overlap in

messaging for climate change and COVID-19, it makes sense to start at the top. In addition to that, if the messaging was focused on a regional or national, or statewide level, it would possibly limit the number of messaging strategies in play. Thus, the WHO was selected to get the full spectrum of messaging strategies that may be employed and better inform the analysis. Climate change, like the COVID-19 pandemic, is a global problem, and it made logical sense to select WHO because of its influence, which spans almost every nation on earth.

More specifically, the sample of messaging selected for this thesis, from the case of the WHO, is that which is present on the WHO's COVID-19 website (https://www.who.int/emergencies/diseases/novel-coronavirus-2019). This section of their website deals specifically with information and messaging on COVID-19, thus providing a complete, focused overview of the messaging relevant to the thesis.

While an initial foray into the website revealed a morass of information, some of it extraneous to the purposes of this thesis, a quick filter was developed to obtain data with the most relevance. Since the focus of the thesis is messaging intending to affect behavioral change, the data selected from the WHO website was limited to messaging for the general public only. This served to eliminate numerous messaging nodes on the website that catered to technical knowledge, advice to policymakers and medical staff, and training—allowing the most relevant messaging to come into focus.

3.3 Systematic Review

The pandemic timeline for this thesis was from January 2020 until August 2021. These particular dates were chosen to include the maximum range of relevant stages of the pandemic, to get the most complete picture of WHO's response. This included the initial outbreak (January-

February 2020), the nascent WHO response (March-June 2020), initiation of global lockdowns (March 2020), the consequences of the lockdowns (May 2020-May 2021), global vaccine development (April 2020-December 2020), vaccine rollouts (January 2021 onwards), and the initial results of the global vaccination drive (March 2021-August 2021). Of course, the pandemic has continued and remains a critical problem even at the time of this writing.

The literature review component of the systematic review, which informed the latter half of chapter 2 of this thesis and the selection of the three climate messaging strategies, is primarily based on a modified method used in Spruijt et al. (2014). This method is based on starting a literature review from a search engine and then manually refining the search results by dismissing certain results based on selection criteria. It incorporates what is called the 'snowball method' i.e., combing through the reference lists of the publications selected in the previous step of the structured search to gather more resources. Once the final list of publications has been compiled, it was subjected to a qualitative review. The results of this systematic review were reported through the literature review in sections 2.3, 2.4 and 2.5 earlier.

Specifically, a broad search was conducted with SCOPUS, using the search terms mentioned in Table 2. The largest possible variety of search terms were deployed (18) to capture the most relevant literature related to the thesis under two main camps: pandemic messaging and climate change messaging. It is important to note here that the messaging referred to here are messaging *strategies*, as defined on page 3, not messaging in the general sense of the word, which is why no synonyms for messaging such as 'news', 'report', or 'bulletin' etc. were used. The initial results were collated with the following parameters: the literature should consist of peer-reviewed journal articles, written in English, published after 2010. Some terms have additional parameters to help reduce the number of articles from the search which explains why

some rows in the figures are inconsistent with the rest. This proceeded to yield a workable, modern, and relevant number of articles that could be further pared down. Once the initial results had been collected, they were manually refined with aid of a collection protocol that focused on removing articles based on irrelevance and duplication. The reference lists within the articles were then analyzed to see if additional material could be gleaned. A flow diagram of the literature selection process is provided in Fig. 2. The final articles were then fed into an Excel database specifying title, year of publication, keywords, summary, and commentary on possible links with WHO messaging. The final yield of articles was then subjected to qualitative review.

Table 2. Structured Search Query (Adopted from Spruijt et al. 2014)

Search Term	Search Query
Pandemic Messaging	TITLE (pandemic AND messaging) AND PUBYEAR > 2009 AND PUBYEAR < 2022 AND (LIMIT-TO (DOCTYPE , "ar")) AND (LIMIT-TO (LANGUAGE , "English")) AND (LIMIT-TO (PUBSTAGE , "final"))
Covid Messaging	TITLE (covid AND messaging) AND PUBYEAR > 2009 AND PUBYEAR < 2022 AND (LIMIT-TO (PUBSTAGE , "final")) AND (LIMIT-TO (DOCTYPE , "ar")) AND (LIMIT-TO (LANGUAGE , "English")) AND (LIMIT-TO (SRCTYPE , "j"))
Coronavirus Messaging	TITLE (*coronavirus* AND *messaging*) AND PUBYEAR > *2009* AND PUBYEAR < *2022* AND (LIMIT-TO (PUBSTAGE , *"final"*)) AND (LIMIT-TO (DOCTYPE , *"ar"*)) AND (LIMIT-TO (LANGUAGE , *"English"*)) AND (LIMIT-TO (SRCTYPE , *"j"*))
Covid Framing	TITLE (covid AND framing) AND PUBYEAR > 2009 AND PUBYEAR < 2022 AND (LIMIT-TO (PUBSTAGE , "final")) AND (LIMIT-TO (DOCTYPE , "ar")) AND (LIMIT-TO (LANGUAGE , "English")) AND (LIMIT-TO (SRCTYPE , "j"))
Coronavirus Framing	TITLE (*coronavirus* AND *framing*) AND PUBYEAR > *2009* AND PUBYEAR < *2022*
Pandemic Framing	TITLE (*pandemic* AND *framing*) AND PUBYEAR > *2009* AND PUBYEAR < *2022* AND (LIMIT-TO (PUBSTAGE , *"final"*)) AND (LIMIT-TO (DOCTYPE , *"ar"*)) AND (LIMIT-TO (LANGUAGE , *"English"*))
Pandemic Communication	TITLE (*pandemic* AND *communication*) AND PUBYEAR > *2009* AND PUBYEAR < *2022* AND (LIMIT-TO (PUBSTAGE , *"final"*)) AND (LIMIT-TO (DOCTYPE , *"ar"*)) AND (LIMIT-TO (EXACTKEYWORD , *"COVID-19"*) OR LIMIT-TO (EXACTKEYWORD , *"Communication"*) OR LIMIT-TO (EXACTKEYWORD , *"Coronavirus Disease 2019"*) OR LIMIT-TO (EXACTKEYWORD , *"SARS-CoV-2"*)) AND (LIMIT-

	TO (LANGUAGE , *"English"*)) AND (LIMIT-TO (SRCTYPE , *"j"*))
COVID Communication	TITLE (*covid* AND *communication*) AND PUBYEAR > *2009* AND PUBYEAR < *2022* AND (LIMIT-TO (PUBSTAGE , *"final"*)) AND (LIMIT-TO (DOCTYPE , *"ar"*)) AND (LIMIT-TO (EXACTKEYWORD , *"COVID-19"*)) AND (LIMIT-TO (LANGUAGE , *"English"*)) AND (LIMIT-TO (SRCTYPE , *"j"*))
Coronavirus Communication	TITLE (*coronavirus* AND *communication*) AND PUBYEAR > *2009* AND PUB YEAR < *2022* AND (LIMIT-TO (LANGUAGE , *"English"*)) AND (LIMIT-TO (PUBSTAGE , *"final"*))
Climate Change Communication	TITLE (*climate* AND *change* AND *communication*) AND PUBYEAR > *2009* A ND PUBYEAR < *2022* AND (LIMIT-TO (DOCTYPE , *"ar"*)) AND (LIMIT-TO (LANGUAGE , *"English"*))
Climate Change Messaging	TITLE (*climate* AND *change* AND *messaging*) AND PUBYEAR > *2009* AND PUBYEAR < *2022*
Global Warming Messaging	TITLE (*global* AND *warming* AND *messaging*) AND PUBYEAR > *2009* AND PUBYEAR < *2022*
Climate Change Messaging Strategies	TITLE (*climate* AND *change* AND *messaging* AND *strategies*) AND PUBYEAR > *2009* AND PUBYEAR < *2022*
Global Warming Messaging Strategies	TITLE (*global* AND *warming* AND *messaging* AND *strategies*) AND PUB YEAR > *2009* AND PUBYEAR < *2022*
Climate Change Framing	TITLE (*climate* AND *change* AND *framing*) AND PUBYEAR > *2009* AND PU BYEAR < *2022*
Global Warming Framing	TITLE (*global* AND *warming* AND *framing*) AND PUBYEAR > *2009* AND P UBYEAR < *2022*
Climate Change Messaging Best Practices	TITLE (*climate* AND *change* AND *framing* AND *strategies*) AND PUBYEAR > *2009* AND PUBYEAR < *2022*
Global Warming Messaging Best Practices	TITLE (global AND warming AND messaging AND best AND practices) AND PUBYEAR > 2009 AND PUBYEAR < 2022

1112 articles identified through SCOPUS search

37

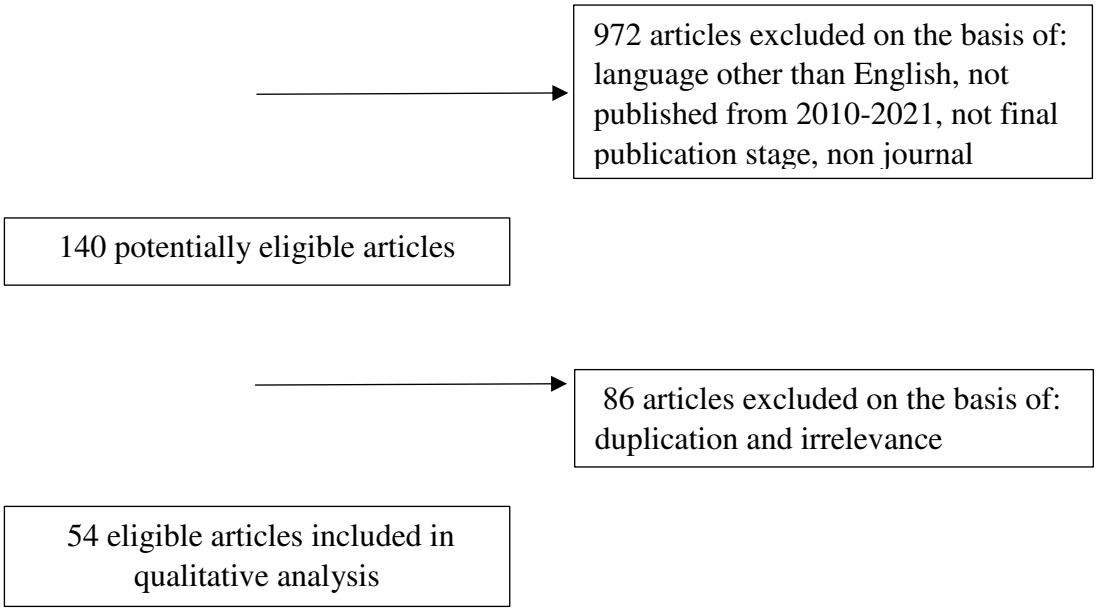


Figure 1. Diagram Outlining the Literature Selection Process (Adopted from Spruijt et al. 2014).

Once the literature collection and analysis were complete, the focus of attention shifted to the document review component of the systemic review, covering messaging found on the WHO website, which will inform subsequent chapters. The entirety of the Coronavirus section of the WHO website was combed through and separated according to codes relating to the climate messaging strategies selected in chapter 2. These were color-coded for easy accessibility: scientific consensus messaging was yellow, inoculation-based messaging was purple, and gain frames were blue. In addition to these codes, room was set aside for new codes that might develop during analysis. As the next chapter will show, this took the form of additional codes, which were titled 'WHO messaging strategy' (red)—indicating a unique WHO messaging strategy that emerged during analysis—and 'no messaging strategy found' (green). These were finally collated into a master MS Word document linking each relevant Coronavirus section on

the WHO website and its respective code (this code is explained in detail in the following chapter).

To satisfy due diligence and make sure the data gathered was exhaustive, there was also a separate analysis conducted to ensure that WHO's regional or country-specific messaging remained consistent with their international messaging. To this end, it was discovered that there are separate sections dividing WHO jurisdictions by region. These are: Africa, the Americas, South-East Asia, Europe, Eastern Mediterranean, and Western Pacific. Three countries were arbitrarily selected from differing regions: Canada, Iceland, and Pakistan. The amount of messaging varied from region to region but apart from availability in the local language, the regional and country-specific messaging was found to be exactly like the one found on the international website. This is an indicator of how the global scale selected for analysis is even more relevant since all WHO messaging links back to how it is aimed at an international audience. Furthermore, it is important to note here that perhaps there is an opportunity to use tailored messaging. If general messaging strategies can be used in the global context by WHO, it is possible to set up a framework where further down the organizational hierarchy (regions to nations), a toolkit can be established where messages can be further targeted towards the jurisdiction being selected.

Once all messaging channels were finalized and it was ensured that the relevant sections of the website were selected, the results of this process are going to be reported in the following chapter.

4 Analysis and Results

This chapter will detail the results of the research protocol applied to messaging regarding COVID-19 on the WHO website. Essentially, it seeks to answer the first two research questions posed in the thesis. They are:

RQ1: What messaging strategies does the WHO employ for COVID-19?

RQ2: Does the WHO employ proven climate change messaging strategies and, if so, to what extent are they employed?

The answer to the first research question will lay a foundation by identifying messaging strategies used by WHO in their COVID-19 messaging. Once this is complete, the focus will be to apply the research done in the literature review to WHO messaging, seeking to determine if climate change messaging strategies have been appropriated for the sake of more effective messaging, thus answering the second research question.

4.1 Coding WHO COVID-19 Messaging Strategies

Before a detailed analysis of the messaging found on the WHO was undertaken, 5 codes were developed to identify messaging strategies that might be found in the data selected. These were:

1. Scientific Consensus Messaging was highlighted in yellow.
2. Inoculation-based messaging was highlighted in purple.
3. Gain framing messaging was highlighted in blue.
4. WHO messaging—a unique messaging strategy used by WHO (explained in detail later on in this chapter), not identified in the existing literature—was highlighted in red.

5. No messaging strategy found: where no evidence of any messaging strategy was found, the messaging was highlighted in green.

The first 3 codes i.e. scientific consensus messaging, inoculation-based messaging and gain framing messaging were developed from the systematic review as examples of climate change messaging strategies. The WHO messaging code was developed from a preliminary analysis of WHO material present on their website. The "no messaging strategy found" code was added to aid classification and to identify areas where gaps in WHO messaging might be present.

Once qualitative analysis of WHO messaging was completed, the relevant sections were collated into the MS Word master document mentioned in section 3.3 earlier. This document categorized relevant messaging themes corresponding to the codes which allowed me to sort the data and collect all relevant data pertaining to those codes. An explanation of how these codes were discovered and why they were coded as such is explained in detail later in this chapter as each specific section is analyzed.

The COVID-19 Pandemic section of the WHO website (https://www.who.int/emergencies/diseases/novel-coronavirus-2019) is divided into 5 master categories

1. Advice: contains subsections such as advice to the public, mythbusters, questions and answers, travel advice, and "science in 5"
2. Technical guidance: all technical guidance on COVID-19
3. Vaccines, treatments & tests: contains information about vaccinations, WHO approved treatments, and different tests for COVID-19 detection

4. Response: contains subsections such as situation reports; disease outbreak news; a timeline of WHO response, strategy, and planning; COVID-19 supply chain system; and funding
5. Research: contains subsections such as global research on COVID-19, R&D blueprint, investigation protocols, general "about COVID-19" information, variants, and origins

An initial exploratory search was conducted on all these sections and the information within was synthesized and collected in a master word processing document that marked all sections containing messaging relevant for this thesis.

Keeping in mind the filter developed (in chapter 3, research design subsection) to weed out data extraneous to the focus of the thesis, only messaging targeting the public with the aim of behavioral change was coded. This rendered certain nodes of the website irrelevant for our purposes (for e.g., COVAX which is the WHO initiative for global vaccine deployment, or the COVID-19 Supply Chain System, which provides an assessment of the global supply system). The next few sections of this chapter aim to deal with WHO messaging as found in the 5 master categories mentioned above.

4.1.1 Advice for the Public

This intended audience of this section is the general public and further divided into 9 subcategories: mythbusters, how to report misinformation, small public gatherings and COVID-19, masks, transmission, advocacy, getting vaccinated, travel advice, and all COVID-19 Q&As.

During the initial exploratory search, it was quite straightforward to determine that some of these subcategories were irrelevant because they did not fit into our criteria of containing messaging being directed towards the public with the aim of behavioral change. Thus, under this

criterion, the following subcategories were not selected for any detailed messaging analysis: small public gatherings and COVID-19 (this was excluded because the advice contained in it linked back to COVID-19 transmission and social distancing guidelines, this is covered in more detail in the transmission section), advocacy (the subsections of this category deal with various topics such as human rights with regards to COVID-19, parenting during the pandemic, violence against children, women and older people, and gender. These are aimed at WHO member states and global actors and do not deal with the public), travel advice (also addressed to WHO member states and policymakers and covers what factors countries need to consider for opening international travel as well as travel precautions along with position papers and technical considerations, screening measures at departure and arrival points, and immunity certificates to facilitate travel. Once again, since this is not directed towards the public, this subsection has not been selected for message analysis), and all COVID-19 Q&As (discarded because they only contain information for commonly asked questions about COVID-19 and related subjects). This left us with the other 5 subcategories to peruse in detail and code.

While initially seeming relevant for this thesis, detailed analysis of these selected 5 subcategories in the 'Advice' section revealed that even some subsections of these did not correspond to any given messaging strategies. To streamline the reading of this section of the thesis, I have decided to group together all the subsections in the 5 selected subcategories that were coded green. These are:

1. Most of the subsection titled 'How to report misinformation' contains in-depth guides on how to report misinformation on leading social media platforms and instant messaging apps that include: Facebook, YouTube, Twitter, Instagram, WhatsApp, TikTok, LinkedIn,

Viber, and VKontakte. While all of these were straightforward guides on how to report misinformation (one per platform), they do not contain any specific messaging strategy.

2. The ‘Masks’ subcategory comprehensively details masks in the context of COVID-19. It informs the reader that masks are part of a greater, encompassing strategy for the suppression of viral transmission and warns them that masks alone are not enough to provide complete protection against COVID-19. It contains detailed instructions on how to wear a mask, what types of masks to wear, and masks and children, as well as technical guidance for mask usage. While of practical use as part of a comprehensive strategy, there was no evidence of any messaging strategy in this section.
3. Certain subsections of the ‘Transmission’ subcategory like the protective measures subsection as ‘visiting family in a long-term health care facility’, ‘find a mask that fits your face best’ and the animation for ‘monitor your COVID-19 long term effects’ do not employ any messaging strategy and simply serve as basic information being doled out to the reader.
4. Some subsections of the ‘Getting vaccinated’ subcategory are also coded green. These subsections include details of the 6 vaccines being used globally that have met WHO criteria for safety and efficacy, general advice on the need for vaccine urgency and its importance, which people should get vaccinated, and exceptions, what to expect after vaccination as well as commonly encountered side effects. Also included in the section are various explainers for how vaccines work; the development, safety, and quality control procedures in place for them; and the effects of virus variants on vaccine efficacy. These subsections just act as information sources.

5. All the subsections in the 5 subcategories have Q&A sections that answer frequently asked questions (FAQ) about the relevant subcategories. These are just FAQ lists and do not employ any messaging strategies and are there for informational purposes.

The rest of this section will deal with the subcategories and relevant subsections that had evidence linking them to some form of messaging strategy.

Mythbusters

The mythbusters subcategory deals with prevalent instances of misinformation and disinformation regarding COVID-19. It contains a list of 40 common myths about the pandemic and seeks to 'bust' them via a short informational poster. The poster debunks the myth with facts, offers a small explanation detailing what actually happens, and offers a WHO-mandated solution. These posters are sometimes accompanied by a short video. An example of this is shown below.

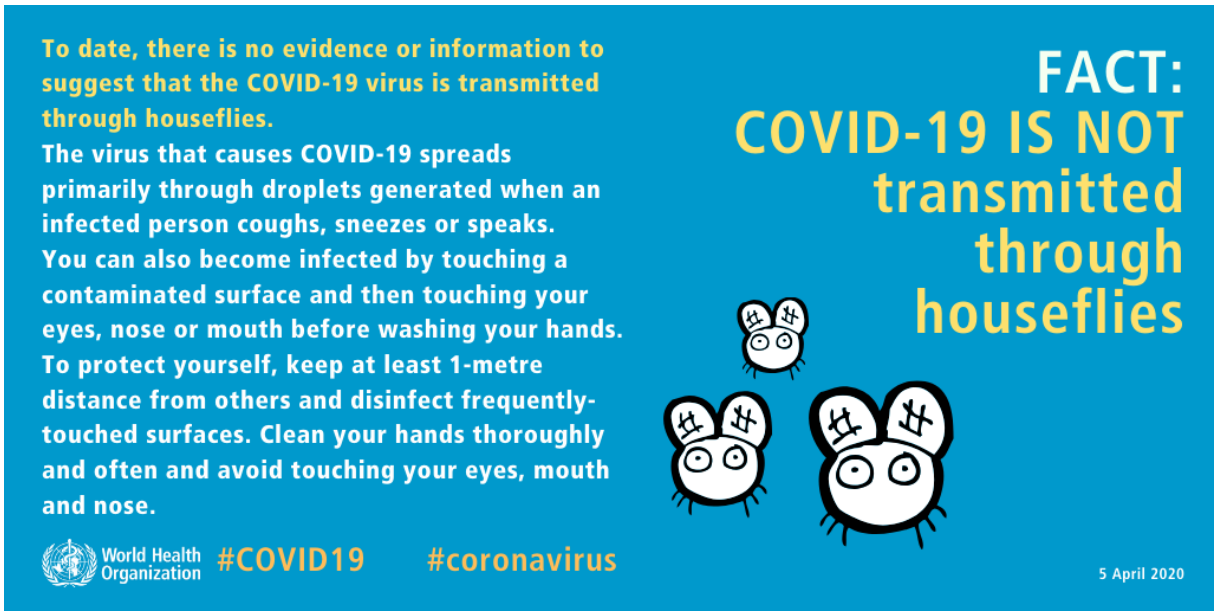


Figure 2. 'Mythbusters' Infographic

In Figure 2, the myth in question is that COVID-19 is transmitted through houseflies. The poster immediately refutes it via factual information (i.e. “FACT: COVID-19 IS NOT transmitted through houseflies”), explains how virus transmission occurs, and lists certain ways to protect yourself from transmission—that is, the WHO-mandated solution.

This example can also be used to illustrate the WHO messaging code that is mentioned as one of our 5 codes. In this case, the messaging strategy corresponds to a very specific form, utilized numerous times by WHO. This takes the shape of message dissemination/providing information, often correcting misinformation, paired with an explanation regarding the actual cause of the subject in question (e.g., virus transmission, COVID-19 detection, treatment, vaccination) and then offers a synthesized solution or behaviour for the subject. This WHO messaging strategy was coded as Information + Explanation + Solution (IES) and was assigned a separate code (red). For a message to qualify for this code, it was determined that three criteria had to be met:

1. Information: This takes the form of information dissemination or misinformation correction. What is the information being presented/what is the misinformation being corrected?
2. Explanation: Elaborates on the information presented about the subject. The ‘why’ of the message.
3. Solution: Presented a solution to the problem or the issue presented in the information, which can be even present in the form of seeking more information or contacting a health service provider or involves a call to action for citizens to amend their behaviour.

To clarify IES and the selection criteria, here is an example of an infographic that did **NOT** qualify as part of their messaging strategy, shown below in Figure 3.

Figure 3. Infographic Where IES is Not Used

The infographic in Figure 3 does not qualify as part of IES because it does not include all three criteria. It provides a message containing information ('the amount of alcohol-based sanitizer you use matters') and provides a solution on how to properly use alcohol-sanitizer by describing the technique but does not satisfy the third part of the criterion trinity as it does not provide an explanation with regards to why the amount of alcohol-based sanitizer matters and was thus coded green i.e., no messaging strategy found.

Out of the 40 myths dealt with in the 'Mythbusters' subcategory, none of the 3 major messaging strategies used in climate change messaging (i.e. scientific consensus, inoculation messaging, gain framing) were found. Instead, extensive evidence of IES was discovered, with 30 out of the 40 myths coded as such. 10 out of the 40 were found to contain no specific or

detectable messaging strategy e.g., they relay a certain message but do not incite behavioral change.

How to report misinformation

One subsection of the 'how to report misinformation' subcategory is a link to a short 5-minute game called 'Go Viral' (https://www.goviralgame.com/en/), which purports to help protect the player against COVID-19 misinformation. The interactive game teaches the player how COVID-19 information goes viral and makes you play as a social media influencer who maximizes likes and credibility by creating posts that have manipulative information. It explains how filter bubbles are created via social media algorithms that tap into negative emotions to drive engagement and elaborates on how fake experts, manipulative wording, and conspiracies can be used to give the impression of being an expert.

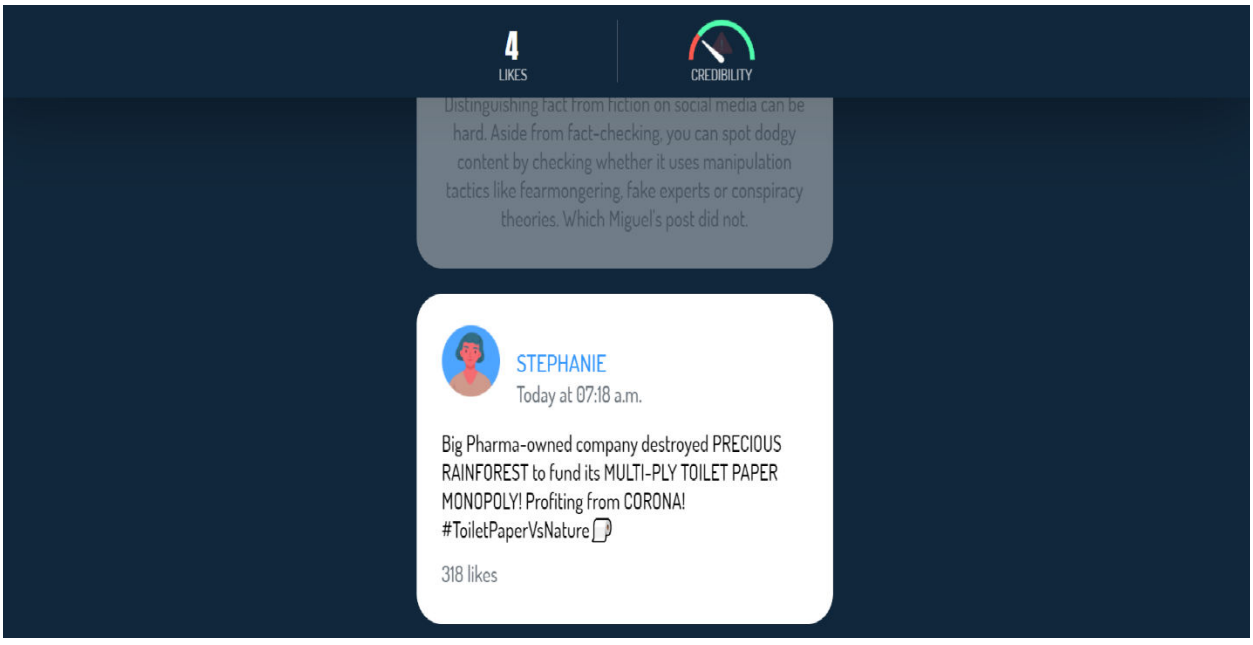


Figure 4. Screenshot of 'Go Viral' Game

This is one of the rare occasions where WHO messaging on COVID-19 is comparable to inoculation-based messaging from climate change communication. The game provides a simple but effective illustration of how misinformation is created and how to be on the lookout for the same on social media. A simplification of Compton's (2013) analogy to a biological vaccine, the game seeks to build up resistance against misinformation by exposing the player to weakened doses of misinformation and takes it a slight step further by showing the player how much misinformation is created and disseminated in the social media ecology.

Transmission

The 'Transmission' subcategory is divided further into 4 segments. These are

1. Protective measures: consisting of a quiz to assess the reader's risk of getting COVID-19, animations and videos detailing different COVID-19 tests, basic precautions to help people reduce their risk, preventing COVID-19 in your workplace, getting through isolation, and preventing COVID-19 long term effects (the segment also has infographics specifying how to deal with a COVID-19 patient in the household, hand sanitizer facts, and grocery shopping, as well as a Q&A section regarding hotel stays and food safety)
2. How the COVID-19 virus is transmitted: has animations detailing virus transmission and mask usage as well as Q&A sections for basic information about the disease and ventilation
3. Contact tracing and breaking the chains of transmission: contains animations explaining contact tracing and how to break transmission chains, Q&As on contact tracing for the public and responders, as well as infographics on how to deal with being diagnosed with COVID-19 and how to protect friends and family

4. COVID-19 symptoms and flu: contains an animation on how to protect yourself from COVID-19, flu, and cold, as well as infographics on COVID-19 symptoms and advice for high-risk groups such as children, health workers, older adults, pregnant women, people with chronic health conditions, and those who live in areas with other infectious diseases

The protective measures segment contains some traces of IES and was coded as such. The animations for basic precautions, factors to help you make safer choices during the pandemic, and different COVID-19 tests all fall within the IES criteria (i.e., they disseminate information about an issue, offer an explanation, and present a solution).

Similarly, in the infographic shown below, which shows what to do in case someone in your household contracts COVID-19, also fulfills the criteria to be coded under IES. In this case, the message is regarding protective measures, the explanation is what steps to undertake, and the solution takes the form of additional guidance on what to do if the patient develops additional symptoms. To elaborate, the information disseminated here is what to do if someone in your household falls ill, the explanation presented is in the form of specific steps to take in case of illness and finally, the solution is to contact a healthcare provider if danger signs such as difficulty breathing, or chest pain present themselves. It is important to note here that since this messaging strategy is an emerging one, i.e., evolving organically out of WHO messaging, this is hard to interpret consistently and coding of the IES strategy remains an approximation instead of a concrete, discrete definition.

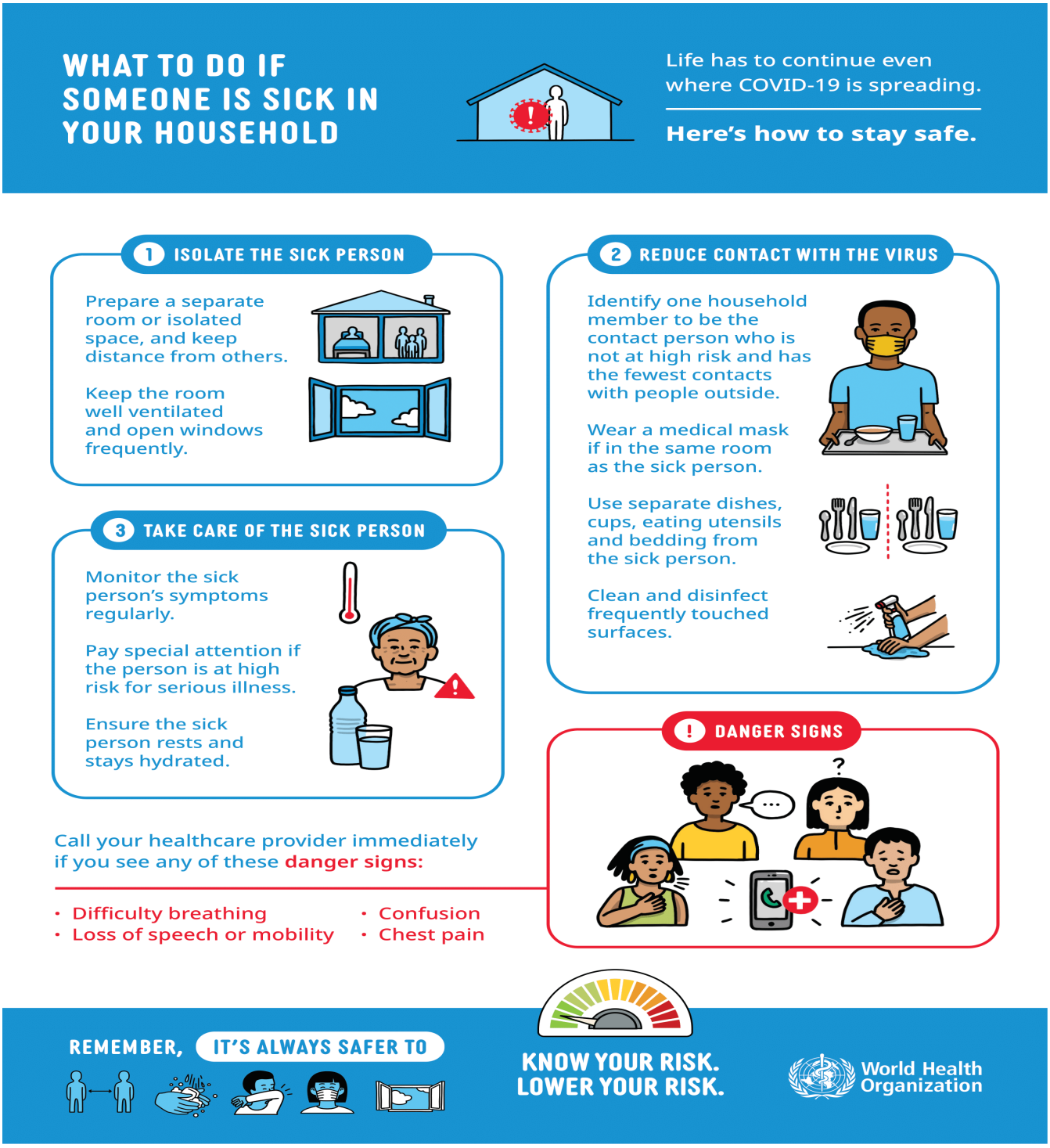


Figure 5. Protective Measures Infographic using IES

The next segment deals with how the virus is transmitted. In this segment, the animation detailing 'how the COVID-19 virus is transmitted' fits the bill regarding IES and was coded red.

'Contact tracing and breaking the chains of transmission' is the following segment and contains 2 animations. The first animation informs the viewer what contact tracing is, how it functions, and how to use it as a solution to help narrow down and trace potentially infected people. The second animation contains information on how to break the chain of transmission and play a responsible citizen's part to protect themselves and others in their communities. It lays out behavioral changes one can make to minimize the chances of contracting the disease and continues to offer a solution as to what to do in case you feel ill or are infected with the virus.

Both animations fall within the criteria required to qualify as IES since they provide information about the issues (what are contact tracing and chain of transmission), explain how they function, and provide a solution as to how they serve of use by targeting potentially exposed people (contact tracing) and acting as responsible members of society (breaking the chain of transmission) and have thus been coded as such. In this, the 'solution' part of contact tracing involves solving the problem of infections by tracing potential infections and then taking action to minimize the spread of the disease in the community. In the case of breaking the chains of transmission, the solution part of the criteria involves a call to action i.e., what to do when you're ill to minimize the chances of other people getting infected. These animations are supported by simple, one-page infographics that also follow IES by informing the reader, explaining the problem, and presenting the solution/call to action. An example of one such infographic is presented below.

Figure 6. Infographic showing gain frame usage in WHO messaging.

There is also an element of gain framing in Figure 6 at the very end of the infographic. WHO states that 'Doing your part protects yourself and others. Your friends and family will

thank you'. This can be seen as gain framing since the infographic clearly states the benefit of taking these precautions i.e., the protection of self and others around you.

The final segment of the transmission subcategory deals with 'COVID-19 symptoms and flu' and helps the viewer differentiate between the symptoms of COVID-19 and influenza to diagnose more accurately what ails them and understand what steps to follow to seek further assistance. Following the pattern of the segment, the animation is bolstered by various infographics which explain symptoms and classify readers with regards to whether they are health care workers, adults over 60 years of age, providing care for children, pregnant, or have chronic health conditions. The infographics then provide further actions to take in case they show COVID-19 symptoms. All this messaging has been coded as conforming to IES.

Getting vaccinated

The next subcategory is 'Getting vaccinated'. Some segments of this subcategory can be coded with regards to messaging strategies. One of these is 'how to have conversations about vaccination' that seems to be aimed at convincing people to get vaccinated. It lists a set of principles, accompanied by simple illustrations, that should be incorporated into such conversations; these include listening with empathy, asking open-ended questions, sharing trusted information, and exploring reasons for wanting to get vaccinated. This section can fit into IES since it informs the public that they should get vaccinated, explains the problem (vaccine hesitancy), and then provides a solution—i.e., the list of principles one should incorporate into such conversations to achieve a behavioral change.

Another section that was coded as IES is the one listing various infographics for vaccines. These infographics follow a pattern like the one found in the 'mythbuster' subcategory discussed

earlier. They deal with popular misconceptions and misinformation about the vaccines, even if they are not explicitly labeled as 'mythbuster' material. An apt example would be the poster shown below.

Figure 7. Vaccine Infographic Using IES

The infographic provides information (how vaccinations help with immunity), explains how it helps (reduces the risk of getting seriously ill or dying from COVID-19), and provides a call to action implicitly by urging people to get vaccinated. These infographics are a set of 13. Out of these 13, 9 were coded as fulfilling the IES criteria.

This section also contains some examples of the WHO employing gain frames as a messaging strategy by clearly elucidating the benefits of taking a certain action. An example of gain-framing in WHO messaging can be found in the infographic shown in Figure 8. Not only does it repeat the benefit that vaccines are highly effective against COVID-19 related severe illness and death but also goes on to clarify that while the vaccine might not be completely

effective at preventing transmission through the Delta variant of the disease, it is beneficial since it is highly effective in preventing serious illness and death.

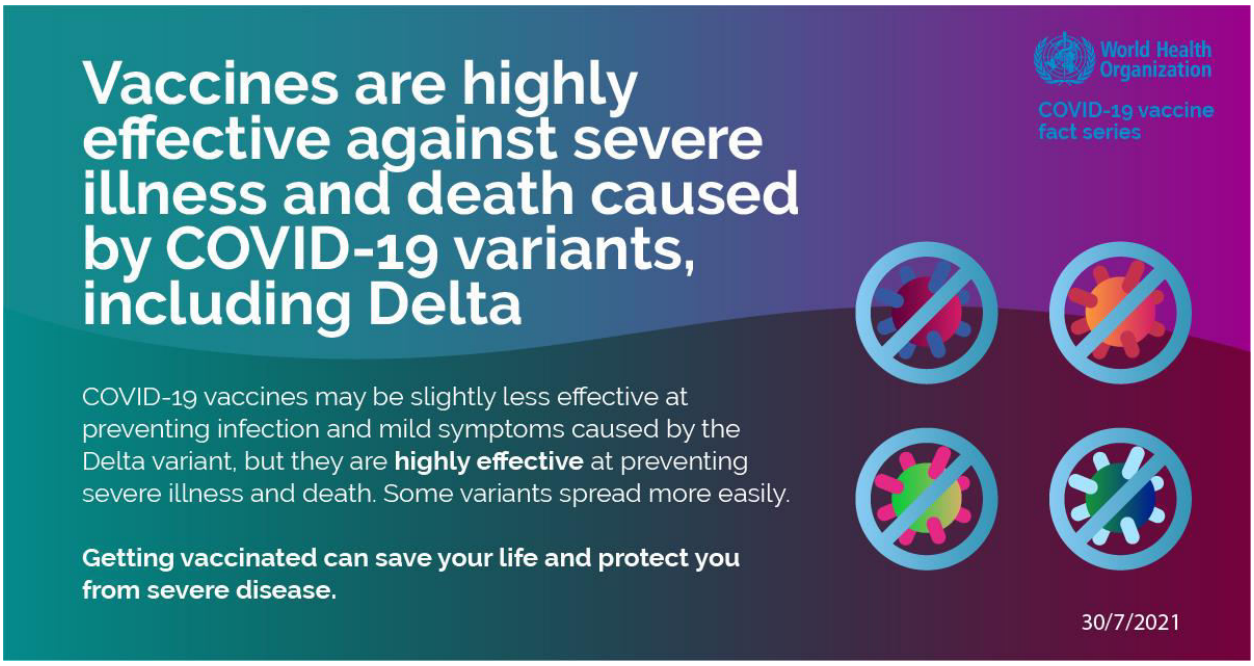


Figure 8. Vaccine Infographic Using a Gain Frame

Out of the set of 13 infographics mentioned above, it was discovered that 4 out of 13 infographics had a messaging strategy that was coded under gain frames.

4.1.2 Technical Guidance

The technical guidance master category is divided into various topics that include critical preparedness, national laboratories, clinical care, risk communication and engagement, essential resource planning, and so forth.

The vast majority of this category is devoted to specific advice, best practices, and updates on WHO guidance. This is geared towards either policymakers, healthcare specialists, frontline responders, or public places. This renders the category irrelevant for this thesis since none of the data is for consumption by the public.

4.1.3 Vaccines, Treatments, and Tests

This umbrella category serves as a repository for all WHO related information on vaccines. It details COVAX, which is the WHO initiative for global equitable access to COVID-19 vaccines, providing justifications for the initiative as well as updates towards goal progression. Furthermore, there are supply forecasts for COVAX and supplementary links containing information about COVAX partners like The Coalition for Epidemic Preparedness Innovation (CEPI), United Nations Children's Fund (UNICEF), and Gavi, the Vaccine Alliance (GAVI). There is also a section on the Access to COVID-19 Tools (ACT) Accelerator, which is a global effort to develop tools such as tests, treatments, and vaccines to fight the virus. An important element here, which will be discussed in detail in the following chapter, is a link to the Strategic Advisory Group of Experts (SAGE), which acts as the principal advisory group to WHO for vaccines and immunization. Finally, there is a section for public advice on vaccines, which links to the same information hub that was discussed in the 'advice' master category above.

Since this category details mere information regarding WHO's procedures, initiatives, fundraising, and technical assessments regarding vaccines, treatments, and tests, it is also not aimed at the general public and falls outside the scope of messaging analysis.

4.1.4 Response

Information contained in this master category includes a weekly epidemiological update, which provides an overview of the global, regional, and country-level COVID-19 cases and deaths as well as identifying key data and trends along with other pertinent epidemiological information to provide a global snapshot into the pandemics progress.

There is a section devoted to a detailed timeline of the WHO's COVID-19 response, with action circles on the chart relating to information, science, leadership, advice, response, and resourcing. This covers a period from 31st December 2019 to 17th April 2021, at the time of this writing. A global dashboard and situation report section is also present. In addition, there is a document package relating to the WHO's COVID-19 Strategic Preparedness and Response Plan for 2021 as well as detailed information about the COVID-19 supply chain system.

A perusal of this master category reveals a mass of information regarding the pandemic, its timeline, WHO's response, and strategic plans, but reveals no relevant information for the general public and, as a result, this section contains no messaging strategies and falls outside the scope of the analysis.

4.1.5 Research

This master category provides a global research database for international scientific findings and knowledge of research findings on COVID-19. It also contains reports on COVID-19 research and innovation achievements as well as technical data regarding Unity Studies, which is a global standardization initiative that aims at increasing the evidence-based knowledge for action.

There are also sections that contain the WHO-convened study into the origins of COVID-19 as well as the various virus variants, tracking efforts, the naming process for the variants, and a list which details currently designated variants of concern.

A useful section for the general public, an overview of COVID-19, detailing its symptoms and prevention techniques, links back to the information hub that is the basis for public advice, which has been analyzed earlier in the chapter.

All this discussion of the various master categories has been provided to prove that due diligence was undertaken during data analysis and that no section of the WHO's COVID-19 website was left untouched in the search for messaging strategies.

4.2 Results Synthesis

As mentioned earlier in the chapter, WHO messaging was analyzed to see if there was any usage of the 3 messaging strategies identified in the literature review on climate messaging: scientific consensus, inoculation messaging, and gain frames or gain framing. To strengthen the analysis, coding also allowed for an emergent WHO messaging strategy (termed IES) as well as a code for where no messaging strategy was found.

Recall the first two research questions asked by the thesis:

RQ1: What messaging strategies does the WHO employ for COVID-19?

RQ2: Does the WHO employ proven climate change messaging strategies and if so, to what extent are they employed?

It is clear that WHO does employ messaging strategies for COVID-19. Throughout the website, I came across examples of various messaging strategies that were in play. The 'advice' master category contained the greatest number of examples of a specific strategy being employed by WHO. The 'mythbuster' subsection used the IES messaging strategy in 75% (30 out of 40) of the myths they addressed. The 'Go Viral' interactive game in the 'how to deal with misinformation' subsection used a simplified form of inoculation messaging to help address COVID-19 disinformation.

The ‘when and how to use masks’ subsection does not contain any traces of a specific messaging strategy. However, the next subsection, ‘transmissions’, has considerable evidence of the WHO strategy being used; all 4 of its segments have information coded to the general WHO messaging strategy.

The subsection dealing with vaccines also contains a very high recurrence of the WHO messaging strategy with 69% (9 out of 13) of the vaccination infographics using this strategy. Interestingly enough, 31% (4 out of 13) infographics were also coded for utilizing gain framing as a messaging strategy, providing the only example throughout the website where more than one messaging strategy was found to be working in concert with another.

The rest of the master categories—‘technical guidance’; ‘vaccines, treatments, and tests’; ‘response’; and ‘research’—did not use any messaging strategies. A minor portion of the ‘vaccines, treatments, and tests’ category contained usage of messaging strategies linked to the same information presented in the ‘advice’ master category and was thus treated as repetition.

Thus, with the above-summarized results, I can answer the first 2 research questions with a certain degree of confidence. Firstly, WHO’s COVID-19 messaging does show evidence of messaging strategies being used with a fair degree of regularity throughout the website. Secondly, they also deploy strategies utilized in climate change communication as proven by their usage of inoculation messaging and gain frames in certain sections. It is, however, surprising to note that no usage of scientific consensus messaging was found during analysis as this is widely regarded as a basic, foundational strategy in climate change messaging. The incidence of climate change messaging strategies is limited as compared to IES, which shows up with far greater frequency throughout the data.

5 Chapter 5: Discussion

This chapter will deal with the remaining 3 research questions. These are:

RQ3: Why does the WHO employ the messaging strategies it does?

RQ4: How can the WHO improve and enhance its messaging strategies?

RQ5: What lessons does the WHO's overall messaging strategy offer other COVID-19 messengers and comparable issues like climate change?

These 3 questions will be answered in the same order they are posed. RQ3 is more of an explanatory question, attempting to understand the WHO's motivations and justifications for its usage of various messaging strategies. By answering RQ4, this thesis will attempt to bridge existing climate change communication with WHO messaging and see what this shape this union will take. RQ5 seeks to understand if the traffic between climate change messaging strategies and COVID-19 messaging is two-way—i.e., whether there are any lessons to be learned for climate change messaging from the WHO's messaging strategy.

5.1 Possible Justifications and Motivations for the WHO's Messaging Strategies

As elaborated in the previous chapter, WHO messaging for COVID-19 incorporates its own messaging strategy as well as select usage of inoculation messaging and gain framing. No traces of scientific consensus messaging were found in the data analyzed.

The absence of scientific consensus messaging is at odds with what the initial assumptions for this thesis were before actually embarking on data analysis. I assumed that this would be the most prevalent form of messaging strategy we encountered during data collection simply because it is regarded as a good foundational messaging strategy by numerous researchers

(Bolsen and Druckman, 2020; van der Linden et al., 2019; van der Linden et al., 2017) because it helps reduce the loss of public conviction in the reality and seriousness of climate change.

With COVID-19 being such a time-sensitive environment for action and behavioral change—i.e., rapid public action regarding lockdowns and masking needs to be undertaken to curb rising infection rates and transmission—it is possible that the WHO regarded scientific consensus messaging to be too ineffective to quickly rally their audience to act in a short period of time. This view is also supported by van der Linden et al. (2019), whose research discovered that emphasis on the scientific consensus on climate change serves to affect the beliefs about the nature of the consensus but does not translate into policy action.

Another criticism of scientific consensus messaging, which may have discouraged its usage, is that it distracts the audience from the call to action. Pearce et al. (2017) claim that because it does not provide any solutions to the problem it is addressing, focusing instead on establishing the problem, it invites scrutiny and competing evidence about the nature of the scientific consensus. Van der Linden et al. (2017) provide a related criticism; their research argues that consensus messaging is vulnerable to misinformation, and its benefits can be significantly diluted and sometimes even neutralized. This would have been of special significance in the case of the pandemic since every aspect of it, including the source of the disease, transmission, vaccinations, seriousness of the illness, and everything else, has been subject to misinformation.

A crucial point to note here is that the messaging analysed in this thesis is aimed at the public and concerned with affecting individual change and spurring personal action. However, as Bushell et al. (2017) show, the gap between knowledge and action at the policy level has its

foundations in individual attitudinal and behavioral change, which creates space for policy action. This applies to both criticisms of consensus messaging as well as its many benefits as a foundational strategy. Therefore, it is possible that consensus messaging may still be of use in WHO messaging and should be explored as a possible option.

The motivation behind the usage, though limited, of inoculation messaging in COVID-19 messaging is fairly self-evident. The strategy is geared specifically towards misinformation; as Cook et al. (2017), van der Linden et al. (2017), and Maertens et al. (2020) have found, it is efficient at diluting misinformation effects. This seems to be the primary justification of the WHO's usage of the strategy since it occurs within the frame of their interactive game 'Go Viral' which is specifically aimed at resisting misinformation regarding COVID-19. Another possible reason for the absence of inoculation messaging could be the nature of the messaging strategy itself. Due to it requiring multi-step messaging (exposure to misinformation message, inoculation message, follow-up messaging to account for message decay, etc.), it may be unfeasible to apply it in a context where your audience is the global population. Furthermore, since inoculation messaging is aimed at countering misinformation and as Williams and Bond (2000) and van der Linden et al. (2017) found, is at its most effective when combined with consensus messaging, the lack of the consensus messaging within WHO communication strategies may have also influenced the minimal use of the inoculation messaging strategy.

Evidence of WHO using gain framing as a messaging strategy was found in several infographics within its vaccination section. A possible reason for WHO's employment of using gain framing can be correlated to a study conducted by Gantiva et al. (2021) where it was found that "gain-framed messaged were more effective to generate motivation to engage in self-care behaviours and were perceived as stronger" (p. 6). Thus, by gain-framing their vaccination

messaging, WHO appears to be consciously and deliberately attempting to persuade people to get vaccinated and thus engage in the self-care behaviour mentioned above.

One potential reason for usage can be found in research carried out by Edwards et al. (2001), where they found that gain framing in safe behaviors was an efficient method to spur behavioral change. This is evident in vaccine infographics shown in chapter 4, where they clearly state the beneficial effects of getting vaccinated (prevention of serious illness or death in case of infection), this can be interpreted as a deliberate attempt by WHO to convince individuals to get vaccinated. WHO undertakes a strenuous effort to declare that both the ingredients used in their approved vaccines as well as the vaccines themselves are safe in their vaccination messaging. This would form another possible link with existing research by Rothman et al. (2006) and Spence and Pidgeon (2010), suggesting that there is a methodical advantage to framing information in terms of gains when the action undertaken is considered by the message recipient to be low risk.

The most frequently used messaging strategy discovered in the data was the WHO's own, IES. I can hypothesize several reasons for this. I believe that one of the most important factors in play for the WHO deciding to use IES as opposed to an established strategy from climate change literature is the fact that WHO's COVID-19 messaging is intended for a global audience. This fact considers that the intended recipients are spread across the planet and comprise different cultural, religious, social, economic backgrounds. Despite the increased effectiveness of tailored messaging (as stated in chapter 2), the possibility of one messaging strategy being tailored to cater to all these separate and sometimes conflicting needs while still being effectual is extremely limited. Xue et al. (2016) underscore this point by claiming that even within the context of a large city with its spectrum of audiences, a message cannot be tailored to account for all the recipient

diversity. This is amplified even more in the case of WHO, which is catering to a global audience. Therefore, a far simpler messaging strategy, compared to the ones found in climate communication literature, was employed. It is also important to note that the other three strategies discussed in the thesis would be less of a fit for global messaging. Consensus messaging, while a good foundational strategy, often works better in tandem with other communication strategies. This, coupled with the criticisms mentioned above, make its application to a global audience somewhat unwieldy and might complicate its deployment in a context where simplicity is called for given the vast number of recipients for whom the message is intended. Inoculation messaging is primarily aimed at countering disinformation. While incredibly useful in this specific framework, this specialization limits its suitability for a global messaging campaign. Gain-framing is also rendered unsuitable for a general strategy since its efficiency is dependant reliant on behaviours deemed by the recipient to be safe. While this makes it quite effective in WHO messaging regarding vaccinations, it dilutes its usefulness in a global context. Consequently, given the vast number of addressees, it makes the most sense and possibly explains the increased frequency of IES found in WHO communication as opposed to the other three strategies.

Secondly, another factor for consideration is the rapidly changing information inflow regarding COVID-19. This is especially true during the earlier days of the pandemic where multiple, sometimes conflicting, sources of information were received. An example of this might be by Dr. Anthony Fauci, the chief medical advisor to the President of the United States of America, who initially advised the public not to wear masks (CNN, 2021; Reuters, 2020) because at that early point it was not established how infectious the disease was and that there were asymptomatic carriers who could act as vectors of transmission. Later, this advice was changed in the face of incoming data and further research. Thus, IES is particularly suitable here since it

disseminates the message, explains the reason for the message, and then presents a solution. In a messaging strategy like this, there is little chance of additional information changing the original message since the 'solution' part of the message in the strategy has already been verified and backed by WHO research.

The rapid and ubiquitous misinformation prevalent in every aspect of COVID-19 may also have informed WHO's messaging strategy. Inoculation messaging, as mentioned earlier is effective against misinformation but cannot be scaled to a global level. IES takes care of this aspect by clearly addressing the misinformation, countering it with factual evidence, and providing a solution for the problem. This can be seen in the infographic in Figure 9, where the misinformation in question is that consuming methanol, ethanol, or bleach prevents/cures COVID-19; it is countered by the factual claim that these products are poisonous to humans and details a solution for protection against COVID-19 in the form of cleaning one's hands and disinfecting surfaces.

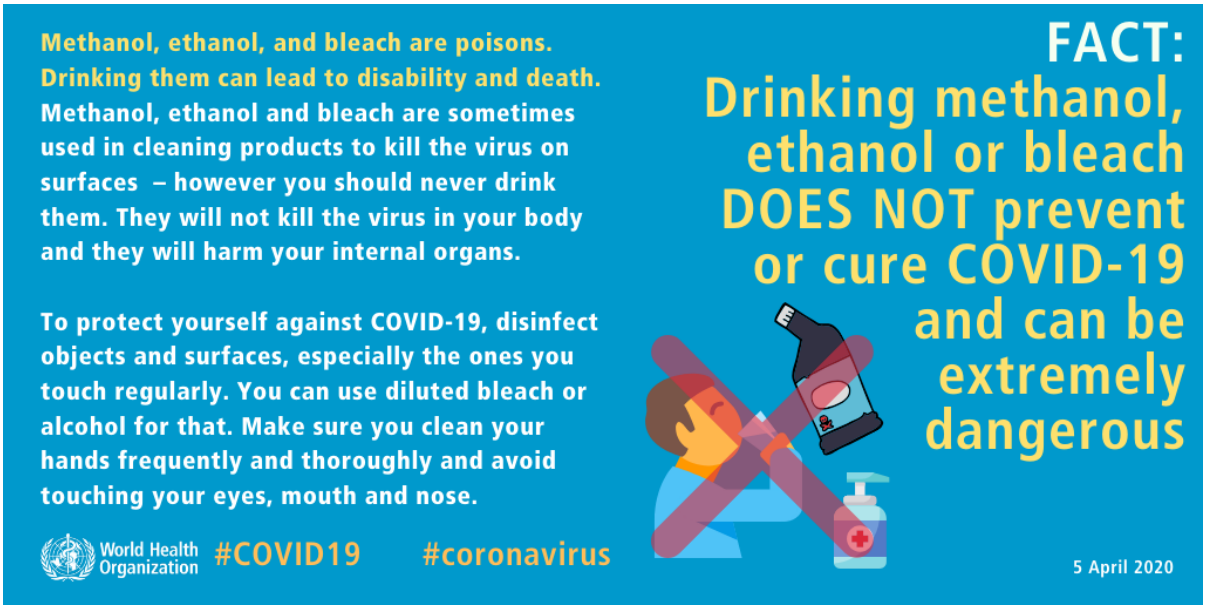


Figure 9. Infographic Showing How IES Addresses Misinformation

It is also important to consider that time may itself have been against WHO. Given the rapidly changing situation and the burgeoning global crisis, it is possible that WHO's focus may have been to keep up with changing developments and relaying simple, easy-to-understand information within a timely manner. This is in stark contrast to a field like climate change where decades of research, analysis, and capacity building is present to inform current messaging strategies.

5.2 Possible Improvements to WHO Messaging

Although the WHO's usage of messaging strategies is reasonably justified, there were instances during the data collection and analysis process where it became clear that it was possible to improve upon the messaging strategies I found on the WHO website. Therefore, this section details possible improvements to WHO COVID-19 messaging.

An interesting question is whether scientific consensus messaging combined with IES might result in more effective messaging. Recall that IES has 3 elements of informing/correcting misinformation, explanation, and solution; scientific consensus could be incorporated into the messaging component.

For example, the vaccination section, which has infographics touting the efficacy of WHO-approved vaccines against illness and death caused by COVID-19 variants, could be improved by underscoring the claim with the addition of scientific consensus. The scientific consensus claim could refer to the Strategic Advisory Group of Experts on Immunization (SAGE), which is the principal advisory group to the WHO on vaccines and immunization, advising it on global policies and strategies. Throughout the data collection process, it was noted that SAGE was rarely mentioned in WHO messaging, suggesting a missed opportunity for

consensus messaging to be incorporated, thus augmenting overall messaging. While SAGE is possibly only relevant for the vaccination section of WHO COVID-19 messaging, the other advisory bodies and special action groups that inform WHO COVID-19 guidance could be mentioned in their respective sections, to achieve this integration. As mentioned earlier, despite its criticisms of distraction and the presence of the knowledge action gap, therefore, its worth as a messaging strategy should not be completely disregarded.

Van der Linden et al. (2017) found that consensus messaging coupled with inoculation messaging resulted in a positive attitude towards scientific consensus in the face of misinformation. Simply put, the combination of the two messaging strategies proved effective against message dilution and neutralization when faced with misinformation. This has potential for use in WHO's COVID-19 messaging as well. In the case of the Go Viral interactive video game, only inoculation messaging was used. It is possible that the information in the game, aiming to educate the player as to how misinformation spreads on social media and thus to some effect immunizing the player towards its effects, could have been coupled with scientific consensus to complete its objectives even more effectively. An example of this could be additional information regarding the scientific consensus on vaccines or another COVID-19 related phenomenon that is subject to a higher degree of misinformation. Adapting Maertens et al. (2020) study, maybe it is possible to relay the scientific consensus on vaccines and their safety and couple it with an inoculation message debunking a commonly quoted mistaken scientific study by the Ottawa Heart Institute which shows a 1 in 1000 risk of heart inflammation after vaccination (Miller, 2021).

Another illustration of how climate communication messaging strategies can be used to supplement existing WHO messaging strategies can be found in adding gain framing to IES.

Vaccination infographics using IES can also incorporate gain framing to further strengthen their communication. An example of how this can take place is where the infographic states 'vaccination reduces the risk of getting seriously ill or dying from COVID-19'. Instead of just what is quoted above, the message can be gain-framed by changing "reduces the risk of getting seriously ill or dying from COVID-19" to something to the effect of "protects you and others from getting seriously ill or dying from COVID-19" which highlights the benefits of vaccination.

Another example of how WHO's messaging can be improved via IES is shown in the comparison between Figure 10 and 11 below. Figure 10 shows the original WHO infographic which corrects a myth about alcohol protecting one against COVID-19. Figure 11 shows how IES can be used to make the messaging more effective. It follows the IES criteria by informing the reader about the fact, explaining what alcohol can do, and provides a solution on how to protect yourself against COVID-19.

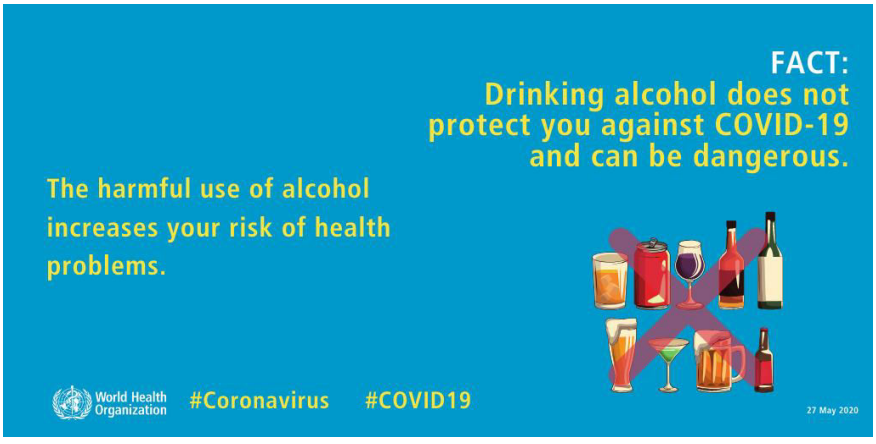
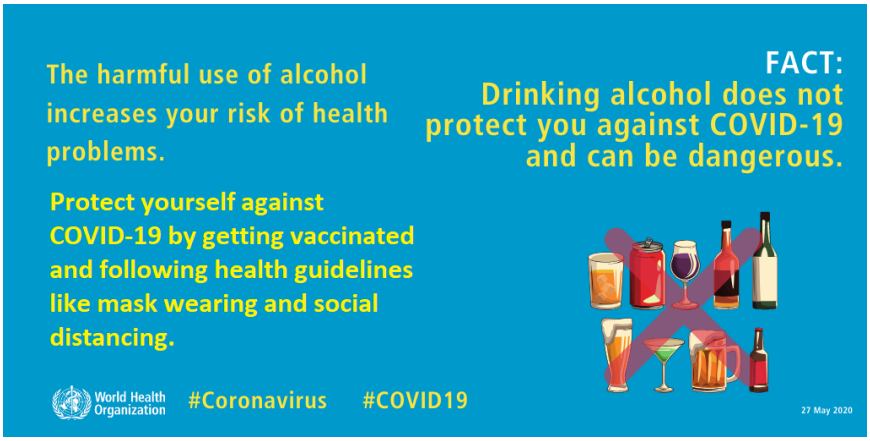


Figure 10. Infographic without IES



Infographic with IES

Similarly, Figure 12 and 13 below show how WHO messaging can be improved regarding gain framing. Figure 12 shows an original WHO vaccination infographic that does not employ any messaging strategy and just simply conveys information. Figure 13 shows how it can be improved by gain framing the message. The gain frame provided here is that 'Vaccination can protect you against serious illness and death' and highlights the benefits of getting vaccinated.

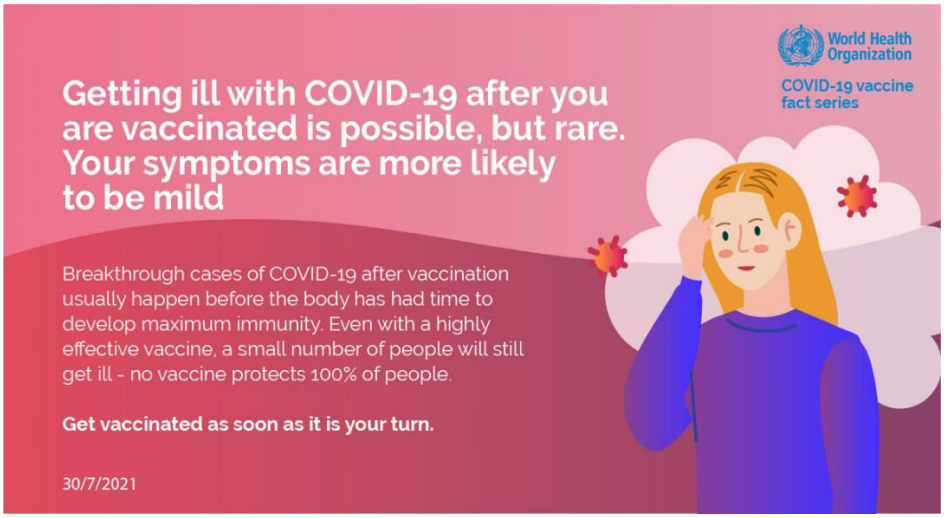


Figure 12. Infographic without Gain Framing.

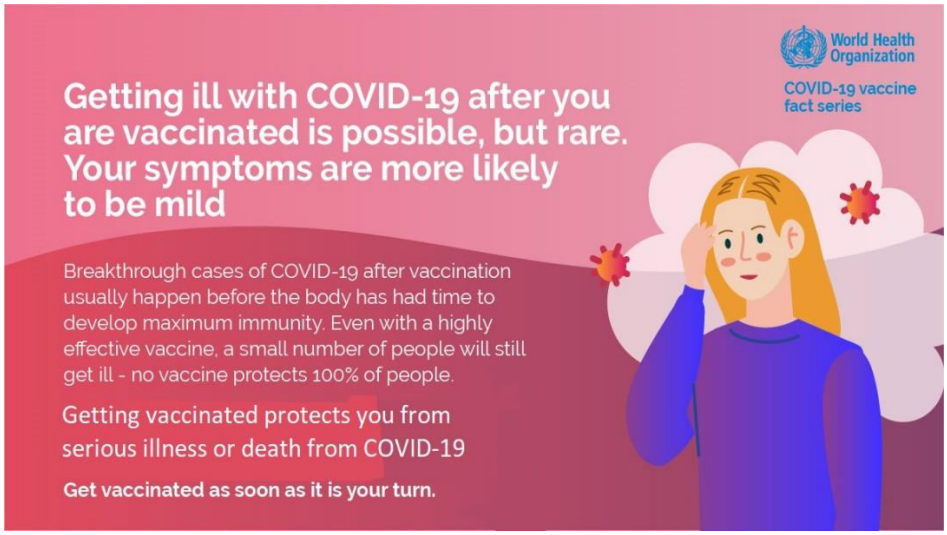


Figure 13. Infographic with Gain Framing

The table below provides some examples of messaging found on the WHO website that can be improved by both climate change communication strategies as well as the WHO's own messaging strategy. Due to inoculation messaging being a multi-step strategy, it cannot be included in Table 3 but an example of how it can be incorporated into existing WHO messaging is suggested earlier in section 5.2.

The first line of rows in Table 3 shows 3 WHO messages which were coded as green i.e., no messaging strategy found. Subsequent rows show how those messages would look with respective messaging strategies from climate change communication as well as IES. Finally, the last row shows how even IES can be improved with integration with climate change communication strategies. The first of these messages (last row) shows IES integrated with gain framing as it spells out the benefits of being vaccinated along with satisfying IES' 3 criteria. The second message shows IES integration with scientific consensus and the last message integrates all three: IES (provides information about rinsing with saline, explains that it doesn't help

infection and provides a solution: vaccination), scientific consensus (a reference to SAGE) as well as gain framing (benefits of getting vaccinated).

Table 3. Existing WHO Messaging Improved with Scientific Consensus, Gain Framing, IES and an Integration of Messaging Strategies.

WHO Message	Getting ill with COVID-19 after you are vaccinated is possible, but rare.	All ingredients in COVID-19 vaccines are safe.	Can regularly rinsing your nose with saline help prevent infection with the new coronavirus? No. There is no evidence that rinsing the nose with saline has protected people from infection with the new coronavirus.
WHO message with Scientific Consensus	SAGE confirms that vaccination protects you against serious illness or death. SAGE is the principal advisory group for WHO on overall global policies and strategies	SAGE confirms that all ingredients in the COVID-19 vaccines are safe. SAGE is the principal advisory group for WHO on overall global policies and strategies.	SAGE confirms that rinsing your nose with saline does NOT prevent infection with the new coronavirus. SAGE is the principal advisory group for WHO on overall global policies and strategies.
WHO message with Gain Framing	You are 29 times less likely to be hospitalized with COVID-19 if you've been fully vaccinated.	All ingredients in the COVID-19 vaccine are safe. Protect yourself and others around you by getting vaccinated.	Regularly rinsing your nose does not prevent infection with the new coronavirus. Getting vaccinated and following health guidelines protects you and others from infection and illness.
WHO message with IES	Getting ill with COVID-19 after you are vaccinated is possible, but rare. A small percentage of people still get ill with COVID-19 after vaccination. You could pass on the virus to someone who is not vaccinated. To protect yourselves and others, get vaccinated and observe health guidelines like social distancing and mask-wearing.	All ingredients in the COVID-19 vaccine are safe. Ingredients help keep the vaccine together, stable, and even at the injection site a little longer. All tests have confirmed that these components are safe. To protect yourselves and others, get vaccinated and observe health guidelines like social distancing and mask-wearing.	Myth: Can regularly rinsing your nose with saline help prevent infection with the new coronavirus? No. Fact: There is no evidence that regularly rinsing the nose with saline protected people from infection with the new coronavirus. To protect yourselves and others, get vaccinated and observe health guidelines like social distancing and mask-wearing.
WHO Message with	Getting ill with COVID-19 after you are vaccinated is	SAGE confirms that all ingredients in the COVID-	Myth: Can regularly rinsing your nose with saline help

Integration	possible, but rare. You could pass on the virus to someone who is not vaccinated You are 29 times less likely to be hospitalized with COVID-19 if you've been fully vaccinated. To protect yourselves and others, get vaccinated and observe health guidelines like social distancing and mask-wearing	19 vaccines are safe. SAGE is the principal advisory group for WHO on overall global policies and strategies. SAGE confirms that all ingredients in the COVID-19 vaccines are safe. SAGE is the principal advisory group for WHO on overall global policies and strategies.	prevent infection with the new coronavirus? No. SAGE confirms that there is no evidence that regularly rinsing the nose with saline protects people from infection with the new coronavirus. Getting vaccinated and observing health guidelines protects you and others around you from infection.

This leads us to finally to a question that kept cropping up during analysis about how WHO messaging can be improved. The question being, why is the WHO this inconsistent in its messaging strategy? Throughout the data, I found instances where one messaging strategy or the other was used but their usage was in no way consistent or indicative of a set pattern informing all COVID-19 related messaging. Would it not be more efficient to use a messaging framework that could guide all COVID-19 related messaging? The options given above show one possible way where a broader suite of messaging options is available to WHO to augment existing messaging. It can be inferred, as is shown from the numerous examples given above, that wherever there is room and capacity for WHO to deploy one, two, or even all the messaging strategies mentioned before, it should be done since the result will possibly be a stronger messaging campaign. It is important to note that simplicity is often desirable in messaging – simple messages catch and hold attention more easily. Therefore, where possible, this principle should be employed by WHO. Similarly, their messaging should reflect the consistency of this framework and should employ it with as uniform a frequency as is possible.

5.3 WHO Messaging and Climate Communication: A Two-Way Street?

While it is quite clear that existing research on climate change messaging strategies is of considerable use for COVID-19 messaging, it is not quite evident yet if climate change messaging could or should adopt WHO's IES COVID-19 messaging strategy. To bridge this gap, it is important to understand that certain differences exist between the two crises.

For one, the climate change crisis and the COVID-19 pandemic, while both being wicked problems, are fundamentally different in terms of global relevance and import. Climate change affects different nations differently; its impacts are not evenly distributed across the globe and certain countries contribute far more to the problem than others. COVID-19, now that it has spread worldwide, affects all nations in a similar way and resulting in similar impacts. Individual nations can make different decisions about how to manage the spread and effects, and have different resources available to them, which may result in different outcomes, but the initial circumstances are comparable. All nations face tough choices between overwhelming pressure on their health services and lockdowns that cause economic devastation and increase slippage into poverty (at least in the short term). In the case of climate change, certain nations, such as coastal nations or islands, or countries in the global south, are at much greater risk.

This difference is important to understand since it dictates the form of action undertaken as a solution to the crisis. In the case of COVID-19, while the available resources to throw at the problem may vary, the solution for every nation or jurisdiction is similar. Adopt social distancing and masking measures, increase vaccination rates, and so forth to stem rising infection rates and avoid pressure on the healthcare system. The 'solution' or actions needed to counter the effects of climate change vary far more substantially from nation to nation, sometimes even from jurisdiction to jurisdiction. For example, a country like Pakistan, which is severely water stressed

and has a problem with plummeting air quality due to pollution might need to increase the water retention of its dams and canals and invest in technologies like carbon capture and devise enhanced policies to deal with air pollution control, whereas a country plagued with increasing wildfires like Australia may look at solutions such as firebreak creation, satellite mapping and controlled aerial ignition.

It is also relevant to note that for this messaging strategy to be applied to the climate change perspective, it needs an organization with WHO's stature and position to disseminate information. In the case of climate change, the comparator organization would be the United Nations Framework Convention on Climate Change (UNFCCC) Secretariat, which in collaboration with the IPCC, is the United Nations entity tasked with supporting the global response to the threat of climate change.

It is also important to note that despite the differences mentioned above, there are also crucial parallels between climate change and COVID-19, as mentioned in Chapter 1. For both crises, people must be educated to understand the nature of the problem confronting them. They must be warned and immunized against misinformation. They need updated information, based on the most recent data, to formulate solutions and adaptive measures. Once the fundamental differences and similarities between the two are understood, we can begin to see if WHO messaging has anything to offer climate change communication

There exists a possibility that IES—comprising the three elements of informing, explanation, and solution—can be used in the context of climate change. Enough parallels exist between WHO messaging and climate change messaging to justify the use of this messaging strategy.

For example, if the UNFCCC or the IPCC wished to carry out an educational campaign for the world, aiming to instruct the public, counter misinformation regarding the subject, to change fossil fuel consumption and extraction habits, IES would be a good vehicle to ensure message efficacy. An example of this would be a global campaign to illustrate to the public the dangers of fossil fuel usage. In this example, the messaging segment would educate the recipient on the dangers that fossil fuels and their extraction pose. The explanation segment of the strategy would define the dangers that fossil fuels pose by their contribution to carbon pollution and thus to climate change. The solution segment of the strategy would provide alternatives (electric cars, renewable energy, etc.) and provide advice on how to pressure policymakers to divest from fossil fuels.

Another possible direction where WHO's messaging campaign can inform climate change is the treatment of the pandemic itself. The parallels between climate change and the COVID-19 pandemic are detailed in chapter 1, these parallels should inform the treatment of climate change as a similar problem. To elaborate, despite its many criticisms, the WHO has managed to spur action in member states throughout the world. Their IES messaging strategy has done a relatively good job in informing the global public, countering misinformation, explaining sometimes difficult concepts, and offering a variety of solutions to various COVID-19 related issues. The possible lesson here to learn is maybe this: instead of treating climate change as a distant, affecting everyone differently, to be tackled by later generations, it should be responded to with the same urgency and rapid response time as a more immediate problem like COVID-19.

It is also relevant to take stock of the fact that the WHO did this in the face of intense pressure, in the form of time constraints, a rapidly changing information ecology, constant new developments, and disease variants, and a vast amount of misinformation being directed towards

all aspects of the pandemic. Given that climate change is an older and much more researched problem, it should be conceivably easier to adopt the same messaging strategies to inform people around the world about climate change, correct misinformation regarding it, its myriad dangers, its immediate and long-term effects, explain its relevance and provide simple, easy to understand solutions. Even simpler, a messaging campaign like the one just mentioned does not even need to address climate change as a whole phenomenon, it could possibly take the form of explaining discrete portions of the causes and effects of climate change. Take, for instance, the case of extreme weather events. A messaging campaign on a global scale would revolve around the causes of extreme weather events, link the problem with climate change, counter misinformation, provide an explanation to their increasing frequency and elaborate on possible solutions.

A thought to possibly ponder on is this: despite its many criticisms, the WHO has played a major role in leading the world through the pandemic through its many arms, whether it is through its global vaccination initiative, its information campaigns, their frameworks for testing, contact tracing, etc. One might wonder why isn't there a credible global institution, like the WHO, leading the charge against climate change? The comparator organization to the WHO in this regard is the IPCC (possibly the UNFCCC) but there are crucial differences in the roles of both organizations. While the WHO focuses on risk communication for the general public, conducts messaging and informational campaigns geared at both the general public as well as policy makers, and generally undertakes a leadership position on the world stage, the IPCC does none of these things. Its main focus is to provide policymakers with regular scientific assessments on climate change and conduct a review of published literature as well as providing policy options to relevant authorities on climate adaptation and mitigation. The UNFCCC was originally formed to facilitate intergovernmental climate change negotiations but currently,

provided technical expertise and undertakes analysis and review of the information on climate change and aids implementation of international agreements like the Kyoto Protocol and the Paris agreement. Maybe this is the real lesson that needs to be taken from WHO's handling of the pandemic, that the world needs a comparable global institution to address climate change or that the UNFCCC or the IPCC needs to add these responsibilities to their portfolio in order to play a role similar to the one that WHO plays in global health.

5.4 Final Thoughts

This chapter attempts to respond to the queries presented in the last three research questions for the thesis.

To synthesize my findings, I can state with a certain degree of certainty that the WHO employs the messaging strategies that it does because of the criticisms inherent in climate change messaging strategies like scientific consensus, inoculation messaging, and gain framing, which can also be applied to the context of the pandemic. Furthermore, the justification for WHO using its own messaging strategy can be found in the fact that it is catering to a global audience, that it is responding to changing incoming information, as well as its every aspect being bombarded with misinformation.

The thesis also attempts to envision how current WHO messaging present on its website can be improved by incorporating strategies from climate change messaging literature as well as being more consistent with its own messaging strategy. I have given various examples of hypothetical improved messaging integrating the above-mentioned strategies into existing messaging examples.

The thesis also goes on to show with examples as to how climate change messaging strategies can supplement pandemic messaging, even going so far as to show how an integration of both the IES messaging strategy used by WHO as well as established communication strategies from climate communication literature can augment message efficiency.

Finally, it imagines a possible outcome where messaging strategies formed and used by WHO in the pandemic can be used in the context of climate change. Given that the lesson learned by the pandemic is that even in the face of severe time limitations, a barrage of misinformation, a global audience, an information system in constant flux, it is possible to conduct an effective communication campaign utilizing a variety of messaging strategies. Climate change, being a problem with many parallels to the pandemic, can possibly prove to be an easier nut to crack vis a vis a messaging campaign since its time limitations are less severe and the information system is subject to less frequent new developments.

6 Chapter 6: Conclusion

This thesis began with drawing parallels between the global problems of the COVID-19 pandemic and the climate change crisis. It hypothesized whether analyzing pandemic messaging through the lens of climate communication strategies might yield a practically applicable result that might inform and guide future messaging for complex problems. By utilizing an oblique lens via climate communication instead of the straightforward usage of public health messaging strategies, the thesis speculated on whether superior research results could be gleaned. Lastly, it led to exploratory deliberations as to whether such an analysis might offer something of value to other relevant messengers and comparable issues.

This chapter will conclude the thesis by: synthesizing the answers to the research questions and presenting a summary of the research, tracing the limitations of the research, providing possible directions for future research, and finally, discussing the relevance of the thesis

6.1 Research Summary and Conclusion

This thesis revolved around 5 research questions.

- RQ1: What messaging strategies does the World Health Organization (WHO) employ for COVID-19?
- RQ2: Does the WHO employ proven climate change messaging strategies and, if so, to what extent are they employed?
- RQ3: Why does the WHO employ the messaging strategies it does?
- RQ4: How can the WHO improve and enhance its messaging strategies?

- RQ5: What lessons does the WHO's overall messaging strategy offer other COVID-19 messengers and comparable issues like climate change?

Through my research, we discovered that the WHO does employ messaging strategies in its COVID-19 materials. A vast majority of the materials analyzed showed the deployment of a unique messaging strategy developed by WHO (known in this thesis as IES), which contains 3 main elements: information dissemination/misinformation correction, explanation, and then presenting a solution to the problem posed in the messaging. In addition to this, usage of two messaging strategies from climate change communication was also found: inoculation messaging and gain framing. Another strategy selected during the literature review; scientific consensus messaging was conspicuous in its absence throughout the data selected for analysis. By providing an answer to the first research question, I established a foundation that allowed us to further explore what directions the WHO was taking in its strategy to make its COVID-19 messaging effective. The answer to the second research question revealed if the WHO was applying valuable lessons learned from decades of research into climate change communication to its COVID-19 messaging. Consequently, the answer to RQ1 and RQ2 is that the WHO does employ climate change communication strategies like inoculation messaging and gain framing in addition to their own IES messaging strategy however their deployment is inconsistent.

Research Question 3 delved into the motivations and logic behind WHO's deployment of its messaging strategies. Criticisms and limitations of the messaging strategies themselves, as well as the limitations imposed on WHO because of its global jurisdiction, seem to guide the organization's utilization of messaging strategies for COVID-19, while still ensuring that the materials achieve their aims and goals. Therefore, the thesis answered this question by relating the lack of consensus messaging to its many criticisms in the literature claiming that it distracts

from the problem at hand, invites competing claims, and sometimes even acts as a barrier to action. The usage of inoculation messaging was tied to combat misinformation whereas gain framing was found to have been deployed to better influence the audience to enact behavioral change. WHO's utilization of IES seems to have been spurred by their intended audience i.e. the global public, the constantly shifting information environment they were operating in as well as some aspects of misinformation that could not be wholly countered by inoculation messaging.

The second-last research question was an exploratory exercise to determine if the further application of climate change communication strategies can enhance existing messaging present on the WHO website. Hypothetical examples showing how current messaging can be improved seek to provide recommendations for the future as well as possible directions to augment messaging already in use. Of note was an integration exercise the thesis indulged in, where IES was strengthened by incorporating climate change communication strategies like gain framing and scientific consensus (Table 3).

The final question has challenged the assumption that only pandemic messaging could benefit from climate change communication research, rather than vice versa. I hypothesize that there is no reason why a global messaging campaign using the WHO's IES messaging strategy cannot be carried out under the auspices of a climate change counterpart of WHO. The thesis also delves into the possible value in treating the climate change crisis and its response time like we did with the COVID-19 pandemic. Finally, it ends with a note that perhaps the most important lesson to be learned from WHO's messaging campaign and its success is the need for a similar counterpart for climate change with global jurisdiction.

6.2 Limitations of Research

A key limitation here is the new and evolving nature of the data that is inherent to the nature of the pandemic itself. The timeline for data selection sought to provide as wide a snapshot as possible of the COVID-19 pandemic, taking into account almost all the major phases of the pandemic: the beginning of the crisis, its global transmission, resultant lockdowns, the imposition of masking and social distancing, and the development and dissemination of vaccines. Despite this, it is crucial to understand that incoming data at the various stages led to differing, sometimes conflicting directives to the public. The importance of this new and evolving data is to highlight the fact that the lessons learned from today's data are not set in stone and may be subject to change or modification in the future in the face of new, incoming data. An example of this is the recent discovery that mixing of messenger ribonucleic acid (mRNA) vaccines like Pfizer and Moderna trigger a stronger immune response than two doses of a single type of mRNA vaccine (Flynn, 2021).

Similarly, the data analyzed was from a systematic, document review, not expert interviews or a more detailed form of analysis which might yield different results. Other limitations stem from the scope of the thesis itself that can be addressed with further research. An expanded time range could be of benefit as it would allow an analysis of the social media feeds of WHO to see if any communication strategies are employed. Furthermore, other pandemic-messaging from institutions like the CDC and the European Centre for Disease Prevention and Control (ECDC) could also be analyzed to get a holistic picture of the messaging strategies in play.

6.3 Directions for Future Research

Future research into the linkage between climate change communication strategies and COVID-19 messaging can perhaps focus on the pipeline from a global jurisdiction to a more granular level, be that national or provincial, or community level. Since the research in the thesis shows that one of the reasons why IES was adopted was because of the global nature of the audience it was addressing, there might be value in seeing if IES can be scaled down and be of similar usage in a jurisdiction smaller than the entire world, maybe a bloc of nations like the Association of Southeast Asian Nations or the European Union. I believe a useful exercise in this regard would be to see if some sort of compilation of best messaging strategies can be developed with relevance to any issue and if a skeletal framework can be created. It would be of great use to provide a framework that encapsulates a sort of manual of efficient messaging strategies which can then act as a toolbox where pertinent strategies can be selected and further tuned for effective deployment based on the jurisdiction targeted. While there are numerous best-practice guides and principles to guide messaging, they do not have the specificity to gather messaging strategies from specific fields like public health or climate change like this thesis has undertaken to. This follows with what Knutti (2019) suggests, that to close the knowledge-action on climate change, an integrated approach to wicked problems is required. In this regard, this thesis can be seen as a proof-of-concept that messaging strategies should translate between issues.

It would also be of benefit if future research could investigate a larger number of messaging strategies used in climate change communication to get an even more holistic view of how these strategies may be employed for a pandemic event. This would link with the above-mentioned point of developing a toolkit of messaging strategies that can then be further customized for other, more granular jurisdictions as well as account for more focused targeted

messaging. It was not possible to do that with the time and resource limitations imposed on me by the requirements of the thesis.

Another possible direction would be a detailed exploration of how pandemic messaging can inform climate change communication. This thesis focused primarily on applying climate messaging strategies to WHO materials for COVID-19. Future research could reverse this focus to document and analyze IPCC or UNFCCC messaging and see if the application of WHO's messaging strategy can be found in or applied to their communication.

The research done in this thesis has possible utility when the next, inevitable pandemic occurs. I believe there is some value to the claim that pandemic messaging could have been more effective if climate messaging strategies were incorporated in its messaging from the very beginning. A starting point for a toolkit for future pandemic messaging which integrates various messaging strategies (as shown in Table 3 on page 69) can act as a valuable educational resource.

Finally, as this thesis identifies opportunities to apply climate messaging to WHO materials and assumes their resultant efficacy, an important direction for future research would be the actual evaluation of how effective the new messaging approaches are with focus groups, surveys, or experiments.

6.4 Relevance of Research

This thesis attempted to view the wicked problem of pandemic messaging through the oblique lens of climate change communication strategies instead of the direct angle of public health messaging strategies. By doing so it bridged the gap between climate change messaging and pandemic messaging, resulting in the discovery of a hybrid messaging policy that relied primarily on the WHO's IES messaging strategy but contained some instances of messaging

strategies similar to those in the climate change communication literature. This finding helps to address the existing gap in literature where a general messaging strategy, aimed at a global audience, has yet to be field-tested, which it was in the case of COVID-19. Most of the literature was focused on a smaller jurisdiction or scale and exhorted the value of tailoring messaging to the target audience (Kreuter and Wray, 2003; Xue et al, 2016; Dixon, Hmielowsi and Ma, 2017) instead of a general messaging strategy. Pandemic messaging by WHO provides a valuable example where the scale is global, and the problem is complex enough and similar to climate change to act as a useful example to act as a foundational case for both further research as well as additional evaluation to assess the efficacy of messaging on such a vast scale.

The research done also reveals the potential for "two-way traffic" between climate change communication and pandemic messaging, negating the assumption that only COVID-19 messaging has lessons to learn from climate change communication. This opens a path where lessons of mutual advantage may be learned and can then be applied to future messaging strategies for both climate change and pandemics. This is of particular relevance if a toolkit or a framework for messaging strategies that can be scaled up or down and applied to other complex problems (as suggested in the previous section) and has potential advantages for both the fields of climate change and messaging for a future pandemic.

Furthermore, the thesis shows that there is considerable room in COVID-19 messaging where climate change messaging strategies can come into play and increase efficacy. It traces the examples of two well-researched strategies that are already being employed by WHO and paves the way for the exploration of a larger number of strategies from climate communication that can be used to augment existing messaging. Furthermore, even though this thesis was limited in scope since it just analyzed a limited number of messaging strategies present in WHO

communication, it opens up the possibility that other messaging strategies from research in different fields should also be evaluated. This expansion of options available is of particular import, especially in the case of wicked problems which demand an interdisciplinary approach to problem-solving.

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