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Evaluating the infodemic: assessing the prevalence and nature of COVID-19 unreliable and untrustworthy information in Aotearoa New Zealand's social media, January-August 2020

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Abstract

The arrival of the COVID-19 pandemic in Aotearoa New Zealand saw New Zealanders presented with the accompanying infodemic. Aotearoa New Zealand's experience, which is characterised by mis- and dis-information, as well as the emergence of a number of conspiracy theories, is linked to international patterns within the COVID-19 infodemic overall, but also displays significant situated and differential themes and impacts. We evaluate the *prevalence* of the COVID-19 infodemic in social and mainstream media February-August 2020, and analyse the narrative intent and social or political discourses of the content collated. In evaluating the *nature* of COVID-19 narratives over this time period, we find that there are significant changes in the types of discourses these narratives engage with, with an increasing prevalence of conspiracy narratives noted since the re-emergence of community transmission in August. Assessing the impact of these unreliable and/or untrustworthy narratives and their sources, including narrators, we develop preliminary understanding of the ways in which these narratives are at work in Aotearoa New Zealand.

Introduction

The COVID-19 outbreak originated in Wuhan, China, in November 2019 (World Health Organisation, 2020b) before spreading globally to become a pandemic in March 2020 (World Health Organisation, 2020c). Between February and May 2020, Aotearoa New Zealand recorded 1,504 cases of COVID-19 before eliminating community transmission of the virus in June 2020. Re-emergence of community transmission was announced on 11 August 2020; as of 3 September 2020

150 cases have been identified within a new, 'South Auckland' cluster; together with cases at the border, Aotearoa New Zealand's total number of confirmed and probable cases is 1759.

Local, regional, and global infodemics map to the spread of the pandemic (Islam et al., 2020). An infodemic is "an over -abundance of information—some accurate and some not—that makes it hard for people to find trustworthy sources and reliable guidance when they need it" (World Health Organisation, 2020a). Recent international surveys of the COVID-19 infodemic have tended to be international in scope, with a focus on the public health impacts of inaccurate and unreliable information. This preliminary investigation, which tracks social and mainstream media content since the beginning of the pandemic's impact in Aotearoa New Zealand, seeks to understand the prevalence of misinformation, disinformation, and mal-information within the infodemic. We then explore the nature of that content investigating *if* and *how* these infodemic discourses fit with known conspiracy theories. We describe the changes in both nature and prevalence of these narratives from Aotearoa New Zealand's first community outbreak and its re-emergence, showing how the infodemic has shifted in discursive nature over time. What is measured here is level of amplification: how much are these ideas being talked about? Who is talking about them? Level of active belief has not yet been measured.

Aotearoa New Zealand's communities have differential experiences of past pandemics, different measures of health and wellbeing, and different experiences of state services and state intervention. The pandemic and infodemic are also taking place within different nation-states, with different political systems, worldviews, and approaches to healthcare and the role of government. These contexts necessarily inform community and individual responses to the overabundance of information experienced. Understanding how the infodemic has presented in Aotearoa New Zealand enables us to better evaluate ways in which unreliable and untrustworthy information differentially impacts our communities.

Methods

Study settings and data collection

We assembled a team of computational and data scientists, public understanding of science and technology scholars, and conspiracy theory scholars with diverse disciplinary backgrounds in August 2020 to collate and analyse Aotearoa New Zealand's publicly available social media, mainstream media, and public discourse from mid-January 2020 to the present. A core team has been monitoring these media sources since the beginning of the infodemic in Aotearoa New Zealand. This collation of 122009 tweets is mostly limited at present to English-language sources; future studies will endeavour to collate more widely in other key languages in use in Aotearoa New Zealand, including Te Reo Māori, a number of Pacific languages, and Mandarin.

Study definitions

We use the following definitions from Berentson-Shaw and Elliot (2020):

Misinformation   "false information that people didn't create with the intention to hurt others"

Disinformation   "false information created with the intention of harming a person, group, or organization, or even a country"

Mal-information   "true information used with ill intent"

We note that mal-information is present in some discourses active within Aotearoa New Zealand's social and mainstream media.

These types of unreliable or untrustworthy information often appear in the form of conspiracy theories. Acknowledging that there is considerable debate as to what counts as a 'conspiracy theory' (see Dentith, 2018), we work with the following, general definition, which defines them as *purported explanations which cite a conspiracy as the salient cause of some event or phenomenon*. Critically, particularly in the context of COVID-19, belief in some conspiracy theories is not unreasonable, because there exist real conditions or lived experiences which make them resonate. Māori scholar and advocate Tina Ngata has described how "these theories aren't a big stretch for a group who've had 180 years of the state riding roughshod over their rights" (Ngata, 2020). In these circumstances, communities and individuals must work to ascertain when the evidence suggests we ought to infer the existence of a conspiracy, and when we should prefer non-conspiratorial explanations (Dentith, 2016).

In categorizing the infodemic, we have used theme, narrative, and meta-narrative as critical definitional terms. Here, we use 'theme' to describe the topic or main meaning of a piece of information, while 'narrative' is used to describe the story within which that meaning is located, and includes its structure, function, substance, and mode/s of performance (Allen, 2017). Meta-narrative here is used simplistically to refer to over-arching narratives or tropes, some of which may rightly be regarded as conspiracy theories and others which reflect cultural norms and mores.

Data collection

We collected publicly available tweets using the R package *rtweet* and the Python module *Twint*. We integrated the dataset with the aggregate information made available daily by FBK CoMuNe lab (Gallotti et al., 2020). The FBK analysis combines computational analysis of Twitter content for sentiment, reliability of sources, and prevalence of accounts classified as bots in the twittersphere.

We searched and aggregated tweets using two different methods: we queried for a list of terms ("covid", "coronavirus", "virus", "lockdown") and their variations, either as hashtags or as words contained in the tweets, and we queried for mention of specific user accounts that have a critical role in the pandemic response (including an extensive list of NZ MPs, health authorities, and science communicators). We collected data geotagged as originating from Aotearoa New Zealand. Where publicly available, narratives were reviewed via other social media platforms including Facebook, Instagram, YouTube and independent websites/blogs. Using FBK CoMuNe lab's categorisations as a starting point, we merged publicly available lists of news sources, both social and mainstream, identified as unreliable, and we localized that list considering social and mainstream news outlets relevant to Aotearoa New Zealand. We monitored the prevalence of the word "conspiracy" (and "misinformation", "disinformation", "debunking") querying the Global Data on Events, Location

and Tone database (GDELT). GDELT is an open-source global database of society, supported by Google's Jigsaw tool (Leetaru & Schrodt, 2013).

Analysis

We established the reliability of the news sources contained in each tweet we collected by matching it with the collated list of reliable and unreliable sources, excluding links to non-relevant websites. For each day in our observational window, we assessed the percentage of unreliable and reliable sources. The matching was performed using R.

The collated text material, which includes found text consisting of social media posts and mainstream media articles in addition to the computationally retrieved Twitter data described above, has been analyzed combining narrative analysis and some initial discourse analysis. Narrative analysis enables the interpretation of stories: "how the story is structured, what functions the story serves, what is the substance of the story, and how the story is performed," (Allen, 2017) while discourse analysis enables the development of interpretations of language and meaning within social contexts; specifically critical discourse analysis is interested in examining "the role of discourse in the (re)production and challenge of dominance" (Salkind, 2010). The use of discourse analysis within a critical context enables evaluation of power within and surrounding specific themes and narratives, despite the sometimes highly coded or visual language and diction of the information examined, and its deeply situated context within both Aotearoa New Zealand and global/trans-global narratives.

Results

Computation analysis

We did not find evidence of a significant increase in the *prevalence* of or *spread* of media narratives from unreliable sources. The mean daily percentage of unreliable sources in our corpus is slightly less than 20%, and is highly volatile (Figure 1). This result is confirmed by the aggregate data shared by FBK CoMuNe lab (Figure 2).

Figure 1- Prevalence of Reliable/Unreliable News Sources on New Zealand Twitter (TPM Collected)
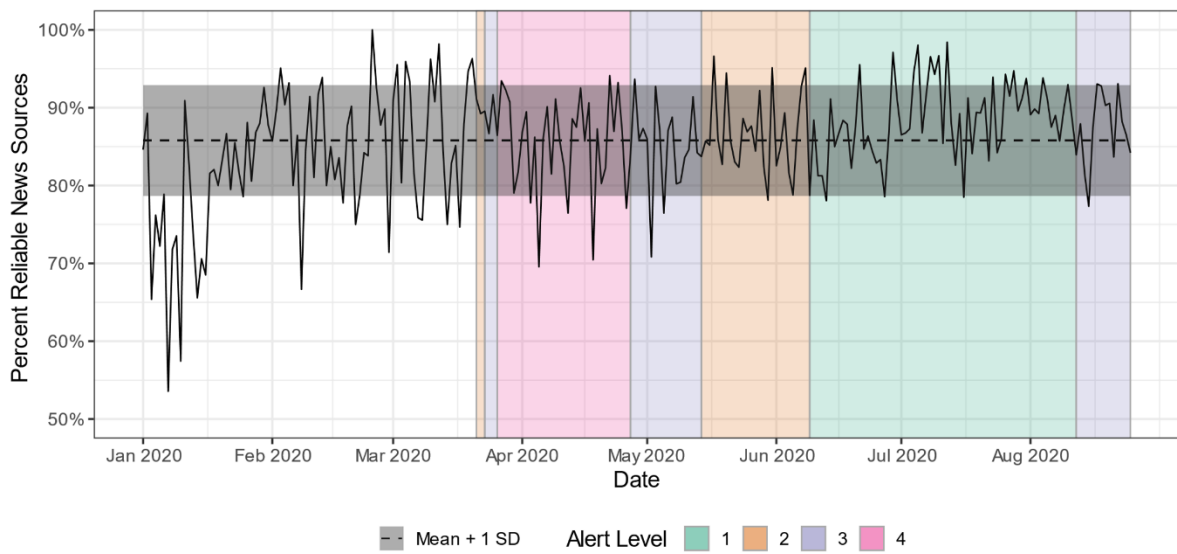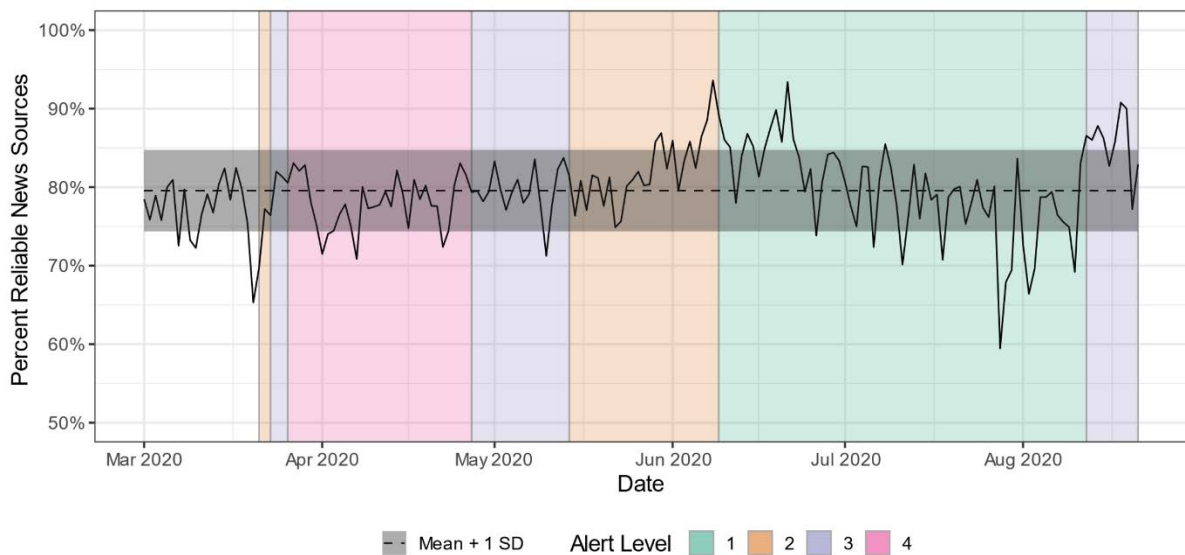

Figure 2- Prevalence of Reliable/Unreliable News Sources on New Zealand Twitter (FBK Collected)

Aggregating data by alert level again shows no significant difference in prevalence at different alert levels (ANOVA: $F(5, 166) = 1.843, p = 0.107$). The prevalence of reliable sources according to alert level was as follows in Table1 and Figure 3.

Table 1- Prevalence of reliable sources by alert level (TPM Collected)

Before alert level 2 (March 2020):   87.0% (sd: 8.05%)

Level 4 (March-May 2020):   85.3% (sd: 6.45%)

Level 3 (May 2020):   85.0% (sd: 5.73%)

Level 2 (May-June 2020):   86.7% (sd: 5.08%)

Level 1 (June-August 2020):   88.5% (sd: 4.98%)

Level 3 (Auckland), Level 2 (nationwide)
(August-Present; data up to the 25th of August):   87.2% (sd: 4.68%)

Figure 3- Prevalence of reliable sources by alert level (TPM Collected)
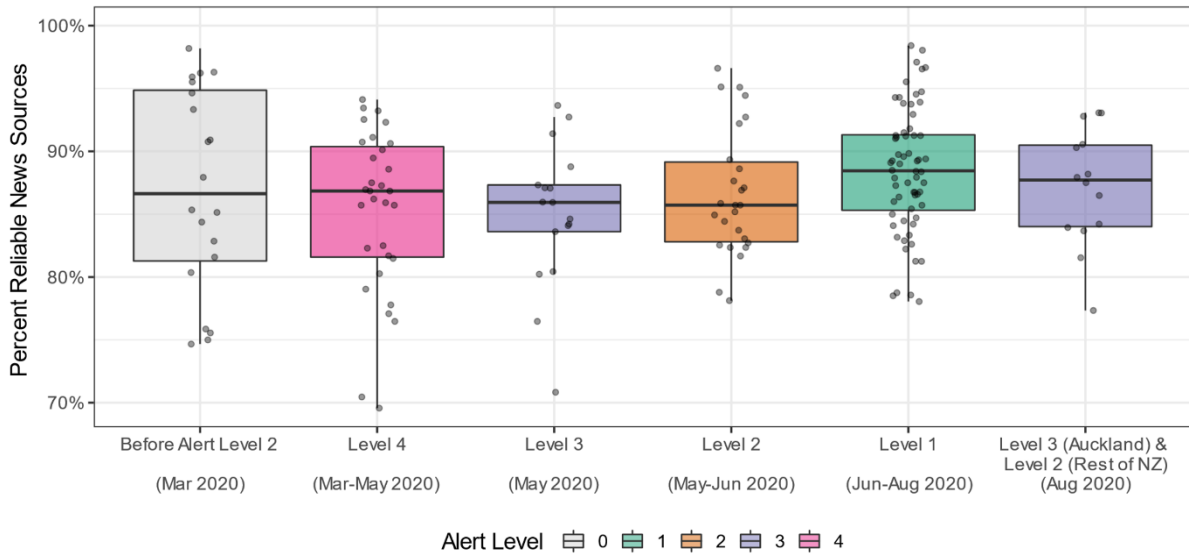
Similarly, aggregate data from FBK CoMuNe lab fails to find any significant increase in the prevalence of bots in the period from 22 January-23 August 2020.

However, the GDELT data does indicate a significant increase in the percentage of Aotearoa New Zealand media that mention the word 'conspiracy', starting from August 2020 (figure 4).

Figure 4- Monitored Articles from New Zealand News Sources mentioning 'Conspiracy'
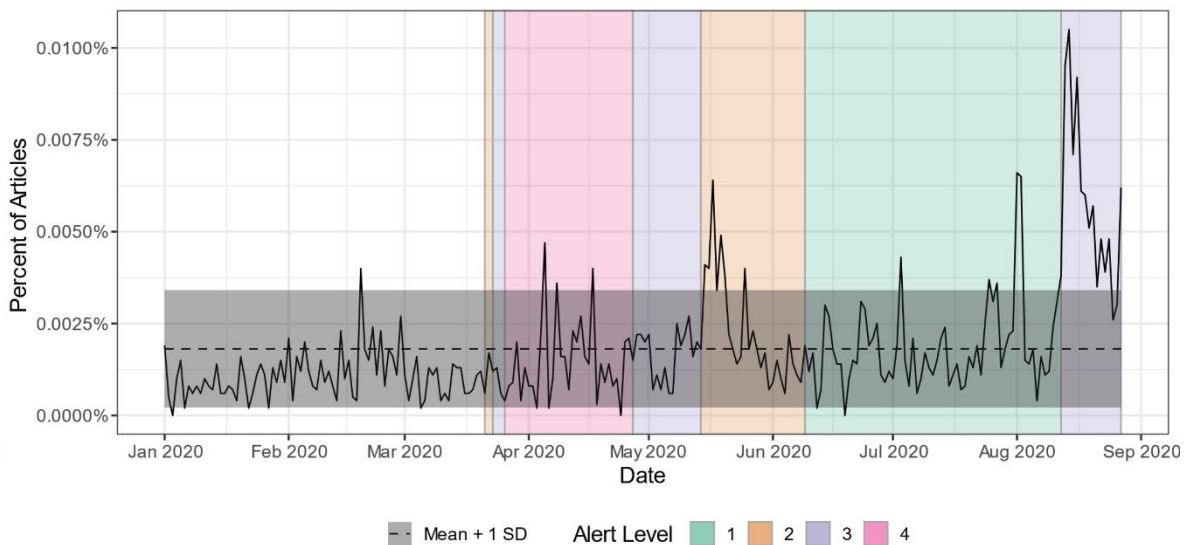
Narrative and discourse analysis

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During the Level 4 and 3 lockdown restrictions in Aotearoa New Zealand between March-May 2020, we identified a number of narratives based on unreliable or misleading information circulating on social media and present in mainstream media discourse. These narratives tend to fit one of three broad themes: **distrust** in governmental, inter-governmental and intra-governmental official health information regarding the virus and its effects; the **origin** of the virus, including **denial** of its existence; and **health** and **wellbeing** narratives grounded in rejection of mainstream medical advice (see Table 2 on the following page).

Distrust in government

A key feature of the COVID-19 pandemic and accompanying infodemic is uncertainty. As a novel viral zoonotic disease which, as of 30 August 2020, has seen nearly 25 million confirmed cases worldwide, and over 800,000 deaths (World Health Organisation, 2020d), the lack of scientific and public health certainty and preparedness has enabled the emergence of significant narratives which emphasise a lack of trust in governments, state actors, and/or inter- and intra-governmental organizations. With critical variance in state responses, and a number of differing scientific or public health approaches advocated for, this lack of trust in government interventions and planning can be identified in known conspiracy theory discourses, but also sits within the contexts of colonisation, systemic racism, state failures, underfunding and under-resourcing of public health, and differential experiences of state intervention (King et al., 2020; McLeod et al., 2020). This is particularly true in the Aotearoa New Zealand context for Māori, Pasifika, and other groups who experience inequitable access to healthcare (Steyn et al., 2020). Given a lack of trust in the state is present in both situated experiences of the pandemic and within known conspiracy discourses, we note then that convergence of these are to be expected.

Criticisms of official health information fills the gaps left by scientific and institutional uncertainty about the novel coronavirus. Meta-narratives include highly conspiratorial discourses, in which governments are stated to be over-reporting deaths or misrepresenting the severity of the virus to justify the restriction of civil rights and consolidate control over populations. These meta-narratives themselves serve as a tool to highlight the extent of state power and control, as well as question its validity. Other meta-narratives rely on the scientific uncertainty regarding best approaches to mitigation and control; in Aotearoa New Zealand this is present in the differential interpretations of the scientific data and public health theory by those describing themselves as offering a 'Plan B' (Thornley et al., 2020).

Origin narratives—which concern the origin of COVID-19—have largely focussed on China, and include a variety of discourses engaged in the (re)production of power. These narratives discursively engage with prevalent fears from individuals and international states about the role of China in a changing global power structure (e.g. Douthat, 2019; see Pew Research Centre, 2013). Other origin narratives are situated within longstanding racist and xenophobic discourses about China and the Chinese. These origin narratives, with specific appeal to racist and xenophobic discourses, have been welcomed by New Zealand white supremacist organizations (see for example Mike E., 2020; Morg, 2020), and alluded to in more mainstream discourses as a 'dog-whistle.' (Hosking, 2020) During the course of the infodemic, Aotearoa New Zealand has seen an increase in anti-Asian racism and racist behaviour towards Asian New Zealanders (Foon, 2020).

Table 2 - March-August narratives

Theme	Narrative	Meta-narrative	Rhetorical strategy	High Profile Narrators
Impact of virus	Low fatality rate or comparison to common flu	Distrust of government health response	Cherry picking	Plan B; Hosking
	Only the elderly or infirm die		Ableism Logical Fallacy	
	Deaths overestimated because people die 'with' the virus, not because of it		Logical Fallacy, Red Herring	
	Severity/fatalities overestimated in general		Misrepresentation	
	Most infected are asymptomatic and therefore herd immunity is the appropriate response		Misrepresentation, Oversimplification	
Alternative Cures	Abidol	Health and wellbeing, rejection of mainstream health advice		
	Grappa			
	Cocaine			
	Vitamin C			
	Hydroxychloroquine/quinines			Elon Musk Donald Trump
	Disinfectant/chlorine/bleach			Donald Trump "Miracle Mineral NZ"
Virus Origins	Virus originated in laboratory in Israel		Antisemitism	
	Vaccines cause virus		Misrepresentation	
	Virus originated in China:		Xenophobia	
	bioengineered (escaped)			
	bioengineered (released)			
	because of a lack of hygiene			
	because of culture/diet			
Virus Denial	China seeking global power		Xenophobia	
	China hiding health effects of 5G			
	China weaponising 5G			
	NZ government trying to introduce communism		Distrust of state authority	

Health and wellbeing narratives related to COVID-19 interplay with omnipresent meta-narratives which connect to 'wellbeing' discourses as well as those which demonise medical interventions, particularly vaccination. These meta-narratives move from misinformation to dangerous disinformation: a particularly high-profile example centres on claims hydroxychloroquine, an anti-malarial medication, was highly effective at combating the virus. This narrative was boosted by high-profile figures such as Elon Musk and Donald Trump (Ensor, 2020), connecting into the prevailing COVID-19 origin meta-narrative which claims simple and effective treatments or cures are being kept from the public by incompetent or conspiratorial state or global actors, including governments and inter- and intra-governmental organisations.

Narratives over time

Social media narratives have shifted in emphasis over the course of the pandemic, January-August 2020, as different countries globally experience different stages of the outbreak and mitigation efforts. Aotearoa New Zealand's prevailing social media and mainstream media narratives have reflected these global patterns, with distinct national specificities, with situated disinformation, for example, exploiting social concerns about the prior state removal of children from parental care (Office of the Children's Commissioner, 2020). Speculation about the virus' source and potential cures occurred early in the pandemic, and while they are still present, they tend now to support emerging meta-narratives that incorporate COVID-19 into pre-existing, organised conspiracy narratives.

Since the campaigning for the 2020 general election began in June and July, a number of distinct social media narratives have dominated which, while 'home-grown', link to a series of largely US-based narratives about the role and responsibility of the government during a pandemic. We have identified a number of key foci: the nature or effectiveness of government response to COVID-19, potential state complicity in orchestrating the present outbreak, and significant debate related to other options for COVID-19 mitigation (see Table 3 on following page).

Narrators

Based on the discursive data reviewed, narrators identified as driving or perpetuating disinformation appear to use social media platforms as a method to call action to likeminded followers. High profile narrators identified in Tables 2 and 3 may be directly promulgating unreliable information or engaging in rhetoric that signals a sympathetic position towards these narratives, often framed as 'just asking questions' (Wade, 2020). It is notable that a considerable number of the narrators identified were either associated with, or explicitly from, conservative leaning networks. Many of the narratives espoused conspiracy theories specifically framed around political 'left' and communist agendas. Indeed, evidence suggests that conservative political ideology is strongly linked to conspiratorial thinking and science denial; considerably more so than liberals (Lewandowsky et al., 2013; Linden et al., 2020). Concerningly, several of the more prominent narrators were directly engaged with political endeavours, and the spread of disinformation perpetuated by political actors in high profile conservative-leaning New Zealand parties. It is, however, unclear the extent to which narrators hold a genuine belief in the conspiracies they promulgate, or simply see these theories as an opportunity to build an audience for material or political gain.

Table 3- August narratives

Theme	Narrative	Meta-narrative	Rhetorical strategy	High Profile Narrators
Impact of virus	Lockdown ineffective	Distrust of government health response	Cherry picking	Plan B; Hosking
	Deaths overestimated or miscounted		Misrepresentation	
	Herd immunity a better response		Ableism	
	Testing ineffective		Impossible expectations	
	Vaccine is dangerous/will alter DNA		Conspiracy Theory	
Alternative Cures	Hydroxychloroquine/quinines	Health and wellbeing, rejection of mainstream health advice	Misrepresentation and Oversimplification	Elon Musk Donald Trump
	Disinfectant/chlorine/bleach			Donald Trump "Miracle Mineral NZ"
Opportunistic response/virus denial	Government withholding information about community transmission		Distrust of state authority, ad hominem	Billy Te Kahika Jami-Lee Ross NZ Public Party Vinny Eastwood Outdoors Party
	Government using (or planned) pandemic to seize power/limit rights			
	- to aid re-election			
	- to implement communism		Xenophobia	
	- on behalf of China			
	- on behalf of UN			
	Masks are a symbol of government power/limits to rights		Distrust of state authority, ad hominem	Gerry Brownlee New Conservative Party
	Martial law/military intervention			
	- method of seizing power			
	- may involve forced compulsory testing			

Conspiracy narratives

The emergence and longevity of narratives that are easily incorporated into pre-existing, organised conspiracy meta-narratives suggest key narrators have been successful in using uncertainty and misinformation around COVID-19 as a recruitment tool. Understanding these theories, their targets, and the values that underpin them can aid our understanding of which unreliable and/untrustworthy narratives will persist, the potential harms they may cause, and the coded ways they are alluded to by mainstream narrators.

Table 4- A taxonomy of COVID-19 conspiracy theory

COVID-19 conspiracy theories	Who the conspirators are?	What is the conspirators' goal?	How are they keeping what they do secret?
Origin/release	Governments	Connect to deliberate secretive state/government activity	Disinformation Cover-ups Propaganda
	Scientists	Connect to state/governmental incompetence	Cover-ups
Endgame	Governments	Connect to the opportunistic use of the pandemic	Disinformation Cover-ups Propaganda
Fake Pandemic	Governments	Connect to the opportunistic use of the pandemic	Disinformation & misinformation
Election	Governments	Connect to the opportunistic use of the pandemic	Disinformation & misinformation
Hidden/supressed cures	Scientists	Connect to deliberate secretive state/government activity	Disinformation & misinformation
	Governments	Connect to state/governmental incompetence	

The COVID-19-specific conspiracy narratives we have observed in Aotearoa New Zealand discourses, increasing in prevalence since August 13 (see fig 3) specifically relate to known conspiracy tropes around the presumed intent and motivation of science and scientists. These are narratives related to the virus's origins and to speculative cures. The other key group of narrative which are being amplified relate to the behaviour and motivations of governments, nation-states, leaders, and inter- or intra-governmental organizations such as the United Nations or the World Health Organization. A situated feature of these narratives in the Aotearoa New Zealand context is

the prevalence of election conspiracy theories related to suppression of the populace prior to or during the election. (For more discussion on the identified conspiracy theories, see Appendix A).

Many of these conspiracy theories centre upon claims that disinformation is being disseminated to publics about the pandemic. Coupled with the prevalence of narratives that predict or anticipate the presence of unreliable and/or untrustworthy information such as misinformation, disinformation, mal-information and conspiracy theories in media, political, and civil society discourses, reliable and trustworthy discourses are tarnished. Narratives which relate COVID-19 to a distrust in the state intersect with existing state and societal racism, resulting in pattern-seeking where those narratives that best fit with a person's or community's experiences and world views are more engaging. This critical issue of trust or distrust is compounded by the complexity of conspiratorial discourses. Rather than being made up of simple theories which can be easily shown to be false, they are theoretical clusters consisting of evidence, implications, suspicions, and sources which are trusted by some audiences and not by others. Therefore, responses such as asking communities to simply trust official sources or countering conspiracy with trustworthy evidence may not work, as the conspiracy theories themselves question these predicted responses.

Discussion

A critical feature of the first stage of the infodemic in the Aotearoa New Zealand context has been high quality scientific and public health information provided from a variety of trusted sources and interventions designed to help New Zealanders locate trustworthy and reliable sources and advice. Government messaging has been complemented by significant high levels of trust in a number of scientists and science communicators who communities have generally found to be reliable. These include: microbiologist Associate Professor Siouxsie Wiles, physicist Professor Shaun Hendy, epidemiologist Professor Michael Baker, public health expert Sir David Skegg, and engineer Dr Michelle Dickinson. The daily press conferences held by the Prime Minister were also a key tool for open communication. Other avenues for communication included television learning services provided on the state broadcaster, and consistent branding and messaging via [www.covid19.govt.nz.](www.covid19.govt.nz) From supermarkets to courier deliveries, the expected behaviours and activities at levels 3 and 4 were consistently messaged, and largely adhered to.

The prevalence and nature of misinformation, disinformation, and conspiracy-related meta-narratives (March-August) has remained relatively static (see figure 1 and figure 2). Yet, a close look shows that the nature of the narratives and discourses have shifted during this period. Since the commencement of the election campaigning and re-emergence of community transmission in Aotearoa New Zealand, narratives have increasingly reflected US-based disinformation and conspiracy related to the role of the government in mitigation, suppression and/or elimination; government control mechanisms; and individual rights. This shift presents significant issues for Aotearoa New Zealand, where previously widely multi-partisan agreement on scientific and public health interventions, is re-presented as entering into 'political' discourse.

The ability of online social media platforms such as Facebook, Twitter, and Instagram to enable the real-time sharing and amplification of information, including misinformation, disinformation, and conspiracy theories is well-documented (Bessi et al., 2015; Cinelli et al., 2020; Vicario et al., 2016). Our data collection has initially focused on the prevalence and nature of narratives related to

COVID-19 on Twitter, given Twitter data is public, accessible, and wide-reaching. It is critical to note that in Aotearoa New Zealand presently, a range of unreliable and untrustworthy information is being distributed via Facebook and its subsidiaries, Instagram, Facebook Messenger, and WhatsApp, as well as Telegram and Signal. These are far more difficult to study at scale, due to privacy regulations and encryption. In using publicly available Twitter data to establish a computational baseline of narrative prevalence and sentiment, combined with situated qualitative evaluation of the nature and discourse of the content, we can at least begin to measure changes to prevalence or nature of the infodemic in Aotearoa New Zealand. Critical to this is the ability to model the social network of disinformation on Twitter, which will enable identification of key nodes (narrators) in the network.

Recent Aotearoa New Zealand research on effective policy communication highlights the challenges for communicating effectively about COVID-19 within these contexts, as audiences bring individualistic personal values or frames to bear on the overwhelming plethora of information presented in social and mainstream media (Berentson-Shaw, 2020). Concerns around effectiveness of medical interventions, particularly those promoting herd immunity or 'secret' cures, are representative of an individualistic mindset, and an us-vs-them mentality, rather than a cooperative community approach. This attitude reflects a lack of trust in medical science on the part of both the public and the media, which is not without foundation in Aotearoa New Zealand. The well documented case of unethical research practice at National Women's Hospital and the University of Auckland resulted in at least fourteen preventable deaths. It was the media that publicly exposed this story, but it took a ministerial committee of inquiry to uncover the scope of the unethical research and the extent of its impact.

These us-vs-them mindsets are also prevalent in narratives focused on government control; not only promoting the government as a distinct entity working against 'the people', but xenophobic prejudice against communities seen to be 'responsible' for the original and subsequent outbreaks, particularly toward Asian, Māori and Pasifika communities. These divisive discourses have critical implications, including resistance to important public health measures risking increased community re-emergence; medical risk-taking behaviour leading to measurably negative health outcomes; and promotion of xenophobic and exclusionary behaviour inciting acts of verbal or physical violence. Further, misaligned distrust of government, the public service, and civil society more generally has lasting effects on Aotearoa New Zealand's democracy (The Workshop, 2019). Given the shift in discourse from the initial outbreak to the August community transmission, it is likely that we may see an increase in narratives of state control, or government intervention during the upcoming election cycle. As international and local teams work on a COVID-19 vaccine, it is inevitable that this will be a major focus for ongoing disinformation and conspiracy narratives.

Conclusion

Aotearoa New Zealand's infodemic has changed over the course of the pandemic, shifting from a prevalence of unreliable information related mainly to the origins of the virus or potential cures, to

narratives which enter into conspiracy theory discourses about state control and individual rights. With high quality science communication present throughout the national epidemic response, this shift in the nature of the discourses present in social and mainstream media is cause for concern. The contagious nature of the virus and the means by which is it spread mean that, for Aotearoa New Zealand to successfully mitigate the effects of COVID-19, it is critical for the majority of the population to adhere to public health advice. However, given the noted amplification in mainstream and social media of conspiracy discourses in recent weeks, reverting to simply relying on the successful multi-faceted science and public health communication approaches of earlier in the pandemic will not be sufficient (on the limits of the debunking approach see Zollo et al., 2017). A wide-ranging response to the increasing discussion of unreliable sources, untrustworthy narrators, and conspiracy narratives in media, political, and civil society discourses is required.

Such a response will necessarily take into account the serious and justified critique of state failure to engage sufficiently with the concerns of Māori as tangata whenua, Pasifika communities, and disability communities during the first period of community transmission (King et al., 2020). This might entail working from and with the most at-risk communities to develop practical, culturally competent counter-narratives which draw on our ability to anticipate the likely incoming disinformation discourses, such as those around the introduction of a COVID-19 vaccination. This kind of approach takes on board those systems-level critiques, acknowledges the preparedness and strengths of communities (for example *Te Arawa | Covid-19 Response*, 2020), and enables relational networks to be prioritised as tools for the spread of trustworthy and reliable information. It engages with the present uncertainty by acknowledging the effects of the infodemic - that it feels very difficult to remain informed – and enabling genuine and respectful conversations.

This preliminary study establishes a computational methodology and process for on-going monitoring of the prevalence of mis- and dis-information, and conspiracy narratives, within Aotearoa New Zealand's social and mainstream media ecosystems. Next steps include building diurnal sentiment prevalence into the monitoring, as well as addressing a number of known limitations, including the Anglophone focus of the data, access to more social media platforms, and the impact of a 'top-down' estimation of prevalence computationally (Tromble et al., 2017), given that the exposure of each individual to the located narrative cannot be revealed via prevalence, and evidence that echo-chambers effect the ways in which we access and engage with information online (Cinelli et al., 2019; Vicario et al., 2016). Future research therefore will focus on developing further mixed methods approaches to understanding the prevalence of *uptake* of misinformation, disinformation, and conspiracy, via qualitative tools to better understand strength or commitment to beliefs, and translation to action.

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Appendix A

Whilst there is considerable debate as to what counts as a "conspiracy theory" (see Dentith, 2018 for a summary on the definitional debate in the academic literature) the most general definition has it that they are purported explanations of some event which cite a conspiracy as the salient cause. Not every conspiracy theory is unwarranted (read: irrational to believe). Rather, the problem with conspiracy theories *as a class of explanatory hypothesis* is working out when the evidence shows we ought to infer to the existence of a conspiracy, and when we should prefer non-conspiratorial explanations (see Dentith, 2016).

A conspiracy theory implies the existence of a conspiracy. So, whilst there is debate as to what the proper subject of the label "conspiracy theory" applies to, it is generally agreed that a conspiracy consists of:

- **The conspirators condition:** a group of two or more people who,
- **The secrecy condition:** work in secret,
- **The Goal condition:** towards some end.

To attempt to show that some conspiracy theory ought to be believed, conspiracy theorists will typically focus on showing that the latter two conditions are true. That is, they will argue that we have reason to believe a conspiracy is occurring either due to evidence of secretive behaviour or because some group desires some end. As such, we can taxonomise COVID-19 conspiracy theories with respect to how they present either the *secrecy* condition or the *goal* condition. That is, COVID-19 conspiracy theories concern groups of conspirators who are keeping secret something from the general populace, typically in order to achieve some end.

Indeed, COVID-19 conspiracy theories present an interesting case of claims of conspiracy, because these theories suggest that the *real* explanation of the pandemic is being *hidden* or *kept* from the populace. These conspiracy theories range from claims about the *true* origin of the novel coronavirus, to what ends the pandemic is being used for, or whether the pandemic is even real. Most of these turn out to be examples of older theories which have been repurposed or relabelled to be about the pandemic. Thus we can analyse them not just with respect to where they fail as claims about conspiracies, but also by how they are neither new nor novel. In this respect, most of the COVID-19 conspiracy theories we are seeing in the infodemic fit into the following conspiracy theory metanarratives.

Origin/release conspiracy theories

One particular class of COVID-19 conspiracy theory concerns the origin of the novel coronavirus. The accepted origin of the virus is animal-to-human transmission due to a mutated strain of a coronavirus which has hitherto not been present in the human population. However, some COVID-19 conspiracy theories posit the novel coronavirus was either accidentally released in the human population, or that it was engineered and then accidentally or deliberately released from a research laboratory *and that this is being kept secret from the general population*.

The accidental release conspiracy theories were taken seriously enough by certain Western powers earlier in the year, such that they were investigated by multiple bodies and found to be unwarranted. It was taken to be a plausible state of affairs that if COVID-19 had accidentally been released from a research laboratory, people in authority might have covered that up. As such, it is useful to note that these particular conspiracy theories were considered to be plausible for a time but were found to be unwarranted upon investigation.

The accidental release conspiracy theories suggest a cover-up of some incompetence (which, whilst bad, is at least understandable). However, the deliberate release conspiracy theories suggest a malevolent cover-up of not only the origin of the novel coronavirus but also the purpose for which it was created.

Advocates of these conspiracy theories do not necessarily have to state what that purpose is; they can just suggest that there is a cover-up of the real origin of the virus, and then claim that the origin is being kept secret because it serves some end (other than covering for a mistake or accident). These conspiracy theories, then, resemble older theories about governments covering up crises by producing cover stories or via the dissemination of dis- or misinformation.

The 5G COVID-19 conspiracy theories

One curious COVID-19 origin conspiracy theory centres around the claim that 5G "poisoning" either causes the novel coronavirus or contributes to susceptibility to it. That is, the suite of 5G conspiracy theories which predate the COVID-19 pandemic by several years have effectively been repurposed to explain the pandemic. This suggests believers in this conspiracy theory are searching for more evidence of a correlation between 5G cell signals and ill-health.

We have seem similar theories in the past concerning other supposed causes of ill-health (like chemtrails or fluoride) and, like those theories, these concern the idea that people in authority are covering up the health effects of various technologies or additives. What is curious about this subset is the claim COVID-19 is both a product of 5G exposure, and that authorities are covering this up in order to create the impression of a viral pandemic.

Endgame conspiracy theories

Whereas conspiracy theories about the origin of COVID-19 may or may not be innocuous in some cases, theories which claim the pandemic is being used to advance some sinister endgame or goal generally turn out not to be. This particular set of conspiracy theories place their focus on the goal condition of conspiracy, arguing that the evidence for a conspiracy occurring can be found in the purported purpose or endgame of the people either behind the virus, or those who are using the virus opportunistically to achieve some end. Some of these endgame conspiracy theories also claim that people in positions of power planned for the pandemic to take place (thus they employ some version of an origin conspiracy theory about COVID-19).

Opportunistic conspiracy theories do not deny the existence of COVID-19 (although they might vary as to whether it has a natural or unnatural origin). Rather, they focus primarily on the question of what is the end the conspirators are working secretly to achieve? These theories typically claim that the COVID-19 pandemic is simply an excuse by people in positions of power to promote policies or

engage in power grabs that governments (or the "Deep State") desire but have never had a pretext to enact.

Some of the posited goals we find put forward by these conspiracy theories are:

- forced vaccination regimes
- microchipping of the population
- changing social mores (such as encouraging mask wearing in order to normalise the introduction of Sharia law in future)
- instituting lockdowns in order to imprison the population.

There is at least some initial plausibility to claims that people might and can use situations like a pandemic to their own political purpose. The government of the US used the aftermath of the 9/11 attacks to justify the invasion of Afghanistan, and the US along with the UK used the resultant "War on Terror" post 9/11 to justify the invasion of Iraq. There is, then, some historical precedence here; indeed, as we have seen in the US over the course of the pandemic, the White House has sought to justify pre-existing policies towards NGOs and China by blaming them for the administration's lackadaisical response to community transmission of COVID-19 in the US.

The incidence of prior conspiratorial activity can be a influence on how people perceive the probability of conspiracies now. However, these particular COVID-19 endgame conspiracy theories are just a recrudesce of a long standing set of One World Government/New World Order conspiracy theories. We see similar narratives around anthropogenic climate change conspiracy theories, for example, using the same kinds of arguments and rhetorical moves. As such, many of these conspiracy theories are the same old wolf in a different sheep's clothing.

Election conspiracy theories

There is a special case of these endgame conspiracy theories, which claim that the current lockdown in Aotearoa New Zealand is being used to stage manage either a military coup, or allow the government to manipulate the upcoming election. That is, whether or not COVID-19 is real or there is a pandemic, the coalition government is using the appearance of a resurgence of community transmission to take or hold on to power.

This particular kind of conspiracy theory is one we have seen in play overseas (such as what is happening in the US), and dog whistles around this are increasingly common (see, for example, people suspicious of postal ballots and general claims about electoral fraud being amplified due to worries about a "COVID election", and the like).

The fake pandemic conspiracy theories

Some COVID-19 conspiracy theories allege not only is the pandemic being used to achieve nefarious ends, but that there is no pandemic to begin with; the fake pandemic is a false flag or disinformation campaign by the government (or world governments) which is being used for sinister ends. These conspiracy theories assume the same kind of sinister ends as the endgame conspiracy theories.

What is interesting about these particular conspiracy theories is their overlap with the class of claims that people in positions of power are overstating the danger of COVID-19. Not everyone who thinks the novel coronavirus is just like the common cold, or nowhere near as dangerous as medical professionals claim believe there is no pandemic. However, these claims are sometimes a dog whistle to those people who believe the pandemic is fake. As such, people who claim the pandemic is being faked will use, as evidence, claims in the media that the dangers of COVID-19 are overstated or cases of politicians acting as if COVID-19 is not a significant threat.

The hidden/suppressed cures conspiracy theories

Some people accept that the COVID-19 pandemic is occurring, but claim there is some conspiracy to hide or suppress the cure to the novel coronavirus. The cover-up here relates to some claim either there is an easily available cure to COVID-19 people in positions of power do not want the public to know about, or that there is some cure to COVID-19 accessible to the political or cultural elites which is not being shared with the general public. That is, the cure to COVID-19 is either being suppressed or hidden from us.

These conspiracy theories are another example of a recrudesce of older conspiracy theories about suppressed cures or a conspiracy to make alternative medical modalities appear unwarranted.

Unfortunately, there has been a history of medical cover-ups and malfeasance (see, for example, the Tuskegee Syphilis Experiments in the US; the Unfortunate Experiment in Aotearoa New Zealand), which renders some suspicion of medical professionals plausible. In the same respect that the prevalence of political conspiracies in a given community informs belief in the possibility a conspiracy is happening now, the existence of medical conspiracies and cover-ups leads to a generalised suspicion of the medical community. However, many of these conspiracy theories go beyond casting suspicion upon existing medical practices to the broader (and harder to substantiate) claim that non-mainstream medical modalities are being suppressed (despite extensive work having been done to test them, and many such modalities still being taught in medical schools) to claims of suppressed cures. These later theories share a long history with the various conspiracy theories of suppressed inventions (such as Tesla's death ray, perpetual motion machines, and the like).

Metanarratives and the interrelation of COVID-19 conspiracy theories

As we can see with regards to the preceding taxonomy, the various COVID-19 conspiracy theories in play over the course of the pandemic to date rely on claims of a cover-up of either *the true origin of the novel coronavirus* or *the desired endgame of the people promoting the idea that there is a pandemic*.

Some of these theories are clearly racist: the origin conspiracy theories which allege that China is hiding the true source of the virus have been used to legitimise attacks on not just China but anyone who looks Chinese (or has a Chinese-sounding name). That is, these conspiracy theories trade upon notions of the "Yellow Peril" a long-standing conspiracy theory about dastardly plots being enacted by sinister figures from Asia generally.

Many of the COVID-19 conspiracy theories we are seeing in the infodemic are just new examples of long-standing New World Order/One World Government conspiracy theories. The conspiracy theories which claim the pandemic has been faked in order to bring about social and political control, for example, are just COVID-19 branded versions of the various conspiracy theories we saw about the Otāutahi Mosque Shootings in March of last year, with only the so-called "precipitating event" changed.

Still, not all conspiracy theories about COVID-19 are *inherently* implausible. As explained earlier, given a history of conspiracy and some questions about the rise and transmission of COVID-19, it was plausible to think early on in the pandemic that there was something more to the story than we were being told. However, the crop of conspiracy theories we are seeing in play now are examples of what philosopher Brian L. Keeley calls "mature unwarranted conspiracy theories" (Keeley, 1999). That is, they are based upon either cases of people being misinformed (which is either a case of misinformation or relying on bad authorities) or relying on disinformation.

Most of the conspiracy theories we are seeing in play now rely upon claims that disinformation is being disseminated to the general public about the state of the pandemic. This, in turn, makes countering the disinformation which underpins these conspiracy theories difficult. Many of these conspiracy theories predict the presence of disinformation in the public sphere, which makes countering them tricky at best. This issue is compounded by the fact that what counts as "disinformation" to some community members rests upon just how much trust they have in particular sources (both official and unofficial). We are dealing here not just with conspiracy narratives repurposed to be about the pandemic; we are also seeing communities with differing levels of trust in official and unofficial sources choosing sides.

This issue of trust is made all the more complicated by the fact that COVID-19 conspiracy theories (just like the official theory) do not tend to be simple theories but, rather, complex theories which rely on clusters of evidence, suspicions, and trusting relationships with certain sources. Responding to complex theories is not as simple as asking citizens to trust official channels, or putting out evidence via those channels, as most of these conspiracy theories call into question these mechanisms.

However, it is important to note that it is possible to believe *a* conspiracy theory about COVID-19 without buying into *all of them*. People who suspect that COVID-19 was engineered might believe there has been a cover-up about the origin of the virus without also believing that the resulting pandemic is part of a plot to take over the world. Meanwhile, not everyone who believes that the pandemic is being used to enact social controls to bring in global communism necessarily believes that the virus does not exist. That is, people might believe there is a cover-up going on, but differ as to what end that cover-up applies to. As such, even though we are dealing with a complex information landscape, engaging with some conspiracy theorists about their particular COVID-19 conspiracy theories will be easier than it will be with others, and we do not necessarily need to worry that endorsement of one conspiracy theory entails believing other COVID-19 conspiracy theories.

The overarching narrative we are seeing, then, around COVID-19 conspiracy theories concerns how we can trust that there is not some conspiracy occurring around the COVID-19 pandemic. Given that most people have little access to all the relevant or salient information about the how and the why of the pandemic, some of the initial suspicions which underpin some of these conspiracy theories are, unfortunately, plausible. Part of the issue at hand is how do we address these concerns in a way which does not amplify these suspicions or lead to new conspiracy theories concerning our response to them.