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When viruses and misinformation spread: How young Singaporeans navigated uncertainty in the early stages of the COVID-19 outbreak

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Abstract

Guided by the frameworks of uncertainty management and sensemaking during crises, this study examined how young adults in Singapore managed uncertainty around the COVID-19 outbreak. Through a series of eight focus group discussions involving 89 young adults, we found that participants experienced uncertainty about the outbreak, especially when it comes to how they should protect themselves. They managed this uncertainty in two ways: while some engaged in information seeking, others engaged in information scanning. Those who did not actively seek information did not avoid it either, with some of them finding it impossible to avoid information about COVID-19, as it comes up in their routine social media use and offline conversations. Understanding COVID-19 as an illness that does not threaten young people, our participants noted only minimal disruptions to them. Instead, they were more concerned about their parents and older family members, whom they considered as more vulnerable.

Keywords

COVID-19, health crises, information scanning, misinformation, uncertainty

Introduction

The World Health Organization (WHO) first learned about a mysterious pneumonia that had downed dozens in the populous city of Wuhan in China on 31 December 2019 (Schumaker, 2020). Some 10 weeks later, it officially declared a global pandemic after the

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disease had affected nearly 120,000 people across 118 countries (Ducharme, 2020). The number of cases steadily increased, reaching more than 40 million as of October 2020, with more than 1 million deaths (Worldometer, 2020). The novel coronavirus disease (COVID-19) disrupted lives around the world: Mass gatherings, including religious services and much-anticipated international sports events, were canceled. Schools were closed; employees were asked to work from home. Businesses took a blow—flights had to be reduced, tourism halted, the supply of raw materials from China, where the epidemic had started, was severely slashed while hundreds of cities were put into lockdown.

The COVID-19 pandemic plunged the world into crisis. Documenting and analyzing how it began and how its early stages unfolded are critical to understanding how it became a global outbreak as well as in identifying important lessons for a world that has always been vulnerable to pandemics (Walsh, 2020). Studying the early stages of a crisis can inform crisis management (Pan and Meng, 2016) and help health educators and practitioners to anticipate how to protect the physical and mental well-being of the public when health outbreaks start (Reynolds and Quinn, 2008). This current study heeds these calls and focuses on the early stages of the COVID-19 outbreak in the small country of Singapore.

Small and densely populated, Singapore became one of the earliest hotspots for COVID-19. Singapore reported its first confirmed case on 23 January 2020—a 66-year-old Chinese national visiting from Wuhan. Two weeks later, Singapore reported local transmission and raised its disease outbreak alert to the second highest level. It started implementing drastic measures, including refusing entry for visitors as well as suspending mass gathering, including religious services. Singapore was arguably well-prepared: It was among the worst-hit countries during the 2013 severe acute respiratory syndrome (SARS) outbreak. Singapore's response to COVID-19 initially earned praises from international agencies, until the virus widely spread among thousands of migrant workers staying in crowded dormitories. Singapore also went through pockets of panic—residents scrambled for face masks and toilet paper, went through a few weekends of panic-buying, and dealt with misinformation online (Gov.sg, 2020).

Health crises are periods of uncertainty: COVID-19 started as a mysterious illness and it was not immediately clear how it originated, how people could protect themselves, what the actual scope of the outbreak was, and how it will be contained. And yet, crises are also instances when not only authorities but also individuals have to make quick decisions. Faced with uncertainty, individuals look for meaning to process and understand the situation, a process referred to as sensemaking (Weick et al., 2005). Sensemaking involves various information behaviors (Genuis, 2012), consistent with the proposition that one way of dealing with uncertainty is by filling gaps with relevant information.

Guided by previous work on uncertainty management and sensemaking during crises, this current study explores how young people in Singapore navigated the uncertainty and engaged in sensemaking in the early stages of COVID-19. Focusing on this demographic is important as infections among young people increased in many cities as the outbreak unfolded (Lin, 2020), accounting for the majority of new infections in some areas (Winowiecki et al., 2020), with authorities calling out young people for going to bars and beaches while the pandemic is in full swing (Bisserbe and Pancevski, 2020). Through a series of focus groups, we sought to understand how young people in Singapore managed

their uncertainty through their information behavior, how these information behaviors shaped how they made sense of the outbreak, and how their sensemaking influence their behavioral responses in the early stages of the outbreak.

Literature review

A crisis refers to "a serious threat to the basic structures or the fundamental values and norms of a system, which under time pressure and highly uncertain circumstances necessitates making critical decisions" (Rosenthal et al., 1989: 10). Studies have labeled a range of occurrences as crisis, such as natural disasters, large-scale accidents, terrorism, as well as pandemics (Longstaff and Yang, 2008). For example, studies have conceptualized the spread of Ebola (Karlsen and Kruke, 2018) and bird flu (Vos and Buckner, 2016) as crises. Three main components constitute the definition of a crisis: the existence of time pressure, the need for critical decision-making, and the presence of uncertainty (Karlsen and Kruke, 2018: 5). These contextual factors contribute to a disruption in the "established patterns of personal and social identity" (Moos and Schaefer, 1986: 9) that challenges individuals' understanding and interpretation of their personal experiences in relation to what is going on around them.

A crisis unfolds across stages and each stage has unique characteristics and requirements, which makes it critical to study each stage (Li, 2007; Reynolds and Quinn, 2008). Fink (1986) identified four stages of a crisis from a crisis management perspective: the prodromal stage, when clues about a potential crisis appear; the crisis breakout stage, when a key event triggers the crisis; the chronic stage, when the main impact of the crisis hits and lingers; and the resolution stage, when the crisis becomes no longer a concern. The breakout stage, which includes the early stages of a crisis, is particularly important because it can shape the subsequent stages of a crisis (Karlsen and Kruke, 2018). This current study focuses on the early stages of the COVID-19 pandemic as experienced by young people in Singapore.

Uncertainty and information acquisition

Health crises, such as COVID-19, are characterized by complexity and ambiguity. They represent risks unfamiliar to most people and often "involve organisms that cannot be seen and diseases and symptoms that have not before been evident in the general population" (Reynolds and Seeger, 2005: 44). Thus, health crises usually begin with high levels of uncertainty. Brashers (2001) argued that uncertainty develops "when details of situations are ambiguous, complex, unpredictable, or probabilistic; when information is unavailable or inconsistent; and when people feel insecure in their own state of knowledge or the state of knowledge in general" (p. 478).

Uncertainty is an uncomfortable cognitive state. Uncertainty reduction theory (URT), which originated in the study of interpersonal communication, assumes that strangers experience uncertainty when they meet and that "their primary concern is one of uncertainty reduction or increasing predictability about the behavior of both themselves and others in the interaction" (Berger and Calabrese, 1975: 100). URT has since been applied and tested in larger communication contexts, such as in health care service (Albrecht and

Adelman, 1984). URT assumes that to reduce uncertainty, interactants will engage in information seeking (Berger and Calabrese, 1975). This assumption has also been applied to larger contexts. For example, during health crises, "information also can decrease uncertainty when it allows people to develop meaning for an event, such as explaining a mysterious symptom pattern" (Brashers, 2001: 482).

Widely studied in the context of health-related information, information seeking refers to "active efforts to obtain specific information outside of the normal patterns of exposure to mediated and interpersonal sources" (Niederdeppe et al., 2007: 155). Studies have found that older individuals, females, those who are highly educated, and those who experience poor health conditions or particular health issues were more likely to engage in information seeking about specific health information (e.g. Bigsby and Hovick, 2018; Kelly et al., 2010; Li et al., 2015; Rice, 2006). A recurring finding is the role of uncertainty in triggering information seeking (Neuberger and Silk, 2016; Rains and Tukachinsky, 2015). For example, an experiment found that participants exposed to a higher level of threat uncertainty were more likely to seek more information about that threat (Goodall and Reed, 2013).

Innovations in information technology have allowed individuals to exercise more control over their information behavior. Thus, studies on information seeking have also looked into the role of online access (e.g. Li et al., 2015; Rice, 2006) while others have also focused on less purposeful ways of information acquisition, which have become easier with newer information technologies, such as social media. For example, studies have explored information scanning, which refers to "information acquisition that occurs within routine patterns of exposure to mediated and interpersonal sources that can be recalled with a minimal prompt" (Niederdeppe et al., 2007: 154). The distinction between information seeking and information scanning is not about active or passive behavior, for while seeking information is active, scanning may or may not be passive (Hornik and Niederdeppe, 2008). Scanning includes information obtained from routine interactions with family, which is passive, as well as focusing on a specific news item about a particular illness while reading the newspaper as part of one's active information-seeking routine (Hornik and Niederdeppe, 2008). The distinction, it seems, is while information seeking is usually operationalized in terms of a specific topic, such as information seeking about cancer (e.g. Shim et al., 2006), information scanning is usually operationalized as stumbling upon information about cancer usually while in the course of routine *general-information* seeking, such as while reading the news. Studies on health information acquisition found that information scanning is more prevalent than information seeking (e.g. Niederdeppe et al., 2007; Shim et al., 2006). In the specific context of cancer-related information, females, those with college education or higher, and those who have a family history of cancer were found to be more likely to engage in information scanning about cancer (Kelly et al., 2010; Shim et al., 2006).

A related concept in news consumption literature is incidental news exposure (INE), or when "people encounter current affairs information when they had not been actively seeking it" (Tewksbury et al., 2001: 534). Initially studied in the context of online news, where users can get accidentally exposed to news headlines they were not originally looking for (Tewksbury et al., 2001), INE has since been applied to the study of social media news consumption (Kümpel, 2019). However, Lewis (2017) argued that "Scanning

involves more than just unintentional exposure to topics, namely also a subsequent decision to attend to that information" (p. 7). While INE is focused on accidental exposure to *news*, information scanning involves coming across *information* about a specific topic across sources that may or may not include news (Kelly et al., 2010; Lewis, 2017). Thus, this current study focuses on information scanning in the context of COVID-19.

Uncertainty and information avoidance

Some scholars questioned whether individuals seek to reduce uncertainty all the time; in some instances, individuals might prefer a state of uncertainty over a certain, but negative, state (Bradac, 2006). Brashers (2001) argued that uncertainty reduction is just "one of an indefinite number of responses to events or behaviors that are unpredictable, ambiguous, equivocal, or lacking information" (p. 478) and proposed instead a broader theory of uncertainty management. Others also questioned whether uncertainty reduction always leads to information seeking (Bradac, 2006; Brashers, 2001; Kramer, 1999). For example, Kellermann and Reynolds (1990) found in a series of experiments no support for the assumed relationship between level of uncertainty and information seeking. Some individuals might also be "distressed by information, which may lead them to avoid situations in which they would encounter it" (Brashers, 2001: 489). Thus, information avoidance might also be a response to uncertainty.

Information avoidance refers to "any behavior intended to prevent or delay the acquisition of available but potentially unwanted information" (Sweeny et al., 2010: 341). Brashers et al. (2002) argued that during health crises, an individual would need to decide between gaining and avoiding information. While seeking more information can enable some individuals to understand the situation better, which may reduce uncertainty (Brashers et al., 2002), information seekers during health crises may not always get the information they need and processing more information might also increase their anxiety (Sweeny et al., 2010). Thus, some individuals might engage instead in information avoidance, which "can shield people from information that is overwhelming and distressing and can provide escape from a distressing certainty by maintaining uncertainty" (Brashers, 2001: 483). Information avoidance can also help to preserve remaining feelings of hope during dire situations (Brashers, 2001).

Golman et al. (2017) specified what they termed as *active* information avoidance, which occurs only when the individual knows that information is available, and that the individual has access to the information but still decides to avoid it. Sweeney et al. (2010) noted that some individuals avoid information that may cause unpleasant emotions or lessen positive emotions. Golman et al. (2017) also listed feelings of anxiety as a factor that can lead an individual to avoid information, such as when patients avoid medical screening to protect themselves from potentially negative information (Howell and Shepperd, 2012). Studies on cancer information avoidance found that those with high levels of anxiety or fear and feel overloaded with information about cancer tend to engage in information avoidance; males were also found more likely to avoid information about cancer (Chae et al., 2020; Miles et al., 2008).

In summary, the rich literature on health information behaviors, particularly in the context of cancer, has identified three information behaviors related to uncertainty

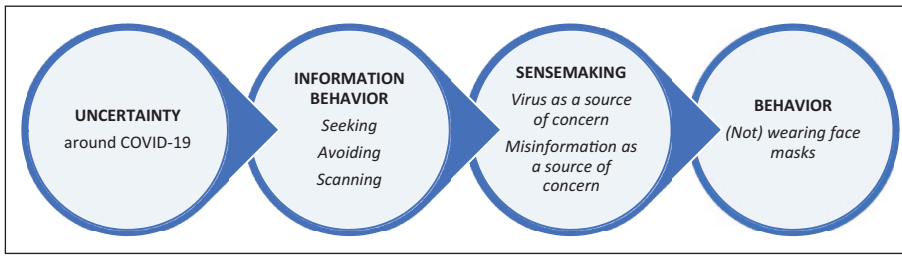

Figure 1. Proposed conceptual framework.
Note. This study examined the ways young adults in Singapore managed uncertainty around the COVID-19 outbreak through information seeking, avoidance, and scanning, and how their information behavior shaped their sensemaking of the pandemic and their engagement or non-engagement in protective behavior (i.e. mask wearing).

management: seeking, scanning, and avoiding. Guided by this literature, this current study focuses on the specific context of COVID-19, a novel illness which arguably elicits higher uncertainty and has less information available than cancer so far. Thus, we first ask the following question:

> *RQ1*. How did young adults in Singapore manage uncertainty around COVID-19 through their information behaviors?

Sensemaking during crisis

As they manage uncertainty by engaging in different information behaviors, individuals begin to construct their own understanding of the crisis (see Figure 1 for our proposed conceptual framework). Such understanding, which refers to how they make sense of the situation, may shape their crisis response. Thus, an important process during crises is what scholars have called "sensemaking," defined as the "placement of items into frameworks, comprehending, redressing surprise, constructing meaning, interacting in pursuit of mutual understanding, and patterning" (Weick, 1995: 6). Sensemaking involves interpretation, but while interpretation is often focused on making sense of texts, sensemaking also involves considering how texts are constructed (Weick, 1995). This conceptualization shares many similarities with Dervin's (1983: 3) use of the term "sense-making" to refer to "how people construct sense of their worlds" especially when faced with rapid changes. This current study adopts Weick's (1995) use of "sensemaking" as a single, unhyphenated word, consistent with subsequent work that investigated sensemaking in the context of health crises (e.g. Vos and Buckner, 2016).

Sensemaking "involves imposing meaning on one's surroundings and using this as the basis for subsequent interpretation and action" (Keller et al., 2012: 6). Thus, sensemaking also involves interpreting new information by comparing them with earlier information (Bourne, 2015; Dilaver, 2013). Maitlis and Sonenshein (2010) proposed two core themes usually present in sensemaking during turbulent times: shared meaning and emotions. Shared meaning refers to how people construct shared commitment, identity, and expectations, while emotions include both positive and negative emotional responses.

Understanding sensemaking can refer to studying how individuals understood *what* they personally experienced—their concerns and their explanations for these concerns—and *how* they experienced it (e.g. Bourne, 2015; Keller et al., 2012).

Genuis (2012) argued that sensemaking involves individuals engaging in different information behaviors "to bridge gaps in their understanding and achieve an end product that comprises knowledge, opinion, intuition, evaluation, and affective response" (p. 1554). For example, Vos and Buckner (2016) found that Twitter use during the 2013 bird flu outbreak helped users engage in sensemaking about the outbreak by posting messages not only containing factual information, such as number of cases, but also including emotional responses and attempts at contextualization, such as associating the virus with other crises. In a study of organizational sensemaking during the H1N1 pandemic, Keller et al. (2012) also found that key officials who mounted response efforts "relied on multiple sources of information and personal experience to make sense of the unfolding pandemic" (p. 14).

While sensemaking is an important process through which people search for meaning (Weick et al., 2005), it may not always be based on truth. "Instead, individuals seek plausibility as they incorporate more information into their understanding of an event" (Vos and Buckner, 2016: 302). This point has become particularly important as the COVID-19 pandemic came at a time when many countries had been grappling with misinformation. The uncertainty brought about by the COVID-19 pandemic and the rise of social media as information source became a potent combination for misinformation to spread. The WHO declared an "infodemic" as misinformation about COVID-19 spread along with the virus (Thomas, 2020). Misinformation is a general term that refers to false or inaccurate information. When information supply is initially slow, such as during health crises, individuals might also "turn to unofficial sources to satisfy their information needs," such as their family and friends on social media, which might expose them to inaccurate information (Heverin and Zach, 2012: 35). This might affect their sensemaking process. Since we focused on the earlier stages of the outbreak in Singapore, when the world still did not know much about the virus, sensemaking was deployed as a sensitizing concept to refer to what young people were initially concerned about. Through an inductive approach, where the specific objects of sensemaking were allowed to emerge from the participants' responses rather than imposed on them, we also sought to answer the following question:

> *RQ2.* How did the information behavior of young adults in Singapore in response to the crisis shape their sensemaking of the COVID-19 outbreak?

Method

This study is based on eight focus group discussions (FGDs) conducted in February 2020 involving 89 participants recruited from a large university in Singapore. The participants were recruited through a series of email invitations sent to all university students that specified two main criteria: participants must be active social media users and should be aged 21 or above. The participants for this study were aged between 21 and 27 years. In terms of gender, 58 are female and 31 are male. Group size for each FGD session ranged from 8–12 participants.

Research approach

The FGD method is appropriate for understanding the range of perspectives around a particular phenomenon. It is considered an efficient and effective way of gaining a comprehensive account of shared experiences as nuances and insights can organically emerge not only from the responses of each participant but also from the group interaction that occurs during the discussion, which is something that cannot be captured in an individual interview (Tracy, 2013). In this study, we decided to use FGDs given our focus on a specific demographic experiencing the same outbreak unfolding in Singapore and engaged in likely similar information behaviors.

The FGD method, however, leans heavily on the discussion moderator, who not only has to ensure that the discussion stays on course and remains comprehensive, but also that enough rapport is built not only between the moderator and the participants, but also among the participants themselves (Tracy, 2013). Therefore, we made the conscious decision of designating a moderator who belongs to the same demographic group as our participants, sharing the same experience: The moderator is also a Singaporean young adult (within the same age range as our sample). This helped facilitate rapport-building, making the participants feel more comfortable to participate in the discussion and share about their experiences.

Procedure

The participants were invited to an FGD facility on campus. First, they were given a set of information sheet and were duly informed of the study procedures, confidentiality of their data, and their rights as participants. Next, after obtaining informed consent from all participants, a moderator facilitated a semi-structured discussion, guided by an FGD protocol that listed key questions but also allowed additional probing and follow-ups. The protocol included questions about what the participants know (and did not know) and feel about the COVID-19 pandemic, how they come across information about the outbreak, and what their personal concerns are, among others. The participants received a S$50 incentive for participating. The discussions were audio-recorded with permission from the participants. The recordings were transcribed verbatim, with no identifying information about any of the participants.

Analytical approach

While the FGDs were guided by a protocol that listed questions informed by an initial list of sensitizing concepts, the analytical strategy employed in this study allowed for other themes to emerge from the data, or what Tracy (2013: 11) referred to as an "iterative approach," a middle ground between deductive and inductive approaches, where "the researcher alternates between considering existing theories, research interests, or predefined questions/goals, on the one hand, with emergent qualitative data, on the other." For example, while we were guided by the concept of sensemaking that helped us probe for the *what* and *how* of the participants' understanding of the outbreak during the FGDs, the specific themes only took shape during the actual FGDs and the subsequent analysis.

The FGD transcripts amounted to 82 pages of textual data, analyzed using the constant comparative approach (Tracy, 2013). First, two researchers independently engaged in open-coding, where transcripts were coded line by line to label emerging datapoints, considering those that related directly to our initial sensitizing concepts as well as those that did not (Saldaña, 2009). Next, the two researchers independently engaged in axial-coding, were the first-level codes were categorized into larger conceptual bins. The coders then compared their axial codes, and then proceeded to link the conceptual bins to examine how they might be related. Finally, the researchers came together to identify larger themes to answer the study's research questions, after which they wrote narratives to develop each theme and included the corresponding exemplars from the data. Participants were represented using a standardized numbering system: the first number represents the group while the second number corresponds to the participant's individual number (e.g. 1.2 means belonging to Group 1 and being assigned the individual code 2 within that group).

Results

When the FGDs were conducted in early February 2020, Singapore had recorded 24 confirmed cases of infection, including four local transmissions. A week before the FGDs, the university also converted one of its graduate residence halls into a quarantine facility. The number of local cases slowly but steadily rose, and by the time the last FGD was conducted, Singapore had reported 74 confirmed cases. China's numbers were also going up exponentially and South Korea had started reporting a steady rise in its number of cases. It is within these regional, national, and local contexts that the FGDs were conducted.

Managing uncertainty

RQ1 asked about how young adults in Singapore managed the uncertainty they experienced. While none of our participants claimed to be a routine news consumer prior to the outbreak—this is consistent with studies that found young people as more likely to be engaged in incidental, rather than purposeful, news exposure (e.g. Kümpel, 2019; Tewksbury et al., 2001)—many of our participants reported actively seeking information specifically about COVID-19.

Uncertainty. The participants noted some uncertainty about COVID-19. This was evident when they were asked to share about what they knew and what they did not know about the disease. Participant 4.2 expressed general uncertainty about the disease, noting that even scientists did not have much information about the exact nature of the virus:

> Normally the established, so-called experts will have a lot of information about it. But when people who are supposed to know about it, don't know about it, then it becomes a point of concern for the rest of us.

Some participants also expressed uncertainty about what they must do to protect themselves. Discussion on this centered on the use of face masks. For example, Participant 6.3 said, noting different approaches observed in different countries:

> There's a lot of articles of other countries on what they do to prevent it or like to contain it. So, like, maybe myself, I will compare to what Singapore do and what they do. For example, in Korea they encourage people to wear masks. So I was, like, thinking in Singapore, we encourage people not to wear masks. So it's like different measures.

While many studies focused on information seeking as a strategy to reduce uncertainty, others focused on information avoidance as a way to manage uncertainty (Brashers et al., 2002). We see these different ways of managing uncertainty from our participants. Participant 6.9 said, "I would feel more secure knowing what's happening rather than not knowing because it's more fearful to not know what's happening than if I know." In contrast, Participant 3.3 said, "If you read more, you will be more worried. Sometimes ah. Just don't go out too often. Yeah. As in, it's not important to see how many people died, and how many people got the virus."

Information seeking. Those who sought information to manage uncertainty accessed traditional and online news media or subscribed to news updates through news apps and messaging services. While these are both information-seeking strategies specifically directed at the COVID-19 outbreak, they are somewhat distinct, as the former strategy relies on actively accessing information directly from sources while the latter relies on waiting for alerts to be pushed after an initial active decision to subscribe for notifications.

The first type of information seeking is characterized by respondents *pulling* information from sources. For example, one participant mentioned listening to the radio while another participant mentioned watching evening news on television to keep track of COVID-19 developments. Some mentioned visiting news websites in Singapore, such as those of news network *Channel News Asia* and newspaper *The Straits Times*, to read news about the outbreak. In these examples, information about COVID-19 is made available in information portals and the respondents actively and intentionally attend to these portals to pull information.

The second type of information seeking is characterized by information sources *pushing* information to the respondents, who wait to be notified if relevant information has been made available. These respondents wait for relevant information to be pushed to them, after initially and intentionally indicating their interest for specific information, such as a user subscribing to a WhatsApp alert system. Some of the respondents mentioned subscribing—after the virus started to spread locally in Singapore—to news alerts from news agencies, such as *The Straits Times*, through messaging apps such as WhatsApp and Telegram. The Singapore Government also created an alert service using WhatsApp and subscribers get 2–3 messages each day about recent developments, such as updates on number of cases and new regulations on travel and mass gatherings. Those who subscribe to these services get notifications on their smartphones every time an alert is sent. They choose to open these messages only when they want to or when they have

time to read. Similarly, some participants downloaded news apps, which alert them when there are new updates. Participant 4.8 said,

> I will only click in when like a notification pops up, because under *The Straits Times* right, after you finish one article there will be several links below, so I will click onto there. But I will only visit when there's notification.

Information scanning. Some participants did not actively seek out information about COVID-19. For example, Participant 6.10 said, "I don't actively seek out information, because after a while, it gets very repetitive." In explaining why he is not seeking information about COVID-19, Participant 1.11 simply said, "There's too much hype about it." Scholars have proposed the term *information scanning* to refer to information acquired in the course of routine exposures to information sources (Niederdeppe et al., 2007). This term does not always refer to passive information behavior; information scanning can occur in the course of active general-information seeking, such as routine news consumption or social media use. For example, Participant 1.1 said,

> I think for me, even if I don't seek out the news, when I go scroll Facebook, there will be people sharing a *Straits Times* article on the virus, like the updates. And then when I meet my friends, one of the conversations we have nowadays, is about the virus.

Thus, even if they did not seek out information about COVID-19, the participants still came across updates and information about the outbreak when they used social media, engaged in interpersonal conversations, or, as what some participants shared, when they interacted with their families in their messaging app chatgroups. When asked about her source of COVID-19 information, Participant 3.5 referred to what "my friends told me last night, because they are from Taiwan, I think they know more information." Participant 1.3 also said, "I think regardless of whether you seek the news out, you will hear people talking about it around you." Consistent with previous studies (e.g. Niederdeppe et al., 2007; Shim et al., 2006), information scanning is a more common uncertainty management strategy among the participants than information seeking.

Engaging in sensemaking

RQ2 asked about how the ways young adults in Singapore managed uncertainty shaped how they made sense of the outbreak. Specifically, we sought to examine how our respondents' information behaviors in response to the uncertainty around COVID-19 shaped their understanding of the crisis. First, we found a generally moderate level of concern among our respondents as they understood the virus as not adversely affecting their age group. While most of them engaged in basic precautions, such as washing their hands regularly and wearing face masks only when they are sick, consistent with information repeatedly communicated by the Singapore Government, most of them said they did not worry much about the outbreak. Second, they were more worried about their parents not only because of the virus, but also because of the spread of misinformation about COVID-19. The respondents detailed examples of misinformation shared to them

by their parents, that they felt like they had to step up and stop misinformation from spreading within their families.

The spread of the virus. Through either seeking or scanning information, our respondents were able to construct an understanding of the COVID-19 outbreak. Some of them expressed being worried, partly due to conflicting information they have obtained so far. Participant 4.1 said,

> Definitely worried in a sense, but it's not to a point where it's that bad as compared to how it is in Hubei province. It's just because there's different articles, some say wear mask, some say don't wear mask if you don't have any symptoms. So it's kind of hard which one to believe. So that one kind of causes a bit of disbelief.

In this response, the participant was making sense of the situation in Singapore by comparing it with the information she had learned about the situation in Hubei, China. Others shared that they felt their daily lives had been close to normal, except the times when they get exposed to information that made them feel worried. For example, Participant 5.8 said,

> If the whole day I didn't read any coronavirus news, I will be going about as per normal. But once, for example, people like, new case, and then everyone in the chat group suddenly starts saying: "Oh, today I'm gonna be going out and buying like 10 packs of noodles." Then, you get sucked into it also, the panic.

These responses show how the participants' understanding of the severity of the outbreak is shaped by their information behavior, which also seemed to have affected the extent to which they engaged in protective behavior. For example, the Singapore Government repeatedly asked residents to wear face masks only when they feel sick. None of our respondents reported wearing a face mask; none wore masks during the FGDs. In explaining why they do not wear face masks, some respondents cited the information they had accessed. Others cited their sensemaking of the outbreak. For example, in explaining why he does not wear face masks, Participant 7.1 said, "The virus don't really target our age group." Participant 1.2 also said, "Because we are young, we don't have burden. They [parents] have burden." In managing uncertainty through information acquisition, our respondents constructed an understanding of the virus as being not a serious threat to themselves. This understanding also shaped their behavioral response to the outbreak, such as not wearing face masks.

The spread of misinformation. A significant part of how our respondents constructed their understanding of the outbreak comes from the information shared to them by their parents. Many of these instances of information sharing are facilitated by messaging apps, such as WhatsApp, the most popular messaging app in Singapore. However, our participants also shared that a lot of these messages from their parents were pieces of misinformation, or what many of them also referred to as "fake news." Participant 5.8 said, "I think my parents are getting a lot of fake news from WhatsApp . . . Their friends forward to them, and it's all rubbish."

Similar to other countries, the COVID-19 outbreak in Singapore was accompanied by a misinformation outbreak—from messages claiming malls and mass rapid transit (MRT) stations being closed for having suspected cases to various home remedies to protect oneself from the virus, such as drinking sesame oil. This became a significant part of what our respondents understood about the problem Singapore was facing—it was not just about the virus, but also about misinformation. Like how they felt about the virus, our respondents also felt the problem with misinformation affected their parents more than themselves. Participant 4.4. said, citing generational differences:

> There was a list of hotspots or confirmed cases that we should try to avoid. In the end, it has been debunked as officially false. Me and my sister will go and check first to see if it's not reliable. Our parent's generation is more concerned, like a "just-in-case" kind of mindset. For our generation, we try to verify that this information, whether it can be trusted or not, whether we can act on it reliably.

Our respondents understand that their parents share these pieces of misinformation because they care about their children. Still, some of them felt a need to stop misinformation from spreading, even if doing so does not really stop their parents from believing in and spreading these posts. Participant 4.8 said she had corrected her parents a few times: "I knew that they meant well but they just forward whatever they receive without filtering . . . They just say 'better be safe than sorry'." It was interesting to hear how participants felt not only the need but also some authority to protect their older family members, such as their parents, aunties, and uncles, from misinformation about COVID-19. This contributed to their sensemaking of the outbreak, understanding it more as an issue of social order, which involves tackling misinformation so residents would not panic, than as a health risk. Focusing on the implications on social order, rather than on specific health risks to himself or his family, Participant 5.2 said,

> I think our government has set quite a clear direction—don't wear mask if you're not sick, then also addressed the panic buying, the stockpile etc. Then also addressed fake news and constantly publish news articles, and also the healthcare is quite good. With all this, I think it helps stabilise the economy, so not so afraid now.

Discussion

This study examined the ways young adults in Singapore managed uncertainty around the COVID-19 outbreak through information seeking, avoidance, and scanning, and how their information behavior shaped their sensemaking of the early stages of the pandemic (see Figure 1). Through a series of FGDs, we found that our participants experienced uncertainty about the outbreak. While some engaged in information seeking—with a few of them increasing their normal news consumption to keep track of developments about the outbreak—some engaged in information scanning. Those who did not actively seek information did not avoid it either, with some of them saying it was impossible to avoid information about the outbreak, as it comes up in their routine social media use and offline conversations. Through these information behaviors, they were exposed to

information—and misinformation—that shaped how they understood the crisis in its early stages. More than posing a health risk, the virus posed risks to social order: Understanding COVID-19 as an illness that does not threaten young people, our participants noted only minimal disruptions in their daily lives. Instead, they were more concerned about their elders—parents and older family members, whom they considered as more prone not only to the spread of the virus but also of misinformation.

Studies that focused on the role of information avoidance in managing uncertainty especially in the context of health noted several reasons for information avoidance, such as protecting oneself from information that can induce negative emotions or increase feelings of anxiety (Howell and Shepperd, 2012; Sweeny et al., 2010). However, our participants, who come from a technologically savvy generation, find it difficult to avoid information about COVID-19. While a few of them tried to avoid information about the outbreak, citing information overload and increased anxiety, they also conceded they could not completely avoid information about the outbreak. Through family group chats on WhatsApp and even casual face-to-face conversations with friends, they got to know more about COVID-19. This constitutes information scanning (Hornik and Niederdeppe, 2008).

By not actively seeking information about COVID-19, they protected themselves from potentially panic or anxiety-inducing information. By being unable to completely avoid information about the outbreak, they also got to learn about recommended precautions to protect themselves. Information seeking is considered important in health communication to increase individuals' self-efficacy in protecting themselves or addressing their health-related conditions (Neuberger and Silk, 2016). Information scanning seems to help in providing our participants some sense of efficacy during this time of uncertainty without making them feel overloaded with negative information. A related mechanism, but one that did not emerge during the FGDs, is the role of selective exposure. Since COVID-19 is a novel disease and the study was done in the earlier stages of the outbreak, our participants might not have yet developed deeply seated prior beliefs about the disease. Future studies should explore whether beliefs developed over time as the pandemic continues lead individuals to actively select information about the outbreak. This is potentially important, especially in relation to misinformation about COVID-19.

Those who engaged in information seeking also seemed to prefer a less active stance. Instead of watching television news or visiting websites, many of our participants kept track of the outbreak by subscribing to alerts on messaging apps or downloading news apps that sent alerts when updates were available. This way, our participants received notifications when updates can be retrieved, but also controlled when they attended to these new developments. This is a way to regulate negative feelings, such as anxiety, that might be triggered by exposure to negative information. This also lessens our participants cognitive load as they do not have to be cognitively alert all the time—if something is important, the news apps or messaging apps will notify them. They did not have to worry about routinely checking with traditional news platforms.

Our results also showed interesting patterns in how our participants made sense of the outbreak, at least in the early stages of the outbreak. Sensemaking can be examined in terms of expressions of emotions and shared meaning (Maitlis and Sonenshein, 2010). Many of our participants expressed moderate levels of concern. Based on what they knew from their information behavior, they constructed an understanding of the virus as

risky for older generations, not for themselves. This understanding, combined with information communicated by Singapore Government that only those who felt unwell should wear masks, made our participants not to wear masks as a form of protection. This sensemaking might explain why some young people, such as those reported in other countries, engaged in risky behavior, like going to the beach or partying, during the pandemic (Bisserbe and Pancevski, 2020). While we found this sensemaking among young people in Singapore, there were no reports of COVID-19 parties in the city-state, which is known for its strict and efficient implementation of regulations; it is also much smaller in size, making enforcement of restrictions more manageable.

The discussions showed that our participants were more concerned about social order, rather than the health threat caused by COVID-19. They referred to the spread of misinformation as a serious threat, one that had caused panic-buying among their parents. They also cited examples of their parents, uncles, and aunties believing in home remedies against COVID-19 that had already been debunked by medical professionals, such as eating garlic. This is an area where the participants displayed feelings of efficacy—they took it upon themselves to correct their parents in their chatgroups. Seeing the virus as not a big threat to their age group, our participants focused on combating the spread of misinformation among their older relatives instead. This also points to a potential third-person effect, where individuals tend to perceive others as being more susceptible toward being negatively influenced by media messages than themselves (Davison, 1983), which future studies should explore.

These findings have to be understood in the context of several limitations. First, we focused on young people in Singapore. To achieve more depth in our analysis, we focused on a specific age group and selected a demographic known for heavier social media use and potentially higher health literacy than other groups. Young people were also highlighted to be among those engaging in risky behavior, such as partying, during the pandemic (Bisserbe and Pancevski, 2020). Future studies should also document how other age groups, who differ in their health literacy levels, among other factors, managed the uncertainty brought about by this pandemic. Second, the virus was still spreading by the time this report was prepared—cases in Singapore had exponentially increased since data were collected, China has re-opened Wuhan after weeks of lockdown, while the United States, the United Kingdom, and Brazil became the new epicenters of the disease. The discussions were conducted when Singapore only had fewer than 75 cases, arguably the early stages of the outbreak in the country. Thus, our findings only speak of what our participants felt and experienced at that time. Our results are reflective of the situation at a specific, narrow point in time—but they were also able to accurately capture sentiments and sensemaking in the early stages of a global health crisis (Karlsen and Kruke, 2018; Li, 2007). Future studies can build on the conceptual framework we have developed here and examine it across different types of crisis as well as in different stages, where uncertainty management and sensemaking might vary.

Despite these limitations, we hope that our study contributes to a deeper understanding of how young people manage uncertainty during the early stages of health crises, how information behavior is changing especially in the context of the COVID-19 outbreak, and how young adults in Singapore made sense of the early stages of a global pandemic. It is important to study initial public reaction toward any health crisis as it can

guide practitioners and social policy makers. The results highlight the importance of new communication channels—social media and messaging apps—as conduits for information during a crisis, able to fit into information scanning as a preferred uncertainty management strategy by young people. The results also document how sensemaking in the early stages of a health crisis can go beyond the disease itself and focus more on social order and information quality, which can affect public action or inaction.

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