PING!: An Exploratory Study of the Relationship between Mental Health Characteristics, IM Usage, and Communication Effectiveness During COVID-19

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ABSTRACT

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March 2020, the beginning of the coronavirus pandemic, ushered in the immediate use of IM technologies and changed the narrative around the impact of IM usage in the workplace. Rather than debating whether these technologies were increasing productivity and resulting in communication efficiencies, they became a survival mechanism; a way to continue communicating with colleagues without being in-person. Simultaneously, the overall mental health of our workforce began to decline as knowledge workers had to adapt to new work environments, processes and tools in the midst of an unprecedented health crisis. This study concerns itself with these two topics: online communication and mental health; precisely, the relationship between mental health characteristics and the perceived effectiveness of communication through instant message technologies is explored.

The dissertation follows a mixed methods approach and is exploratory in nature. The goal of the study is to understand the impact of mental health characteristics on IM usage and perceived communication effectiveness. Specifically, a comparison is made between employee perception of IM use as an effective means of communication before the pandemic and now. How workers have coped with the changes that come from working remotely and the strategies they have developed to address potential mental health challenges while continuing to work are also examined.

The findings indicate that IM communication tools are effective enough, meaning that, despite their benefits, key flaws negatively impact one's ability to be an effective communicator. Although overall mental health was not correlated with IM communication effectiveness and has had little impact on one's ability to use these tools, the pandemic has led to increased feelings of isolation, loneliness, and stress. These factors are exacerbated by the lack of visual cues associated with IM, one's ability to manage multiple platforms synchronously, the lack of online communication etiquette, and missing governance around online communication that may only come with increased usage and/or time. These conclusions are further analysed and recommendations for organizations and employers are provided.

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1: Introduction

March 2021 marks one year of the coronavirus pandemic; one year since our lives dramatically changed. As a society, we were asked to stay home, social distance, and wear masks in public. Schools and workplaces were closed, and our economy temporarily shut down. For those who were lucky enough not to lose their job, work from home mandates were enacted, and any daily normalcy was lost. All of a sudden, work activities moved online, Zoom calls were scheduled, and we found ourselves replacing watercooler conversations with virtual happy hours. These were supposed to be temporary solutions to a health crisis that no one, including governments, knew how to handle. As we sadly celebrate the one-year anniversary of the coronavirus, not much has changed. Yes, the vaccines have been rolled out and children are back in school, however, those adults who were asked to work from home one year ago are still doing so today and a fourth wave is inevitable.

With work from home mandates in place, employees have had to embrace and rely on online communication tools. They have had to navigate Zoom meetings and accept that the quick in-person question has been replaced by an instant (text) message. While these technologies are not new, this is the first time a large segment of the workforce, what is referred to in this thesis as knowledge workers, is being forced (out of necessity) to use them. A knowledge worker is defined as "an employee whose primary contribution to the workplace is knowledge of a specific subject" (Druker, 1959, p. 16). More recently, Thomas Davenport (2005) described knowledge workers as "having a high degree of expertise, education, or experience, and the primary purpose of their jobs involves the creation, distribution, or application of knowledge" (p. 5). Knowledge workers *think* for a living, they solve problems by understanding the needs of their clients and make decisions by collaborating and communicating with other people in the course of doing

their own work (Ipsen et al., 2020); "they also work with non-material inputs and output, with 'the individual' as the primary bearers of knowledge" (Alvesson, 1995, p. 425). Generally, knowledge workers are differentiated from other workers by their ability to think for a living and to solve complex problems, unlike manual labourers or front-line workers who are paid for performing physical tasks. Throughout this dissertation, the terms knowledge workers, employees and workers are used interchangeably, however, these are individuals who fall into the definitions identified here.

These current circumstances have reignited the conversation around the effectiveness of these tools, especially instant messaging. One might wonder, are these technologies actually improving communication and increasing productivity, or is work becoming an unyielding series of interruptions, messages, calls and chats? This thesis is not the first to explore this question, however, the pandemic has provided the unprecedented opportunity to study online communication in a different context, in a time when people cannot rely on known and comfortable means of communication, and during a time when one's physical and mental health are extraordinarily tested.

In addition to changing work environments and forcing the mass adoption of online communication tools, the coronavirus pandemic is impacting our mental health like never before. The World Health Organization defines mental health as "a state of well-being" (World Health Organization [WHO], 2020). The inability for human beings to establish *normal* routines, engage in activities, and build and maintain social relationships impacts one's emotional wellbeing. Fear, lack of information and transparency in decision-making, and the uncertainty of what might happen also impact one's mental health. In a given year, approximately 20% of Canadian and American adults experience some degree of mental illness (WHO, 2020), however, new

studies are starting to show that this statistic is increasing. According to a recent poll by The Centre for Addiction and Mental Health out of the University of Toronto, 50% of Canadians reported worsening mental health since the pandemic began (Angus Reid Institute, 2020). Similar results were found in a survey of Canadian workers, where 81% reported that the pandemic is negatively impacting their mental health (Morneau Shepell, 2020).

As a result of the pandemic, knowledge workers are adapting to new work environments, processes, and tools while managing their mental health. My research concerns itself with these two topics: the effectiveness of online communication and mental health; precisely, the relationship between mental health characteristics and the perceived effectiveness of communication through instant message technologies is explored.

Framing the Inquiry

This dissertation tackles two very timely discussions being held in workplaces. On the one hand, workers have fundamentally changed the way they communicate now that they are relying on online communication tools to do their jobs. On the other hand, change is hard and the ever-present uncertainty that results from living through a global health pandemic is placing (I think) new burdens and stresses on workers, beyond what is socially considered *normal*. These two issues combined present a unique opportunity to disrupt traditional workplace models and position organizations to allow for more flexible work environments, and to destigmatise and support the mental health of their employees. During and probably post-pandemic, workplaces anticipate an increased use of online communication tools as part of the *new normal* and the future of work (Ipsen et al., 2021); however, existing literature focuses on general usage and the perceptions of how productive these tools are; the perceptions of both employers (Ipsen et al., 2021) and employees (Shareena & Sharhid, 2020), which typically differ (see literature review

for a discussion of these differences), have been studied. My concern is that there are two other variables that supersede productivity in importance. Employers are quick to focus on performance and productivity, however, both employee emotional well-being and their ability to effectively communicate ultimately impact productivity (Grawich, Gottschalk & Munz, 2016). There is also a plethora of literature that documents organizations' prioritization of profits over the well-being of their employees (Diener & Seligman, 2004) and worker burnout being more prevalent than ever (Ipsen, Karanika-Murray & Nardelli, 2020). Nonetheless, progress was identified in these areas prior to the pandemic (Ipsen, Karanika-Murray & Nardelli, 2020), but in March of 2020 when the pandemic hit, I believe these concerns were exacerbated by the unintended consequences of moving all communication online while navigating so much uncertainty and change. Therefore, the rationale for focusing on mental health in this dissertation is because knowledge workers' mental health is being tested like never before. The rational for focusing on communication effectiveness is because the tools that workers are now relying on to do their jobs are *communication tools.* Ultimately, I do not believe that we can measure productivity without first measuring effectiveness. If instant messaging, for example, is not an effective way to communicate now that face-to-face options are not available, how would any employer expect productive work out of that employee? And regardless of the perceived effectiveness of instant messaging, has the pandemic impacted workers' mental health and their ability to focus on work-related tasks?

What is Instant Messaging?

Instant messaging (IM) is a communications technology that allows individuals to send and receive text-based messages in real time. Modern versions of IM trace their roots to the 1960s and 70s, to the earliest university networks which allowed users to "ping" and chat with

others online (Economist, 2002). In 1996, “I Seek You” (ICQ) was developed as a free IM application that allowed anyone with Internet access to communicate in real-time via text messaging (Economist, 2002). By the late 1990s, Internet service providers such as Yahoo (Yahoo Messenger) and Microsoft (MSN Messenger) offered IM as a free or add-on feature to their software (Howarth, 2002). In 2000, Jabber, which acted as a gateway for users to chat with friends simultaneously, regardless of the network they were on, was introduced to the market. Apple developed iChat in 2002, Skype was founded in 2003, Google Talk was released in 2005, and Facebook Chat appeared in 2008 (“Instant messaging”, n.d.). Over the next ten years, various other IM technologies with additional functionality were developed, including WhatsApp, WeChat, Facebook Messenger, Microsoft Teams, and Slack.

Initially, these IM technologies were designed to connect individuals on a social level; they essentially piggy-backed off the rise of the internet and social media, and it wasn’t until the early 2000s that IM was introduced in the workplace. Many argue that their rapid adoption stemmed from their ability to improve efficiencies and make communication easier (Isaacs et al., 2002; Rennecker & Godwin, 2003; Cameron & Webster, 2005; Cho, Trier & Kim, 2005). While IM has features similar to email and the telephone, it offers benefits that are not present in these traditional communication methods: employees are able to determine whether a co-worker is logged in and *available* to chat*;* messages appear instantaneously in a pop-up window and minimize when not responded to immediately; multiple concurrent conversations can occur; and conversation records are kept, which users can refer to at a later date.

Prior to the pandemic, it was predicted that IM was going to change the work environment by facilitating increased engagement, increasing collaboration and improving productivity. According to Pazos, Chung and Micari (2013) “the current usage and projected

growth of IM in organizations suggests that, whatever the implications for individual and team productivity, they will be widespread, and, therefore, of interest to practitioners and academics" (p. 87). However, published studies between 2013 and 2018 provide mixed reviews on the effectiveness and/or impact of IM communication in the workplace (see Chapter 2, Review of the Literature for an in-depth discussion of these studies). In theory, it makes sense that these benefits would bring efficiencies to the workplace, however, it is not clear whether this is an accurate depiction of reality.

March 2020 ushered in the immediate use of IM technologies and changed the narrative around the impact of IM usage in the workplace. Rather than speculating if these technologies were increasing productivity and resulting in communication efficiencies, they became a survival mechanism; a way to continue communicating with colleagues. In my organization, we relied on Microsoft Teams to keep in touch with others because it was easier than trying to schedule video calls. It became clear early on that IM would become an invaluable tool, but we still did not know whether its usage over time would be positive or negative. This thesis research began with the goal of better understanding the impact of IM use on productivity in the workplace, however, now that IM is being used by more individuals as a replacement for more traditional means of communication, there is a greater need to understand, from a communications perspective, its effectiveness. Such data will be invaluable for employers as they navigate a workforce predominantly working from home, and who, post-pandemic may be interested in flexible and/or hybrid working environments.

Mental Health Consequences During Crises

Similar to how the pandemic has shifted the conversation on IM usage and its effectiveness, the narrative around mental health in the workplace has also been challenged.

Employers have always been responsible for ensuring a healthy workplace; however, it has been questioned whether mental health issues are truly being supported. In Canada, prior to the pandemic, 30% of disability claims were reportedly related to mental health problems (Sairanen, Matzanka & Smeall, 2011) and one in five Canadians reported having symptoms of mental health issues including depression, stress, being overwhelmed, and feeling anxious (CAMH, 2020). Mental health in the workplace was a topic that organizations were beginning to take seriously, although some would argue, not seriously enough. Then COVID-19 struck, and the conversation changed from supporting mental health in the workplace to supporting mental health in times of crisis.

The impact of a crisis on one's mental health has been widely studied in varying contexts (for financial crises see Ruiz-Perez, Bermudez-Tamayo, & Rodriguez-Barranco, 2017, Mohseni-Cheraghlou, 2016; for health crises see Perrin et al., 2012; Reynolds et al., 2007; Maunder, et al., 2003), and there is a lot to be learned from the severe acute respiratory syndrome (SARS) and Middle East respiratory syndrome (MERS) outbreaks. Research from communities affected by SARS and MERS showed widespread panic and anxiety (Tiwari et al., 2003; Lee et al., 2007). Depression (Hawryluck et al., 2004; Mihashi et al., 2009), stress (DiGiovanni et al., 2004), mood alterations, irritability and insomnia (Kim et al, 2018), and emotional exhaustion (Maunder et al., 2004) were also reported. Additional psychological reactions experienced by the general public included fear (Bai et al., 2004; Cava et al., 2005), pervasive anxiety (Jeong et al., 2016), frustration (Saad et al., 2014), boredom and loneliness (Mackay et al., 2005).

Although these mental health challenges impacted fewer people compared to the coronavirus, it only seems logical that these symptoms would be compounded as more and more people's lives are being affected. Furthermore, this pandemic has required people to social

distance *en masse,* which has not happened in almost a century. Being required to work from home and use new technologies is one issue, but the mental health impact of not seeing our friends and family, never mind our colleagues, is equally as important, especially because human beings are inherently social, and because knowledge-based work is highly collaborative. Research on the direct impact of COVID-19 on mental health is starting to emerge and will be further discussed in the next chapter, however, it is important to understand that this thesis research is not a study on mental health from a purely psychological perspective, rather, the reported perceptions of participants' mental health are studied in relation to their perception of the effectiveness of IM communication.

Statement of Problem

There are two perceptions of instant messaging use in the workplace. For some, it is a technology that has, and will, continue to provide benefits to workplace collaboration, as email did 25 years ago (Zhang & Fjermestad, 2008; Bertolotti, Mattarelli & Vignoli, 2015; Dannerlein et al., 2016). For others, it is a distraction, a frivolous method of communication with privacy and productivity concerns (Stephens, 2008; Cousins et al., 2015; Lee & Duffy, 2015). But what if IM is the best way to improve efficiencies and productivity in an era when people are working from home and having to navigate the mental health effects of the coronavirus pandemic? What if IM can foster a healthy workplace culture even though people are no longer seeing their colleagues in-person? Additionally, the question arises as to whether one's mental health impacts their ability to effectively use IM technology or, is the overuse of these communication technologies negatively impacting employees' mental health?

Current literature on the effectiveness of IM communication in the workplace (how good of a tool it is) presents three challenges. First, there is no agreement as to its effectiveness.

Although we might suspect variation based on different contexts, for example, in workplaces versus educational institutions, complex versus simple task output, or differences in occupation/industry, even in similar contexts we are still trying to determine how best to integrate these technologies for optimal use. I would also argue that industry publications and the media are further compounding this challenge by suggesting how beneficial these technologies are without providing factual evidence, as is the excellent marketing by these software companies. Slack claims that its application "brings people, data, and applications into a single place where people can effectively work together… [the application] makes it easier to achieve the kind of alignment that makes people's working lives simpler, more pleasant, and more productive " (slack.com, 2019). The benefits are clear. Research suggests that IM has helped to deepen relationships among employees in demographically diverse locations (Bunce, Wright & Scott, 2017), facilitates polychronic communication (though this comes with its own drawbacks) (Pazos, Chung & Micari, 2013), reduces the amount of time spent reading and sending emails (Zhang & Fjermestad, 2008), and accelerates the flow of communication, resulting in faster, more effective decision-making (Osterman Research Inc., 2006). Anecdotally, it is logical that these technologies, which are designed to support communication, do provide these benefits to its users. However, there is a different set of research that suggests this is not the case.

There are costs related to increased interruptions and multitasking that result from increased IM use. Workers are constantly managing workplace-related interruptions, including those that come from the technologies they use (i.e., email, IM, and other online communication tools). The sheer number of computer-mediated communication technologies available to workers today also contribute to interruptive environments because they are increasingly competing for workers' time (Ou & Davison, 2011; Rennecker & Godwin, 2013; Lee & Duffy,

2015). Yet some argue that interruption frequency has no significant impact on task completion, but the polychronic orientation of these technologies does influence how users process information (Pazos, Chung & Micari, 2013). Irrespective of the IM usage literature, there are consequences to multitasking (Koch, Poijac, Muller et al., 2018). We know from the psychology research that individuals have limited capacity to process information at a single time. Our brains filter what we perceive to be the most salient when we are doing more than one task at a time or over consuming information (Alilovic, Slager, & van Gaal, 2020). The complexity of the task also impacts one's ability to multitask. Alder and Benbunan-Fich (2015), who compared the effects of different types of multitasking, found that individuals who were multitasking performed poorly when the tasks were more complex versus those who were completing tasks deemed easier. IM technologies facilitate multitasking, but that does not mean they provide efficiencies from a communications perspective. IM technologies are thought to disrupt productive working time, but the true impact is yet to be determined.

The second challenge is that current literature on the effectiveness of IM communication focuses on the perception of individual workers. Considering that knowledge-based work environments are highly collaborative, there is a need to better understand IM team dynamics. Stephens (2008) notes, "if IM is being used as a tool to facilitate work at a team level, it is important to examine team outcomes as a whole… it is possible that people in heavy IM groups might be individually less productive because they serve an information repository and dissemination function" (p. 376). Although there is literature on IM use and individual performance (many of these previously cited), very few studies address team performance - Bertolotti, Mattarelli and Vignoli (2015), however, conducted a study that did just that. Bertolotti et al., examined the relationship between the size of team, IM use and performance.

They concluded that the more people who were involved in an IM thread, the lower the performance. Conversely, when team membership was low, IM use had a positive effect on team performance. This says something about the effectiveness of IM communication given the number of people involved in the conversation.

Prior to the pandemic, team collaboration occurred in-person and the desire to understand IM usage and its effectiveness was not a priority for academics and organizations alike. These technologies were not being used in the same capacity, which explains why there is a gap in the literature. As teams have shifted collaborative conversations online, this matter has become more important. Organizations are now concerned with the ability of their teams to continue being innovative while communicating with each other through a computer screen. This complete shift in how communication occurs in the workplace has made understanding the effectiveness of IM communication incredibly timely.

The third challenge presented by current literature is that previous research does not consider that IM users today are living through a global pandemic. The COVID-19 pandemic is causing real mental health repercussions on all levels (WHO, 2020); whether one recognizes it or not, stress behaviours such as simply watching the daily increase in positive cases impact one's ability to go about day-to-day activities with the same pre-pandemic ease. This is not to say that mental health struggles were not present or important pre-pandemic. But for those individuals, outside of essential workers, who have been fortunate enough to continue working during the pandemic, there is a practical need to understand the impact on worker performance, how one communicates with their colleagues and clients now that in-person, face-to-face meetings are not possible, and, accordingly, how they have coped. As employers and employees have had to embrace online communication and rely on online technologies as their primary mode of

communication, new questions are emerging around their effectiveness. What is missing from the existing body of literature, and what I intend to address in this dissertation, is the effect mental health has on the perception that IM technologies are effective and positively facilitate communication.

Interest in the use and effectiveness of online communication technologies, particularly IM tools, is growing rapidly. Not only are more knowledge workers than ever using IM, but they are also navigating a global health pandemic. The goal of this study is not to settle the debate around whether IM use results in effective communication, rather, we shift the focus to team collaboration and bring in a new variable that has not been examined in this context before. Moreover, we shift the conversation to how people are coping and what types of mitigation strategies they are adopting to help them focus on work-related tasks and better communicate with their colleagues using IM technologies.

Purpose of Study

The purpose of this study is to explore the relationship between mental health characteristics and the perceived effectiveness of communication through instant messaging technologies. In other words, for knowledge workers who were working at home during the pandemic, how do mental health characteristics, communication, and instant messaging fit together? This study extends our current understanding of the effectiveness of IM communication. It also explores how the pandemic has impacted worker's mental health by asking about overall feelings, as well as individual symptoms of depression, fatigue, stress, anxiety, and loneliness, as well as ability to focus and regulate mood. Although these symptoms are components of mental health, they can be analyzed individually, which is common practice in the psychology literature (Westerhof & Keyes, 2010; Keyes & Lopez, 2009; Bech, Olsen,

Kjoller, et al., 2006). The relationship between these mental health characteristics and one's perception of the effectiveness of IM communication is then explored. The following research questions guide the inquiry:

1. How often do workers use instant messaging technologies to communicate with their colleagues and/or clients?
    a. Has the frequency rate of IM use increased or decreased as a result of COVID-19 and having to work from home?
2. What types of conversations are being had over instant messaging?
    a. Have the types of conversations on IM changed due to COVID-19?
3. How effective is IM as a communication tool for work purposes?
    a. Has one's perception of the effectiveness of IM communication changed because of the pandemic?
4. How has COVID-19 impacted one's mental health and ability to be productive at work?
5. What is the impact of perceived symptoms of mental health (depression, fatigue, stress, anxiety, loneliness, ability to focus, and mood regulation) on IM usage and perceived communication effectiveness?
6. How have workers coped with the changes that come from working remotely?
7. What strategies have been developed to address potential mental health challenges caused by the pandemic?

See Table 1 for a description of the aim of each research question.

Table 1

Research question inclusion rationale

Research Questions	Rationale for Inclusion
1. How often do workers use instant messaging technologies to communicate with their colleagues and/or clients? a. Has the frequency rate of IM use increased or decreased as a result of COVID-19 and having to work from home?	Over the past 12 months, workers have had to embrace change, which includes (I believe) the reliance on IM technologies as their primary communication method with colleagues/clients. The purpose of this question is to determine whether this is a true statement. We also know that IM technologies are not new, but that their frequency of use wasn't high because face-to-face communication was the preferred method of communication (Garrett & Danziger, 2007). There is also no consensus in the academic literature on whether these technologies result in efficiencies in the workplace. Therefore, if this research shows that frequency has increased, organizations will need to address some of the disadvantages that this technology poses to ensure its use facilitates effective communication and work productivity.
2. What types of conversations are being had over instant messaging? a. Have the types of conversations on IM changed due to COVID-19?	Comparing the types of conversations workers are having pre-pandemic to during the pandemic allows us to determine the degree to which IM has replaced and/or replicated in-person communication. If IM is effective enough, there is an argument that being in the office isn't necessary. If these technologies can facilitate the types of conversations that were had in-person prior to the pandemic, there is proof that work from home models can succeed. This is important for determining what the future work environments look like.
3. How effective is IM as a communication tool for work purposes? a. Has one's perception of the effectiveness of IM	Effective communication is the dependent variable in this study. The purpose is to understand how effective respondents perceive IM tool are when communicating for work purposes. Perceived effectiveness is not being used as a proxy for effectiveness.

	communication changed because of the pandemic?	IM technologies have been designed to assist in communication. If results show that respondents do not perceive these to be effective, that is problematic. This impacts the future use of these technologies, prompts future design and functionality conversations, and potentially puts work from home options post-pandemic in jeopardy. The rationale for focusing on IM perceived communication effectiveness versus performance or productivity is because effectiveness can impact these other variables, and is often overlooked by employers. Ultimately we need to understand perceived communication effectiveness before productivity. Furthermore, workers went from a work environment where IM tools were available but not a necessity in their daily work to an environment where they had to rely on them. This study looks at this difference by asking workers to compare their perceptions pre-pandemic versus during the pandemic. Perceived IM effectiveness in this context has not yet been studied and should provide for an interesting discussion. Recognizing that question 3a is a yes/no question, if there is a change in perception, there is the opportunity to also understand what is causing this change. This information will be explored in phase 2 of this study, participant interviews.
4.	How has COVID-19 impacted one's mental health and ability to be productive at work?	Overall mental health is the independent variable in this study. The aim is to understand the impact of overall mental health on perceived IM communication effectiveness. Research being conducted on the impact of COVID-19 on one's mental health is still in its infancy. However, this is a very popular

	topic in the mass media. By exploring this research question, not only will the results add to the research in this area, but it also explores mental health from a perspective not yet tackled (i.e., mental health and online communication effectiveness).
5. What is the impact of perceived symptoms of mental health (depression, fatigue, stress, anxiety, loneliness, ability to focus, and mood regulation) on IM usage and perceived communication effectiveness?	Depression, fatigue, stress, anxiety, loneliness, ability to focus and ability to regulate mood are common terms in the psychology literature that are used to further study mental health. They are both examined together and individually. The research aim is to explore the impact of general mental health on perceived IM communication effective, but also to study the impact of each of these factors alone. If we can better understand which factors have a greater impact on the dependent variable, greater focus can be placed on solutions to address each of these symptoms.
6. How have workers coped with the changes that come from working remotely?	Work from home mandates resulting from the pandemic have fundamentally changed the way that we work. The pandemic is also placing new stresses and burdens on society, yet people still have to work. The aim of this research question is to better understand the results of research question #4.
7. What strategies have been developed to address potential mental health challenges caused by the pandemic?	This research question is tied to research question #6. If this study can identify beneficial coping strategies they can be shared and implemented by others` who may be struggling with their mental health. I also believe that these strategies will be necessary for any future work-from-home model.

Expected Contribution

This study is novel because it explores the relationship between mental health characteristics such as depression, fatigue, stress, anxiety, and loneliness and one's perceived ability to use IM as a communication tool, an angle which has not previously been explored. Furthermore, this study aims to compare this relationship pre-pandemic and during the pandemic, where no prior research on this topic during the COVID-19 pandemic exists. With no option for in-person, face-to-face meetings, communication technologies like IM are becoming the new normal and data around patterns of use will be necessary for organizations and employers as they adapt to a remote workforce and ensure performance and productivity metrics are being met.

Summary

Over the past year, employers and employees alike have had to adjust to the new reality of working from home and the stresses which have been caused by the coronavirus pandemic. It is clear that the way in which we communicate at work has changed. Prior to the pandemic, IM communication technologies were positioned to disrupt the workplace, however, not everyone was on board, especially employers. Somewhat unbelievably, it took a global pandemic and work from home mandates to force people to adopt and use these technologies. Today, some would argue their jobs would not be possible without them. That being said, there is still a lot to uncover around their effectiveness, especially in the context of the pandemic.

The purpose of this study is to explore the relationship between mental health characteristics and the perceived effectiveness of communication through instant messaging technologies. Does one's mental health impact one's perception of the effectiveness of IM

communication? The current global pandemic affords the unprecedented opportunity to compare and contrast this relationship pre-pandemic, as well as talk to people about how they have coped with the changes that resulted from working remotely and the strategies they have adopted to address potential mental health challenges.

This thesis has been organized into six chapters. Chapter two provides a review of the literature and describes key gaps and proposed hypotheses. Chapter three outlines the research design and methodology, chapters four and five present the quantitative and qualitative research findings, and the final chapter, chapter six, includes a discussion of the findings presented in the previous chapters, draws some conclusions, and provides suggestions for further research.

2: Literature Review

Introduction

The previous chapter introduced readers to the topic of this thesis: the relationships between symptoms of mental health and perceived IM communication effectiveness amidst a global health pandemic. The problem, purpose, and expected contributions of this research were also identified. Chapter 2 builds on what was introduced by further exploring existing research on the advantages and disadvantages of IM use, and, in particular, the important shift to team collaboration through these platforms. This chapter will also review mental health research beginning to emerge on the mental health impacts of the pandemic. Situated within the computer-mediated communication (CMC) framework, this chapter will also examine the effects of mental health on the usage of these technologies. Based on this discussion, eight hypotheses are identified. Although these areas guide the research undertaken in this thesis, to the researcher's knowledge, the niche relationship proposed has not been empirically explored.

The Advantages and Disadvantages of IM Use in the Workplace

IM was designed to create efficiencies around communication (Baron, 2013). It simulates in-person, face-to-face communication and allows those working remotely to actively communicate as if they were in the office. Existing research on instant messaging in the workplace focuses on its adoption (Herbsleb, Atkins, Boyer et al., 2003; Cameron & Webster, 2005), use (Rajendra, Baharin & Kamal, 2019), and overall impact from both a communications and a productivity/performance angle (Garrett & Danziger, 2007) . The research on its impact further emphasises the role IM has on interruptions in the workplace and its influence on a worker's ability to effectively (or ineffectively) multitask (Issacs, Walendowski, Whittaker et al.,

2002; Rosen, 2008; Li, Gupta, Luo & Warkentin, 2011). Advantages and disadvantages are widely reviewed, however, the lack of consensus on whether IM use results in efficiencies opens the door to examine relationships beyond understanding why organizations adopt and use these technologies as done so by other scholars. Today, in the midst of a pandemic, the question of workplaces adopting and using these technologies is irrelevant. The shift in focus to the effectiveness of team-based collaboration using these platforms is more relevant, as is the debate on the role IM technologies will have in a post-pandemic world. We are no longer in an environment where these technologies are options, rather, they have become a necessary tool for the successful completion of work tasks.

There are a number of studies that look at the benefits of IM use in the workplace. According to Garrett and Danziger (2007), IM affords near synchronous communication that can be initiated by any employee, suggesting that two or more people can communicate anytime, anywhere. IM also allows users to see whether someone is online and available to chat. This presence awareness capability enables an employee to identify a colleague who can quickly answer a question, "eliminat[ing] internal churn and email waste" (p. 24). Garrett and Danziger (2007) also show that the pop-up windows and audio alerts, which inform users that someone wants to communicate with them, are beneficial because they allow users to consciously decide whether to answer a message immediately or respond at a more appropriate time. However, the benefits of IM use go beyond these affordances.

Cho, Trier and Kim (2005) examined how IM systems help employees improve their relationships with co-workers both within and outside of their organization. Data were collected from an online questionnaire of employees (n=137) and from thirteen structured interviews in a

Korean tire manufacturing company. Their results show that employees perceived that the use of IM improved working relationships between colleagues.

IM also connects people regardless of where they are located, as employees can send messages in real time without being face-to-face. Bunce, Wright and Scott (2017) conducted research on IM use between journalists who worked remotely in different European countries. Through ethnographic observations, they studied the impact Slack had on work processes and colleague relationships over a two-year period (2014-2016). Their findings suggest that consistent IM use deepens relationships and leads to novel creative processes across various countries. They also found that IM allowed journalists to interact with colleagues, which provided opportunities for management to shape the newsroom culture.

Most of the research that was conducted in the early 2000s looked at the benefits of IM in large organizations. However, Zhang and Fjermestad (2008) studied IM use at two small New York firms. At company A, an eCommerce firm, IM was used extensively; when the total time spent on email, phone, and IM was analyzed, 70% of that time was on IM. In comparison, at company B, a lamp manufacturing and retailing business, IM use was limited and highly regulated by management. Some of the benefits listed by both companies included reduced operational costs, increased productivity due to the speed with which IM allows users to respond to queries, productivity improvements from multitasking, and the ability to promote organizational learning.

The above studies have been conducted in an academic context, however, there is value in reviewing the results of industry-based studies that look at the benefits of IM use even though the rigor is not the same. While the methodologies used are not clear, these studies (Quest Software Inc, 2008; Deloitte, 2019) do provide a perspective outside of academia and seem to

have a greater focus on workplace outcomes, communication, and productivity in comparison to the academic studies discussed here. Quest Software Inc. (2008) found that IM "boosts business performance by making operations faster, more agile, and more efficient with very little cost" (p. 4). These benefits ultimately outweigh the risks associated with IM, which Quest Software Inc. identifies as information leaks, viruses, network hacks, compliance issues, increased interruptions and distractions, and productivity loss. Similarly, Osterman Research Inc. (2006), a marketing research and consulting firm, found in a study they conducted that IM provides more efficient communications, results in faster decision-making, and accelerates the flow of information. I recognized that these findings are somewhat dated, however, a 2019 study published prior to the pandemic by Deloitte saw that both acceptance levels and satisfaction have increased related to instant text-based communication, and there is an increase in consumer demand for instant forms of communication (Deloitte, 2019). These findings point to the benefits of IM as a two-way communication tool which facilitates the interchange of quick-fire responses. However, little is known about the effectiveness of interactions between users when they go beyond question/answer activities and to collaborative working sessions, which is arguably more representative of remote working environments today.

The challenge with understanding the impact of IM use is that prior research focuses on the activities most commonly associated with IM; the interchange of quick-fire responses mentioned above. We can, however, draw conclusions on the effectiveness of collaborative-based activities by using the computer-mediated communication (CMC) research and the literature on virtual teams, which focuses more on group dynamics and group characteristics rather than on the technologies used to facilitate collaboration.

Computer-mediated collaboration is important to understand because I believe it is the primary method by which employees are communicating during the coronavirus pandemic. Its evolution "is characterized by attention to interactive processes that lead to shared and emergent knowledge and practices" (Haythornthwaite, 2017, JCMC1046), both of which are developed and mediated through computer technologies. Traditionally, but not exclusively, computer-based team collaboration has been studied within two theoretical frameworks: social presence (Short et al., 1976) and media richness (Daft & Lengel, 1987). Social presence theory is one of the first theories to be applied to CMC. It centers on the social relations and reactions of remote collaboration and posits that the greater number of non-verbal cues users have in communication, the greater the social presence ("a sense of the other") they experience, leading to greater satisfaction with the interaction (Walther, Loh and Granka, 2005). Unfortunately, social presence theory focuses on collaboration during a task, not on the outcomes related to task effectiveness or efficiency (i.e., being able to effectively complete a group task using an online communication tool). Media richness, in comparison, is used to rank and evaluate the richness of certain communication media: face-to-face communication versus phone calls versus video conferencing versus email, etc. It differs from social presence theory in that it "does not predict linear benefits from greater cue system use", rather, it suggests that the greater the number of cues, the richer the media and the better the communication (Daft & Lengel, 1984, p. 198). It also considers factors like the potential for immediate feedback and personalization, which also increase the effectiveness of the CMC (Daft et al., 1984; see also Daft et al., 1987). Based on this theory, because IM has less cues than face-to-face communication, it is therefore less rich, resulting in poorer communication than, for example, in-person conversation. These two theories

are often used when discussing why organization adopt communication technologies, and to a lesser degree how teams interact using them.

Bertolotti, Mattarelli and Vignoli (2015), whose research was introduced in the previous chapter, examined the relationship between team performance, multiple team membership, and the use of collaborative technologies. Their data were collected via a questionnaire sent to 83 employees, interviews with four senior managers, and the analysis of diary entries where participants were asked to record all project activities performed during the workday. The survey and interview data results showed that, when multiple team membership is low (when an individual belongs to only one or two teams), IM use has a positive effect on team performance, but, when multiple team membership is high (when an individual belongs to many teams), IM use has a negative effect. The authors argue that, when an individual is involved in many projects, the act of continuously switching between project tasks hinders performance. The diary findings also confirmed that those individuals who were working on multiple projects found that IM interruptions "characterised by urgencies and the need for immediate attention, made it difficult for workers to organize their time in the way they preferred or to optimize their efforts across multiple projects" (p. 921).

Dennerlein, Gutouning, Goldgruber et al. (2016) examined IM use from a team-based knowledge management perspective, considering its ability to help collect, manage and distribute data or information whenever it is needed. Their research looked specifically at the features of IM tools that determine actual usage within five different organizational contexts: a project-based university course, a distributed project team for software development, an NGO working group, a co-located team in a software development company, and a master's degree program community. The results of their interviews with participants from each group indicated that "it is

not the context of the application, but the intended usage that affects the tool's efficacy with respect to knowledge management" (p. 228). Specifically, they found that IM supports agile project management, connects team members across demographically diverse locations, and can be leveraged for knowledge transfer. In looking at Slack, for example, Dennerlein at al. (2016) state that "knowledge is organized with the help of various open and closed channels and integration features in all cases leading to an effective identification and structuring of knowledge area resources" (p. 229). This finding was specific to Slack, however, one could cautiously generalize to IM technologies that have similar functionality, such as the Facebook at Work app and Microsoft Teams. The channels ultimately improve communication because information is nicely organized.

Continuing the discussion on group-based communication, there is also a link between social interaction and collaboration worth exploring. Cheng (2017) investigated this relationship and found that social interaction increased the effectiveness of knowledge transfer among team members. Similarly, Lee et al. (2016) reported an association between strong relationships and improved group performance. Results of a study conducted with Swiss soldiers also found that team members with higher levels of social interaction positively impacted group cohesion and cooperation (Goette et al., 2012). Technologies only facilitate these relationships. Sheer and Rice (2017) looked at the role of mobile group chat and found that mobile instant messaging was positively associated to employee outcomes such as job performance and job satisfaction. Likewise, Hsieh and Tseng (2017) found that individuals who interacted more often with people in their social networks were more likely to feel supported, establish connections and build trustworthy relationships. They also found that text-based communication and the use of emoticons increased information richness through playfulness, ultimately increasing connections

between communicators. These findings suggest that managing social interactions is an important component of effective online team collaboration.

Text-based platforms are inherently informal. They have the potential to facilitate this social component that seems to be necessary for effective team collaboration. In a recent study looking at how employees collaborate through group chat, two key factors emerged. First, the longer the chat thread, the more likely there was productive work output. This finding was established based on a project that involved hours of online back and forth communication. Second, the use of *@name* predicted better team collaboration. For example, if someone was named in a group, the correct person responded, rather than everyone attempting an answer and then having to navigate a thread that was less targeted to a solution (Wang, Wang, Yu, et al., 2019). Understanding how teams collaborate is important. The *@name* finding is interesting because it directs and organizes the conversation. It is also used on social media. Social media is informal by nature, and by bringing this practice into the workplace, it keeps the conversation social and informal. Based on this logic, because IM is perceived to be a more informal way to communicate, it is more likely that users will use it to socialize, therefore increasing the chances that work output will improve.

Insights on team collaboration can also be pulled from the research on virtual communities. Shulze and Krumm (2017) present a review on the "knowledge, skills, abilities, and other characteristics (KSAOs)" often associated with successful virtual teamwork (p. 67). When these characteristics, as well as one's motivation, are aligned with common online communication challenges, it is more likely that communication will be successful. Knowledge refers to understanding when different media are used based on the communication goal. According to Dennis et al. (2008), convergence processes, or the goal of achieving a shared

understanding, would require a different technological approach than if, for example, a team was simply using a platform to transmit information (otherwise known as conveyance processes). Skills refers to behaviours required when interacting online. Expressiveness, coordination, attentiveness, and confidence have been shown to predict communication outcomes such as satisfaction and effectiveness (Spitzberg, 2011). To draw the link between KSAOs and technology use, team members should therefore use the knowledge and skills they have about these processes and match them to the virtual technologies that best support their communication goals.

To summarize, there are both advantages and disadvantages to IM use depending on the context being examined. Generally, research that analyses the activities for which IM is typically used usually reports positive outcomes. We also know that IM is a way for users to connect and build relationships for demographically diverse teams. However, we know less about these group dynamics and the effectiveness of overall communication. As a result, we draw on the CMC and virtual communities literature, which suggests the importance of technology use for social purposes; those who connect informally build trust and are therefore better communicators, and having the knowledge, skills, abilities and motivation that align with communication goals and are related to technology selection, resulting in better overall communication.

Emerging Research on the Impact of COVID-19 on Mental Health

It is not surprising that the findings are grim, that the pandemic will not only result in physical deaths but also cause a serious mental health crisis (Center for Disease Control and Prevention [CDC], 2021). The emerging mental health research is still in its infancy, however, it is important to review because I suspect that the mental health of knowledge workers, specifically increased stress and anxiety levels, and the effects of social distancing are impacting

their ability to focus on work and effectively communicate with their colleagues amidst changing physical environments.

The mental health research in Canada is spearheaded by the Canadian Institutes of Health Research (CIHR) and the COVID-19 and Mental Health (CMH) initiative, which is part of the federal government's rapid response to addressing major health challenges. In May-June 2020, the first round of grants were awarded to those studying acute mental health and/or substance use. Over the summer months, there was an emphasis placed on access to mental health supports. The University of Alberta published a study that found benefits to digital mental health treatment for those experiencing trauma (Jones, Miguel-Cruz, Smith-MacDonald et al., 2020). Today, there are approximately 150 projects funded under the CMH on various populations (see Table 2). Presently, these studies have not reported any data.

Table 2

CMH research by population

Population Targeted	No. of reports
Chronic disease and/or mental illness	37
Children, youth, and families	31
People who use drugs (PWUD) and substance use	24
Vulnerable or at-risk populations	23
Healthcare, front-line workers and public safety personnel	16
General population	14
Aging	11
Indigenous peoples and communities	9
Total	**165**

Note: Description of funded research can be reviewed at https://cihr-irsc.gc.ca/e/52079.html

In addition to the CMH research initiative, key Canadian organizations such as the Mental Health Commission (MHC), the Centre for Addiction and Mental Health (CAMH), the Canadian Alliance on Mental Illness and Mental Health (CAMIMH), and the Canadian Mental

Health Association (CMHA) have also started reporting on mental health impacts of the coronavirus pandemic. Looking at the general public, many Canadians have reported that their stress levels have doubled since the beginning of the pandemic (CMHA, 2020a). There is a sense of fear and uncertainty about their own health and the health of friends and family (MHCC, 2020; Pfefferbaum & North, 2020), and there are increased concerns about employment, finances, and the impact of social isolation (CMHA, 2020b). An Angus Reid Institute poll (2020) found that 50% of Canadians experienced worsening mental health since the pandemic began, with many feeling worried (44%) and anxious (41%). Ten per cent of Canadians said their mental health had worsened "a lot" because of COVID-19. Similarly, a survey of Canadian workers conducted by Morneau Shepell (2020) found that 81% of respondents were struggling with decreasing mental health because of the pandemic. Therefore, there is a sense that the population is experiencing a decrease in their mental health. However, according to the CAMH, "most Canadians who are struggling with their mental health as a result of COVID-19 are experiencing a normal stress response to the health, social, and economic crisis, and readily available mental health resources and supports can help them to cope" (CAMH, 2020, p. 2).

The negative impact of COVID-19 is not unexpected given that previous health and economic crises have had similar outcomes. The SARS outbreak in 2003, for example, saw increases in fatigue (i.e., not being able to sleep), alcohol use, mood disorders and post-traumatic stress symptoms (Lau, Yang, Tsui et al., 2006). In Toronto, individuals who were required to self-isolate experienced symptoms of PTSD and depression (Hawryluck, Gold, Robinson et al., 2004). Several studies have linked the experience of quarantine to symptoms of anxiety, sometimes with long-term effects (Brooks, Webster, Smith et al., 2020).

There is also an economic impact worth mentioning. For example, the 2008 global financial crisis "was associated with increased rates of mood disorders, anxiety disorders and suicides as a result of unemployment, job insecurity, reduced wages and increased workloads" (CAMH, 2020, p. 2; see also Mucci, Giorgi, Roncaioli et al., 2016). Unemployment resulting from COVID-19 could be a major long-term mental health concern going forward.

Based on early research identified here, there is no denying that the pandemic has had various negative impacts on individuals' mental health. Preliminary research and polls conducted by industry research groups, as well as data from prior health and economic crises, are all indicating that mental health issues are increasing among Canadians and could result in a long-term mental health crisis that will be felt for years to come. This study, although quite niche, adds to this body of research and hopes to address some of the predicted negative outcomes before they become systemic.

The first section of this literature review discussed existing research on the advantages and disadvantages of IM use and, in particular, the important shift to team collaboration through these platforms. This chapter also reviewed the research beginning to emerge on the mental health impacts of the pandemic. Next, the relationship between mental health and the perceived effectiveness of IM communication will be explored.

Mental Health Impact on Perceived IM Communication Effectiveness Pre-COVID-19

A review of the literature on Google Scholar on the impact of mental health on perceived IM communication effectiveness has resulted in the exploration of three related areas of research: the positive and negative effects of computer-mediated communication (CMC) technologies on mental health, the effects of networked communication interventions for support

purposes, and the mental health impact on communication in general. This section will introduce these bodies of research. Pre-COVID research focuses primarily on the impact of technology use on mental health, rather than the relationship that is being explored in this study. Not to confuse readers, the next few paragraphs will explore this inverse relationship since it provides some interesting insights later explored.

Effects of CMC Technologies on Mental Health

Computer-mediated communication technologies have a notable impact on the way individuals communicate. They also provide another avenue when face-to-face communication is not possible. However, there are also disadvantages to its overuse. Previous studies have observed a link between technology usage and certain mental health characteristics, including loneliness, anxiety and depression. A 2017 study conducted on young adults aged 19-32 years old in the US found that people with higher technology use were more than three times as likely to feel socially isolated than those who did not use technology as often (Primack, Shensa, Sidani et al., 2017). In contrast, a 2018 systematic review discussion on the link between social networks and mental health issues found mixed results. People who had positive interactions and support communicating with others using these CMC platforms seemed to have lower levels of depression and anxiety. However, the reverse was also true. People who perceived that they had more negative social interactions online experienced higher levels of depression and anxiety (Seabrook, Kern and Rickard, 2018). In the workplace, research has explored how CMC technology contributes to “technostress” and burnout (Nimrod, 2017; Ninaus, Terlutter, Chan et al., 2015) and how trade-offs made when resisting interruptions from messages negatively impact one’s well-being (Russell, Woods, & Banks, 2017).

As suggested above, not all research in this area is negative. As awareness of the link between mental health and technology is increasing, there are a number of observable areas in which the development of technology has helped individuals cope with mental health and ultimately change their behaviours. For example, literature around the relationship between online chatting and mental health shows reductions in depression and loneliness as well as increases in social support and self-esteem (Shaw & Gant, 2002). There also seems to be a positive link between relationship building, well-being and CMC technology use (Hall, 2018; Park, Lee, & Chung, 2016). Researchers also recognize the potential of CMC technologies to allow for short work breaks, referred to as "micro-breaks", which facilitate recovery and improve well-being (Ivarsson & Larsson, 2011).

Using Communication Technologies to Support Those With Mental Health Challenges

Continuing the discussion around the effectiveness of networked communication interventions and virtual support networks, communication technologies that play a role in the treatment process may improve decision-making by clinicians because they provide access to useful data. These technologies may also increase access and convenience (Maher , Lewis, Ferrar et al., 2014). Treatment can take place anytime and anywhere, which may be ideal for those who have trouble attending in-person appointments, or during a time when meeting in-person is unfeasible. Instant messaging platforms have the potential to help users cope with symptoms, connect with others going through similar experiences, share their stories, and complete helpful exercises. According to a paper released by the Mental Health Commission of Canada (2014), the primary advantage of integrating technology into existing services is its potential to improve the quality, efficiency and equity of mental health services. As a result, we are seeing the rapid development of mental health applications. Researchers at Dalhousie University, for example,

have developed a smartphone app that can keep tabs on people's mental health by measuring their emotions when they are talking and texting on their phones (Smith, 2020).

There is also the argument that the future of mental health care revolves around peer-to-peer support and social media platforms. In a 2016 study published in Epidemiology and Psychiatric Sciences, findings indicated that people with mental health symptoms reported benefiting from interacting with peers online. These individuals reported that belonging to a community and sharing their personal stories with members going through similar experiences helped them cope with the day-to-day challenges of living with mental illness. However, the authors also identified potential unforeseen risks, including exposure to misleading information, facing hostile or derogatory comments from others, and participants feeling more uncertain about their own condition (Naslund, Aschbrenner, Marsch & Bartels, 2016). Other criticisms of online communication technologies include the lack of scientific evidence that they work, or that they work better than traditional methods (Dowling & Rickwood, 2012). There is also the concern around patient privacy and lack of government regulation (Dowling & Rickwood, 2014).

Despite these criticisms, some psychologists today are of the opinion that people are more inclined to seek mental health support online, especially during times of heightened stress and anxiety. This sentiment is argued by Barak and Grohol (2011), who suggest that there is strong evidence to support the effective use and future development of a variety of online mental health applications. Future trends in online interventions include the greater prevalence of online therapy and the use of video chat, texting or short message service. However, the effectiveness of these online communication tools from a user's perspective has yet to be determined.

Mental Health Impact on Perceived IM Communication Effectiveness During COVID-19

Overall Impact of Mental Health on Perceived IM Communication Effectiveness

The literature around the impact mental health has on one's ability to communicate is very clear (Cohen, McGovern, Dinzeo et al., 2015; Kapolnek and Nocak, 2001; Moller, 1996). Common issues include loss of interest, the inability to talk to others, difficulty following conversations, issues around remembering information, and not knowing what to say when talking with others. Many people who experience mental health challenges often isolate themselves and prefer not to be social. It is for these reasons that introducing a technology such as instant messaging might not be as effective as one thinks, especially from the perspective of users with mental health challenges. Despite these effects, research also shows that effective communication is essential in mental health recovery (Slade et al., 2014). Based on emerging research trends on the mental health impact of COVID-19, the decline in mental health suggests that, regardless of how people communicate with each other, it is more likely to be difficult. On IM usage, those experiencing mental health symptoms are more likely to feel that IM is not an effective tool for communication. Therefore, the following hypothesis is proposed:

H1: There is a negative association between respondents' perception of their mental health and their view of IM as an effective communication tool.

Impact of Depression on Perceived IM Communication Effectiveness

Research shows that, in the workplace, depression may have a negative impact on productivity (Burton et al., 2017; Evans-Lacko and Knapp, 2016; Henderson et al., 2011). According to the most recent World Health Organization (WHO) Fact Sheet on depression, more than 264 million people of all ages suffer from depression, and it often results from a complex

interaction of social, psychological, and biological factors (WHO, 2020). Depression affects the interaction patterns an individual has with other people, which can in turn lead to various problems in the workplace, such as the inability to effectively communicate with others (Haverkampf, 2017). Most studies look at the relationship between depression and communication and technology's role in causing depression (Thomee, Dellve, Harenstam et al., 2010), or at the usefulness of technologies as an intervention for depression (Zhao et al., 2017). However, little research exists on the impact depression has on someone's ability to effectively communicate using an IM tool. A study conducted by Jung-Hyun, Mihey, and Prabu (2015) suggested that individuals with signs of depression may rely on mobile phones to alleviate their negative feelings and spend more time on communication activities. However, their most significant findings were not that depressed people would rely on text messages, rather that face-to-face communication was more likely to alleviate their negative feelings. As more workplace communication moves online, it is therefore being predicted that individuals with symptoms of depression are more likely to find communication technologies, for example IM, difficult to use as a communication medium. Therefore, the following hypothesis is proposed:

H2: There is a negative relationship between symptoms of depression and one's perception of IM use as an effective communication tool.

Impact of Fatigue on Perceived IM Communication Effectiveness

Although fatigue is often a symptom of depression (Targum & Fava, 2011), one can be tired but not depressed. Research shows that fatigue negatively impacts an individual's ability to communicate effectively (Wright & Cropanzano, 1998). People who are fatigued are more easily distracted, are less able to concentrate, tend to forget things more easily, take longer to solve problems, make more mistakes, and take more risks than they might otherwise (Rudin-Brown,

2015). When it comes to communicating online recent research shows digital communication can be more draining compared to face-to-face conversations (Boros et al. 2016). This body of literature is specific to video conferencing technologies like Zoom, Skype, and Microsoft Teams; it does not look at instant messaging technologies, which is the focus of this study. Therefore, it is predicted that fatigue is negatively related to one's perceived ability to effectively communicate using IM technology.

H3: There is a negative relationship between symptoms of fatigue and one's perception of IM use as an effective communication tool.

Impact of Stress on Perceived IM Communication Effectiveness

Research shows that stress is one of the greatest barriers to successful communication. In offline settings, when your stress levels are high you give off confusing non-verbal signals, lose control of your emotions and are highly likely to misunderstand what other people are trying to tell you (Strumska-Cylwik, 2013). High employee stress levels can result in lower productivity, increased turnover, decreased quality of work, and a toxic work culture, all factors that could negatively impact productivity (Rabenu, Yaniv and Elizur, 2017; Avery et al., 2011). These outcomes are less known in online contexts, specifically with instant messaging scenarios. Existing studies look at the pervasive use of information and communication technologies and their impact primarily on satisfaction and productivity (La Torre et al. 2019), however, they do not analyze the relationship between stress and one's perceived ability to effectively communicate using a communication technology. Based on these findings, it is predicted that stress is negatively related to one's perceived ability to effectively communicate using IM technology.

H4: There is a negative relationship between symptoms of stress and one's perception of IM use as an effective communication tool.

Impact of Anxiety on Perceived IM Communication Effectiveness

Research has been conducted around how social anxiety, differences in online interaction anxiety, and attitudes predict online communication preferences (Dhir, Yossatorn, Kaur et al., 2018; Green et al., 2016; Becker, Alzahabi, & Hopwood, 2013). However, this body of research focuses primarily on internet use and social media, as well as mobile device usage. These studies also focus on anxiety caused by overuse. For example, an industry study conducted by Shamsi Iqbal and Eric Horvitz in 2007 found that workers respond instantly to 71% of instant message notifications, causing distraction and anxiety. The main problem with digital messaging, according to some, is that it is a major source of anxiety. Sending texts or instant messages, for example, makes people anxious because they are sometimes made to wait for a response (Ou & Davison, 2011; Rennecker & Godwin, 2003; Nardi et al., 2000). To build on this information, it would be interesting to know how anxiety impacts one's perception of communication effectiveness when engaging with others using an IM tool. It is predicted that individuals with symptoms of anxiety are less likely to see IM as an effective means of communication.

H5: There is a negative relationship between symptoms of anxiety and one's perception of IM use as an effective communication tool.

Impact of Isolation/Loneliness on Perceived IM Communication Effectiveness

Literature suggests that there is a strong link between social isolation, loneliness and health (Cole et al., 2015). "Being connected to others socially is widely considered a fundamental human need – crucial to both well-being and survival" (Charvat, 2020). As COVID-

19 is requiring more employees to work at home, there is real concern that this will result in feelings of isolation and loneliness. Previous research has shown that working from home may perpetuate a sense of loneliness and increase feelings of isolation (Hertel et al., 2005; Stich, 2020). With the additional stresses of COVID-19 and social distancing measures mandated by governments, it is not surprising that these feelings are magnified. Feeling connected is one of the most significant predictors of our emotional well-being and loneliness can be toxic (Ellis, Dumas & Forbes, 2020). However, one of the suggested mitigators is the use of online communication tools, such as instant messaging, which have a number of benefits despite new research showing that too much interaction through IM fatigues users (Boros et al. 2016). Based on the literature, it is predicted that, despite the potential for greater IM usage to decrease feelings of isolation or loneliness, isolation is negatively related to perceived IM effectiveness the lonelier someone is, the less likely they are to perceive IM communication as an effective workplace communication tool.

H6: There is a negative relationship between feelings of loneliness and one's perception of IM use as an effective communication tool.

Impact of Focus/Attention on Perceived IM Communication Effectiveness

The pandemic is pulling workers' attention away from work-related tasks. There is no question that workforces are more distracted than usual. As a society, we are consumed with the virus no matter where we turn. We hear or read about it in the news, we talk about it with our friends and family, and we are physically limited in our daily activities because of it. For most, any sense of normalcy has been lost. Because the pandemic is all-consuming, one might wonder how it is possible to focus on anything else, never mind work tasks. How does one's ability to focus affect their perception of the effectiveness of IM communication? Research has not yet

been completed in this area related to COVID-19, however, we can draw from the neuroscience literature. Scientists know that the "electrical activity of the neocortex of the brain changes" when human beings focus their attention. When we are distracted "neurons stop signalling in sync with one another" and outside stimuli competes for our brain's attention. When activity is synchronized in the brain, the ability to concentrate increases. When neurons are responding to outside stimuli, our ability to focus decreases (Williams & Fletcher, 2018; Wimmer, Schmitt, Davidson et al., 2015). Therefore, we would expect that the excess stimuli in the brain caused by the pandemic is inhibiting our ability to concentrate. The expectation that an employee should be able to focus on work tasks is therefore unrealistic unless there are measures in place to tune out these distractions or if there are other mediating factors at play. Adding in having to change the way we communicate only adds to the distractions people are facing. Furthermore, we know that face-to-face communication is richer; it is the most direct way to communicate (Kiesler & Cummings, 2002). Therefore, when we add online communication to the mix, it is likely that users do not believe it to be as effective as face-to-face communication and if they are unable to focus, what is to say that text-based communication will be effective? Therefore, it is predicted that there will be a negative association between one's ability to focus on work-related tasks and their perception of IM communication effectives.

H7: There is a negative relationship between one's ability to focus on work-related tasks and one's perception of IM use as an effective communication tool.

Impact of Mood Regulation on Perceived IM Communication Effectiveness

The way someone feels affects how they relate to others (Wubbels, Levy & Brekelmans, 1997) and how individuals relate impacts communication, especially in times of crisis (Myers, 2009). Research has demonstrated that mood impacts how a team is managed. Essentially,

"groups with leaders in a positive mood [have] a more positive and a less negative affective tone than groups with leaders in a negative mood" (Sy, Cote and Saavendra, 2005, p. 302). It has also been shown that the leader's mood influences group processes and team communication, and is critical to group effectiveness (Neumann & Strack, 2000). There is less research on team members with similar statuses, however, Bartel and Saaverda (2000) found mood convergence among colleagues. Mood convergence, or mood contagion, refers to the automatic transfer of mood between individuals (Neumann & Strack, 2000). When someone is unable to regulate their mood, communication is negatively affected because groups are unable to focus on the task at hand. Conversely, team members in a positive mood are more likely to exhibit relatively high coordination on a task, suggesting strong communication (Sy, Cote and Saavendra, 2005). Therefore, regardless of the mediating effect of the communication medium, one's ability to regulate their mood is either going to improve or impede communication.

Furthermore, mental illness is defined as the "reduced ability for a person to function effectively over a prolonged period of time because they are experiencing significant levels of distress"; they are experiencing changes in thinking, mood and/or behaviour (About Mental Illness, 2021). By definition, one would expect that, if someone is experiencing mental health issues, they are less likely to be regulate their mood. Therefore, those whose mental health is most impacted by the pandemic are less likely to be able to regulate their mood, and not being able to regulate one's mood inhibits the ability to communicate. In other words, the more one regulates their mood, the more they perceive IM as effective. Consequently, it is predicted there will be a positive relationship between mood regulation and the perception of the effectiveness of IM communication.

H8: There is a positive relationship between one's ability to regulate their mood and one's perception of IM use as an effective communication.

Summary

Addressing mental health characteristics such as depression, anxiety, stress, fatigue and loneliness and how people cope is not new. Rather, the purpose of the above discussion was to provide the context to be able to explore the relationship between these symptoms and the perceived effectiveness of IM communication. This chapter addressed three key areas. First, it continued the discussion from Chapter 1 on the advantages and disadvantages of IM use, as well as extended the conversation beyond the typical activities associated with IM and talked about team-based collaboration and communication. Second, emerging research on the mental health impact of COVID-19 was identified. Although in Canada this research is in its infancy, it demonstrates that officials are nervous about the long-term mental health impacts on society post-COVID-19. It also illustrates the need to explore the effect of mental health on other areas such as the workplace, as this study does. Third, literature related to the relationship between mental health symptoms and online communication effectiveness was reviewed. Based on what we already know about mental health illnesses and their impact on communication, eight hypotheses were proposed. Overall, regardless of the symptom, it is predicted that the symptom will be negatively associated with the perception of the effectiveness of IM communication. In other words, the more depressed, stressed, anxious, tired and/or lonely someone is, the less likely they will believe that IM communication is effective. A similar prediction was made for one's ability to focus, but one might expect a positive relationship for mood regulation.

The next chapter, Chapter 3, outlines and justifies the methodological approach adopted in this dissertation, and specifically describes the research design, instruments and measurement scales used, data collection procedures, and approach to data analysis.

3: Methodology

Introduction

This chapter outlines and justifies the methodological approach adopted in this thesis, and describes the research design, instruments and measurement scales used, data collection procedures, and approach to data analysis. This chapter concludes by identifying limitations in the methodology and describing measures taken to tackle bias and possible ethical issues.

Research Design

This thesis follows a mixed methods approach and is exploratory in nature. The goal of the study is to understand the impact of mental health characteristics on IM usage and perceived communication effectiveness. Specifically, a comparison is made between employee perception of IM use as an effective means of communication before the pandemic hit and now. How workers have coped with the changes that come from working remotely and the strategies that they have developed to address potential mental health challenges while continuing to work is also examined.

Mixed methods research draws on potential strengths of both qualitative and quantitative methods, allowing for more diverse perspectives to emerge around the relationships that exist between the intricate layers of the research questions proposed in this thesis (Creswell and Clark, 2011). Its central premise is that using qualitative and quantitative methods in combination "provides a better understanding of research problems than either approach alone" (Tashakkori and Creswell, 2007, p. 4) and allows for more complete analysis (Green, Caracelli, and Graham, 1989, Tashakkori and Teddlie, 1993). In quantitative research, variables are identified and studied to determine the magnitude and frequency of relationships. On the other hand, qualitative

research is “an inquiry process of understanding” (Creswell, 1998, p.15) rooted in constructivist thought (Guba and Lincoln, 1982). Data is collected from those immersed in the everyday life of the setting in which the study is framed and data analysis is based on the values that participants perceive based on their world views. Ultimately, qualitative research produces an understanding of the research problem based on multiple contextual factors (Miller, 2000).

When designing a mixed methods study, three issues need to be considered: priority, implementation, and integration (Creswell et al., 2003). Priority refers to which method, either quantitative or qualitative, is given more emphasis in the study. Implementation refers to whether the quantitative and qualitative data collection analysis comes in sequence or in chronological stages, one following another, or concurrently, in parallel. Integration refers to the phase where the mixing or connecting of quantitative and qualitative data occurs.

This study adopts an exploratory sequential design, which uses a qualitative approach, for example semi-structured interviews, to explain quantitative results collected through the administration of a web-based questionnaire. First, a questionnaire was designed, distributed and responses analyzed, then semi-structured interviews were conducted, and responses were used to triangulate survey data and better understand why certain phenomena occur.

The priority in this design is given to the quantitative method because it provides the means for broadly understanding respondents’ perceptions of the impact of symptoms of mental health during COVID on IM communication effectiveness. A smaller qualitative component therefore follows to better understand why respondents have answered survey questions a particular way and to determine the mitigation strategies that people have adopted as a result of the pandemic to address mental health challenges, stay focused at work and continue to

effectively communicate with their colleagues. The results of the two phases are integrated within the discussion chapter in this thesis.

Identification of Variables and Measures

The first goal, identified in research question 1, was to explore frequency of use: how often do respondents use IM to communicate with their colleagues and/or clients and has the frequency rate increased or decreased as a result of having to work from home? Second, the types of activities or conversations being held over instant message was explored, as identified in research question 2. Are respondents using IM for social purposes, to ask colleagues quick questions, to share documents/files, or to have in-depth conceptual conversations, and has this changed since the onset of the pandemic? Third, and addressing research question 3, the effectiveness of the communication occurring over IM was considered. Effective communication is typically characterized by key factors such as accuracy, clarity of message, timeliness, completeness, reliability of information, relevance and the interaction between sender and receiver. Effective communication occurs when a message is sent and the intended meaning of the message is received (Griffin, 2010). Thus, for an interaction to be considered effective, one must acknowledge to what degree each of these characteristics is being satisfied. As a message is being sent, for instance, as someone is explaining something to you, or is asking or answering a question, inadvertently you determine if each of these characteristics are met. Communication is not effective when one or more of these factors does not happen. In this scenario, I have assumed that the delivery mechanism is face-to-face, that the communication is happening verbally. However, regardless of how the message is delivered, whether it is verbal and in-person, over the phone or on a video call, or text-based through an email or chat, the process of determining the effectiveness of the interaction is the same. The importance of these characteristics will vary

depending on the individual, and it is important to recognize that each of us has different expectations about the degree to which each must be satisfied. This may result in the over- or under-estimation of one's ability to communicate using communication mediums like instant messaging because the benefits of being in-person are no longer available.

Likewise, context matters. One's work environment may impact their expectations about effective communication. For example, prior to the pandemic, instant messaging was a tool that many employees had at their disposal, however, because general perceptions of the effectiveness of face-to-face communication are higher, in most cases, it was the preferred way to communicate. When face-to-face communication was no longer possible, employees had to rely on text-based communication.

In the present study, I first determined whether or not there had been an increase in IM use. The purpose of understanding the change in frequency was to ensure that there truly had been a shift to online communication. Next, participants were asked to compare, overall, the effectiveness of communication pre-pandemic and during the pandemic. Participants were asked to focus on IM communication. In addition to asking about overall effectiveness, participants were also required to identify how timely, accurate, adequate, complete and interactive communication was during the same two time periods. In operationalizing "effective communication" multiple measures were used to improve accuracy and reliability. Similarly, respondents were asked to compare their experience using IM as a communication tool pre-pandemic to the last six months referenced in the questionnaire (April 2020 to October 2020).

Next, to address research questions 4 and 5, mental health characteristic measures were identified. Terms and themes that are common in the psychology literature when mental health is examined include depression, anxiety and loneliness. For the purpose of this study, stress,

fatigue, attention and mood regulation were also included because these are key themes that continue to emerge in the media surrounding mental health and the impact of the pandemic. Questions from the Canadian Community Health Survey for Mental Health and Well-being (Statistics Canada, 2003) were adapted to measure general mental health, depression, fatigue, stress, anxiety and loneliness. The Center for Epidemiological Studies Depression Scale (CES-D), the Weiss Symptom checklist, and Beck's Depression Inventory Survey were also consulted to measure depression, anxiety, mood regulation, and attention, and the Hamilton Anxiety Scale (HAM-A), which is a primary measure for generalised anxiety disorder (GAD) and is often used to assess general anxiety symptoms across conditions, was consulted (Hamilton, 1959). Finally, loneliness measures were adapted from the UCLA Loneliness Scale (Russell et al., 1980) and attention and mood measures were adapted from the Weiss Symptom Checklist created by the Canadian ADHD Resource Alliance (ADHD Assessment Forms for Adults, 2021).

The questionnaire used in this study was developed using applicable questions (questions that measured one of the six independent variables) from the instruments described above. The full instruments were not used for two reasons. First, the purpose of this research is to address seven components of mental health and each instrument addressed only one or two of these components. Second, some of the constructs that the instruments measured were not applicable to this study. In order to streamline the survey, only relevant constructs were selected. It was also important that the questionnaire did not creep in size and would only take respondents approximately 20-25 minutes to complete. All variables were measured on a continuous 7-point Likert-type scale. For the test to have statistical power, each variable was represented by at least three items on the scale in the survey instrument. Measures are summarized in Table 3 below.

Table 3

Survey measures

IM Use	
use_1	Frequency of use
use_2	Type of IM technology used
use_3	Number of hours IM used per day
use_4	Employers' encouragement of IM use
use_5	Pre/during COVID IM usage
use_6 / use_7	Specific frequency activities (how often) Ask questions Answer questions Discussions (unscheduled) Schedule meetings Share files Work-related socialization Non-work-related socialization
IM Communication	
comm_1 (a-f)	Pre-COVID communication timeliness, accuracy, adequacy, completeness, effectiveness, and level of interactivity
comm_2 (a-f)	During-COVID communication timeliness, accuracy, adequacy, completeness, effectiveness, and level of interactivity
comm_3	Availability/accessibility of colleagues with whom I communicate using IM
General Mental Health	
gmh_1 gmh_2 gmh_3 gmh_4 gmh_5 gmh_6	Identification of a current mental health condition General life satisfaction in general Perception of current mental health (4 questions were asked to assess respondents' perception of their mental health)
Symptoms of Depression	
dep_1	Feeling sad, empty, discouraged, depressed
dep_2	Feelings of hopelessness
dep_3	Being bothered by occurrences (lack of interest)
dep_4	Emotional balance
dep_5	Enjoying life
dep_6	Dealing with difficult situations
dep_7	Ability to carry out day-to-day activities
dep_8	I have felt depressed
Fatigue	

fatig_1	Hours of sleep per night
fatig_2	Average sleep pre-COVID
fatig_3	Average sleep currently
fatig_4	Ability to stay awake during the day
Stress	
stress_1	General stress levels
stress_2	General stress at work
stress_3a	Factors impacting stress at work
stress_3b	
stress_3c	
stress_3d	
stress_3e	
stress_3f	
stress_4	Ability to handle stressful situations
stress_5	
stress_6a	Dealing with stress
stress_6b	
stress_6c	
stress_6d	
Anxiety	
anx_1	General anxiety levels
anx_2a	Being nervous or worried
anx_2b	Having tension
anx_2c	Being restless or unable to relax
anx_2d	Inability to cope with everyday responsibilities
anx_2e	Inability to concentrate
anx_2f	Intense fears (e.g., heights, crowds, spiders)
Loneliness	
lone_1	Wanting to be alone (yes/no)
lone_2a	Impact on personal relationships
lone_2b	Impact on work relationships
lone_2c	Having nothing in common with others
lone_3 (a-f)	General feelings of loneliness
Mood Regulation	

mood_1a	Distinct period(s) of intense excitement
mood_1b	Distinct period(s) of inflated self-esteem, grandiose
mood_1c	Distinct period(s) of increased energy
mood_1d	Distinct Period(s) of racing thoughts or speech
mood_1e	Irritable behaviour that is out of character
mood_1f	Rage attacks, anger outbursts, hostility
mood_2	Difficulty regulating mood
mood_3	Overall, mood changes (open-ended question)
Attention	
att_1a	Attention to detail or makes careless mistakes
att_1b	Holding attention or remaining focused
att_1c	Listening or mind seems elsewhere
att_1d	Difficulty following instructions or finishing work
att_1e	Avoids/dislikes activities requiring effort
att_1f	Forgetful
att_2	Difficulty focusing on work-related tasks
att_3	Overall attention difficulties (open-ended question)
Demographic measures	
dem_1	Gender
dem_2	Age
dem_3	Ethnicity
dem_4	Education
dem_5	Industry type
dem_6	Occupation
dem_7	Size of company
dem_8	Position in company
dem_9	Average income
dem_10	Country
dem_11	Province/Sate

Phase 1: Quantitative Survey Research

Instrument Description

Survey designs are frequently used to understand beliefs and attitudes (Creswell, 2002). Thus, a survey is an appropriate tool for soliciting the opinions of a sample population on the impact COVID-19 has had on their mental health and their ability to communicate for work

purposes using online communication tools. Web-based surveys in particular are economical and are widely viewed as being the least costly means of conducting a quantitative survey (Frippiat and Marquis, 2010). In addition, data can be quickly gathered, and researchers can reach a geographically dispersed population – an advantage of this study.

The final survey instrument consisted of four parts. First, screening questions were used to ensure respondents were working during the six-month period referenced in the survey and that instant messaging technology was used to communicate with others at work. Second, information about respondents' general use of instant messaging technologies at work and their perceived ability to communicate was sought. Third, questions around respondents' perceived mental health, specifically around depression, anxiety, fatigue, stress, loneliness, attention levels and mood were asked. Finally, general demographic questions were asked. The survey was designed to take no longer than 20-25-minutes to complete.

Participation was voluntary and respondents had the option to opt out up until the survey close date, which was October 31, 2020. Respondents were informed that the information gathered was confidential. Data was only used for statistical purposes and the final results in this thesis are reported in aggregated form. Because data was collected confidentially, respondents were asked to provide an unidentifying nickname if, for any reason, they wanted to pull their data/responses from the study. Although this was built into the instrument, I did not receive a request to remove any participant's data or responses.

Prior to going live, the survey instrument was piloted by fifteen individuals. Based on the pilot test results, minor revisions were made around the wording of some of the questions and to include additional open-ended questions allowing respondents to explain why they answered a question a certain way. These were optional fields.

A copy of the questionnaire is available in Appendix C.

Target Survey Population and Sample

The target population in this study is knowledge workers who have been working during the pandemic and who use instant messaging as a communication tool at work. Although it would be interesting to compare the mental health impact on communication in cases where instant messaging is not used, this was considered out of scope. A total of 257 people responded to the survey. After removing partial responses (n=67) and "no" response (n=35), 155 responses were used for analysis.

Data Collection

Data was collected through a questionnaire circulated online. The questionnaire was distributed using LimeSurvey and available for four weeks, which was an appropriate time frame given the data collection method selected and the availability of potential participants. Data was downloaded as a CSV file from LimeSurvey and stored in a password-protected file on the researcher's hard drive. Recruitment of participants occurred online through social media, specifically LinkedIn and Facebook, as well as by reaching out to known contacts by email. A snowball sampling approach was used to increase sample size. This approach was advantageous because it helped recruit participants using social networks, resulting in a greater response rate, and it was cost-effective. It goes without saying, however, that snowball sampling sometimes results in sampling bias. Since social networks are not random, people refer those they know and with whom they share similar traits; resulting in a potential sampling bias and margin of error. This will be discussed further in the limitations section.

Data Analysis Procedures

The survey responses contained both quantitative and qualitative data. After an inspection of the results, data from 35 respondents were removed because of incompleteness of data. Data were transferred into SPSS for analysis. The qualitative data from open-ended questions in the survey were transferred into an Excel spreadsheet along with the respondents' demographic data. Comments were typically short phrases and could be easily reviewed.

Data analysis began with the demographic data as a way to provide an overview of the sample. Descriptive statistics of variables, including gender, age, education, industry, position within the organization, size of company and location, were calculated using SPSS software. The analysis then proceeded by looking at IM usage, including frequency of use and types of IM activities, and communication perceptions. Next, Mann-Whitney U tests and Kruskal-Wallis H tests were run to determine if there were differences in general mental health scores between males and females, between non-management employees, managers/supervisors and senior/executive managers, between age generations, between size of company, and between geographic location (by Canadian province). Because data was not normally distributed, nonparametric tests were considered instead of Pearson's Correlation.

Then, Kendall's tau-b was used to measure the strength and direction of association that exists between variables measuring mental health characteristics (symptoms of depression, fatigue, stress, anxiety and loneliness), and attention and mood regulation and the perceived effectiveness of communication using IM technologies. This test was run because the data is nonparametric, and our variables were measured on ordinal scales. Respondents were asked to

rank on a scale from 0 to 7, where 0 is strongly disagree and 7 is strongly agree, their perception of communicating online before COVID-19 and during COVID-19 in the following areas: timeliness, accuracy, adequacy, completeness, effectiveness, and level of interactivity. An additional step was taken by running an ordinal logistic regression to predict perception of communication effectiveness given the statistically significant predictor variables identified (general mental health, symptoms of stress and symptoms of loneliness). Ordinal logistic regression can be used to predict the belief that IM communication is effective (for instance, dependent variable measured on a 7-point Likert scale from Strongly Disagree to Strongly Agree), based on two independent variables: symptoms of stress (an ordinal variable) and symptoms of loneliness (an ordinal variable). In some cases, because of small numbers and because ordinal variables have to be recoded into categorical variables for ordinal logistic regression, data from Likert scales were reduced into three categories by combining all the agree responses, the disagree responses, and neither agree nor disagree responses.

Phase 2: Qualitative Interview Research

The second, qualitative phase in this study focuses on explaining the results of the statistical tests obtained in the first, quantitative phase. Essentially, this phase provides a means to better understand participants' experience, and their perception of IM use and its impact on communication during COVID-19. Questions around how participants have coped during the pandemic and the strategies that they have introduced into their day-to-day activities were also discussed. This qualitative phase involved conducting semi-structured interviews with select individuals who had completed the survey. Interview transcripts were used to validate the information obtained during interviews and analysed as a way to triangulate research findings and to delve deeper into findings collected through the initial survey phase.

Instrument Description

An online interview protocol was developed to address the goals identified above. The content of the protocol was based on wanting to understand why survey participants agreed or disagreed with statements in the questionnaire around IM usage, symptoms of mental health and communication effectiveness. A secondary goal was to identify how participants are coping during the pandemic and the types of mitigation strategies they have used, if any, to help with any mental health challenges.

The interview protocol was designed to include six open-ended sections. The first section provided time for the researcher to introduce the study and describe its purpose and build a rapport with the interviewee. It also allowed for the participant to talk a little bit about themselves and how they have been feeling over the last few months, amidst a global pandemic. The second section asked participants to describe how the pandemic has impacted their job. Participants were asked, “how has your role at work changed during the past four months and how does this compare to pre-pandemic”. The third section shifts the focus from an overall discussion to communication effectiveness and IM usage. Although this study focuses on IM communication specifically, space was provided for participants to discuss other forms of online communication, such as Zoom meetings. Participants were asked about the type(s) of technology used, frequency of use, types of conversations, length of conversations and communication effectiveness. The fourth section opens up the discussion on how the pandemic has impacted participants’ overall mental health. The researcher probed for feelings and symptoms of depression, fatigue, anxiety, stress, loneliness, and changes in attention and mood. Participants were also asked to identify how likely they are to use an online platform as a communication tool when they are more anxious, stressed, tired and/or lonely. The fifth section was structured

around how participants have been coping and the strategies they have used to mitigate mental health challenges. The sixth and final section provided an opportunity to collect demographic information on the participant. A copy of the draft interview guide and consent form is available in Appendix D**.**

Target Interview Population and Sample

This study aims to gain a broad understanding of the perceptions of knowledge workers throughout all kinds of organizations in North America, however, the majority of responses came from Canada, and so the analysis will be situated within Canada. Similar to the target population requirements of phase 1 of this study, the intent was to interview individuals who have been working during the pandemic and who use instant message as a communication tool at work. Job position and industry are not specified, rather the goal is to collect data across all industries and job positions. It is also important to understand that, although this study explores mental health, this population, individuals suffering from known mental health issues, is not specifically targeted. This study is not clinical in nature. Rather, respondents have voluntarily participated.

Recruitment of interview participants occurred online through social media, specifically LinkedIn and Facebook, as well as by reaching out to known contacts by email. ‘Call for Participants’ social media posts were designed to capture interest. Primary interest came from direct messages on LinkedIn and through recommendations from friends who had colleagues that were interested in participating. A total of 23 interviews were completed. These individuals worked in various fields, although all were considered to be conducting knowledge-based work, similar to all survey respondents.

Data Collection

All interviews were conducted online using Zoom (licensed by Concordia University). All interview participants completed and submitted the 'information and consent form' sent to them by email prior to the interview. Oral consent was also established the day of the interview. This information was coded as Y/N as part of the collected data. All interviews were recorded with the permission of the participant and both the recording and interview transcript were saved in a password-protected file on the researcher's hard drive. Responses were coded to ensure participant confidentiality. Participants were also provided with a copy of the interview transcript for review and feedback, and had the opportunity to correct the contents of the interview after it had been transcribed if they felt their responses were misrepresented. This process is referred to as 'member checking' – getting the feedback from the participants on the accuracy of information (Merriam, 1988; Creswell, 2002).

Data Analysis Procedures

The steps involved in analyzing interview data were as follows: (1) preliminary exploration of the data by reading through the transcripts; (2) coding the data by segmenting and labelling the text; (3) using codes to develop themes by aggregating similar codes together – initial codes were reduced by checking for overlap and redundancy; (4) connecting and interrelating themes; and (5) constructing a narrative. This follows the approach proposed by Creswell (2002). At this point, the validity of the data was examined. Interview participants were asked for feedback based on the accuracy of the themes identified.

Limitations in the Methodology

The mixed methods methodology as outlined has some limitations. First, this approach is often time consuming to execute. Due to the immediate impacts COVID-19 has had on individuals, there was a desire to rapidly conduct this study, especially if mental health strategies need to be put in place to mitigate more consequential effects. It is recognized that similar research conducted a year from now is likely to produce different results. At the time this thesis was written, COVID-19 measures had been in place for approximately eleven months. At the time the survey and interviews were conducted, we were six months into the pandemic. This context is important for understanding the outcomes of this study.

Second, there is the risk that quantitative results of the first phase may show no significant differences. Further, it may be unclear how to resolve discrepancies that arise in the interpretation of findings. However, because this study is one of the first of its kind, and because it is largely exploratory, an insignificant finding or discrepancy is a finding in and of itself.

Third, although popular for collecting data, web surveys often suffer from low response rates as compared to other modes of collecting data (Frippiat and Marquis, 2010; Archer, 2008). On average, online survey response rates are 11% below mail and phone surveys, and rates as low as 2% have been reported (Petchenik and Watermolen, 2011). In order to mitigate against this limitation, multiple follow up emails to potential participants and messages on social media were posted. Another mitigation approach that was considered was to offer monetary compensation, however, because this was not an option, we relied on the fact that people would be interested in the research topic and want to participate. As a society, it is clear that we are trying to navigate the pandemic and its impact on our ability to stay focused at work and be productive citizens.

Fourth, survey data is self-reported information, which is subject to the following biases and limitations: (1) honesty - subjects may make the more *socially acceptable* answer rather than being truthful; (2) introspective ability, or the inability for participants to assess themselves accurately; (3) response bias where questions are subject to all the biases of what the previous responses were, whether they relate to recent or significant experiences and other factors; and (4) self deception enhancement, where participants may unconsciously distort their perception of how they represent themselves and answer based on this distortion (Steenkamp, De Jong and Baumgartner, 2010). Additionally, the way someone answers a question on a particular day may differ if they answer the same question a few days later. Part of the rationale for including interviews was to be able to mitigate against these possible biases, triangulate findings and provide a more accurate picture of results.

Fifth, the nature of the snowball approach used to recruit participants can result in sampling bias and a reduction in randomness. The researcher initially emailed known contacts and posted on her social media pages. Since social networks are not random, people refer those they know and with whom they share similar traits. Representativeness of the sample is therefore not guaranteed. However, based on the analytics available from Facebook and LinkedIn, these posts were shared by a diverse group of people. Demographic data also showed variation in gender, age, average income and industry and type of job. Finally, it is also important to consider that two screening questions were used to ensure the eligibility of potential respondents. Participants were required to be working during the pandemic and using IM as a tool to communicate.

Sixth, most of the data collected in this study derives from Likert scales. Although this approach is broadly used and accepted in survey research, ordinal data used for scaling responses

often violates the assumptions of many parametric tests. The challenge observed in my study was that the data did not appear to be normally distributed, which is a key requirement for parametric analyses (another key requirement, for correlational analyses, is that relationships among variables is essentially linear). There is great debate about the use of parametric versus nonparametric test, where nonparametric tests are argued to have a lower probability of detecting an effect that exists. In a study conducted by Joost de Winter and Dimitra Dodou (2010) that compared Type I and Type II error rate of parametric and nonparametric tests, very little difference was detected in terms of both power and the error rates that were found. They conclude, "for five-point Likert items, the t test and Mann-Whitney-Wilcoxon generally have similar power, and researchers do not have to worry about finding a difference whilst there is none in the population" (de Winter and Dodou, 2010, p. 5). Therefore, it is unlikely that a loss of power was indicated in my study.

Another criticism associated with the analysis of Likert data is the loss of information when data is collapsed from a seven-point scale into less categories. For the purpose of the ordinal logistic regressions that were run in this analysis, the data needed to be recoded into categorical variables and collapsed into three categories. I combined all the agree responses, the disagree responses, and neither agree nor disagree responses. Not only is this a common practice for ordinal logistic regression analysis, but it is also common in the psychiatry and psychology literature and the same procedure was followed in the analyses of the survey instruments that were referenced in this study to score mental health symptoms, where data was not normally distributed (Streiner and Norman, 2008; Dunn, 2000). Another consideration is that this is one of the first studies being conducted during the COVID-19 pandemic on this topic and it is not

being compared directly to results obtained in other, similar studies that did not collapse the scales.

In sum, overall, there are good arguments for analyzing the data using nonparametric tests. The data is, by definition, ordinal, not interval. The distribution I obtained was not normal, the key requirement for parametric analyses. And there is, contrary to some popular beliefs expressed by researchers in the social and behavioural sciences, good evidence that using nonparametric analyses does not seriously reduce power. The procedure I followed to collapse the seven-point scales to three categories inevitably reduces variance or information and thus reduces the power to find differences. However, given the decision to treat the variables as interval data, it was necessary to recode the data to perform logistic regression analyses. This decision was also influenced by the circumstance I did not intend to compare my results directly to studies which referenced the original seven-point scales in their results.

Summary

This chapter outlined and justified the mixed methods methodological approach adopted in this thesis. It also described the research design, measurement scales used, survey and interview protocol instruments, data collection procedures, and approach to data analysis. This chapter concluded by identifying limitations in the methodology and describing measures taken to tackle bias and possible issues.

Participants in both the survey and interview are adults currently working who use IM technologies at work to communicate with customers and/or clients. The questionnaire included an instrument adopted based on previously validated scales and instruments. A total of 257

respondents participated in the survey and 23 respondents participated in an interview. Survey data were collected and analyzed using SPSS, and interview data was coded into themes.

4: Quantitative Results

Introduction

This chapter consists of six sections and presents the main findings of the study. Section one will begin by reviewing the demographics of the survey population. Section two will present the results on IM usage related to frequency of use pre-pandemic compared to now, and the types of conversations being held. This section will also provide the context for discussing how the work environment has changed due to the pandemic and what impact working from home and moving most communication online has had. Section three will review the results related to respondents' perception of IM communication, specifically its timing, accuracy, adequacy, completeness, level of interactivity and overall effectiveness. The focus is then shifted to respondents' perception of their mental health, examining whether or not the pandemic has caused symptoms of depression, fatigue, stress, anxiety, and/or loneliness. Results related to attention and one's ability to focus on work-related tasks, and one's ability to regulate their mood will also be analyzed. Section five presents the results based on the eight hypotheses identified in this thesis, specifically examining the various relationships and associations between mental health characteristics and the perceived effectiveness of communication using IM technologies. The sixth and final section in this chapter provides the results of four ordinal logistic regressions that were run to predict perception of communication effectiveness given three statistically significant predictor variables: general mental health, symptoms of stress and symptoms of loneliness. Following this chapter, these results and their implications will be discussed in detail.

Section 1: Demographics of Survey Population

The original target population of this study was intentionally quite broad. The aim was to post an online questionnaire using social media platforms that targeted adults who were employed, working from home due to the pandemic and who were using online communication technologies with colleagues and/or clients. Combining posts on both LinkedIn and Facebook, the initial request for participants was shared 13 times and viewed over 700 times. Follow up posts were shared on average by four people and viewed on average by 300 people. This resulted in a total of 257 responses. It is not possible to calculate a true response rate, however, using the view count from the initial posts, an estimated response rate of 36.7% can be calculated, which is acceptable for this type of research.

Upon completion of the survey response period, all responses were reviewed for completeness and any partial response was removed. This resulted in 190 total responses, 171 respondents (90%) who use an IM technology to communicate at work, and 19 (or 10%) respondents who do not. Note that if a participant responded “no” to using an IM technology, they were thanked for their time and were not asked any additional questions. Remember that this study focuses on individuals where IM usage is a part of their daily communication with others; any other scenario was considered out of scope. Before additional analysis was completed, the data was further trimmed to remove outliers and responses outside of Canada resulting in a total n of 155.

Survey respondents were asked to indicate their gender, age, education level, employment status (full-time or part-time), and location. In addition, they were asked to identify the industry they work in, their occupation, the position they hold in the company (non-management employee, manager/supervisor or senior leader/executive manager), and the size of

the company. Slightly more females (56.1%) than males (36.8%) responded to the survey, and 11 respondents (7.1%) did not indicate a gender. Age was analyzed by grouping responses into generational categories: 14.2% of respondents fell into the baby boomers (ages 57-75) category, 27.7% of respondents fell into the Generation X (ages 41-56) category, 53.9% of respondents were millennials (ages 25-40), and 4.3% of respondents were categorized as Generation Z (age 24 and under). Respondents are also well educated. 44.4% of respondents indicate having a masters degree or higher, 41.7% of respondents have a bachelors degree, 9.0% hold a college or Cegep diploma, and only 4.9% of respondents have a high school diploma or equivalent only. From the perspective of employment status, 90.9% of respondents were employed full-time, and 9.1% part-time.

Survey responses came from all over the world, including Canada, the United Sates, Europe (U.K. and Switzerland) and South Korea. However, it was decided based on the limited number of responses outside of Canada (9.7%), that the analysis would focus on Canada only. The breakdown of responses by province are provided in Table 4 below.

Table 4

Raw number of participants location by province

Location by Province	N	%
British Colombia	7	4.5
Alberta	39	25.2
Saskatchewan	12	7.7
Ontario	28	18.1
Quebec	53	34.2
Nova Scotia	1	.6
Other (non-Canadian province)	15	9.7
Total	**155**	**100**

When asked about industry and occupation, a wide range of responses were provided (see Table 5 below). A decision was made not to combine industry sectors or occupation types because it shows the variation among responses, which was one of the goals when selecting a target population. Additionally, other than presenting the frequencies, no further analysis was done on these two variables.

Position within company and size of company presented some interesting findings. First, 52.8% of respondents indicated that they were non-management employees, 28.9% of respondents indicated that they held a manager or supervisory role, and 18.3% of respondents were senior leaders or executive managers. Respondents were asked about their position because I wanted to explore whether or not one's level of responsibility impacts their mental health more or less and then whether this changes their perception of the effectiveness of IM communication. Second, when it comes to the size of company, almost an equal number of individuals work for a small company of 50 employees or less (31.3%) and a large company of 1001 employees or more (34.7%). To fill in the gap, 13.2% of respondents work for a company with 51-100 employees, 13.9% of respondents work for a company with 101-500 employees, and 6.9% of respondents work for a company with 501-1000 employees.

Table 5

Raw number of participants industry and occupation

Industry and Occupation	N	%
Education		20.6
Teacher	14	
eLearning/Training	14	
Research Assistant	1	
Other	3	
Finance		15.5
VP	1	
Accountant	3	

Account Executive	2	
Account Manager	4	
Actuary	2	
Advisor	4	
Auditor	1	
Business/Sales Analyst	1	
Data and Analytics Consultant	1	
Financial Consultant	1	
Other	4	
Consulting		1.9
IT/Web Consulting	3	
Journalism		1.9
Journalist/Producer	2	
Editor	1	
Engineering		7.7
Mechanical Engineer	2	
Aerospace Engineer	1	
Project Engineer	1	
Rail Traffic Controller	1	
Highway Project Engineer	1	
Sales Engineer	1	
Software Engineer	3	
Research Scientist	2	
Government		14.8
Not for Profit	8	
Policy Director	3	
Policy Analyst	4	
Economist	2	
Administrative Assistant	1	
Environment/Regulations Officer	1	
Human Resources	4	
Law		3.9
Lawyer	5	
Recruitment Coordinator	1	
Technology		3.2
Product Owner	1	
Other	4	
Hospitality		1.3
Waiter	1	
Visitor Services Supervisor	1	
Athletic Therapy		.6
Athletic Therapist	1	
Pharmaceuticals		.6
Sales Consultant	1	
Manufacturing		.6
Product Manger	1	
Advertising		1.3
Advertising Agent	1	
Senior Art Director	1	
Tourism		8.4
Human Resources	1	

Travel Consultant	3	
Travel Counsellor	1	
Other	8	
Oil and Gas		3.2
Geophysicist	1	
Other	4	
Real Estate		.6
Real Estate Agent	1	
Health Care		1.3
Physician	1	
Mental Health Facilitator	1	
Other (industry/occupation not identified)	19	12.6
Total	**155**	**100**

In summary, these demographics show that respondents represent a wide range of industries and occupations, work for varying sizes of companies and represent all levels of employment, from non-management positions all the way up to senior leaders. In the results outlined below, further analysis related to IM usage, communication effectiveness, and perception of mental health symptoms is conducted on gender, age, position in company, size of company and location (by Canadian province). First, overall IM usage is discussed.

Section 2: IM Usage - Frequency and Types of Conversations

There were two introductory survey questions that asked respondents to evaluate their current IM usage. A majority of respondents (85.8%) use an IM technology all day, primarily during office hours, 3.2% of respondents use IM in the morning only (8:00am to 11:00am), 1.3% of respondents use IM during the lunch period (11:00am to 1:00pm), 7.1% of respondents use IM in the afternoon (1:00pm to 4:00pm) and 1.3% of respondents use IM in the evening only (4:00pm to 7:00pm). When it comes to the actual application, it was very clear that Microsoft Teams was the most used (61.9%) with Slack coming in second with 11.6% of respondents reporting its use. Other IM technologies selected by respondents included Google Chat/Hangouts

(7.7%), Messenger (5.2%), iMessage (4.5%), WhatsApp (3.9%), Skype Chat (1.3%) and other (3.9%).

If we turn our attention to perceptions of IM usage pre-pandemic versus now, prior to COVID-19, respondents neither agreed nor disagreed with the statement that their employer/company encouraged employees to use IM for work-related communication with colleagues and/or clients (M=3.88, SD=1.86), compared to during COVID, where respondents were more likely to agree with this statement (M=5.03, SD=1.44). There was also a slight increase in perception when asked about how often participants use IM compared to before COVID-19. Prior to COVID-19, respondents somewhat agreed with the statement that 'I used IM multiple times a day' (M=4.13, SD=1.97), however, during COVID, this perception increased (M=5.43, SD=1.09), indicating that IM was relied on more heavily in respondents' workdays.

We also wanted to know the types of activities that occurred using IM technologies. Respondents were asked to identify how often they use IM to ask questions, answer questions, have unscheduled discussions, schedule meetings, share files, have work-related conversations and non-work-related conversations. For all types of conversations, compared to pre-COVID, IM usage increased, except for scheduling meetings, which decreased during the pandemic. It is not surprising that this increase was observed, since most respondents were required to work from home and face-to-face conversations were impossible due to social distancing measures put in place by governments and implemented by organizations. Detailed results on activity types and the comparison pre-pandemic to now are summarized in Table 6 below.

Table 6

Pre-COVID/COVID IM activity types

Pre-COVID, how often was IM used to…	N	%	During COVID, how often is IM used to…	N	%
Ask questions (M=2.41, SD=1.20)			Ask questions (M=3.43, SD=0.77)		
Never	14	9.0	Never	1	.6
Rarely	18	11.6	Rarely	2	1.3
Sometimes	47	30.0	Sometimes	15	9.7
Often	43	27.7	Often	48	31.0
Very Often	32	21.3	Very Often	88	56.8
Missing			Missing	1	.6
Answer questions (M=2.45, SD=1.18)			Answer questions (M=3.47, SD=0.77)		
Never	13	8.4	Never	1	.6
Rarely	14	9.0	Rarely	2	1.3
Sometimes	53	34.2	Sometimes	14	9.0
Often	38	25.3	Often	44	28.4
Very Often	35	22.6	Very Often	94	60.6
Missing	1	.6	Missing		
Have unscheduled discussions (M=2.18, SD=1.23)			Have unscheduled discussions (M=3.24, SD=0.79-)		
Never	20	12.9	Never		
Rarely	20	12.9	Rarely	3	1.9
Sometimes	49	31.6	Sometimes	25	16.1
Often	40	25.8	Often	58	37.5
Very Often	24	15.5	Very Often	68	43.9
Missing	2	1.3	Missing	1	.6
Schedule meetings (M=1.54, SD=1.21)			Schedule meetings (M=2.64, SD=1.33)		
Never	34	21.9	Never	15	9.7
Rarely	47	30.3	Rarely	20	12.9
Sometimes	38	24.5	Sometimes	22	14.2
Often	21	13.5	Often	44	28.4
Very Often	12	7.7	Very Often	42	33.5
Missing	3	1.9	Missing	2	1.3
Share files (M=1.43, SD=1.28)			Share files (M=2.19, SD=1.36)		
Never	45	29.0	Never	24	15.5
Rarely	42	27.0	Rarely	33	14.8
Sometimes	33	21.3	Sometimes	42	27.1
Often	18	11.6	Often	31	20.0
Very Often	14	9.0	Very Often	35	22.6
Missing	3	1.9	Missing		
Have work-related conversations (M=1.89, SD=1.22)			Have work-related conversations (M=2.78, SD=1.06)		
Never	25	16.1	Never	4	2.6
Rarely	30	19.4	Rarely	13	8.4
Sometimes	49	31.6	Sometimes	44	28.4
Often	31	20.0	Often	45	29.0
Very Often	16	10.3	Very Often	48	31.0
Missing	4	2.6	Missing	1	.6
Have non-work-related conversations (M=1.68, SD=1.33)			Have non-work-related conversations (M=2.36, SD=1.29)		
Never	41	16.1	Never	17	11.0
Rarely	26	19.4	Rarely	23	14.8

	Sometimes	41	31.6	Sometimes	37	23.9
	Often	28	20.0	Often	41	26.5
	Very Often	16	10.3	Very Often	36	23.2
	Missing	3	1.9	Missing	1	.6
Total		**155**	**100%**	**Total**	**155**	**100%**

Section 3: Respondents' Perception of the Effectiveness of IM Communication

One of the main goals of this study is to understand perceptions around the effectiveness of IM communication within the context of COVID-19. As indicated in the literature review, there are many benefits to instant messaging, however, previous studies have shown that face-to-face communication, and even email communication, is thought to be more effective. For the purpose of this study, survey participants were asked to rate on a 7-point Likert scale whether they agreed or disagreed with the following two statements: "In general, before COVID-19 hit, I felt communication (specifically IM communication) with colleagues and/or clients at work was…" and "In general, during COVID-19, I feel communication (specifically IM communication) with colleagues and/or clients at work is…". Respondents were asked to consider the timeliness of communication, accuracy, adequacy, completeness, level of interactivity, and overall effectiveness. Results generally indicate a slight increase in the belief that IM communication is more effective now compared to before the pandemic, the biggest difference occurring in respondents' perception of the adequacy (pre-COVID, M=3.95, SD=1.40; during COVID, M=4.58, SD=1.18) and the completeness of online communication (pre-COVID, M=3.59, SD=1.43; during COVID, M=4.38, SD=1.25). As will be discussed in Chapter 6, this is likely due to the inaccessibility of communication mediums available prior to COVID-19 and IM being *tolerated* and/or people making more of an effort to ensure their text messages are more accurate and more complete. If we look specifically at the effectiveness

measure, there was only an increase in mean of less than .5, suggesting that perceptions around the effectiveness of IM as a communication tools have not changed as a result of the pandemic. Table 7 below shows the frequency output for all six communication measures.

Table 7

Pre-COVID/COVID communication perceptions

Pre-COVID, communication was…	N	%	During COVID, communication was…	N	%
Timely (M=4.39, SD=1.26)			Timely (M=4.99, SD=0.97)		
Strongly Disagree	3	1.9	Strongly Disagree	0	0
Disagree	3	1.9	Disagree	2	1.3
Somewhat Disagree	4	2.6	Somewhat Disagree	3	1.9
Neither Agree nor Disagree	21	13.5	Neither Agree nor Disagree	4	2.6
Somewhat Agree	36	23.2	Somewhat Agree	23	14.8
Agree	64	41.3	Agree	76	49.0
Strongly Agree	23	14.8	Strongly Agree	46	29.7
Missing	1	.6	Missing	1	.6
Accurate (M=4.32, SD=1.13)			Accurate (M=4.81, SD=0.85)		
Strongly Disagree	1	.6	Strongly Disagree	0	0
Disagree	2	1.3	Disagree	0	0
Somewhat Disagree	4	2.6	Somewhat Disagree	2	1.3
Neither Agree nor Disagree	31	20.0	Neither Agree nor Disagree	9	5.8
Somewhat Agree	32	20.6	Somewhat Agree	34	21.9
Agree	69	44.5	Agree	82	52.9
Strongly Agree	15	9.7	Strongly Agree	28	18.1
Missing	1	.6	Missing		
Adequate (M=3.95, SD=1.40)			Adequate (M=4.58, SD=1.18)		
Strongly Disagree	3	1.9	Strongly Disagree	1	.6
Disagree	8	5.2	Disagree	3	1.9
Somewhat Disagree	14	9.0	Somewhat Disagree	8	5.2
Neither Agree nor Disagree	20	12.9	Neither Agree nor Disagree	7	4.5
Somewhat Agree	43	27.7	Somewhat Agree	38	24.5
Agree	52	33.5	Agree	68	43.9
Strongly Agree	12	7.7	Strongly Agree	28	18.1
Missing	3	1.9	Missing	2	1.3
Complete (M=3.59, SD=1.43)			Complete (M=4.38, SD=1.25)		
Strongly Disagree	3	1.9	Strongly Disagree	1	.6
Disagree	11	7.1	Disagree	5	3.2
Somewhat Disagree	23	14.8	Somewhat Disagree	8	5.2
Neither Agree nor Disagree	28	18.1	Neither Agree nor Disagree	14	9.0
Somewhat Agree	44	38.4	Somewhat Agree	42	27.1
Agree	37	23.9	Agree	60	38.7
Strongly Agree	9	5.8	Strongly Agree	24	15.5
Missing			Missing	1	.6
Effective (M=4.16, SD=1.26)			Effective (M=4.75, SD=1.07)		
Strongly Disagree	2	1.3	Strongly Disagree	0	0
Disagree	5	3.2	Disagree	1	.6
Somewhat Disagree	9	5.8	Somewhat Disagree	7	4.5
Neither Agree nor Disagree	21	13.5	Neither Agree nor Disagree	10	6.5
Somewhat Agree	43	27.7	Somewhat Agree	30	19.4

Agree	61	39.4	Agree	70	45.2
Strongly Agree	13	8.4	Strongly Agree	36	23.2
Missing	1	.6	Missing	1	.6
Interactive (M=4.05, SD=1.40)			Interactive (M=4.69, SD=1.22)		
Strongly Disagree	2	1.3	Strongly Disagree	0	0.0
Disagree	7	4.5	Disagree	3	1.9
Somewhat Disagree	13	8.4	Somewhat Disagree	9	5.8
Neither Agree nor Disagree	26	16.8	Neither Agree nor Disagree	9	5.8
Somewhat Agree	36	23.2	Somewhat Agree	33	21.3
Agree	51	32.9	Agree	57	36.8
Strongly Agree	19	12.3	Strongly Agree	42	27.1
Missing	1	.6	Missing	2	1.3
Total	**155**	**100%**	**Total**	**155**	**100%**

Section 4: Respondents' Perception of Their Mental Health

General Mental Health

The first question that was asked on the subject of mental health was about whether or not participants struggled with a mental health issue unrelated to the pandemic. It is important to know this information so that we can better understand the direct impact COVID-19 has had on one's mental health. When asked if a current mental condition or health problem reduces the amount or kinds of activity you can do at work, an overwhelming majority of participants responded never (53.5%) or rarely (33.5%), 7.7% of respondents indicated they experience mental health struggles half the time, 1.9% frequently struggle, 1.3% almost always struggle and 1.9% of respondents do not know. Based on sample results, we are looking at a population who generally do not struggle with mental health issues or who are at least not reporting one.

Next, when asked about how their mental health has changed since the beginning of COVID-19, 2.5% of respondents believed their mental health has become poor or very poor, 8.4% somewhat poor, 5.8% neither good nor poor, 26.5% somewhat good, and 56.8% good or

very good. This indicates that the pandemic has had some impact on respondents' mental health, however, the majority of respondents still believe their mental health is good or very good.

Respondents were also asked if, during COVID-19, they have had periods lasting several days or longer where they have lost interest in things or activities they usually enjoy, such as work, hobbies, and personal relationships: 55.5% of respondents said 'yes' and 44.5% of respondents said 'no'. When respondents were asked if they had brief or transient feelings of fear or panic, 61.9% of respondents responded yes, indicating that COVID has, at times, negatively impacted the mental health of the sample group. Although respondents generally do not feel that they are mentally struggling, they are experiencing brief, transient periods where a difference in mental health is observed.

Symptoms of Depression

Using a 7-point Likert scale, respondents were asked to agree or disagree with a number of statements probing for feelings of depression. When asked specifically if they felt depressed, 45.9% of respondents disagreed, compared to 47.7% who agreed, and 5.8% who neither agreed nor disagreed.

Symptoms of Fatigue

When asked about symptoms of fatigue, 49% of respondents indicated that, compared to before the pandemic, their sleep has stayed the same, compared to 23% whose sleep got worse and 25.2% who indicated their sleep improved. On average, respondents are sleeping 7.5 hours per night.

Symptoms of Stress

Respondents were asked about their stress levels related to their day-to-day lives as well as their stress levels specific to work. When compared, respondents' work-related stress was slightly higher (M=3.89, SD=1.01) than general life-related stress (M=3.54, SD=1.27). Respondents also reported that their ability to handle difficult or unexpected problems at work, was high (67.8%), indicating that, despite higher stress levels, respondents are still able to deal with issues that arise at work.

Symptoms of Anxiety

When asked about symptoms of anxiety, on average, respondents somewhat agreed that they have felt more nervous, worried, or more anxious than usual (M=3.57, SD=1.90). Note that 57.4% of respondents agreed with the statement "Overall, I have felt more anxious than usual", 29.1% disagreed and 13.5% neither agreed nor disagreed.

Symptoms of Loneliness

When asked if they have felt more lonely than usual, 47.1% of respondents disagreed, 40.4% agreed, and 6.5% of respondents neither agreed nor disagreed. Survey results also showed that personal relationships have been negatively impacted more than work relationships. However, the impact of COVID-19 on personal relationships is out of scope for this study.

Lack of Attention/Ability to Focus at Work

When asked about their ability to focus on work-related tasks, 43.6% of respondents found it difficult to focus, 46.2% did not find it difficult, and 10.2% neither agreed nor disagreed with the statement presented.

Difficulty Regulating Mood

When asked about their ability to regulate their mood, 41.6% of respondents have found it difficult compared to 49% who have not, and 9.4% who neither agreed nor disagreed with the statement presented.

In addition to the above results, means on general mental health scores were compared in five cases: gender, position, age (recoded into generations), size of company and location. Because the data was not normally distributed, non-parametric tests were considered instead of Pearson's Correlation. Furthermore, the data meets the assumption for both the Mann-Whitney U test and the Kruskal-Wallis H test requiring a continuous or ordinal dependent variable. SPSS has two procedures for running these two tests, a new procedure, and the legacy procedure. The new procedure was used for this analysis.

First, a Mann-Whitney U test was run to determine if there were differences in general mental health scores between males and females. Distributions of general mental health for males and females were not similar, as assessed by visual inspection. General mental health score for males (mean rank = 79.42) and females (mean rank = 67.96) were not statistically significantly different, $U = 2085$, $z = -1.683$, $p = .092$.

Second, a Kruskal-Wallis H test was run to determine if there were differences in general mental health scores between non-management employees (n = 75), managers/supervisors (n = 41), and senior/executive managers (n = 26). Distributions of general mental health scores were similar for all groups, as assessed by visual inspection of a boxplot. Median general mental health scores were statistically significantly different between groups, $X^2(2) = 8.796$, $p = .012$. Subsequently, pairwise comparisons were performed using Dunn's (1964) procedure with a

Bonferroni correction for multiple comparisons. Adjusted *p*-values are presented. This post hoc analysis revealed statistically significant differences in general mental health scores between non-management employees (*Mdn* = 4.00) and senior leaders/executive managers (*Mdn* = 5.00) ($p = .011$), but not between any other group combination.

Third, a Kruskal-Wallis H test was run to determine if there were differences in general mental health scores between age generations: baby boomers (n = 20), Generation X (n = 39), millennials (n = 76), Generation Z (n = 6). Distributions of general mental health scores were similar for all groups, as assessed by visual inspection of a boxplot. Median general mental health scores were statistically significantly different between groups, $X^2(3) = 16.057$, $p = .001$. Subsequently, pairwise comparisons were performed using Dunn's (1964) procedure with a Bonferroni correction for multiple comparisons. Adjusted *p*-values are presented. This *post hoc* analysis revealed statistically significant differences in general mental health scores between millennials (*Mdn = 4.00*) and baby boomers (*Mdn* = 5.50) ($p = .005$) and between Generation X (*Mdn* =5.00) and baby boomers (Mdn = 5.50) ($p = .011$), but not between any other group combination.

Fourth, a Kruskal-Wallis H test was run to determine if there were differences in general mental health scores between size of company: 50 employees or less (n = 45), 51-100 employees (n = 19), 101-500 employees (n = 20), 501-1000 employees (n = 10), 1001 employees and above (n = 50). Distributions of general mental health scores were not similar for all groups, as assessed by visual inspection of a boxplot. The mean rank of general mental health scores was not statistically significantly different between groups, $X^2(4) = 5.016$, $p = .286$.

Finally, a Kruskal-Wallis H test was run to determine if there were differences in general mental health scores across provinces: British Colombia (n = 7), Alberta (n = 39), Saskatchewan

(n = 12), Ontario (n = 28), Quebec (n = 53), Nova Scotia (n = 1), other (n = 15). Distributions of general mental health scores were not similar for all groups, as assessed by visual inspection of a boxplot. The mean rank of general mental health scores was not statistically significantly different between groups, $X^2(7) = 7.248$, $p = .702$.

In summary, when it comes to general mental health, statistically significant differences were observed between non-management employees and senior leaders/executive managers, between millennials and baby boomers, and between Generation X and baby boomers. These findings will be further discussed in the next chapter.

Section 5: Relationships Between Mental Health Characteristics and the Perceived Effectiveness of Communication Using IM Technologies

This section seeks to determine whether a relationship exists between the various mental health characteristics discussed in this thesis (symptoms of depression, fatigue, stress, anxiety, loneliness, attention and mood regulation) and the perceived effectiveness of communication through IM technologies. Kendall's tau-b was used to measure the strength and direction of association that exists between variables because the data is not normally distributed, and all variables are measured on ordinal scales. For each association, the following assumptions were met: at least two variables were measured on an ordinal scale, all variables represented paired observations, and the data followed a monotonic relationship. A total of eight hypotheses were tested. For each, the null hypothesis is as follows:

> H_0: There is no association between *symptoms of mental health* and one's perception of IM use as an effective communication tool.

Respondents' Perception of Their Mental Health and Their View of IM as an Effective Communication Tool

H1: There is a negative association between respondents' perception of their mental health and their view of IM use as an effective communication tool.

A Kendall's tau-b correlation was run to determine the relationships between one's perception of their overall mental health and views towards the effectiveness of communicating using IM technologies amongst 155 participants. There was a weak, positive association between one's perception of their mental health and the view that IM technologies were effective communication tools, which was statistically significant, $\tau_b = .142$, p=.036. A weak positive correlation indicates that, while both variables tend to go up in response to one another, the relationship is not very strong. There was a statistically significant association ($p < .05$) between one's perception of their mental health and views towards the effectiveness of communicating using IM technologies. Therefore, we can reject the null hypothesis and accept the alternative hypothesis.

H2: There is a negative relationship between symptoms of depression and one's perception of IM use as an effective communication tool.

A Kendall's tau-b correlation was run to determine the relationships between symptoms of depression and views towards the effectiveness of online communication amongst 153 participants. There was a weak, negative association between symptoms of depression and views on the effectiveness of online communication, which was not statistically significant, $\tau_b = -.122$, $p = .066$. Because there was not a statistically significant association between symptoms of

depression and one's perception of IM use as an effective communication tool, we cannot reject the null hypothesis and cannot accept the alternative hypothesis.

H3: There is a negative relationship between symptoms of fatigue and one's perception of IM use as an effective communication tool.

A Kendall's tau-b correlation was run to determine the relationships between symptoms of fatigue and views towards the effectiveness of online communication amongst 151 participants. There was a weak, negative association between symptoms of fatigue and views on the effectiveness of online communication, which was not statistically significant, $\tau_b = -.093$, $p = .182$. Because there was not a statistically significant association between symptoms of fatigue and one's perception of IM use as an effective communication tool, we cannot reject the null hypothesis and cannot accept the alternative hypothesis.

H4: There is a negative relationship between symptoms of stress and one's perception of IM use as an effective communication tool.

A Kendall's tau-b correlation was run to determine the relationships between symptoms of stress and views towards the effectiveness of online communication amongst 149 participants. There was a weak, negative association between symptoms of stress and views on the effectiveness of online communication, which was statistically significant, $\tau_b = -.194$, $p = .006$. Because there was a statistically significant association between symptoms of stress and one's perception of IM use as an effective communication tool, we can reject the null hypothesis and accept the alternative hypothesis.

H5: There is a negative relationship between symptoms of anxiety and one's perception of IM use as an effective communication.

A Kendall's tau-b correlation was run to determine the relationships between symptoms of anxiety and views towards the effectiveness of online communication amongst 149 participants. There was a weak, negative association between symptoms of anxiety and views on the effectiveness of online communication, which was not statistically significant, $\tau_b = -.123$, $p = .066$. Because there was not a statistically significant association between symptoms of anxiety and one's perception of IM use as an effective communication tool, we cannot reject the null hypothesis and cannot accept the alternative hypothesis.

H6: There is a negative relationship between feelings of loneliness and one's perception of IM use as an effective communication.

A Kendall's tau-b correlation was run to determine the relationships between symptoms of loneliness and views towards the effectiveness of online communication amongst 147 participants. There was a weak, negative association between symptoms of stress and views on the effectiveness of online communication, which was statistically significant, $\tau_b = -.159$, $p = .018$. Because there was a statistically significant association between symptoms of loneliness and one's perception of IM use as an effective communication tool, we can reject the null hypothesis and accept the alternative hypothesis.

H7: There is a negative relationship between one's ability to focus on work-related tasks and one's perception of IM use as an effective communication tool.

A Kendall's tau-b correlation was run to determine the relationships between respondents' ability to focus on work-related tasks and views towards the effectiveness of online communication amongst 147 participants. There was a weak, negative association between ability to focus on work-related tasks and views on the effectiveness of online communication,

which was not statistically significant, $\tau_b = -.094$, $p = .166$. Because there was not a statistically significant association between one's ability to focus on work-related task and one's perception of IM use as an effective communication tool, we cannot reject the null hypothesis and cannot accept the alternative hypothesis.

H8: There is a positive relationship between one's ability to regulate their mood and one's perception of IM use as an effective communication tool.

A Kendall's tau-b correlation was run to determine the relationships between respondents' ability to regulate their mood and views towards the effectiveness of online communication amongst 146 participants. There was a weak, negative association between ability to regulate mood and views on the effectiveness of online communication, which was not statistically significant, $\tau_b = -.091$, $p = .178$. Because there was not a statistically significant association between one's ability to regulate their mood and one's perception of IM use as an effective communication tool, we cannot reject the null hypothesis and cannot accept the alternative hypothesis.

In summary, there were three correlations that were statistically significant: general mental health on participants' perception of IM use as an effective communication tool, symptoms of stress on participants' perception of IM use as an effective communication tool, and symptoms of loneliness on participants' perception of IM use as an effective communication tool. Consequently, additional correlations were run using these three variables on the other five communication measures: timeliness of communication, accuracy, adequacy, completeness, and level of interactivity.

General mental health. There was a weak, positive association between one's perception of their mental health during COVID and views on the adequacy of online communication, which was statistically significant, $\tau_b = .163$, $p = .016$ and there was a weak, positive association between one's perception of their mental health during COVID and views on the completeness of online communication, which was statistically significant, $\tau_b = .134$, $p = .046$. All other associations were statistically insignificant.

Symptoms of stress. There was a weak, negative association between symptoms of stress and views on the accuracy of online communication, which was statistically significant, $\tau_b = -.141$, $p = .046$ and there was a weak, negative association between symptoms of stress and views on the completeness of online communication, which was statistically significant, $\tau_b = -.143$, $p = .038$. All other associations were statistically insignificant.

Symptoms of loneliness. There was a weak, negative association between symptoms of loneliness and views on the adequacy of online communication, which was statistically significant, $\tau_b = -.166$, $p = .014$ and there was a weak, negative association between symptoms of loneliness and views on the level of interactivity of online communication, which was statistically significant, $\tau_b = -.183$, $p = .006$. All other associations were statistically insignificant.

Section 6: Ordinal Logistic Regressions

The correlations for respondents' perception of their mental health, symptoms of stress and symptoms of loneliness and their belief that IM communication is effective were weak, but statistically significant. Consequently, additional regressions were run to help determine which of these variables better predicts the belief that IM communication is effective in the hopes of

better targeting solutions that address the biggest impact. Because this study is exploratory in nature, four models have been identified for analysis:

- Model 1: Symptoms of stress + symptoms of loneliness on perception of IM communication effectiveness.
- Model 2: Symptoms of stress + symptoms of loneliness + age (recoded as generation) + position in company on perception of IM communication.
- Model 3: Perception of general mental health on perception of IM communication effectiveness.
- Model 4: Perception of general mental health + age (recoded as generation) + position in company on perception of IM communication effectiveness.

These four models were selected in order to determine which model, if any, better predicts IM communication effectiveness, as well as to determine which of these independent variables has a statistically significant effect on the dependent variable – perception of IM communication effectiveness.

It has already been established that non-parametric tests were run due to the unequal distribution of the data. In order to run an ordinal logistic regression, the following assumptions were met: the dependent variable is measured at the ordinal level, one or more independent variables are continuous, ordinal or categorical, there is no multicollinearity, and likeliness of proportional odds is met. Note that ordinal independent variables were recoded into categorical variables using dummy variables. Six new dichotomous dependent variables were also created (Cat1, Cat2, Cat3, Cat4, Cat5 and Cat6) that represent the cumulative splits of the categories of the ordinal dependent variable, communication effectiveness. Next, separate binominal logistic regressions were run on these new dependent variables using the Binary Logistic procedure in

SPSS. This allows us to inspect the similarity between the odd ratios for each slope coefficient to help determine if the assumption of proportional odds is tenable. To complete the regression, both the PLUM and GENLIN procedures were run in SPSS and the associate assumptions were evaluated. The results of the regression are described below.

Model 1: Symptoms of Stress + Symptoms of Loneliness on Perception of IM Communication Effectiveness

A cumulative odds ordinal logistics regression with proportional odds was run to determine the effect of stress and loneliness on the belief that IM communication is effective. The odds of respondents with symptoms of stress considering IM communication effective was not statistically significant. However, feeling lonely (symptoms of loneliness) has a statistically significant effect on the prediction of whether IM communication is thought to be effective, Wald $\chi^2(2) = 5.428$, $p = .066$. Feeling stressed (symptoms of stress) was not statistically significant ($p > .05$). The odds of respondents with symptoms of loneliness considering IM communication to be effective was 0.261, 95% CI [0.073, 0.937] times that of respondents who were neither stressed nor relaxed, a statistically significant effect, Wald $\chi^2(1) = 4.245$, $p = .039$. The odds of respondents with no symptoms of loneliness (relaxed) considering IM communication to be effective was similar to that of respondents who felt neither relaxed nor stressed (odds ratio of 0.438, 95% CI [0.124, 1.544]), Wald $\chi^2(1) = 1.648$, $p = .199$.

These results indicate that, when included with symptoms of stress, loneliness is a better predictor of the belief that IM communication is effective.

Model 2: Symptoms of Stress + Symptoms of Loneliness + Age + Position in Company on Perception of IM Communication Effectiveness

A cumulative odds ordinal logistic regression was run to determine the effect of symptoms of stress, symptoms of loneliness, age, and position in company, on the belief that IM communication is effective. There were proportional odds, as assessed by a full likelihood ratio test comparing the fitted model to a model with varying location parameters, $X^2(21) = 31.304$, $p = .069$. However, the model did not statistically significantly predict the dependent variable over and above the intercept-only model, $\chi^2(7) = 9.839$, $p = .198$. Furthermore, the odds of respondents experiencing symptoms of stress considering IM communication to be effective was similar to that of respondents who do not experience symptoms of stress (odds ratio of .848, 95% CI [0.243, 2.955]), Wald $\chi^2(1) = .067$, $p = .795$. The odds of respondents experiencing symptoms of loneliness considering IM communication to be effective was similar to that of respondents who do not experience symptoms of loneliness (odds ratio of .568, 95% CI [0.257, 1.231]), Wald $\chi^2(1) = 2.074$, $p = .150$. The odds of a non-management employee considering IM communication effective was similar to that of senior leaders/executive managers (odds ratio of .711, 95% CI [0.231, 2.190]), Wald $\chi^2(1) = .352$, $p = .553$. Similarly, the odds of a manager/supervisor considering IM communication effective was similar to that of senior leaders/executive managers, (odds ratio of .522, 95% CI [0.151, 1.810]), Wald $\chi^2(1) = 1.049$, $p = .306$. Finally, an increase in age (expressed as generations) was not associated with an increase in the odds of considering IM communication as effective (odds ratio of 2.062, 95% CI [0.320, 13.305]), Wald $\chi^2(1) = .579$, $p = .447$.

In summary, this model was not a good predictor of the dependent variable, nor were any of the individual predictor variables.

Model 3: Perception of General Mental Health on Perception of IM Communication Effectiveness

A cumulative odds ordinal logistic regression with proportional odds was run to determine the effect of mental health on the belief that IM communication is effective. There were proportional odds, as assessed by a full likelihood ratio test comparing the fitted model with varying location parameters, Wald $\chi^2(6) = 30.864$, $p = .316$. The deviance goodness-of-fit test indicated that the model was a good fit to the observed data, Wald $\chi^2(6) = 4.857$, $p = .563$, and only 6.7% of cells were spares with zero frequencies. Therefore, the model statistically significantly predicted the dependent variable over and above the intercept-only model, Wald$\chi^2(2) = 37.918$, $p = .034$. The odds of respondents with strong mental health (i.e., not struggling with a mental health issue) considering IM communication as effective was .278, 95% CI [.106, .276] times that for respondents with poor mental health, Wald $\chi^2(1) = 6.824$, $p = .009$. Although significant, the difference in odds between respondents with mental health issues and those without is very small.

Model 4: Perception of General Mental Health + Age + Position in Company on Perception of IM Communication Effectiveness

Mental health was the only predictor of IM Communication effectiveness when age (recoded as generation) and position in company were added. The odds of respondents with strong mental health considering IM communication as effective was .381, 95% CI [.131, 1.17] times that for respondents with poor mental health, Wald$\chi^2(1) = 3.142$, $p = .046$. All other variables were not statistically significant.

Based on the results of these regressions, the data best fits model 1, where loneliness is the better predictor of the view that IM communication is effective. Recommendations, therefore, should focus on this outcome.

Summary

This chapter presented the quantitative results of this study. First, survey demographic information was provided. Second, results related to IM frequency of use and type of activity were presented. Third, respondents' perception of the effectiveness of IM communication was described. A comparison was made between perceptions before the pandemic to now. Fourth, overall general mental health statistics and mental health characteristic statistics (symptoms of depression, fatigue, stress, anxiety, loneliness, attention, and mood regulation) were analyzed. Correlations were run to determine differences in overall mental health means between gender, age, position, size of company and location. Results indicated statistically significant differences between non-management employees and senior leaders/executive managers, between millennials and baby boomers, and between Generation X and baby boomers. Fifth, results on the relationship between mental health characteristics and the perceived effectiveness of IM communication were presented. Three correlations were statistically significant: general mental health on participants' perception of IM use as an effective communication tool, symptoms of stress on participants' perception of IM use as an effective communication tool, and symptoms of loneliness on participants' perception of IM use as an effective communication tool. Finally, ordinal logistic regressions were run on four models to determine which indicator variables statistically predict IM communication effectiveness. In model 1, loneliness better predicts IM communication effectiveness than stress. In model 3, overall general mental health is a statistically significant predictor of IM communication effectiveness. When age and position

were added to either model, the overall fit was not statistically significant. This indicates that age and position are not important factors when considering one's perception of IM communication effectiveness. Overall mental health, and specifically loneliness, are better indicators.

The next chapter, Chapter 5, will review the qualitative findings collected during the interview phase and being to discuss key conclusions.

5: Qualitative Results

Introduction

This chapter includes further analysis of the findings presented in the previous chapter, beginning with a review of the purpose of the study and of the literature that was critical to establishing its hypotheses. This is followed by an overall analysis of the qualitative findings and their implications.

Summary of Study

Your mental health influences how you think, feel, and behave every single day. It impacts your ability to function in daily activities and, when good, results in productive work environments, strong and healthy relationships, and the ability to adapt to change and cope with hardship. When someone struggles with mental health, these factors are all negatively impacted. Pandemics or extenuating situations aside, even the smallest, incremental changes in psychological and cognitive emotions have the potential to negatively impact your actions. This is why, as we navigate a global pandemic, the study of its repercussions on mental health has become a critical area of research by governments, private sector organizations, and academics. Not only are the immediate impacts being studied, but these impacts are also being compared to the outcomes of previous pandemics with the intention and hope that as a society we can be better prepared to deal with the fallout.

Over the past eleven months, people have had to embrace change, especially in their work environment and how they communicate with their colleagues, teams, and customers. This has absolutely reignited the conversation around the effectiveness of online communication tools. These technologies are not necessarily new to people; video meetings (Zoom,

GoToMeeting, WebEx, Skype, etc.) and IM text-based threads/conversations (Slack, Microsoft Teams, WhatsApp, iMessenger, etc.) were being used in the workplace prior to the pandemic. The difference is that, while these tools were *available* before*,* now they have become *necessary* in order to get work done. In the 2019 Global Human Capital Trends report, Deloitte reported that employers had a high level of anxiety about whether online communication tools, which were positively trending among employees, aligned with business goals. The advent of COVID-19, however, ushered in their rapid adoption and acceptance, albeit reluctantly in some cases (Cho, Lee, and Kim, 2019). It has become very clear that these tools are being used, but, other than anecdotally, what do we know about their true effectiveness, especially within the context of a global pandemic? Examining how workers communicate using online communication tools, and in particular instant messaging technologies, has minimal effect unless we also consider another variable that has become synonymous with the pandemic – mental health. How do mental health characteristics such as depression, fatigue, stress, anxiety, and loneliness, as well as ability to stay focused on work tasks and regulate mood, impact one's perception of the effectiveness of IM, or text-based online communication?

The purpose of this study is to explore the relationship between mental health characteristics and the perceived effectiveness of communication through instant messaging technologies. The current global pandemic affords the unprecedented opportunity to compare and contrast this relationship pre-pandemic, as well as talk to people about how they have coped with the changes that resulted from working remotely and the strategies they have adopted to address potential mental health challenges.

Thus, the research questions that guided this thesis are:

1. How often do workers use instant messaging technologies to communicate with their colleagues and/or clients?
    a. Has the frequency rate of IM use increased or decreased as a result of COVID-19 and having to work from home?
2. What types of conversations are being had over instant messaging?
    a. Have the types of conversations on IM changed due to COVID-19?
3. How effective is IM as a communication tool for work purposes?
    a. Has one's perception of the effectiveness of IM communication changed because of the pandemic?
4. How has COVID-19 impacted one's mental health and ability to be productive at work?
5. What is the impact of perceived symptoms of mental health (depression, fatigue, stress, anxiety, and loneliness) on IM usage and perceived communication effectiveness?
6. How have workers coped with the changes that come from working remotely? and
7. What strategies have been developed to address potential mental health challenges caused by the pandemic?

To further investigate the relationship between mental health on perceived IM communication effectiveness during COVID-19, it is worth reviewing the literature that emerged after two similar virus outbreaks: severe acute respiratory syndrome (SARS) and Middle East respiratory syndrome (MERS), which are also caused by coronaviruses. Interestingly, similar mental health issues were reported as a result of these two outbreaks. Research from communities affected by SARS and MERS showed widespread panic and anxiety (Tiwari et al.,

2003; Lee et al., 2007). Depression (Hawryluck et al., 2004; Mihashi et al., 2009), stress (DiGiovanni et al., 2004), mood alterations, irritability and insomnia (Kim et al, 2018), and emotional exhaustion (Maunder et al., 2004) were also reported. Additional psychological reactions experienced by the general public included fear (Bai et al., 2004; Cava et al., 2005), pervasive anxiety (Jeong et al., 2016), frustration (Saad et al., 2014), boredom and loneliness (Mackay et al., 2005). These referenced studies are summarized in Appendix B.

What is significant about these previous findings is that we can draw parallels to what is happening as a result of the current coronavirus pandemic, albeit on a much larger scale because more people have been impacted by this virus.

Data were collected in two phases. First, using an online survey disseminated primarily through social media (LinkedIn and Facebook), and second through semi-structured interviews. A survey instrument was developed using pre-existing instruments and measures, and the interview protocol was designed based on the preliminary survey results. A total of 257 survey responses were collected, and 23 interviews were completed. A pilot study had been conducted to test the comprehensibility of the survey and interview questions. Based on the results of the pilot, minor modifications were made to both instruments.

Findings

The study findings will be presented in four sections. First, a discussion will be provided on how the work environment has changed overall and how this has impacted how people communicate at work. Second, the focus will shift specifically to IM usage in this context. Third, how COVID-19 has impacted one's mental health and perception of IM communication effectiveness will be discussed. This section will include a review of key themes that emerged

from interviews and their implications. Fourth, the final research question will be tackled - how workers have been coping with the changes that came from working remotely and what strategies they have adopted to address potential mental health challenges caused by the pandemic.

Changes to the Work Environment and How Workers Communicate

The pandemic has required most knowledge-based workers to work remotely, which has changed how they interact and communicate with others. Based on the sample in this study, most survey respondents and all interview participants held office jobs and were required to work exclusively from home beginning March 2020. Survey respondents had the option of answering an open-ended question about their work situation during the pandemic, and 51% provided comments. Generally, with the shift to at-home work, the requirements and responsibilities of their jobs similarly stayed constant. What has changed is their days have become less structured; there are no more commutes, no travel, the absence of coffee breaks, regular social work lunches and events, and more time spent online in front of a screen.

For individuals where collaboration was a big part of their day-to-day activities, initially the only change was that conversations moved online instead of being in-person. At the outset, participants felt that decisions were being made just as effectively as when they were in the office. However, as the pandemic progressed, collaboration became more difficult, people were more tired, and it was reported that the dynamics between colleagues changed. Participants indicated that conversations were less structured, more time was being spent “checking in” with each other, and, sometimes, decisions took multiple meetings because the right people were not always available. From a productivity perspective, participants felt that less structured conversations slowed productivity. At the same time, people felt the need to see how others were

handling changes and stresses resulting from the pandemic. Although conversations were longer and less productive, there was an increased sense of empathy and a curiosity around how people were coping. Once acknowledged, discussions would shift to the work at hand.

A second dynamic that changed was the relationships between colleagues. Where workers used to feel connected to their peers, now they feel more isolated. Despite feeling this way, participants did not believe that the lack of connectivity negatively affected communication. The digital world and 'talking in text' is no substitute for face-to-face conversation. It is being tolerated because of its necessity, but participants may quickly become tired of these virtual environments.

Text-Based Communication and IM Usage

Finding: Work from home mandates due to the pandemic have resulted in the increased use of online communication tools, including IM. Survey results showed that IM usage increased during the pandemic, however, this is not surprising due to work from home requirements and inability to meet in person with others. When we talk about online communication tools, our thoughts immediately go to Zoom or text-based communication, yet I would argue that knowledge workers spend more time using IM technologies than any other online communication type. In this study, 61.9% of respondents use Microsoft Teams throughout their day, and 11.6% use Slack. This accounts for more than 70% of all respondents. The perception is that they are chatting *all day*, and some provided estimates of being on [Microsoft] Teams up to four hours per day. Others indicated that their chat was "very active". Chatting with colleagues has become a way to stay connected, ask and answer questions and collaborate. It has become a necessary tool that employees have had to embrace without much direction and without any real policies or governance around their use. One participant indicated that the types

of conversations that were had in person before the pandemic now happen through chats. Another felt that, since they have transitioned to remote working, the frequency of [Microsoft] Teams messages has increased. While the pandemic has not necessarily changed the nature of the work, it has changed how it occurs. Furthermore, a few participants felt that instant messaging allowed for more direct communication. There was also a comfort level that was not there before the pandemic. According to one participant, "I have always used IM with my team, however, during the pandemic I feel more comfortable messaging colleagues, especially if I do have a strong relationship with them. Picking up the phone doesn't feel right". Perhaps this is because chat-based communication has become a new shared reality; everyone is doing it. This could also be because chat feels less invasive, when the lines between work life and home life have arguably been blurred. Overall, the types of conversations participants reported having ranged from being conversational to being technical. Interview participants noted using IM for "chit-chat", as a replacement for the water cooler conversations, for asking questions and seeking answers, and for scheduling meetings when topics were more sensitive and warranted a video conversation. Ultimately, chatting with colleagues has become a way to stay connected, ask and answer questions and collaborate.

Navigating key features/benefits: There were two key features that resonated among participants. First was the fact that IM platforms keep a thread, or record, of conversations, which is then searchable at a later date. Although one could argue that email provides the same advantage, IM conversations tend to provide more dialogue and discussion around why a decision is made (they sometimes represent someone's thought process behind a decision), which is useful if someone needs to refer back to the conversation. It is believed that the informal nature of IM allows for more open conversations where users are essentially getting a more

truthful response that they can refer back to if needed. In comparison, it is more difficult to decipher tone in an email message.

A second feature worth mentioning is the status setting. There is ample research that talks about the benefits of the "status" feature in IM platforms (Ou and Davison, 2011). This literature also puts forth that users generally respect colleagues' status (Rennecker and Godwin, 2003), meaning, for example, if someone's status is set to busy, people are less likely to interrupt them. Based on conversations related to this study, roughly half of respondents believe status is respected. Those who did not feel their status was respected indicated that colleagues would send messages with the understanding that they might not get an immediate response. Regardless, the constant 'ping' of messages was still distracting for these individuals. There was an overall understanding among respondents that people's workdays were more consumed with childcare responsibilities and a shift to non-traditional hours. Consequently, rather than acting as an immediate means of getting a question answered, traditionally what IM has been marketed for, IM was instead being used to ask a question with the understanding that the response would come when the recipient was able to respond. From an organizational productivity perspective, this obviously is not ideal. Whereas before someone could pop their head over their cubicle and ask a question, the time lag introduced by IM technologies slows the work process.

Finding: Overall, participants believe IM communication is effective, but it takes effort. When it comes to its effectiveness, interview participants felt IM communication was "effective enough", meaning that the information that was being passed back and forth was useful and helped in progressing work tasks, however, many workers felt at times they had to work harder to ensure the medium's effectiveness. Respondents echoed the sentiment that it is still difficult to replicate personal chemistry and the visual cues that occur with face-to face

communication. It was also noted that IM has to be widely adopted if it is to be deemed effective within an organization. There were some cases where one department was using IM, but another department was not, or different IM software was used between different teams within the same organization. Put simply, messaging platforms can be noisy when used by an entire organization and not properly managed. One organization I spoke to uses Slack, Microsoft Teams, Zoom and Discord – can you imagine having to monitor all of these, in addition to email? Another organization uses Slack only, but there are thousands of threads on various topics. So yes, these tools keep people connected and facilitate discussions as if you are in the office but, to be effective, organizational guidelines governing their use need to be in place.

Lack of visual cues. It is not surprising that respondents mentioned the lack of visual cues associated with IM. Human beings have perfected face-to-face communication over the course of hundreds of years. When someone new walks into an office, they learn very quickly how to act and how to communicate with others just by watching how others act and communicate. This skill does not necessarily have to be taught. In comparison, IM has only existed for 20-years and, even then, Jabber, an open-source application launched in 2000, was technologically nowhere near what we have today. It really wasn't until 2010, when social networking providers offered IM capabilities, that the concept of IM, or chat, was normalized. Even then, these tools were not being used in the workplace. Slack, which was one of the first true online instant messaging technologies built for the workplace, first launched in August of 2013 so, in hindsight, workplace IM communication has only been around for eight years, yet there is an expectation that using it for communication purposes is mainstream. Where organizations have developed communication policies around working in the office, in most cases these do not exist for remote, online-based communication. The pandemic ultimately

forced workers to adopt IM technologies without any real guidance or governance around its use. These technologies were developed during non-pandemic times to improve workplace efficiencies. They were not developed for entirely remote workforces. These technologies effectively facilitate remote work; however, is it possible that during the pandemic they have played a role in employee burn-out? Have they contributed to mental health challenges? Are we experiencing too much noise? At the end of the day, the pandemic has resulted in these online tools being forced on people, without any real policy direction. Over the next year, online communication etiquette is a business area that organizations will not be able to ignore. There seems to be a growing need to document clear policies and governance around online communication similar to those that exist for general office communication and technology use.

Technologies resulting in "Zoom fatigue"/burnout. Another trend that has emerged is what is being referred to as "Zoom fatigue" (Jiang, 2020), or always "feeling on". Used in the right way, IM can improve engagement, productivity and collaboration, allowing coworkers to exchange ideas. On the other hand, IM has become yet another form of communication and is simply an added source of stress. According to some, IM feels like a turbo-charged distraction and, by its very nature, demands our instant attention. To some degree, there is a feeling that there are too many platforms that are used to get in touch with people. One participant indicated that they feel like they are constantly managing multiple platforms to manage situations which used to be solved by popping into someone's office for a quick chat. There is an overwhelming feeling that there is less time for uninterrupted work. Even when time has been deliberately blocked, interruptions are still significant. One participant went so far as to say that colleagues were more considerate and there were fewer interruptions when everyone was working in-office. Although the number of communication channels has not increased compared to before the

pandemic, the difference is that, now, more people are being required to use them, which has resulted in employees feeling that they are constantly being pulled in different directions throughout the day.

These findings reference IM use and its perceived effectiveness without considering the impact of the pandemic, changing work environments, and the mental toll completely unrelated to its use. The positive points that have emerged from this study around general IM usage is that IM is less formal and more conversational, it provides space when the lines between work-life and personal-life have blurred, and conversation records are recorded and searchable. The negatives include possible additional distractions, lack of visual cues that are important in workplace conversations, the perception that more time is spent on chats than getting actual work done, and lower productivity resulting from not getting questions answered quickly. Despite these disadvantages, most workers agree that, based on the circumstances, IM communication meets their needs and is positive when it comes to communicating with their colleagues and/or clients and getting work done.

The Impact of COVID-19 On One's Mental Health and Perception of IM Communication Effectiveness

Overall Impact of COVID-19 on Mental Health

Finding: The pandemic has not impacted participants' overall mental health, but they do report having brief transient periods where they have felt more anxious or stressed. Survey respondents were asked to indicate if their mental health has changed since the beginning of the pandemic. The majority of respondents believed that their mental health had not changed and was strong (2.5% of respondents believed their mental health had become poor or very poor,

8.4% somewhat poor, 5.8% neither good nor poor, 26.5% somewhat good, and 56.8% good or very good), suggesting that, based on the population surveyed, mental health struggles are not apparent, or respondents are not reporting that their mental health has been impacted. Of the various characteristics of mental health that were asked about, between 40 and 50 % of respondents indicated feeling depressed, tired, stressed, anxious or lonely. On average, more people did not report symptoms of mental health than those that did. However, when asked about having brief or transient feelings of fear or panic, 61.9% of respondents responded yes, indicating that COVID-19 has, at times, negatively impacted their mental health.

Based on what we know from previous studies on the mental health impacts resulting from pandemics, these findings are surprising as more respondents should have reported having mental health struggles. Furthermore, mental health has become one of the most talked about topics in the mass media aside from the details around the pandemic itself and how governments are responding and keeping people safe. An online search beginning March 2020 of cbc.ca returned 1237 article on the mental health impact of COVID-19, theglobeandmail.com returned 393 articles, and nationalpost.com returned over 10,000 articles. It is true that daily headlines read ‘Canadians report worse mental health than before pandemic’, but if you delve deeper into the actual findings, on average 35 – 40 % of respondents in these various surveys are feeling worse or somewhat worse (see Table 7 and 8 in Appendix B). One could argue that these headlines are misleading. Ultimately, our findings show similarities to these reports when each individual symptom of mental health is analyzed, but not on overall mental health.

Due to the nature of these quantitative findings, semi-structured interviews provided for a unique opportunity to better understand these results. First, when asked how the pandemic has impacted their overall mental health, interview participants confirmed what was initially found

indicating that it has not. Sixteen of the twenty-three participants initially answered this question stating there has been no impact. However, as the conversations progressed, key themes started emerging. Early on, mental health was not a significant factor but, as the pandemic continued, participants started to feel tired, more anxious and isolated, and disconnected. Days started to feel longer, in some cases boredom set in, and any sense of normalcy was missing. Despite reporting these feelings, there was a general consensus that one's mood varied depending on the day, there were ups and downs, good days and bad days, and a lot of the times participants were unable to pinpoint what was causing these emotional changes. According to survey results, stress and loneliness were the biggest impacts and were negatively associated with perception of IM effectiveness. Conversations with interview participants echoed these symptoms, but they also reported feeling more tired and anxious.

Symptoms of fatigue. "COVID fatigue" is real. As the pandemic wears on, it is understandable that some people are getting tired of it. People are tired of missing their family and friends, tired of not having a routine, of not going into the office, all of which are putting a mental and emotional toll on everyone. At the time of this study, participants were not burnt out per se, but their mental capacity to cope was diminishing. Interestingly, this did not impact their ability to work. In fact, some saw their patience levels increase – they understood and were aware that COVID-19 was impacting others differently and therefore had more sympathy and empathy towards other people. Others were less patient but found that IM communication masked how they truly felt when talking with colleagues.

When tired, participants generally do not believe that IM communication is effective. Yet, at the same time, they also indicated that being able to communicate online instead of face-to-face hid this fatigue. One participant stated, "because IM is so informal, when I'm tired I can

get away with quick and short responses back to my colleagues. If I were in the office, I'd have to sit through a meeting". Another participant indicated that they noticed a difference between feeling tired and bored. When this particular individual is tired, they are less likely to reach out to someone through IM to have a conversation, unless they notice that person is online. That being said, sometimes the accuracy of the communication is negatively impacted, "when I'm tired or fatigued I feel communication is much worse when done online [because] I'm less likely to be invested and I don't push to get a task done; there is less urgency". In this case, fatigue resulted in lack of motivation, and lack of motivation resulted in less effective communication. However, it is important to understand that participants do not think this is unique to IM communication, rather the same could be said for in-person, face-to-face communication. Overall, when the responses to the question '*when you are tired, how likely are you to use an online platform as a communication tool?'* are examined, the consensus is "not likely". This is not surprising because this is observed with other forms of communication in the workplace. Research shows that fatigue impacts motivation, which in turn leads to burnout or complicity and work ultimately not getting done quickly (Levenson, 2017). Nevertheless, this does not mean IM communication is ineffective, just that the tired individual is less likely to engage.

Symptoms of anxiety. 57.4% of survey respondents agreed with the statement 'overall, I have felt more anxious than usual', and it seems, based on findings from the interviews, that this source of anxiety primarily comes from the uncertainty surrounding the pandemic; not knowing if they or a family member are going to get sick, not knowing when the pandemic will be over, and wondering when things will feel normal again. A secondary cause was observed in those individuals who indicated an obsession with the news. Similar to what was observed with increased symptoms of fatigue, anxiety levels do not seem to impact one's ability to

communicate effectively using IM. Feelings of anxiety are not being projected on others through text-based communication, but participants did indicate that this was apparent on a Zoom or video call. Moreover, when others are anxious, unless it is extreme, participants find it difficult to tell or even notice a difference in communication behaviour. Whether or not someone is likely to use an IM technology if they feel more anxious than usual depends on whether or not the participant feels that being social helps them mitigate anxious feelings. However, this really has nothing to do with one's ability to effectivity communicate using IM for work purposes.

Symptoms of stress. As identified in the previous results chapter, we were able to reject the null hypotheses that there is no relationship between symptoms of stress and one's perception of IM use as an effective communication tool and accept the alternative hypothesis that there is a negative relationship between these two variables. A weak but negative association between symptoms of stress and views on the effectiveness of IM communication was statistically significant, $\tau_b = -.194$, $p = .006$. In other words, an increase in stress is associated with a decrease in the perception that IM communication is effective. The correlation coefficient is quite small, which suggests that the association is relatively weak, which is partially explained through interview data.

Stress was not a symptom that interview participants felt was heavily impacted by the pandemic. If anything, participants felt that work was causing more stress than before the pandemic, only because there were so many changes that occurred very rapidly. Despite these findings, respondents feel that, when at work, they are able to effectively communicate online and their ability to handle difficult or unexpected work-related problems that causes increased stress is quite high (67.8% of survey respondents reported that their ability to handle difficult or

unexpected problems at work was high). Regardless if participants felt more or less stressed, this did not change their opinion on the effectiveness of IM communication.

As will be discussed later in this chapter, it is possible that online communication and the availability of communication options is contributing to increased stress levels and indirectly making IM communication ineffective. If we are spending all day managing these technologies and responding to chat messages, less time is being spent on getting work done, exacerbating the overwhelming feeling that there is not enough time in the day to accomplish everything, ultimately leading to longer hours.

Symptoms of loneliness. Similar to symptoms of stress, a weak negative association between symptoms of loneliness and view on the effectiveness of IM communication was statistically significant $\tau_b = -.159$, $p = .018$. Although we can reject the null hypothesis that there is no relationship, a correlation of .159 is very weak and shows a very small association. This makes sense based on the finding that only 40.4% of respondents felt lonely. However, interview data would indicate something different. When interview participants were asked if they felt more lonely than usual, there was an overwhelming yes response. Loneliness primarily resulted from not being able to see friends and family, but missing the social aspect of being in the office was also a contributing factor. Now that everyone is working from home, there are less opportunities to connect and talk to people on a daily basis. The lack of a social outlet is also affecting participants' mood. Participants miss the social interactions of being in the office, the flexibility of being able to go out for lunch or go for a walk. This is not, however, impacting their ability to be productive at work, nor is it impacting their ability to communicate with colleagues.

Further analysis showed a negative association between symptoms of loneliness and views on the adequacy of online communication, which was statistically significant, $\tau_b = -.166$, $p = .014$ and a weak, negative association between symptoms of loneliness and views on the level of interactivity of online communication, which was statistically significant, $\tau_b = -.183$, $p = .006$. These findings are interesting because interview participants thought that, although they may think to use IM to communicate with others when they feel lonely, they would agree that the actual information being communicated and their ability to collaborate may decrease. One participant said that they like using IM to check in with their colleagues but, if their colleagues are busy, responses back are short and not engaging. Over time, they think they will be less likely to continue this behaviour. One might wonder if this behaviour is already apparent based on the significant correlation between loneliness and level of interactivity; the lonelier someone feels, the less likely they are to feel that IM is an interactive communication tool. IM might be interactive-enough for work purposes, but when it comes to helping someone feel more connected (i.e., less lonely), face-to-face communication might still be the best option.

Finding: Experiencing mental health symptoms does not change one's perception of the effectiveness of IM communication. To summarize what was discussed above, there is very little indication that mental health characteristics change one's perception of the effectiveness of IM communication. Feeling more stressed or lonely is negatively correlated with the perception of IM communication effectiveness, but this is not backed up by anecdotal evidence and the correlation was weak. However, there is justification for exploring whether or not the IM technologies used by employees are exacerbating these two symptoms. On the one hand, are employees required to stay connected on too many applications, which is overwhelming them and causing stress, or are these IM technologies too informal? Yes, you are chatting with

someone, but is the lack of in-person connection perpetuating feelings of isolation and loneliness? Human beings are inherently social and want to be in the presence of others. If we know that the pandemic is resulting in people feeling lonely and more stressed, what can employers do to ensure, when their employees are using these technologies, that these feelings do not manifest into something worse?

This study also showed that there were differences in general mental perceptions between millennials and baby boomers and between Generation X and baby boomers. Both millennials and Generation X were more likely to indicate worsening mental health because of the pandemic in comparison to baby boomers. Initially, I would have expected that, because more baby boomers held higher job positions (senior leaders/executive managers) than millennials and Generation X, their stress and anxiety levels would be higher because they are responsible for navigating their businesses during a pandemic and keeping their workforce employed. However, this was not the case. One explanation is that baby boomers did not grow up in a society that discussed mental health issues; there was a stigma around mental health and potentially this made them less likely to report their true feelings in this study. A second explanation is that millennials are in the phase of their lives where they may be working up the corporate ladder and/or navigating having kids at home. Although most survey respondents were not worried about their job security (79.5% of respondents were not concerned about losing their job), many miss being social, and many are dealing with changed family dynamics.

Finding: Work has become a temporary distraction from COVID-19 and any mental health symptoms one might be experiencing because IM technologies have helped in normalizing work-related tasks and staying connected. COVID-19 has impacted people's work-life balance but, for many, work has been a welcome distraction. All participants recognize how

lucky they are to be employed compared to those people who have lost their jobs or who work in a sector that has been grossly impacted by the pandemic. For some, work took priority because it was something that they could control. There were also expectations and deadlines that had to be met, regardless of any impact the pandemic was having on them. Early on in the pandemic, working from home was an added stress for many participants. They felt that they had a shorter attention span, it was harder to get settled and focus, and new distractions had to be navigated. However, as soon as it became clear that the situation was not changing and that working from home was not a short-term solution, participants were forced to re-evaluate their realities, and think about how to manage their time, attention and energy. Remember, at the time this study was conducted, people had been working from home for over six months. I would not say people believed things felt normal, but they definitely were more comfortable in their new routines.

Many participants indicated that there were new distractions that they had to deal with, namely being home with their family, significant other, and/or kids. There was also the overconsumption of news related to the pandemic that provided a negative distraction. I think that we have been quick to forget that working in the office presented its own distractions. Participants recognized that there were not necessarily more distractions at home, they were just different, and they had to find new ways to navigate them. Most found that, by having a dedicated workspace and setting up a new routine, they were able to focus on their work.

In this thesis, it was predicted that there would be a negative relationship between one's ability to focus on work-related tasks and their perception of IM as an effective communication tool. Analysis of survey data did not show a statistically significant relationship and therefore we cannot reject the null hypotheses that there is no difference. Based on interview data, this finding can be confirmed as participants did not feel that their ability to focus impacted their overall

perception of IM as an effective communication tool. However, it was discussed that during times when someone was waiting for a response back, work slowed down and the inability to walk into someone's office to get a question answered was frustrating. Another concern people had was that they found it challenging to focus on work when they either could not connect with someone on chat to discuss work-related items, or when people were constantly messaging them. In these two situations, IM was not considered as effective, however, in the grand scheme of things, without it, participants felt their ability to complete their work would be worse.

Finding: Employees have adopted personal coping mechanisms into their day-to-day lives to mitigate potential mental health impacts. It is clear that some people are coping better than others. However, key individual coping strategies that were discussed include:

- Setting and sticking to clear work hours.
- Trying to remain present and empathetic when talking with others.
- Trying to have a positive attitude and friendly demeanor.
- Offering to help others.
- Creating a dedicated, welcoming workspace.
- Investing in proper technologies (i.e., monitors, keyboard, mouse, chair, etc.).
- Being goal-oriented.
- Reading versus being on social media.
- Exercising/going outside for fresh air.
- Focusing on personal health and wellbeing, as well as work-life balance.
- Being forgiving of oneself.
- Speaking up about fatigue.
- Asking for more frequent feedback.

- Disconnecting from the news and social media when at work.
- Recognizing personal triggers and addressing them, as necessary.
- Building small, positive habits into the day.
- Playing video games/family game nights.
- Scheduling virtual coffee chats/breaks.
- Having creative outlets like crafts and artistic projects.
- Downloading and using wellness apps on devices.

There were also some key strategies that emerged from those individuals in supervisory/managerial positions, including:

- Increasing communication with team - some have daily check ins others do it on a weekly basis.
- Setting weekly team goals collaboratively.
- Assigning a moderator to all group chats or calls.
- Having more respect for the needs of others and being a comfortable resource to talk to.
- Using the screenshare option when chatting.
- Relying on shared calendars.
- Organizing weekly/monthly online team-building activities.
- Encouraging team members to take up a hobby outside of work.
- Refraining from engaging with staff outside of work hours (including sending emails).

As distracting and impactful as the pandemic has been for some, there are others who indicated that it has simplified life. For these individuals, their days are less hectic because they have stabilized their schedules. The pandemic has also forced people to connect with others in deeper ways, something which some participants noted was previously taken for granted. For these individuals, there is a worry of what will happen to these positive changes when life goes back to normal.

Summary of Conclusions

Table 8 provides a summary/response for each research question analyzed in this dissertation.

Table 8

Summarized answers to research questions

Research Question	Result
1. How often do workers use instant messaging technologies to communicate with their colleagues and/or clients?	Knowledge workers are overwhelmingly using IM technologies as a way to communicate with their colleagues and clients and complete work tasks.
a. Has the frequency rate of IM use increased or decreased as a result of COVID-19 and having to work from home?	Compared to before the pandemic the frequency rate of IM use has increased as a result of COVID-19 and having to work from home, and knowledge workers are spending more time using IM than any other online communication tool.
2. What types of conversations are being had over instant messaging?	Knowledge workers are using IM to ask and answer simple questions, to have work-related discussions and conversations, to schedule meetings, share files, and engage in non-work-related conversations.
a. Have the types of conversations on IM changed due to COVID-19?	The types of conversations have not necessarily changed, however, how often these are occurring has increased. For example, where 12 % of respondents often or

	very often used IM for work-related conversations prior to the pandemic, this jumped to 60% of respondents often or very often using IM for work-related conversations during the pandemic.
3. How effective is IM as a communication tool for work purposes? a. Has one's perception of the effectiveness of IM communication changed because of the pandemic?	Results indicate a slight increase in the belief that IM communication is more effective now compared to before the pandemic. On overall effectiveness, 47% of respondents agreed or strongly agreed that IM communication was an effective tool pre-pandemic, and 69% agreed or strongly agreed that IM communication is an effective tool during the pandemic. The biggest differences occurring in respondents' perception of the adequacy and completeness of the tool. On average, a very small percentage of respondents somewhat disagree, disagree, or strongly disagree for each measure.
4. How has COVID-19 impacted one's mental health and ability to be productive at work?	It does not appear that COVID-19 has impacted one's mental health and their ability to be productive at work to the extent that I would have predicted based current dialogue in the field and previous research. However, 55.5% of respondents did report having periods lasting several days or longer where they lost interest in hobbies and the activities that they usually enjoy doing, and 62% of respondents had brief feelings of fear or panic.
5. What is the impact of perceived symptoms of mental health (depression, fatigue, stress, anxiety, loneliness, ability to focus, and mood regulation) on IM usage and perceived communication effectiveness?	Depression: When asked if respondents felt depressed, 45.9% disagreed compared to 47.7% who agreed (5.8% neither agreed/disagreed). Fatigue: When asked about symptoms of fatigue, 49% of respondents indicated that, compared to before the pandemic, their sleep has stayed the same, compared to 23% whose

	sleep got worse and 25.2% who indicated their sleep improved. On average, respondents are sleeping 7.5 hours per night. Stress: Despite higher stress levels at work compared to home-life, respondents are still able to deal with issues (67.8% of respondents indicated being able to handle difficult/unexpected problems at work). Anxiety: 57.4% of respondents agreed that overall, I have felt more anxious than usual. Loneliness: When asked if they have felt more lonely than usual, 47.1% of respondents disagreed, 40.4% agreed, and 6.5% of respondents neither agreed nor disagreed. Lack of attention/ability to focus at work: When asked about their ability to focus on work-related tasks, 43.6% of respondents found it difficult to focus, 46.2% did not find it difficult, and 10.2% neither agreed nor disagreed with the statement presented. Difficulty regulating mood: 41.6% of respondents have found it difficult compared to 49% who have not (9.4% who neither agreed nor disagreed). Stress and loneliness were the only two variables that significantly impact one's perception of the effectiveness of IM communication. As stress or loneliness increase, there is a decrease in the perception that IM is an effective communication tool.
6. How have workers coped with the changes that come from working remotely?	Employees are adjusting to the new normal, and are coping better than we might expect. Not only are challenges with mental health symptoms not as worrisome as we might have expected, but there is also a sense that workers are resilient; resilience has helped workers navigate and overcome adversity caused by COVID-19.

7. What strategies have been developed to address potential mental health challenges caused by the pandemic?	There are various personal coping mechanisms that knowledge workers have incorporated into their day-to-day lives that have potentially mitigated declining mental health. The top five strategies for employees and employers are: • Employee strategies: - Having an outlet (fitness, creative) - Remaining present and empathetic when talking with others. - Focusing on personal health and well-being. - Speaking up about fatigue, stress and asking for more frequent feedback. - Scheduling virtual coffee chats/breaks. • Employer strategies: - Setting weekly team goals collaboratively. - Assigning a moderator to all group chats/calls. - Using the screenshare option when chatting. - Organizing weekly/monthly online team-building activities. - Refraining from engaging with staff outside of work hours.

What is important to take away from this study is increases in stress and feeling lonely have the potential to negatively impact text-based communication. This statement is based on perception data only, nevertheless it is a sentiment that should not be ignored by management because it is coming directly from how workers are feeling. Second, since we learned that loneliness is a better predictor than stress, disengagement should not be ignored and measures should be put in to place to foster team relationships, even if that means doing it online. Just

because we have moved to remote work, does not mean that collaboration has stopped; we still work in teams and accomplish tasks as teams. My findings indicated that collaboration through these tools was difficult because there was less structure compared to face-to-face communication. But because teams had to adapt to the technology, key pieces of IM functionality were found to be helpful in collaboration, namely the ability for the platform to keep a thread with the conversation as a 'notes set' that could be later referenced, and it allowed those who were less comfortable communicating face-to-face to contribute more to the conversation. These individuals felt that it was easier to share their thoughts and opinions through text versus in a boardroom.

My conclusion and contribution to the literature is that we know there are challenges with IM communication, especially when we are comparing it to face-to-face communication. I do not know if it will ever present the same richness, however, we have had hundreds of years to learn how to collaborate in person, face-to-face and the same cannot be said for online collaboration. I believe there is a need, therefore, for guidance and technological governance around online communication. Although organizations have developed communication policies around working in the office, in most cases these do not exist for remote, online-based communication. The pandemic has left organizations scrambling to some degree. Online communication tools are keeping employees connected, but employees are also feeling the impact of the pandemic, a feeling that isn't going to go away overnight. Therefore, organizations need to address this gap, especially as work continues to be team-based and as a society we move to hybrid work from home environments.

Furthermore, online tools seem to be most effective in tackling loneliness when used to enhance existing relationships or form new meaningful conversations. These tools are

counterproductive if used as a substitute for real-life social interactions. Therefore, fostering strong team relationships, building trust, respect, self-awareness, inclusion, and open communication, irrespective of the technology being used, is critical. As employers recognize disengagement, they need to work harder at building the relationship among team members since technology (regardless of what it is) is only as effective as the people using it.

Finally, organizations need to continue to destigmatize mental health in the workplace and provide supports for employees who need them. At the end of the day, and in times of crisis, early, frequent, and honest communication helps employees cope and build a culture of resilience that mitigates against worsening personal mental health.

Summary

This chapter presented the qualitative results of this study. First, it is not surprising that work environments have changed. Survey respondents and interview participants have all been required to work from home for over a year now and they have had to adjust to new realities. Second, both quantitative and qualitative data show the increase use of online communication tools, especially IM technologies. Despite this increase, participants believe IM communication is effective, but it is exhausting, and it takes effort. The lack of visual cues, online fatigue (also known as “Zoom fatigue”), and no consistency around when and how to use these technologies has made it difficult for users to focus. Third, overall mental health issues are not being reported by those who responded to this survey, however, respondents did notice increased stress levels and brief periods where they are more anxious than usual. The study also observed increases in people feeling lonely, which has likely been caused by the mandated social distancing regulations. Despite these increases, they are not significantly changing people’s perception of the effectiveness of IM. Finally, it is evident that participants have adopted coping strategies,

which may be mitigating the mental health symptoms that we would have expected. This finding will be further discussed in the next chapter.

The sixth and final chapter pulls the quantitative and qualitative data findings together. Its purpose is to confirm expected findings and to identify results that were unexpected, discuss why this might be the case, and offer alternative explanations. Chapter six also presents key implications and identifies how organizations can use the findings presented here to better address the shortfalls of online IM use. Research limitations are discussed, as well as areas for future research.

6: Discussion

Introduction

At the beginning of this thesis, I made the claim that there was still some uncertainty in people's perception of the effectiveness of IM communication, and in conducting this research, it remains apparent that some people value the benefits that result from using IM and others do not. Nevertheless, the coronavirus pandemic has afforded the opportunity to re-examine IM effectiveness when the spotlight on these technologies is bright – arguably, IM technologies are being used more now than ever before, simply out of necessity. This is also one of the first studies that analyzes the relationship between mental health and perceived IM communication effectiveness. As the pandemic continues to take a toll on society, the long-term mental health impacts on the perceived effectiveness of computer-mediated technologies (CMC) in general will be of interest, especially as hybrid work environments begin to take shape.

This final chapter pulls the quantitative and qualitative data findings together. Its purpose is to confirm expected findings and to identify results that were unexpected, discuss why this might be the case, and offer alternative explanations. I will begin by exploring IM use in general, specifically the perception of the effectiveness of IM pre-pandemic to now, irrespective of mental health. Second, reported mental health will be examined and compared pre-COVID-19 versus six-months into the pandemic. Third, the relationships between mental health and IM effectiveness will be discussed along with the implications of the findings provided in the previous chapter. Remember, it was predicted that as symptoms of mental health go up (regardless of the symptom), perception of the effectiveness of IM would go down. A weak, negative, relationship was observed between stress and perceived IM effectiveness and loneliness and perceived IM effectiveness, but no other symptom was statistically significant.

There were also significant differences between generations and job position that will be further explored. Finally, I will discuss the question of what we can learn from the coping and mitigation strategies provided by participants, especially in the context of what's next for organizations. Key implications will be identified for future online communication use by workers. Research limitations will be identified, as well as suggestions for further research.

Perception of the Effectiveness of IM Communication

IM technologies have been used consistently in workplaces for at least the last ten years, and their purpose has always been to keep people connected (Li et al., 2005); facilitate asking and answering questions (Nardi et al., 2002), share files (Isaacs et al., 2002); and engage in social conversations (Cameron & Webster, 2005). My research confirms that IM is being used in these ways, but not to the degree that one might expect. Prior to the pandemic, IM was being used to ask and answer questions *sometimes* but neither sharing files nor having work-related conversations were activities workers used IM for very often. These numbers increased once the pandemic hit, which suggests two things. One, that workers are using these technologies more out of necessity, and two, that they are now being used more for what they were designed to be used for. During the pandemic, IM technologies are keeping people connected, they are providing an online space to ask and answer questions and have work-related conversations. But has the pandemic-triggered increased use of IM changed users' perception of its effectiveness?

The perception of IM effectiveness has typically been tied to the level of interactivity that is afforded by its use (Nardi et al., 2000; Garrett & Danziger, 2007). In fact, the benefits associated with interactivity often outweigh the challenges associated with distractions caused by IM interruptions. In a commonly cited study conducted by Ou and Davison (2010), IM use and interactivity explained 6% of work interruptions, which is a relatively small percentage of all

work-related interruptions, suggesting that IM use does not impact one's day any more than any typical distraction. Therefore, I expected that my findings would show similar outcomes; respondents would feel that IM communication is both interactive and effective. Prior to the pandemic, on all measures except for adequacy and completeness, respondents overwhelmingly agreed that IM was an effective tool. One might expect that IM communication is not adequate and/or complete because respondents are comparing their IM use to other, more typical, office communication styles, such as being able to have in-person face-to-face conversations. Six months into the pandemic (when data for this study were collected), perception of the effectiveness of IM increased on all measures. Despite the fact that the use of IM has been in place long before the pandemic as another form of communication that often supplements in-person meetings and interactions and despite everything that participants are experiencing during the pandemic, their perception of the effectiveness of IM communication is generally positive. One explanation for why the raw data suggest participants perceive communication to be more effective, interactive and complete is because they cannot rely on other forms of communication. I argue that, intuitively, participants have found a way to be as effective as possible when using these technologies and, in addition, have concluded that maybe they are more useful than originally thought. Differences in mean show a slight increase, however, a further review of the raw data shows that the number of participants who disagree, neither agree nor disagree, and somewhat agree that IM communication is effective, interactive and complete dropped since the pandemic and the number of participants who agree or strongly agree increased. Interview responses confirm this finding. In the previous chapter, it was concluded that IM communication at work was *effective enough*, meaning that there are still challenges (which is to be expected during a global pandemic). However, the takeaway is that workers believe that these

technologies are effective tools in the workplace when other communication options are not available. Nevertheless, when face-to-face communication is again possible, will the perception of the effectiveness of these online tools decrease?

Perceptions of Mental Health

Literature on previous disease epidemics and their impact on mental health suggests that the mental health of individuals is something that cannot be ignored; COVID-19 is resulting in higher levels of anxiety and stress, increases in depression rates, and more people struggling with loneliness caused by isolation (Panchal, Kamal, Cox, Garfield, 2021). This does not take into consideration the people who have contracted the disease and the mental health challenges they might face. Before the coronavirus pandemic, approximately 20% of Canadian and American adults experienced some degree of mental illness (World Health Organization [WHO], 2020). This is not the first time that I am sharing this statistic, but it is important for comparison purposes. In Canada, recent data is showing an approximate 15% increase in the number of individuals reporting a decrease in the quality of their mental health (Mental Health Index™ report, 2021), however, some polls have reported decreases of up to 50% (Angus Reid Institute, 2020). In the present study, although the majority of respondents believed that their mental health had not changed, suggesting that, based on the population surveyed, mental health struggles are not apparent, approximately 60% of respondents had brief or transient feelings of fear or panic. When specific symptoms of mental health are examined, on average, 40-45% of respondents felt depressed, stressed, anxious, lonely, and had some difficulties focusing on work-related tasks, but much fewer individuals reported increased fatigue or the inability to regulate their mood. Many of the individuals surveyed indicated that, because commutes to work have disappeared, they have been able to sleep more than usual. For others, the amount of sleep

simply has not changed. Individuals may be feeling more anxious or stressed, but this is not impacting their ability to sleep. It is therefore likely that the increase in sleep or lack of fatigue is mitigating the increase of other symptoms. As for mood regulation, there is no clear explanation for why the pandemic is not impacting one's mood, however, there seems to be a level of resilience and the perspective that eventually the pandemic will pass. I believe that this optimism is helping people cope and adequately regulate their mood.

Explanation: Expected Results

We are seeing a deterioration in mental health for potentially three reasons. First, we would expect these outcomes based on consequences resulting from being socially isolated and lonely. Leigh-Hunt, Baggule, Bash, et al. (2017) published a systematic review on the public health consequences of social isolation, finding associations between loneliness and poorer mental health outcomes. There is also evidence linking loneliness with mental health challenges including depression, poor sleep, and cognitive decline (Hawkely & Capitanio, 2015). In addition, research published in the American Journal of Epidemiology shows that social isolation may also increase the risk of premature death (Alcaraz, Eddens, & Blasé, 2019). There is clear evidence pointing to the negative impact of social isolation on mental health. As governments have enforced stay at home measures, these concerns align with what is seen in the literature on this topic.

Second, the increase in mental health symptoms could also be a consequence of rapid change, uncertainty, lack of information and transparency, and fear caused by the pandemic. Changes in the workplace, of which there have been many over the last year, contribute to decreases in workers' mental health (Bamberger, Vinding, Larsen et al., 2012; Loretto, Platt, & Popham, 2010). This is often exacerbated by the fact that organizational change results in job

insecurities (Faragher, Cass & Cooper, 2005). With change comes uncertainty. When speaking with interview participants, it was clear that concerns over not knowing if a friend or family member was going to get sick, or simply not knowing what the future held, led to higher levels of perceived anxiety. Although we are still learning about the true impact of the pandemic, uncertainty is being used to predict long-term mental health outcomes (Rettie & Daniels, 2020; Smit, Twohy & Smith, 2020).

Although fear was not a direct measure analyzed in this study, it could be a mediating factor contributing to the increases in other mental health symptoms observed. Consequences of prolonged fear include fatigue, depression, and PTSD (Khan, Mamun & Ullah, 2020). An online study investigating predictors of fear concluded that COVID-19 induced fear was related to concern for family members and personal health anxiety, as well as the time spent reading and/or listening to the news or being on social media (Mertens, Gerritsen, Duijndam, et al., 2020). Additionally, the lack of clear directives from the federal and provincial governments is further perpetuating uncertainty and fear, which is resulting in more people struggling with mental health issues. But remember, despite having moments where respondents felt scared or more anxious than usual, these feelings did not last. As will be discussed in the next section, a possible explanation for this is that the pandemic is not impacting participants in this study to the same degree as more vulnerable individuals, those with pre-existing physical and mental health conditions, and those who are at greater risk for job loss.

To summarize, observed increases in mental health symptoms (not necessarily overall perception of mental health) can be contributed to the impact of social distancing and isolation measures put in place, rapid changes, uncertainty, lack of information and transparency, fear

caused by the pandemic, and the major disruptions to normal life that people have had to navigate.

Explanation: Unexpected Results

Although we saw the increase in symptoms of mental health being reported, the overall perception of one's mental health does not seem to be declining as one would expect. There are a few factors that may have contributed to this finding. For instance, the general demographic of survey respondents and interview participants was employed workers who felt that their job was secure. They were not frontline workers or members of vulnerable communities, generally did not suffer from a pre-existing mental health condition, were low risk for infection, and, in many cases, had coping mechanisms in place to mitigate potential mental health impacts.

On the first item, one of the conditions for participating in this research was that you had to be employed and working since the beginning of the pandemic. The focus is really on those individuals who have a job and who use IM. Therefore, I have automatically eliminated sample groups who are more likely to be facing mental health challenges, such as individuals who have lost their job, are worried about their finances, and who may fall into populations harder hit by the pandemic. Research on the financial stresses caused by the pandemic is starting to draw a link between job insecurity, the resulting financial concerns and mental health (Wilson, Lee, Fitzgerald, et al., 2020). In January, the Mental Health Index™ report (2021) concluded that "finances and isolation continue to be the strongest drivers of mental health and stable employment is central to offsetting the risk of poor mental health" (p. 3). In the present study, the negative impact of isolation was observed, but participants ultimately felt supported by their employers and were not at risk for losing their jobs.

Individuals within vulnerable communities and those more susceptible to getting the virus, including the elderly and people of colour, have disproportionally been impacted by COVID-19. Vulnerable communities are witnessing higher rates of job loss, they are more likely to work on the front lines, more likely to live in crowded conditions due to cultural and socioeconomical factors, and are 2.3 times more likely to die from the virus than white people (Walters, 2020; Powell, Cooper, Hollister et al., 2020). One might therefore conclude that, in the present study, it makes sense based on the demographic studied that the perception of mental health is less of a concern. We are seeing periods of increased symptoms but, in general, respondents are not reporting overall mental health deficiencies.

When asked about having a pre-existing mental health issue, most respondents reported having no issues. Research from previous health epidemics has shown that increases in trauma associated with epidemics has a greater impact on individuals struggling with a pre-existing mental health illness (Linz & Sturm, 2013). As for related outcomes during COVID-19, early research conducted by Hamada and Fan (2020) found that current conditions resulting from the pandemic are disproportionally impacting those individuals already struggling with mental health issues. It does not help that the supports that are available have moved online, making access difficult. Because participants did not have pre-existing conditions, it is highly likely that any symptom that was reported was either directly or indirectly caused by the pandemic.

Another factor to consider is the timing of the present study. The UCL COVID-19 social study in England, which examined data between March 23 and August 9 when the initial lockdown measures were enacted, found that the "fastest decreases were seen across strict lockdown periods (between weeks 2 and 5), with [mental health] symptoms plateauing as further lockdown easing measures were introduced" (Fancourt, Steptoe & Bu, 2020, p. 141). At the time

this study was conducted (October 2020), Canadians were finishing a summer of eased restrictions and entering phase two closures. It is possible that participants were settling into a new normal after having a small reprieve over the summer months, which is why people's mental health was better than expected.

The final factor that may be contributing to these findings is the fact that people are reporting that they are coping, and that they are putting in place mitigation strategies to combat the negative mental health impacts of the pandemic. The importance of having a routine was apparent, as was the need to be active, get outside and connect socially with friends and family online. Additionally, it is also possible that steady employment and the need to focus on work-related tasks as opposed to the pandemic itself has been beneficial from a mental health perspective.

To summarize, the perception that people are not struggling with mental health was an unexpected result based on what is being reported by both the media and recently published research on the topic. However, five potential factors that may have contributed to this finding were identified: present study participants were employed and were not worried about finances and job security, participants were not frontline workers or members of vulnerable communities who have been unproportionally impacted by the pandemic, participants did not generally report dealing with a pre-existing mental health condition, the timing of the study may have coincided with feelings of optimism, and coping mechanisms used by many may have mitigated potential mental health impacts.

The Relationship Between Mental Health and Perceived IM Effectiveness

It was predicted that, as symptoms of mental health increase, the perception of the effectiveness of IM would decrease. This means that those individual reporting stronger feelings of depression, anxiety, stress, loneliness and/or fatigue would likely perceive IM communication to be less effective. As discussed in the previous section, a slight increase in individual symptoms was observed but, overall, participants did not believe that the pandemic was impacting their mental health. Once the data was collected and analyzed, only two mental health measures were statistically significant with IM communication effectiveness: stress and loneliness. However, for these two measures, the correlation was very weak.

The question becomes, why is there a significant, albeit weak, correlation between IM effectiveness and stress, and IM effectiveness and loneliness but not with the other measures of mental health? Remember that the correlation between overall mental health and IM effectiveness was also insignificant.

Stress

Compared to the other six measures of mental health, individuals reported feeling more stressed than any other symptom. I asked if this stress was related to the coronavirus specifically, respondents' private lives, or from work. Although stress did come from all three of these areas, work-related stress was slightly higher than the others. High levels of work-related stress pose risks to workers' well-being (Glazer & Liu, 2017). The shift to working from home, coupled with increased technology use, blurred personal and work boundaries, making it hard for people to "switch off mentally". The inability to psychologically detach from work has been shown to be associated with poor well-being, including increased stress levels (Sonnentag & Schiffner,

2019). Additionally, knowledge-based jobs are often considered stressful (Sorensen & Holman, 2014), therefore, in the present study we are potentially seeing a negative correlation with perceived IM effectiveness because individuals are associating stress levels with work and IM communication with work. Conversely, with the other symptoms of mental health, they are less likely to be factors attributed to occurrences in the workplace. To know this for sure, a control group would have needed to have been established comparing the stress levels of the same individuals prior to the pandemic and now. Furthermore, even though employees are navigating a global health pandemic, for some, work has been a distraction. But that does not mean work is void of additional stresses. In fact, the shift to online communication is stressful. According to some, online communication has become a *free for all* because there is a lack of consensus in organizations on how and when it should be used. Consequently, there is a certain level of stress from having to manage these communication technologies.

Irrespective of technology use, stress negatively impacts communication (Day, Scott, & Kelloway, 2010). It has long been known that stress hormones may affect the operation and structure of the hippocampus within the nervous system, which is most important for cognitive functions like paying attention, focusing, and filtering out irrelevant information (Stranks, 2005). Consequently, people who experience higher levels of stress are more likely to become easily frustrated or angry and misunderstand what someone else is saying. On average, individuals under low levels of stress can process an average of seven messages at a time, compared to those under high levels of stress who can only process three messages (Bhui, Dinos, Galant-Miecznikowaska, et al., 2016). Therefore, it is possible that this relationship is exacerbated when communication is done online. From this perspective, we might see a negative correlation between stress and perceived IM, not because of the tool but because stress impedes

communication. One might argue that a similar rationale could be used to explain a possible correlation between other symptoms of mental health and communication effectiveness, however, scientific evidence does not point to as strong a correlation with depression and anxiety. Not only are these two symptoms harder to self-report but, unlike stress, they are psychological disorders that are clinically diagnosed. This aspect of mental health goes beyond the expertise in this study but could be further explored as future research. I think the difference is in understanding mental wellness versus actual mental illnesses.

Loneliness

The last year represents the longest Canadians have been alone in modern history, and it is no surprise that the lack of interaction with others has left people feeling isolated. The results showed that the lonelier respondents felt, the less likely they thought IM communication was effective. Feeling connected is one of the most significant predictors of our emotional wellbeing and loneliness can be toxic (Ellis, Dumas and Forbes, 2020). What is puzzling is that online communication tools are supposed to help mitigate these feelings and help people stay and feel connected with others.

There are two schools of thought when it comes to the effectiveness of online communication tools. On the one hand, they are most effective in tackling loneliness when used to enhance existing relationships or forging meaningful new connections (Khosravi, Rezvani and Wiewiora, 2016). On the other hand, these tools are counter-productive if used as a substitute for real-life social interactions (Ferencz-Flatz, 2019; Cohen-Mansfield and Perach, 2015). If the pandemic is resulting in increased feelings of isolation and loneliness, and employees are being required to use online communication tools that are supposed to replace in-person face-to-face

conversations, how do people build meaningful relationships using these tools and how do employers provide support to ensure a healthy and productive workforce?

First, there is a need to identify, independently from technology, how we build and foster strong working relationships with our colleagues. A good relationship requires trust, respect, self-awareness, inclusion and open communication. Relationship-building is a skill that needs to be practiced and honed, and continued improvement is required if relationships are to be successful long-term. When technology is introduced into the mix, these factors are just as important. Technologies help facilitate how we communicate and maintain our relationships, but if there isn't trust, respect, inclusion, etc., it does not matter what online tool is used, the relationship is going to suffer. There is no question that COVID-19 has made it more difficult to foster relationships at work. Let's be honest, most of us are just trying to survive. I am the first person to recognize how important online communication tools are for organizations to continue to survive, however, I also think that we are not focusing on the right thing when it comes to effective communication. Effective communication starts with building a relationship, regardless of what technology is used. If we shift our perspective away from the advantages and disadvantages of online tools, we can then focus on rebuilding relationships which will help us feel less isolated and more connected with our colleagues regardless of if we are working in the office or from our homes.

Second, we need to recognize that technology is limited in how much it can enhance the human experience in the workplace. It is only as good and effective as the people using it. When, for example, email replaced regular mail as the preferred communication medium, people were not immediately good at sending emails. The same can be said with IM communication, which has evolved because of the downsides of email – most people are truly experiencing these

technologies for the first time without much direction. Writing a text, setting a tone, finding a voice, making a point, or writing clearly in an informal setting is a learned skill. IM technologies are marketed as tools used to connect people, but if individuals are feeling isolated and lonely, which we know makes fostering relationships more difficult without involving technology, the puzzle really is not as surprising as originally stated. Over time, as we continue to learn how to navigate their use, maybe then people who feel lonely will change their perception of the effectiveness of online communication tools.

Third, organizations need to recognize that individuals mentally struggling from COVID, those individuals who feel lonely, isolated and more stressed than usual, need to feel as connected as possible to their colleagues. In this study, those individuals who felt that they were constantly being interrupted by IM chats or always being pulled into meetings, or even those people who were tired of the weekly virtual happy hours, did not report increased feelings of loneliness. Overall, participants' mental health has not grossly impacted their ability to work because they feel supported enough; the tools at their disposal, although not perfect, have resulted in the ability to communicate with colleagues when conversations can not be conducted in-person. Therefore, if we focus on building relationships irrespective of the technologies used so that employees feel less isolated, and if employers start to provide more guidance around technology usage, it is possible that the negative perceptions of these tools is also likely to become more positive.

Generational Differences and Job Position

Significant differences in general mental health perceptions between millennials and baby boomers and between Generation X and baby boomers was observed, as well as between non-management employees and senior leaders/executive managers, but not between non-

management employees and managers/supervisors, or managers/supervisors and senior leaders/executive managers. In both cases, I am analyzing different age groups who have different experiences and perceptions of both mental health and technology use. Compared to older generations, younger people seek a better work-life balance and mental health is a top concern (Guest, 2002; Emslie & Hunt, 2008). They are not afraid to talk about it, nor are they hesitant to make the changes necessary (and demand change from their employers) to ensure their mental health is not impacted. For older generations, mental health is a stigma, especially in the workplace. In general, it is unlikely they feel comfortable talking about or self-reporting symptoms. Because these people are in leadership positions, it is potentially why we do not see the level of support in the workplace younger generations are seeking. Furthermore, I think that younger generations are dealing with more negative consequences from the pandemic than older generations. As previously mentioned, these are individuals who are working up the corporate ladder, who have kids and family that they are managing while working from home, and they are concerned about the long-term impacts on their lives. Most baby boomers' kids are older, and so they do not have to worry about homeschooling. Millennials are caught in the middle, not only do they have responsibilities at work, but their kids are home and there are greater pressures and distractions that are impacting their mental health.

From a technology perspective, older generations, those that typically hold supervisor/senior leadership roles, have not used online technologies for their entire career. Anecdotally, one participant indicated that her boss would send a Teams message and then wait with the window open until she had responded. Typically, someone sends an IM, continues on with their work and expects a response when the receiver sees the message, which might not be

right away. I think that older generations are having to learn and navigate IM because it is not intuitive, whereas younger generations have grown up with smartphones and text.

There is also emerging research that suggests that the older we get, the better off emotionally we are, and the more resilience we have (Carstense, Shavit, & Barnes, 2020). For years, psychologists have said that age and emotional well-being are correlated (Reed, Chan, & Mikels, 2014). There are obviously variables that impact this relationship such as social economic status and race, however, typically older people tend to experience more positive than negative emotions in a given day. One area according to Dr. Susan Charles that has not been studied previously is how prolonged stress and/or anxiety impacts this correlation (Charles & Carstensen, 2010). To address this gap (age differences in emotional experiences in times of crisis), Dr. Laura Carstense set out to examine this relationships during COVID-19. Her findings suggest that "age [is] associated with relatively greater emotional well-being both when analyses did and did not control for perceived risk and other covariates" (Carstense, Shavit, & Barnes, 2020, p. 1374). The reason for this is possibly because of motivation, goal changes, and perspective; meaning that older people are aware that time passes quickly, even terrible times like the coronavirus will pass. Older people also tend to have strong social connections that make it easier to navigate crises. At the end of the day, it is about perspective and recognizing the narrowing of time.

Coupling the two issues of mental health and IM effectiveness, it makes sense that there is a generational or age divide. Each demographic is demonstrating varying degrees of resilience, has varying levels of experience and comfort with IM technology, and each is being mentally impacted differently by the pandemic. In other words, the stresses and anxiety are coming from different things.

The Role of Resilience in Mitigating Symptoms of Mental Health

Many people believe that the pandemic is perpetuating a long-term mental health crisis. In the present study, knowledge workers' experience with mental health has intensified, and many are struggling with their mental health for the first time. Participants are struggling with higher levels of anxiety and stress and are feeling more isolated than ever. Not only has the last eighteen months highlighted the negative impact mental health has on individuals, but the increase in mental health awareness has shifted both how we talk about mental health and how we address it. One could argue that the pandemic has, to some degree, destigmatized mental health, which has eased the burden and embarrassment for those people dealing with mental illnesses. That being said, results from this study do not indicate that we are experiencing a mental health crisis. The impact of mental health on knowledge workers is not as great as what was predicted, especially on the perception of IM effectiveness. In fact, people are surviving, they are showing resilience, they are finding ways to use the technologies available to them, and they are making daily changes in their personal and work life that are positively changing their outlook. Many of the insignificant/unexpected findings can be attributed to the resilience that people are demonstrating, as well as the coping strategies that have been adopted to mitigate some of the negative mental health consequences of the pandemic.

Resilience can help navigate and overcome adversity caused by COVID-19. However, it is not something people inherently have, rather, based on both positive and negative lived experiences, it is acquired (Southwick & Charney, 2012). This is why so many people have responded differently to the pandemic. It is clear that people are most affected by the stress caused by the pandemic, which is having an impact on how effective they believe IM communication to be. Scientific evidence points to the ability of the human brain to deal with

stress. Stress symptoms in the brain, for example, are highly adaptive and allow humans to deal with challenges associated with stress (de Kloet, Joels & Holsboer, 2005). Consequently, one might wonder if the individuals surveyed in this study are better able to cope because they are feeling more stressed over any other mental health symptom; they are better able to manage stress than other symptoms because the brain processes stress differently compared to anxiety, depression and loneliness. This is a conclusion that would require further investigation in order to determine its validity.

In this study, the resilience of participants is strengthened by positive relationships, for instance, seeking connections and feeling supported by colleagues, and by financial and job security. In the workplace itself, resilience and resilience training has a positive impact for employees dealing with adversity (Robertson, Cooper, Sarkar, & Curran 2015; Hartmann, Weiss, Newman, & Hoegl, 2019). According to Luthans (2002) in Hartmann et al. (2019), "resilience [i.e., positive adaptation] is one of the core constructs of positive organisational behaviour" (p. 914). Related studies focus on the relationships between personality traits and resilience (Wei & Taormina, 2014; Forster & Duchek, 2017), one's ability to effectively manage work demands, one's level of confidence, motivation and self-efficacy and resilience (Cameron & Brownie, 2010), and the degree of social support provided to employees, which has been found to be strongly related to employee resilience (Lamb & Cogan, 2016; Todt, Weiss, & Hoegl, 2018). Research on workplace resilience is often cited within the work stress literature, which explores how people cope with stress in the workplace. For example, resilience has been shown to have a positive effect on task performance (Ceschi, Fraccaroli, Costantini, & Sartori, 2017), work engagement (Malik & Garg, 2017), and overall well-being (Pangallo, Zibarras, & Patterson, 2016). Resilience has also been shown to negatively affect psychological stress (Shatte, Perlman,

Smith, & Lynch, 2017). Although these studies focus on individual resilience, team resilience is equally important, especially in the context of team-based collaboration. According to Edson (2012) and Flint-Taylor and Cooper (2017), both contextual factors and organizational practices such as work tasks, work environments and the influence of supervisory and organizational practices positively contribute to team resilience. Despite the extra stresses caused by COVID-19, resilience of employees and teams within the context of the workplace is likely contributing to the results observed in this study.

In addition to the resilience that is being demonstrated, this study provided insight into the various coping mechanisms that are being adopted by workers. For employees, strategies such as creating and sticking to established routines, staying connected with colleagues, and incorporating some sort of mental and/or physical wellness into their days may also explain why greater mental health symptoms were not observed. For employers, increasing communication with team members, having empathy for what others are experiencing, and being a comfortable resource to talk to were identified strategies used in communicating with staff. Evidence-based recommendations from the literature on resilience provides similar coping mechanisms. To understand feelings of fear, anxiety and stress, researchers look to the opposite – situations that are expected, predicted and can be controlled (Allen, 2008). Therefore, establishing normal, repetitive behaviours and maintaining perspective allow the brain to confirm that things are going according to plan. Perhaps this is why those who are establishing routines are more successfully coping with the mental health impacts of the pandemic.

Little research has been done on the effects of physical activity during the pandemic, however, prior research shows that light to moderate exercise can benefit one's mental health (Garber, Blissmer & Deschenes, 2011). It has been reported that physical activity improves

anxiety, mood, and social and emotional well-being among cancer patients (Loh et al., 2019), as well among individuals with chronic heart failure (Chien et al, 2011). The positive effects of yoga have also been demonstrated in people with anxiety and depression (Javnbakht et al., 2009; Wang and Szabo, 20202). Thus, taking care of your body by incorporating regular exercise is likely to combat mental health challenges faced by individuals during the pandemic. Early on in the pandemic when the gyms closed, many people stopped exercising. However, six-months into the pandemic, people are starting to be more active, and some are even using this opportunity to become healthier. An increase in physical activity was definitely something observed in this study… assuming that those who reported an increase are actually doing it.

Despite everything, participants also made efforts to stay connected with others. According to the CDC (2020), one of the best ways to mitigate symptoms of mental health during lockdowns is to use social media and online tools to connect with friends and family. I have talked at length throughout this thesis about the use of online tools for work purposes, however, these technologies are also being used to connect outside of work, which is potentially contributing to the mitigation of adverse mental health effects.

In summary, resilience plays an important role in mitigating adverse mental health impacts. In the present study, I can partially explain why participants are not demonstrating symptoms of depression, anxiety, stress and loneliness to the extent that was predicted because key coping mechanisms are being introduced that are normalizing day-to-day activities and allowing people to stay more focused at work. The key strategies identified are justified in the literature as things people should incorporate into their lives when they are experiencing trauma and/or increased signs of worsening mental health.

Limitations

This thesis is not without limitations. Most importantly, there is a pure clinical psychology perspective that is missing. There are psychological and scientific nuances around various mental illnesses that may be able to better explain why certain outcomes were reported. The purpose of this study was to explore whether or not various symptoms of mental health impacted one's perception of the effectiveness of IM communication. There was no relationship discovered between general mental health and IM effectiveness, but relationships were observed between stress and IM effectiveness and loneliness and IM effectiveness. One might argue, as discussed by the Canadian Mental Health Association (2021), that increases in stress and loneliness are potentially *normal* reactions resulting from the pandemic. An attempt was made to explain these findings, and in particular why there was no significant relationship between depression, fatigue or anxiety and IM effectiveness, however, there is likely a clinical point of view that would provide a more accurate perspective. Future research would require the refinement of the definition of mental health and the clarification between mental health and mental illness. I would also be very deliberate in categorizing clinical symptoms vs. non-clinical symptoms. That being said, it is also important to recognize that symptoms like stress and loneliness, although not clinical per se, are characteristics that impact mental health and can escalate into more serious mental illnesses such as depression and anxiety. At the end of the day, these significant symptoms still impact one's mental well-being. In the future, I would be interested in partnering with a psychologist to better flesh out these nuances. Furthermore, there is a body of research around the challenges of self-diagnosing mental health that is not fully explored in this thesis (see Bonsaksen, Grimholt, Skogstand, et al., 2018; Semigran, Linder, Gidengil, & Mehrotra, 2015; North, Ward, Varkey, et al., 2013; Black, 2009) but may contribute

to explaining why participants were able to identify being stressed and lonely, but not depressed or anxious. If people were able to more accurately report these symptoms, a greater effect may have been observed on the perception of IM communication effectiveness. In this study, it is likely that insignificant findings were caused because of the inaccuracies associated with self-reported mental health data. This thesis relies on self-reported perception data. Most survey questions ask respondents to rate their perception on a 7-point Likert scale. The challenge with this approach is that responses may not always be truthful or accurate. Respondents often report what *they think* the researcher wants to hear and/or portrays themselves in a more positive way. The fact that this study showed that respondents' general mental health was strong, but interview data indicated people are tired, more anxious, stressed, and lonely potentially proves this point. Identifying, or even admitting, that you are struggling with mental health issues is difficult to do, never mind responding to a public survey. Furthermore, mental health struggles fluctuate. Someone might be struggling with increased depression or anxiety one day but feel better the next. While mental health symptoms are transient, there is also the point where symptoms become clinically significant. It is equally as important to note that a respondent's answers for this study may differ greatly from one day to the next. It is also extremely difficult to personally recognize symptoms of mental health and admit that you may be feeling one way or another. It needs to be stated that the results in this study are based on how people were feeling on the day they responded to the survey or participated in an interview. If this exact study is replicated, it is possible that a very different set of outcomes could be observed.

There are two other limitations that need to be considered. First, this study has been conducted very early on in the pandemic and there are few baseline studies that can be referenced. Every day we are learning something new. This study provides an interesting

perspective of individuals' perception of IM use at a time when there is rapid change and a lot of unknown factors. Even during the six-month period that was studied here, I saw variation in participants' responses. The limitation is in the preliminary nature of these findings. COVID impact research is ever evolving, and it will be necessary to follow up this study with research on the long-term effects.

Second, this study focuses on the mental health and perceptions of knowledge workers who have been employed during the pandemic. That is, they have been fortunate enough to keep their jobs. While it was identified that these factors contribute to resilience, participants represent a white demographic with privilege. Therefore, these findings cannot be generalized – they do not consider the perceptions of front-line workers, the unemployed, vulnerable populations or those with more diverse backgrounds who traditionally struggle with mental health issues such as people in marginalized communities, or BIPOC. Furthermore, the findings presented are based on the perceptions of individuals who represent a similar demographic as I, who have, overall, been less impacted by COVID-19. Therefore, the conclusions made about individuals not struggling with mental health issues are based on the perceptions of people who participated in this study and cannot be generalized or projected on these other groups. It is highly recommended that further research be conducted on the mental health impact of COVID-19 and perceptions of the effectiveness of online communication on ethnically diverse populations including vulnerable populations and BIPOC.

Future Research

This study only focuses on the current realities of the pandemic. It provides a snapshot of participants' perceptions from March 2020 to October 2020 and, despite its focus on mental health, is situated within the CMC framework. There is a need to further explore these findings

from a clinical psychology perspective and to analyze the long-term effects of the pandemic on one's mental health and perception of the effectiveness of online communication across different types of technologies, not just IM applications.

There is also a productivity and/or performance measure that is not captured in this study that would be interesting to explore. Findings showed that employees are constantly connected but, at the same time, are having to manage multiple technologies at once. One might ask if these tools have become *too* good at keeping people connected. Are employees spending too much time responding to IM messages, sitting in Zoom meetings and answering emails to be productive? How has the increase in IM use impacted performance?

One should also consider how this pandemic has disrupted the traditional work environment. This study demonstrated that people think IM is an effective tool that allows them to collaborate without being in the office. Does this mean that organizations will support remote options? What might these flexible working relationships look like and are they sustainable? I think it has been established that workers can accomplish tasks remotely without significant drops in productivity or quality. We have also learned that it is not necessary to be in-person in order to foster relationships and effectively collaborate – IM tools are filling this gap. Yet it begs the question, are employees embracing online work because of the pandemic, because it is the only option, or do they truly believe that online is the best way forward? I think the answer to this question depends on a number of variables, including job position/responsibilities and the industry you work in. At the time this study was conducted, many participants were in survival mode. They were embracing these technologies because it allowed them to continue working, however, they were not specifically asked about the long-term sustainability of a predominantly online work environment. At that time, participants were not focused on what their post-COVID

work environment would look like and, to be frank, this will ultimately be a management decision. Anecdotally, we know that employees have appreciated the flexibility of remote work, but productivity levels are still a significant factor for why management has not fully embraced a remote workforce. Productivity did not go up, but it also didn't significantly drop. As employees are vaccinated and society reopens, rethinking how productivity is measured is one factor that might prompt management to be in favor of a remote workforce. One could argue that right now, as we have these conversations, is the perfect opportunity for organizations to evaluate their metrics to better align with remote work. Ultimately, organizations will need to ask themselves whether or not they believe that these behaviour changes are sustainable and, if they are, figure out how to modernize the workplace.

Finally, during catastrophic events like the coronavirus pandemic, the media plays an important role in mobilizing the community, providing authoritative information and emotional support (Perez-Lugo, 2004; Wicke and Silver, 2009). People look to the media to make sense of a situation. However, large volumes of information may amplify the perception of risk and make it difficult for consumers to critically review unbalanced media coverage (Kasperson et al., 1988). According to Chao et al. (2020), "this 'infodemic' has the potential to affect a population's mental health and wellbeing" (p. 74). Preliminary research has shown that exposure to a greater number of media sources and more hours on social media is modestly associated with increases in mental health issues during the rise of COVID-19 (Riehm et al., 2020). We also know from previous disasters and pandemics that mental health can be affected by what is being reported in the media (Ahern et al., 2002). Although not the purpose of this study, I do believe both the consumption of media and its biases have perpetuated the belief that the number one impact of the pandemic is on mental health. It is important to understand that, on average, 40%

of Canadians are struggling with increased mental health issues, which is an increase of about 20% from before the pandemic. However, what no one is saying is that 60% of Canadians, the majority, are not struggling, or are not reporting that they are struggling. Based on these numbers, which align with the findings of this study, I believe that the media is forwarding a theory of a mental health crisis that is not borne out by reality. I am not saying that we should not be concerned about mental health but, based on the participants of this study, the outcomes do not indicate that individuals are struggling with mental health, and they definitely are not impacting one's views on the effectiveness of IM communication. It begs the question, does the influence of the media, and in particular media bias, impact public responses to mental health?

What's Next for Organizations?

One of the goals of this thesis was to be able to shed some light for organizations on the mental health of their workers and on the effectiveness of IM communication as they navigate a global pandemic and plan for the future. I talked in the previous section about the impact of stress and loneliness, but also the resilience that people are showing. The outcomes identified in this dissertation suggest that stress has the biggest effect on the perception of IM communication, loneliness also being significant. The data also indicated that loneliness predicts the perception of IM communication effectiveness. Although other mental health symptoms (depression, anxiety and fatigue) are not significant, and people are able to regulate their mood and focus on work activities, employers should still be aware of the slight increases in these other symptoms. The perception of stress is the materialization of an undesirable experience, for instance *something is stressing me out*. In contrast, mental health is an internalization of an undesirable experience (*I feel depressed, I feel anxious*) which, when triggered in the workplace, typically gets labelled as burn-out. I believe employers and managers need to take employee stress levels seriously by

providing venues for support and coping, so as to mitigate the risk of burn-out. Furthermore, this dissertation has demonstrated that online communication tools are effective enough and, with some direction, could be widely used if and/or when employees return to the office. The return of in-person face-to-face communication will not result in the disappearance of online tools, rather, much of the conversation is going to shift to hybrid work environments, where these technologies will continue to be necessary. Mental health and effective online communication will continue to be conversations had between organizations within the knowledge and their employees.

There are still questions that need to be answered around some of the key flaws that IM communication affords. Although mental health is not as great a factor as initially predicted, the pandemic has led to increased feelings of isolation, loneliness and stress, which are potentially exacerbated by the lack of visual cues associated with IM, one's ability to manage multiple platforms synchronously, the lack of online communication etiquette, and missed governance around online communication that may only come with increased usage and/or time. These findings are intriguing in a world where knowledge work continues to be conducted predominately online. In addition, these issues will be heightened with the perception and/or reality of increased interactions, interruptions and the requirement to multitask, which are widely studied consequences of IM usage.

To date, the effectiveness of technology-based intervention for mental health is generally inconclusive and lacking data-based evidence. Seeing a therapist or psychologist online, or accessing online resources, may not be effective, however, participants in this study reported that feeling supported by their coworkers via IM interactions helped to sustain their mental health. Because we know that loneliness predicts the perception of communication effectiveness and

feeling supported by coworkers via IM interactions helps sustain one's mental health, perhaps organizations should focus on promoting relationships between coworkers, not only for work/task reasons, but for interpersonal reasons as well.

Based on the data collected and analyzed, I believe organizations can improve in three areas. First, in continuing to destigmatize and support mental health in the workplace. Traditionally, there has been a culture of silence around mental health. Baby boomers, who hold the majority of senior leadership positions, are not accurately reporting symptoms of mental health. When compared to younger generations, they also believe IM communication, which is arguably the future, is less effective, especially when any increase in worsening mental health is observed. Second, evidence not only from the coronavirus pandemic, but from the SARS and MERS crises shows that, when information is not being delivered transparently there is an increase in fear and a desire for clarity (Moon, 2020). These are uncertain times, which puts employers in unprecedented situations. However, their role as heads of organizations is to ensure the safety of their workforce, point to long-term goals, listen to concerns and provide avenues for dialogue. In times of crisis, early, frequent, and honest communication will help employees cope and build a culture of resilience. Third, drawing on findings related to the need for technological governance, although organizations have developed communication policies around working in the office, in most cases these do not exist for remote, online-based communication. Online communication tools are keeping employees connected, but employees are also feeling overwhelmed and burnt out from having to manage the constant influx of messages and multiple tools. Ultimately, my recommendation is that any response should stem from an organizational culture change, as opposed to the redesign of IM or the provision of other tools.

Conclusion

The coronavirus pandemic has disrupted our lives. Working environments and the way we do our jobs have evolved to incorporate online communication technologies, and we are navigating the effects of the virus on our mental health. This study concerned itself with these two topics: online communication and mental health; precisely, it explored the relationship between mental health characteristics and the perceived effectiveness of communication through instant message technologies. The current global pandemic affords the unprecedented opportunity to compare and contrast this relationship, as well as talk to people about how they have coped with the changes that resulted from working remotely and the strategies they have adopted to address potential mental health challenges.

Chapter 1 introduced readers to the topic of research. It framed the inquiry by describing what instant messaging is and how it has evolved within the workplace since its inception, and by explaining the impact of crisis on mental health by drawing from past health and economic global events. In framing the inquiry, Chapter 1 also introduced the problem; that the perceptions of the effectiveness of IM are inconsistent. There is a lack of consistency around whether or not these technologies improve or impede work processes. Chapter 1 concluded by stating the research questions to be explored in this study. I set out to understand how often workers use instant messaging technologies to communicate with their colleagues and whether this frequency has increased or decreased as a result of the pandemic, the types of conversations being held, the overall perceived effectiveness of these technologies, how COVID-19 has impacted one's mental health and ability to be productive at work, and the impact of perceived symptoms of mental health (depression, fatigue, stress, anxiety, loneliness, ability to focus, and ability to regulate mood) on IM usage and perceived communication effectiveness. I also wanted to understand

how people were coping and identify the strategies that were being adopted to address massive work-related change and potential mental health challenges caused by the pandemic.

Chapter 2 presented the literature review. I continued the discussion on the advantages and disadvantages of IM use introduced in the first chapter, and expanded the conversation by incorporating what CMC literature says about online group/team collaboration, which I argue is more representative of today's working realities than the studies conducted specifically on IM adoption and use. Chapter 2 also discussed emerging mental health research resulting from the COVID-19 pandemic. Although this research is in its infancy, it is clear that, as a society, we are concerned about the long-term impact the virus is going to have on mental health. Furthermore, Chapter 2 justifies this study; there is a need to better understand the mental health impacts on a workforce that is now remote. Results presented have the potential to change the way organizations operate and the supports that they provide to their employees. Based on the literature, chapter 2 concluded by suggesting 8 hypotheses. It was predicted that overall mental health and each of the various symptoms examined would be negatively associated with the perception of IM effectiveness. In other words, the worse someone felt, the less likely they would believe that IM was an effective communication tool.

Chapter 3 described the methodology used. This dissertation followed a mixed methods approach and was exploratory in nature. Data was collected in two phases. First, by using an online survey disseminated primarily through social media (LinkedIn and Facebook), and second through semi-structured interviews. A survey instrument was developed using pre-existing instruments and measures, and the interview protocol was designed based on the preliminary survey results.

Chapters 4 and 5 described the research findings. It was determined that work from home mandates due to the pandemic have resulted in the increased use of online communication tools, especially IM. Overall, participants believe IM communication is effective, but it takes effort. Switching gears to mental health, it does not seem like the pandemic has had a huge impact on participants' overall mental health, however, they do report having brief transient periods where they have felt more anxious or stressed. Differences in mental health perceptions were observed between millennials and baby boomers and between Generation X and baby boomers. There were also differences in general mental health perceptions between non-management employees and senior leaders/executive managers, but not between non-management employees and managers/supervisors, or managers/supervisors and senior leaders/executive managers. On individual symptoms, loneliness and stress were negatively correlated with the belief that IM communication is effective. All other mental health symptoms were statistically insignificant. Finally, experiencing mental health symptoms does not change one's perception of the effectiveness of IM communication. At the end of the day, work has become a temporary distraction from COVID-19 and any mental health symptoms one might be experiencing are mitigated because IM technologies have helped in normalizing work-related tasks and staying connected.

Chapter 6 provided explanations for why some of what was observed was unexpected. On the one hand, one's mental health has not been impacted to the degree that I would have expected. It is possible that this is an issue with the accuracy of self-reported data, however, a level of resilience was observed; participants' ability to introduce coping strategies into their lives has probably mitigated more dire mental health impacts. This study also worked with participants with high job security and who were less vulnerable to the possible impacts of the

virus. These people's worst-case scenario truly is not life or death, as it is for other, more vulnerable populations.

Why were stress and loneliness significantly related to perceived effectiveness of IM use and not depression, anxiety, fatigue, ability to focus and mood regulation? Increased work levels may explain the observed higher levels of stress, and social distancing requirements have impacted feelings of loneliness, so both these factors will have been heightened during the pandemic. Additionally, while depression and anxiety are clinically diagnosed mental health illnesses, stress and loneliness are not. It is likely that the general population does not accurately self-diagnose these symptoms. One could argue that to be depressed or suffer from anxiety is more crippling than being stressed or lonely. Nevertheless, the findings are based on how people were feeling the day they answered the survey or participated in an interview. As mentioned, the outcomes of this research could be very different if conducted on a different day. This is inherent in mental health research and mitigated by having a larger sample population.

In conclusion, the perception is that employees are effectively coping with the shift to at-home work and accomplishing tasks without significant drops in communication, especially as it relates to online text-based communication. People are finding ways to remotely collaborate with their teams and focus on work-related deliverables. There is also the perception that mental health is not directly impacting one's ability to effectively communicate using IM technologies. When working, employees do not seem to be talking about the pandemic or about current news. Workers are being asked how they are doing, but conversations are generally focused on the work-related tasks at hand. Across Canada, and regardless of the type of industry/occupation, people are considerate of the fact that some may be struggling more than others, which has resulted in increased empathy. In general, people are taking care of themselves and their

families. They have adopted coping mechanisms such as more structured or scheduled work hours, properly setting up and investing in their workspace, getting outside or exercising, and adding wellness settings to their devices. Yet this research should also serve as a cautionary tale. It is a true work in progress to navigate feelings, mental health, work and communication during the pandemic. Daily IM check-ins and weekly online happy hours are great, but does this lead to the perception that we are being productive, or is it noise and added stress? At the end of the day, workplaces are social environments and, as hard as we try to replicate this online, we have yet to perfect it. In the future, it is recommended that organizations focus on bringing their employees together, even if they are remote, and be aware of the stress levels of their employees as stress and loneliness seem to be the two factors impacting people most during COVID-19. Finally, this study brought to light the need to continue the conversation on what online communication guidelines and policies look like. Currently, we are all just trying to adapt, but employers have the potential to provide leadership on best practices for online communication, ultimately eliminating some of the stress felt by their workforces.

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Appendix A

The following sources have been consulted in order to identify and operational proposed measures.

Table 9

Constructs with description and literature consulted

Construct & Description	Literature Consulted
Mental Health Various mental health indicators have been used as performance determinants, including importance of personal problems, financial concerns, and depression. Studies have shown a positive correlation between these indicators and productivity. According to the World Health Organization, mental health is generally characterized by some combination of "abnormal thoughts, emotions, behavior and relationships with other". This includes depression and anxiety. There is also interest around exploring the impact of stress, fatigue and loneliness as these factors also have the potential to impact one's mental health.	Alonso, J, Petukhova, M, Vilagut, G et al. (2011). Days out of role due to common physical and mental conditions: Results from the WHO World Mental Health Survey. *Mol Psychiatry, 16,* 1234-1246. Kuoppala, J., Lamminpaa, A., Liira, J, and Vaninio, H. (2008). Leadership, job well-being, and health effects – A systematic review and a meta-analysis. *Journal of Occupational and Environment Medicine, 50*, 353-365. World Health Organization (2020, June 1). *Mental Health.* Retrieved from https://www.who.int/health-topics/mental-health#tab=tab_1
IM Use at Work IM is a communication tool that serves to ask and reply to questions as well as the sharing of files in combination with participation in socialization related to the work. This construct can be measured using frequency of use, frequency of file sharing using IM, engaging in work-related socialization through IM, and ability to effectively ask and answer questions.	Cho, H.-K., Trier, M., & Kim, E. (2005). The use of instant messaging in working relationship development: A case study. *Journal of Computer-Mediated Communication, 10*(4), 00-00. Quan-Haase, A., Cothrel, J., & Wellman, B. (2006). Instant messaging for collaboration: A case study of a high-tech firm. *Journal of Computer-Mediated Communication, 10*(4), 00-00.
Communication	Ou, C., & Davison, R. (2011). Interactive or interruptive? Instant messaging at work. *Decision Support Systems, 52*(1), 61–72.

Communication quality and perceived interactivity are two critical factors required for effective team communication. Ou and Davison (2011) explore the relationship between IM use, interruptions, interactivity and communication quality. Ou and Davison (2011) argue that "while the use of IM will cause interruptions, it will also lead to improved communication quality and the establishment of trust between colleagues, which will further influence group outcomes" (p. 62). Communication quality is also dependent on the timeliness of the communication. According to Lowry et al. (2009), communication without delay is an attribute of quality communication because it enables the transfer of more complete and accurate information. The two-way means allows communicators to refine and extend their communication. In the context of IM, this means to easily "enable the conversation between two or multiple team members synchronously which enhances the willingness of team members to engage in conversation" (Koo et al., 2011). Instant messaging platforms also provide a safe environment for conversations (Tigelaar et al., 2013) and provide a balance between formal and informal conversations (Cameron and Webster, 2005).	Lowry, P. B., Romano, N. C., Jenkins, J. L., & Guthrie, R. W. (2009). The CMC interactivity model: How interactivity enhances communication quality and process satisfaction in lean-media groups. *Journal of Management Information Systems, 26*(1), 155–196. Koo, C., Wati, Y., & Jung, J. J. (2011). Examination of how social aspects moderate the relationship between task characteristics and usage of social communication technologies (SCTs) in organizations. *International Journal of Information Management, 31*(5), 445–459. Cameron, A., & Webster, J. (2005). Unintended consequences of emerging communication technologies: Instant Messaging in the workplace. Computers in Human Behavior, 21(1), 85–103.

Appendix B

Table 10

Summary of SARS and MERS mental health research

Author(s)	Sample	Results / Conclusions
Bai et al., 2004	338 staff members in a hospital in East Taiwan with potential contacts with SARS	17 staff (5% reported an acute stress disorder. Quarantine was the most relevant predictor. Participants manifested predominantly anxiety, irritability, insomnia, poorer concentration, and performance. There were psychological challenges caused by the outbreaks. There is a need for a developed response.
Cava et al., 2005	Qualitative study on the experience of quarantine for individuals affected by SARS in Toronto.	Despite individual differences, common themes of uncertainty, isolation, and coping.
DiGiovannie et al., 2004	Unstructured interviews with 35 Toronto residents and a general population survey (n=43).	Psychological stress for those in quarantine resulted from social distancing and stigmatization. Survey results: 16 of 43 respondents who had been quarantined reported emotional difficulties secondary to their quarantine.
Hawryluck et al., 2004	129 quarantined persons who responded to a Web-based survey.	A small group of Torontonians who were quarantined during SARS showed symptoms of depression (31.2%) shortly after the outbreak. Longer durations of quarantine were associated with an increased prevalence of PTSD symptoms. Acquaintance with or direct exposure to someone with a diagnosis of SARS was also associated with PTSD and depressive symptoms.
Jeong et al., 2016	1656 South Korean residents isolated for 2-weeks due to having contact with MERS patients.	Anxiety symptoms present in 7.6%, feelings of anger in 16.6% (during the isolation period). 4-6 months post isolation periods, feelings of anger were present in 6.4%. Mental health problems

		might be prevented by providing mental health support to subjects with vulnerable mental health, and providing accurate information together with adequate supplies.
Kim et al., 2018	27 cases of individuals post MERS.	Diagnosed symptoms included: adjustment disorder, depressive disorders, acute stress disorders, delirium, and anxiety disorders. Although not diagnosed, participants also demonstrated symptoms of insomnia and difficulty regulating their mood (i.e., aggressive outbursts).
Lee et al., 2007	1744 individuals who reported symptoms of SARS.	Showed symptoms of confusion, drowsiness, and depression. No direct psychological diagnosis given.
Mackay et al., 2005	Sample of 246 individuals who contracted SARS in Toronto, Canada	Mental health symptoms witnessed included agitation, confusion and hallucinations.
Maunder et al., 2004	Toronto, Canada – 12 participants with SARS.	Qualitative/observational study. Showed symptoms of insomnia, anxiety, and small signs of a panic disorder.
Mihashi et al., 2009	A survey using a self-administered questionnaire was conducted on 300 printing company workers in Beijing, China, which was under mass isolation following the 2003 SARS outbreak, in the 7-8 months after the isolation was lifted.	Predictive factors of psychological disorder developing during recovery following SARS outbreak. The predicting factor with the highest correlation was income reduction, with an odds ratio of 25.0. Other items obtained were gender, range of activities, eating restrictions, restrictions in going out, disinfection of clothing, and infection control, with odds ratios of 3.2, 5.5, 3.9, 3.2, 0.2, and 0.1, respectively, and the contribution ratio was 87.7%.
Reynolds et al.	1912 adult individuals.	Of individuals who have been quarantined as in close contact with those who potentially have SARS, 20% reported fear, 18% nervousness, 18% sadness and 10% guilt. Minimizing duration of quarantine, revising requirements, and providing enhanced

		education/support necessary (could be improvements).
Saad et al., 2014	70 participants	Showed symptoms of confusion.
Tiwari et al., 2003	Case study of 12 individuals (general public in Hong Kong during SARS).	Primary symptoms Fear and frustration witnessed.

Table 11

Preliminary research on the mental health impact of COVID-19 in Canada

Date	Research Commissioned By	Research Conducted By	Methodology	Results
May 2020 / Sept 2020	Canadian Mental Health Association	Maru/ Matchbox	Online survey of 3000 Canadians	Phase 1 - 38% of Canadians say their mental health has declined due to COVID-19. Phase 2 – 40% of Canadians say their mental health has deteriorated since the onset of the pandemic.
	Source: https://cmha.ca/wp-content/uploads/2020/06/EN_UBC-CMHA-COVID19-Report-FINAL.pdf Source : https://cmha.ca/wp-content/uploads/2020/12/CMHA-UBC-wave-2-Summary-of-Findings-FINAL-EN.pdf			
May 2020	Mental Health Commission of Canada	Nanos Research	Telephone and online survey of 1049 Canadians	"Nearly 40% of respondents indicated that "their mental health is worse or somewhat worse than before the pandemic."

Source: https://www.mentalhealthcommission.ca/sites/default/files/2020-05/nanos_covid_may_2020.pdf

Oct 2020	CTV	Nanos Research	Telephone survey of 1003 Canadians	"Canadians said their mental health is now worse (16%) or somewhat worse (24%) than it was in April during the early stages of the pandemic."
	Source: https://www.ctvnews.ca/health/coronavirus/canadians-report-worse-mental-health-than-before-pandemic-nanos-survey-1.5141592			
Dec 2020	Mental Health Research Canada	Pollara Strategic Insights	Online survey of 2761 Canadians	Canadians are reporting their highest levels of anxiety (23%) and depression (15%)
	Source: https://www.mhrc.ca/national-data-on-covid			
Dec 2020	Global news	Ipsos poll	Online poll of 1000 Canadians	40% of Canadians struggling with their mental health.
	Source: https://globalnews.ca/news/7544244/coronavirus-addiction-mental-health-ipsos-poll/			

Appendix C

Draft Survey

Thank you for agreeing to take part in this survey measuring perceptions of instant messaging (IM) use during COVID-19. The purpose of this research is to explore the relationship between mental health characteristics and the perceived effectiveness of communication through instant message technologies. The current global situation affords the unprecedented opportunity to compare and contrast this relationship pre-pandemic versus during the pandemic, as well as allowing an examination of how workers have coped with the changes that come from working remotely and the strategies that they have developed to address potential mental health challenges while continuing to work. This survey should only take 20-25 minute to complete. Be assured that all answers you provide will be kept in the strictest confidentiality.

SCREENING QUESTIONS

consent

Potential benefits of participating in this research include:

- Gaining a greater understanding of your online community preferences.
- Understanding how your mental health has impacted your ability to effectively communicate for work purposes.
- Understanding how the pandemic has impacted your perceived performance/productivity at work.

Due to the sensitive nature of some of the survey questions, you may at any time elect not to answer certain questions, move to the next questions and/or revise a response. If you decide that you don't want your information used, you must inform the researcher (sarah.flesher@concordia.ca) prior to **midnight October 31, 2020.** When navigating through the survey please use the Previous and Next buttons at the bottom of the screen. Do NOT use the browser back button.

When answering the survey questions, please be aware that the intent is to understand how the COVID-19 pandemic has impacted your mental health and your ability to communicate at work. Throughout the survey there will be opportunities to provide additional information. Although not mandatory, it would be appreciated if you took the time to further explain your answer.

Participant's Declaration

1. I consent to be a participant in this study and understand that I can refuse to answer questions and I can withdraw from the study at any time, without having to give a reason, until I finish the survey and up until the cut off date - midnight October 31, 2020.
2. I understand that confidentiality will be maintained, and it will not be possible to identify me in any research outputs.

	I confirm all of the above and consent to take part in this study. 1 … Yes 2 … No (End survey) **This is a mandatory response question, if respondent selects no, they are directed to a page that says, "Thank you for your time" and they can exit out of the tab/browser.* *If Yes, ask for an unidentifiable nickname in the event that they want to withdraw responses to be included in the study.*
work_1	Have you been employed during the COVID-19 pandemic (between March and August 2020)? 1 …Yes 2 …No (End survey)
work_2	Are you working full-time or part-tie? Please explain your work situation. 1 …Full-time 2 …Part-time *Open ended comment available.*
work_3	Using the scale provided, please tell us how satisfied are you with your job? 7-point 1 …Extremely satisfied 2 …Satisfied 3 …Somewhat satisfied 4 …Neither satisfied nor dissatisfied 5 …Somewhat dissatisfied 6 …Dissatisfied 7 …Very dissatisfied

IM USAGE

use_1	Do you use an online or mobile instant messaging technology to communicate with colleagues at work? *Instant messaging technology refers to online or mobile chat that offers real-tie text transmission.* 1 …Yes 2 …No (End survey)

use_2	Please indicate the instant messaging (IM) tools that are most commonly used in your workplace. Select all that apply. 1 ….Slack 2 ….Microsoft Teams 3 ….Skype Chat 4 ….Workplace by Facebook 5 ….Messenger 6 ….iMessage 7 ….WhatsApp 8 ….WeChat 9 ….Google Chat/Hangouts 10 …ezTalks 11 …Viber 12 …Other
Use_3	During which hours of the day are you most active on IM? 1 … All day/during office hours 2 … In the morning between 8am and 11:00am 3 … During the lunch period between 11:00am and 1:00pm 4 … In the afternoon between 1:00pm and 4:00 pm 5 … In the evening between 4:00pm and 7:00on 6 … Other, please indicate _____
use_4a	Before COVID-19, my company encouraged employees to use online IM for work-related communication with colleagues and/or clients. 7-point 1 …Strongly agree 2 …Agree 3 …Somewhat agree 4 …Neither agree nor disagree 5 …Somewhat disagree 6 …Disagree 7 …Strongly disagree
use_4b	During COVID_19, my company encourages employees to use online IM for work-related communication with colleagues and/or clients. 7-point 1 …Strongly agree 2 …Agree 3 …Somewhat agree 4 …Neither agree nor disagree 5 …Somewhat disagree

	6 …Disagree 7 …Strongly disagree
use_5a	Before COVID-19, I used instant messaging tools multiple times a day to communicate with colleagues and/or clients. 7-point 1 …Strongly agree 2 …Agree 3 …Somewhat agree 4 …Neither agree nor disagree 5 …Somewhat disagree 6 …Disagree 7 …Strongly disagree
use_5b	During COVID-19, I use online instant messaging tools multiple times a day to communicate with colleagues and/or clients. 7-point 1 …Strongly agree 2 …Agree 3 …Somewhat agree 4 …Neither agree nor disagree 5 …Somewhat disagree 6 …Disagree 7 …Strongly disagree
	Using the scale provided, please tell us prior to COVID_19, how often you used an instant messaging technology to:
use_6a	Ask questions
use_6b	Answer questions
use_6c	Have unscheduled discussions
use_6d	Schedule meetings
use_6e	Share files
use_6f	Work-related socialization
use_6g	Non-work-related socialization 5-point 1 …Almost always 2 …Frequently 3 …Half the time 4 …Rarely 5 …Never

	Using the scale provided, please tell us during COVID-19, how often you have used an instant messaging technology to:
use_7a	Ask questions
use_7b	Answer questions
use_7c	Have unscheduled discussions
use_7d	Schedule meetings
use_7e	Share files
use_7f	Work-related socialization
use_7g	Non-work-related socialization
	5-point 1 …Almost always 2 …Frequently 3 …Half the time 4 …Rarely 5 …Never
use_8	How has COVID-19 impacted how often and what you use instant messaging technologies for at work? *(Open ended question)*
	Using the scale provided, please tell us how strongly you agree or disagree with each of the following statements about communication. In general, before COVID-19 hit, I felt communication (specifically IM communication) with colleagues and/or clients at work was (7-point scale):
comm_1a	a) Timely (1) – Untimely (7)
comm_1b	b) Accurate (1) – Inaccurate (7)
comm_1c	c) Adequate (1) – Inadequate (7)
comm_1d	d) Complete (1) – Incomplete (7)
comm_1e	e) Effective (1) – Ineffective (7)
comm_1f	f) Interactive (1) – Non-interactive (7)
	Using the scale provided, please tell us how strongly you agree or disagree with each of the following statements about communication. In general, during COVID-19, I feel that my communication (specifically IM communication) with colleagues and/or clients at work is (7-point scale):
comm_2a	g) Timely (1) – Untimely (7)
comm_2b	h) Accurate (1) – Inaccurate (7)
comm_2c	i) Adequate (1) – Inadequate (7)
comm_2d	j) Complete (1) – Incomplete (7)

comm_2e	k) Effective (1) – Ineffective (7)
comm_2f	l) Interactive (1) – Non-interactive (7)

comm_3	Currently, I feel that the colleagues with whom I communicate with using instant messaging (IM) at work are always (7-point scale): 1 …Always available/accessible when needed (100% of the time) 2 …Usually available/accessible when needed (75% of the time) 3 …Sometimes available when needed (50% of the time) 4 …Occasionally available/accessible when needed (25% of the time) 5 …Never available/accessible when needed (less than 25% of the time *[add open ended box for comments]*

The next questions are about your well-being and areas of your life that could affect your physical and emotional health. Take your time to think about each question before answering.

GENERAL MENTAL HEALTH

gmh_1	Does a current mental condition or health problem, reduce the amount or kind of activity you can do at work? 5-point 1 …Almost always 2 …Frequently 3 …Half the time 4 …Rarely 5 …Never

gmh_2	How satisfied are you with your life in general? 7-point 1 …Extremely satisfied 2 …Satisfied 3 …Somewhat satisfied 4 …Neither satisfied nor dissatisfied 5 …Somewhat dissatisfied 6 …Dissatisfied 7 …Very dissatisfied

gmh_3	In general, would you say your mental health is: 7-point 1 …Extremely good 2 …Good

	3 …Somewhat good 4 …Neither good nor poor 5 …Somewhat poor 6 …Poor 7 …Very poor
gmh_4	During the past six months, have you had a period lasing several days or longer when you lost interest in most things you usually enjoy like work, hobbies and personal relationships? 1 …Yes 2 …No
gmh_5	During the last six months have you ever had an attack of fear or panic when all of a sudden you felt very frightened, anxious, stressed or uneasy? 1 …Yes 2 …No
gmh_6	Overall, how has COVID-19 impacted your mental health? *[Open ended question]*

DEPRESSION

	Using the scale provided, please tell us how strongly you agree or disagree with each of the following statements.
dep_1a	During the last six months I have often felt sad, empty, discouraged or depressed.
dep_1b	During the last six months I have felt that the future is hopeless, and that things cannon improve.
dep_1c	During the last six months I have often been bothered by things that usually don't bother me.
dep_1d	During the past six month I have felt emotionally balanced.
dep_1e	During the past six months I have had the impression of really enjoying life.
dep_1f	During the past six months I was able to face difficult situations in a positive way. 7-point 1 …Strongly agree 2 …Agree 3 …Somewhat agree 4 …Neither agree nor disagree

	5 …Somewhat disagree 6 …Disagree 7 …Strongly disagree

FATIGUE

fatig_1	Approximately how many hours of sleep do you get per night? *[Open ended question]*
fatig_2	Compared to six year ago, how would you say your sleep is now? Please explain your answer. 5-point 1 …Much better now than 6-months ago 2 …Somewhat better now than 6-months ago 3 …About the same 4 …Somewhat worse than 6-months ago 5 …Much worse now that 6-months ago
fatig_3	During the last six months, how often do you have trouble going to sleep or staying asleep? 5-point 1 …All of the time 2 …Most of the time 3 …Some of the time 4 …A little of the time 5 …None of the time
fatig_4	During the last six months, how often do you find it difficult to stay awake when you want to? 5-point 1 …All of the time 2 …Most of the time 3 …Some of the time 4 …A little of the time 5 …None of the time

STRESS

stress_1	Thinking about the amount of stress in your life right now, would you say that most days are: 7-point

	1 …Extremely stressful 2 …Stressful 3 …Somewhat stressful 4 …Neither stressful nor relaxed 5 …Somewhat relaxed 6 …Relaxed 7 …Very relaxed
stress_2	The next question is about your main job or business in the past six months. Would you say that most days at work were 7-point 1 …Extremely stressful 2 …Stressful 3 …Somewhat stressful 4 …Neither stressful nor relaxed 5 …Somewhat relaxed 6 …Relaxed 7 …Very relaxed
	The next few questions are about your main job or business in the past six months. Please tell me if you strongly agree, agree, somewhat agree, neither agree nor disagree, somewhat disagree, disagree, or strongly disagree with the following statements.
stress_3a	Your job allowed you freedom to decide how you did your job.
stress_3b	Your job was very hectic.
stress_3c	You were free from conflicting demands that others made.
stress_3d	Your job security was good.
stress_3e	Your employer was supportive.
stress_3f	The people you work with were helpful in getting the job done.
stress_4	In general, how would you rate your ability to handle unexpected and difficult problems, for example, a very tight work deadline? Would you say your ability is 7-point: 1 …Very high 2 …High 3 …Somewhat high 4 …Neither high nor low 5 …Somewhat low

	6 …Low 7 …Very low
stress_5	In general, how would you rate your ability to handle the day-to-day demands in your life, for example, handling work, family, and volunteer responsibilities. Would you say your ability is 7-point: 1 …Very high 2 …High 3 …Somewhat high 4 …Neither high nor low 5 …Somewhat low 6 …Low 7 …Very low
	People have different ways of dealing with stress. Thinking about the ways you deal with stress, on a scale from 1 to 7 where 1 is extremely often and 7 is not at all please tell me how often you do each of the following:
stress_6a	When dealing with stress, how often do you avoid being with people?
stress_6b	How often do you sleep more than usual to deal with stress?
stress_6c	How often do you try to feel better by eating more, or less, than usual?
stress_6d	How often do you try to feel better by drinking alcohol or using drugs or medication? 7-point 1 …Extremely often 2 …Often 3 …Somewhat often 4 …Neither often nor not often 5 …Somewhat not often 6 …Not often /rarely 7 …Never

ANXIETY

anx_1	Some people have periods lasting several days or longer when they feel much more excited and full of energy than usual. Their minds go too fast. They talk a lot. They are very restless or unable to sit still and they sometimes do things that are unusual for them. For example, they may drive too fast or spend too much money.

	During the past six months, have you had a period like this lasting several days or longer? 1 …Yes 2 …No
	On a scale from 1 to 7 where 1 is 'Strongly Agree' and 7 is 'Strongly Disagree', please rate your feelings on the following statements:
anx_2a	During the last six months I often felt nervous, worried or anxious.
anx_2b	During the last six months I've had feelings of tension, fatigability, or am moved to tears easily.
anx_2c	During the last six months I've been unable to relax or have been restless.
anx_2d	During the last six months I've felt like I cannot cope with my everyday responsibilities.
anx_2e	During the last six months I've had trouble concentrating on things such as completing work tasks or watching television. 7-point 1 …Strongly agree 2 …Agree 3 …Somewhat agree 4 …Neither agree nor disagree 5 …Somewhat disagree 6 …Disagree 7 …Strongly disagree

LONELINESS

lone_1	During the past six months how often did you feel like you wanted to be alone rather than spend time with colleagues, friends, or relatives. 7-point 1 …Extremely often 2 …Often 3 …Somewhat often 4 …Neither often nor not often 5 …Somewhat not often 6 …Not often /rarely 7 …Never

	During the past six months COVID-19 has affected my:
lone_2a	1 …Personal relationships
lone_2b	2 …Work relationships
	7-point 1 …Strongly agree 2 …Agree 3 …Somewhat agree 4 …Neither agree nor disagree 5 …Somewhat disagree 6 …Disagree 7 …Strongly disagree

	On a scale from 1 to 7 where 1 is 'Strongly Agree' and 7 is 'Strongly Disagree', please rate your feelings on the following statements:
lone_3a	During the last six months I feel like I've lacked companionship.
lone_3b	During the last six months there has been no one I can turn to.
lone_3c	During the last six months I no longer feel close to anyone.
lone_3d	During the last six months I've had friends and family to turn to.
lone_3e	During the last six months I've felt I've had a lot in common with the people around me.
	7-point 1 …Strongly agree 2 …Agree 3 …Somewhat agree 4 …Neither agree nor disagree 5 …Somewhat disagree 6 …Disagree 7 …Strongly disagree

ATTENTION

	During the past six months, please indicate the level of difficulty associated with each time:
	None: This is not a problem or concern. *Mild*: Some difficulty (somewhat)

	Moderate: This is a problem (pretty much) *Severe*: This is a serious problem (very much) *NA*: Not application; select this option of the item is not a problem or not relevant to you.
att_1a	Attention to details or makes careless mistakes
att_1b	Holding attention or remaining focused
att_1c	Listening or mind seems elsewhere
att_1d	Difficulty following instructions or finishing work
att_1e	Avoids/dislikes activities requiring effort
att_1f	Forgetful
att_2	During COVID-19 it has been difficult to focus on work-related tasks. 7-point 1 …Strongly agree 2 …Agree 3 …Somewhat agree 4 …Neither agree nor disagree 5 …Somewhat disagree 6 …Disagree 7 …Strongly disagree
att_3	How has COVID-19 impacted your ability to focus on work-related tasks? *[Open ended question]*

MOOD REGULATION

	During the past six months, please indicate the level of difficulty associated with each time: *None*: This is not a problem or concern. *Mild*: Some difficulty (somewhat) *Moderate*: This is a problem (pretty much) *Severe*: This is a serious problem (very much) *NA*: Not application; select this option of the item is not a problem or not relevant to you.
mood_1a	Distinct period(s) of intense excitement
mood_1b	Distinct period(s) of inflated self-esteem, grandiose

mood_1c	Distinct period(s) of increased energy
mood_1d	Distinct Period(s) of racing thoughts or speech
mood_1e	Irritable behaviour that is out of character
mood_1f	Rage attacks, anger outbursts, hostility
mood_2	During COVID-19 it has been difficult to regulate my mood. 7-point 1 …Strongly agree 2 …Agree 3 …Somewhat agree 4 …Neither agree nor disagree 5 …Somewhat disagree 6 …Disagree 7 …Strongly disagree
mood_3	How has COVID-19 impacted your ability to regulate your mood? *[Open ended question]*

DEMOGRAPHIC QUESTIONS

dem_1	Please indicate your gender. _____
dem_2	Please indicate your age. _____
dem_3	Please indicate your ethnicity. _____
dem_4	Please indicate your education level. 1 …Less than a high school diploma 1 …High school diploma or equivalent 2 …College diploma 3 …Undergraduate Bachelor's degree 4 …Masters degree or above
dem_5	Please indicate the industry you work in. _____
dem_6	What is your occupation? _____
dem_7	Please indicate the size (number of employees) of your company.

	1 …50 or less 2 …51-100 3 …101-500 4 …501-1000 5 …1001 and above
dem_8	Which of the following best describes your position in your company? 1 …Non-management employee 2 …Manager/supervisor 3 …Senior or executive manager
dem_9	What is your approximate average yearly income? 1 …Less than $10,000 2 …$10,000-$19,999 3 …$20,000-$29,999 4 …$30,000-$39,999 5 …$40,000-$49,999 6 …$50,000-$59,999 7 …$60,000-$69,999 8 …$70,000-$79,999 9 …$80,000-$89,999 10 …$90,000-$99,999 11 …$100,000-$124,999 12 …$125,000-$149,999 13 …$150,000 or more 14 …Prefer not to answer
dem_10	In what country do you live? _____
dem_11	In what province/state do you live? _____

Call for Participants – Social Media:

Hello everyone,

As part of my PhD research I am looking for individuals who use instant messaging (IM) tools in their workplace and who would be interested in participating in my survey. Completing the survey will take less than 20-minutes and your participation would be greatly appreciated. All responses will be confidential and the answers you provide will be kept in the strictest confidentiality.

Because of the COVID-19 pandemic, and as employees are being required to work from home, in-person face-to-face meetings are not an option. Communication technologies like IM (Slack, Facebook Messenger, Microsoft Teams, Skype, etc.) are becoming the new normal and data around patterns of use will be necessary for organizations and employers as they adapt to a remote workforce and ensure performance and productivity metrics are being met. The purpose of my research is to look at the impact mental health characteristics (depression, anxiety, fatigue, stress and loneliness) has on workplace IM usage and effective communication.

To access the survey, click **HERE.**

Please let me know if you have any questions. Message me here or email me (sarah.flesher@concordia.ca).

Please share!

Thank you.

Call for Participants – Email:

Subject: Research Survey regarding Mental Health and Instant Messaging Use During COVID-19

Hi _____,

My name is Sarah Flesher and I am a Doctoral Candidate at Concordia University in Montreal, QC, Canada. I am currently conducting research studying the impact of mental health characteristics on instant messaging use and communication in the workplace during the COVID-19 pandemic.

I am reaching out to you because I am looking for individuals who use instant messaging (IM) tools in their workplace and who would be interested in participating in my survey. Completing the survey will take less than 20-minutes and your participation would be greatly appreciated. All responses will be anonymous and the answers you provide will be kept in the strictest confidentiality.

The deadline to complete the survey is **[insert date].**

Please click on the following link to complete the survey:
[add survey link]

Please share this email with your friends and colleagues.

Thank you!

There are no negative consequences for not participating, stopping in the middle, or asking us not to use your responses.

If you have questions about the scientific or scholarly aspects of this research, please contact me by email (sarah.flesher@concordia.ca) You may also contact my faculty supervisor, Dr. Steven Shaw at steven.shaw@concordia.ca

If you have concerns about ethical issues in this research, please contact the Manager, Research Ethics, Concordia University, 514.848.2424 ex. 7481 or oor.ethics@concordia.ca.

Appendix D

Draft Semi-Structured Online Interview Protocol

Please note that due to COVID-19, all semi structure interviews with be conducted online using GoToMeeting or Zoom.

Date:

Interviewee (full name and contact information):

Confirm consent for has been received and signed by the participant: Y / N

Orally ask participant if they are still okay to participate in the interview Y /N

Questions:

Before delving into the prepared questions, take a few minutes to get to know the interviewee and build a rapport. A lot has been going on in the world over the past four months and it's important to get a feel for how the interviewee is coping. This initial conversation will help assess potential mental health factors impacting the interviewee.

Interviewer: The purpose of this study is to understand how COVID-19 has impacted your ability to effectively communicate with work colleagues using online communication tools like instant messaging. I am examining the experience(s) shared by individuals, like yourself who have been working during the pandemic and have had to adapt to new ways of communication – face-to-face, in person meetings have not been allowed due to government mandated social distancing requirement.

1. Tell me a little bit about yourself and how you've been feeling over the last few months.

2. How has the pandemic impacted your job? How has your role at work changed during the past four months? How does this compare to pre-pandemic?

3. How are you most commonly communicating with colleagues on a daily basis? Probe for pre-pandemic and during pandemic:
- Type of IM tool used
- Frequency of use
- Types of conversations
- Length of conversations
- Communication effectiveness – has it been a useful tool?

3. How has the pandemic impacted your overall mental health? Probe for general feelings of:
- Depression

- Fatigue
- Anxiety
- Stress
- Loneliness

4. Answer the following questions and have a conversation to understand why the interviewee answered a certain way:

a) Has the pandemic made it easier or harder to stay focused at work? And, how have you adapted?

b) When you are more anxious, how likely are you to use an online platform as a communication tool? How effective do you perceive that communication to be?

c) When you are tired, how likely are you to use an online platform as a communication tool? How effective do you perceive that communication to be?

d) When your stress levels are high, how likely are you to use an online platform as a communication tool? How effective do you perceive that communication to be?

e) When you are feeling lonely or that you need some type of social interaction with others, how likely are you to use an instant messaging tool. If you do have a conversation over Slack, for example, how does that make you feel after the conversation is over?

f) Overall, what impact do you think your mental health has on your ability to effectively communicate with others online?

5. How have you been coping? What kinds of strategies have you been using to help cope?

General demographic questions:

- Gender
- Age
- Education level
- Industry
- Size of company
- Position

Conclude the interview by thanking your participant for their time and informing them that a copy of the interview transcript will be provided for them for their review and feedback.

Note: This protocol was adapted from Creswell, J. (2013). *Qualitative inquiry and research design: Choosing among five approaches.* Thousand Oaks, London, New Delhi: SAGE Publications. p. 136.

INFORMATION AND CONSENT FORM

Study Title:
PING!: An Exploratory Study of Mental Health Characteristics on IM Usage and Communication Effectiveness During COVID-19

Researcher:
Sarah Flesher
PhD Candidate, Faculty of Education, Educational Technology

Researcher's Contact Information:
Email: sarah.flesher@concordia.ca
Phone: 514-473-5795

Faculty Supervisor:
Dr. Steven Shaw
Associate Professor, Faculty of Education, Educational Technology

Faculty Supervisor's Contact Information:
S-FG-6327
Faubourge Ste-Catherine Building,
1610 St. Catherine W.
Email: steven.shaw@concordia.ca
Phone: (514) 848-2424 ext. 2044

Source of funding for the study:
This study is not being funded.

You are being invited to participate in the research study mentioned above. This form provides information about what participating would mean. Please read it carefully before deciding if you want to participate or not. If there is anything you do not understand, or if you want more information, please ask the researcher.

A. PURPOSE

The purpose of the research is to explore the relationship between mental health characteristics (depression, fatigue, stress, anxiety and loneliness) on instant messaging use and effective communication in the workplace during the COVID-19 pandemic. Current research shows that instant message (IM) use at work can be both an effective way to communicate with colleagues, but also a tool that is distracting and impedes one's performance. We also know that mental health is a huge influence on employee productivity.

No prior research on this topic has been conducted during the COVID-19 pandemic and as employees are being required to work from home, in-person face-to-face meetings are not an option. Communication technologies like IM are becoming the new normal and data around patterns of use will be necessary for organizations and employers as they adapt to a remote workforce and ensure performance and productivity metrics are being met.

B. PROCEDURES

If you participate, you will be asked to participate in a 45-minute semi-structured interview whereby you will be asked about how you've been coping during the pandemic, how communication with colleagues has changed since social distancing measures have been put in place, and how the stresses of the pandemic have made it easier or more difficult to communicate online using an instant messaging technology.

In order to participate, you must have been working during the past four months and be using an instant messaging tool to communicate with work colleagues.

Participation is voluntary and you can choose at any point to end the interview. Data collected will only be used with the participants consent, otherwise it will be deleted.

The interviews will be conducted online using Zoom. Interviews will be recorded with the consent of the participant and transcribed post interview.

Transcripts will be provided to participants for verification.

C. RISKS AND BENEFITS

You might face certain risks by participating in this research. These risks include:

- Feeling uncomfortable discussing topics around how the pandemic has affected you mentally. If participants express their concern, the interviewer will ensure the participant is okay to continue with the interview by gaining oral consent and move on to the next set of questions, or end the interview if desired by the participant.

Potential benefits include:

- Gaining a greater understanding of your online communication preferences.

- Understanding how your mental health has impacted your ability to effectively communicate for work purposes.
- Understanding how the pandemic has impacted your perceived performance/productivity at work.

This research is not intended to benefit you personally.

D. CONFIDENTIALITY

The following information will be gathered as part of this research:

- Demographic information
- Contact information
- Responses to a survey
- Responses to interview questions:
    - Participants' overall perception on how the pandemic has impacted them personally and their work
    - Participants' frequency of using instant messaging tools and the types of conversations that are had
    - Participants' perception of their mental health as it relates to feeling anxious, worried, tired, stressed and lonely or isolated because of the pandemic and how this has impacted their ability to communicate in the workplace

We will not allow anyone to access the information, except people directly involved in conducting the research. We will only use the information for the purposes of the research described in this form.

The information gathered through the survey will be confidential. Data will only be used for statistical purposes and will be reported only in aggregated form.

The information gathered through the online interview will be coded. That means that the information will be identified by a code. The researcher will have a list that links the code to your name.

We will protect the information by storing data, transcripts and related notes in a password-protected file on the researcher's hard drive.

We intend to publish the results of the research. However, it will not be possible to identify you in the published results.

We will destroy the information five years after the end of the study.

F. CONDITIONS OF PARTICIPATION

You do not have to participate in this research. It is purely your decision. If you do participate, you can stop at any time. You can also ask that the information you provided not be used, and your choice will be

respected. If you decide that you don't want us to use your information, you must inform the researcher. This can be done prior to the interview or at any point during the interview.

There are no negative consequences for not participating, stopping in the middle, or asking us not to use your information.

G. PARTICIPANT'S DECLARATION

I have read and understood this form. I have had the chance to ask questions and any questions have been answered. I agree to participate in this research under the conditions described.

NAME (please print) _____

SIGNATURE _____

DATE _____

If you have questions about the scientific or scholarly aspects of this research, please contact the researcher. Their contact information is on page 1. You may also contact their faculty supervisor.

If you have concerns about ethical issues in this research, please contact the Manager, Research Ethics, Concordia University, 514.848.2424 ex. 7481 or oor.ethics@concordia.ca.