8-10-2021 10:00 AM

Social Media Use, Social Connectedness, and Physical Distancing Among University Students During the COVID-19 Pandemic

Olivia Holmes, *The University of Western Ontario*

Supervisor: Burke, Shauna M., *The University of Western Ontario*

A thesis submitted in partial fulfillment of the requirements for the Master of Science degree in Health and Rehabilitation Sciences

Abstract

The overall purpose of this cross-sectional, survey-based study was to examine university students' social media use, perceptions of in-person and online social connectedness, and feelings about physical distancing during the early phases of the COVID-19 pandemic in Ontario, Canada. University students' (N = 1,588; M_{age} = 22.4, SD = 5.1; 80.6% female) survey responses revealed high levels of in-person (M_{item} = 4.4, SD = 0.8) and online (M_{item} = 3.8, SD = 0.7) connectedness. Students who reported greater perceptions of connectedness were those whose social media use: (a) had "increased greatly" since the start of the pandemic; and (b) was *active* (versus passive). Connectedness was significantly higher among users of Instagram, Snapchat, and TikTok (versus non-users). Students reporting greater *support* and *attitudes* about physical distancing also reported significantly higher connectedness scores. Results are discussed in the context of existing literature and as a basis for potential implications and future directions.

Keywords

Social media, social connectedness, physical distancing, university students, COVID-19, pandemic, health and wellbeing, public health

Summary for Lay Audience

As COVID-19 marks the first pandemic of the digital era, social media presents an opportunity for maintaining social connections when physical interactions are not possible. This cross-sectional, survey-based study was conducted to examine university students' social media use, perceptions of in-person and online social connectedness, and feelings about physical distancing during the early phases of the COVID-19 pandemic in Ontario, Canada. University students (N = 1,588 [92.2% from the host university]; M_{age} = 22.4, SD = 5.1; 80.6% female) completed an online survey in March/April, 2020. Results showed that most students reported spending 1-4 hours per day on social media, and that 85.6% had increased their use since the start of the pandemic. Most students reported having 4+ social media accounts, with Facebook and Instagram being the most common. Students were more likely to report their social media engagement as passive (i.e., scrolling), rather than active (e.g., sharing photos). Overall, students reported high levels of both in-person and online social connectedness, as well as high levels of support from others and positive attitudes related to physical distancing; students' adjustment to physical distancing was moderate. Females and younger students (aged 17-19) reported spending significantly more time on social media than males and older students. With regard to physical distancing, younger students reported significantly lower levels of adjustment, and males reported significantly lower attitudes. Perceptions of in-person and online connectedness were significantly higher among students who reported: (a) that their social media use had "increased greatly"; (b) active engagement; and (c) using Instagram, Snapchat, and TikTok. Students who had greater perceptions of support from others and more positive attitudes towards physical distancing also exhibited significantly higher levels of connectedness. Significantly greater perceptions of online connectedness (but not in-person connectedness) were observed for students who:

(a) were high (> 5 hours/day) social media users; (b) used Twitter and "other" platforms; and (c) reporting having more social media accounts. These findings provide useful information about how university students adapted to the COVID-19 pandemic in its early stages. Researchers can utilize these results to support public health in the case of future waves and crises.

Acknowledgments

First and foremost, I would like to thank my supervisor Dr. Shauna Burke. I am so fortunate to have learned from one of the best. I am sincerely thankful for your guidance and support over the past two years. While you helped me substantially in my studies, you also supported me in other aspects of my life, and for that I am eternally grateful.

Second, I would like to thank my advisory committee, Dr. Tara Mantler and Dr. Trish Tucker, for their ongoing support. I am extremely appreciative to have received your feedback along the way.

I would also like to extend a special thanks to Dr. Tara Dumas. Your patience and kindness are unmatched. Thank you for your expertise and significant contributions with data analysis.

Next, I express my sincerest thanks to my friends and research mates. Your words of encouragement meant the world to me. Thank you Nerida for your kindness and support from day one. I am forever grateful for everything you taught me.

To my wonderful family, thank you for always believing in me. I am appreciative of everything you have done to help me over these past two years; I could not have done this without you. I love you all.

Finally, thank you to Zack. Your motivational sticky notes kept me going through the hardest of times. Thank you for always showing interest in my work and for pushing me to be my best. I love you.

Table of Contents

List of Tables

List of Appendices

Chapter 1

1 Introduction and Literature Review

The overarching purpose of this thesis was to explore university students' social media use, perceptions of social connectedness, and feelings about physical distancing during the early stages of the COVID-19 pandemic in Ontario, Canada. This chapter includes an overview of the literature pertaining to social connectedness, including its evolutionary basis and importance for university students, social media and its use among the university student population, and finally, a theoretical framework which has informed aspects of this research. In addition, given that this Masters project was conducted as part of a larger project (i.e., i*Belong* Phase 1) which took place in March/April 2020, a background section containing an overview of the COVID-19 pandemic and its associated public health measures was included to provide an introduction to and backdrop of the context in which the data were collected.

1.1 Background

In December 2019, an outbreak of a highly contagious virus (SARS-CoV-2), referred to as COVID-19, was reported to the World Health Organization (WHO) China Office after a number of cases of pneumonia were detected in Wuhan, China (Kang & Xu, 2020; WHO, 2020a). Within a month, the WHO announced a Public Health Emergency of International Concern as the virus had infected thousands of people in China and spread to 18 other countries (WHO, 2020b). As the number of cases continued to increase, the WHO officially declared COVID-19 a pandemic on March 11, 2020

(WHO, 2020b). In an effort to control the spread of the virus, countries around the world moved to implement a wide range of public health measures.

In Canada, public health agencies have worked alongside government officials to recommend and in some cases, mandate, a range of health measures to slow the transmission of COVID-19. Specifically, at various points in time throughout the pandemic, Canadians have been encouraged and/or required to practice proper hygiene (i.e., to wash hands with soap, cover the mouth and nose when coughing or sneezing, avoid touching one's face, etc.), to wear a non-medical face mask in public settings, and to avoid contact with others outside of their immediate household (Government of Canada, 2021a; Government of Ontario, 2020a). Additional public health measures that have been utilized and in some cases, mandated, include social/physical distancing (i.e., reducing physical contact with others by staying at least two meters apart; Government of Canada, 2020a), quarantine (i.e., the separation of individuals who are *not* ill but who may have been exposed to a virus or are returning from travel outside of the country; WHO, 2020c), and isolation (i.e., the separation of individuals who have been infected or have symptoms of a virus; WHO, 2020c). Social/physical distancing, quarantine, and isolation have been recognized as some of the most successful public health tools for controlling the spread of infection, having been used for centuries to control diseases like the plague, SARS, and H1N1 (Güner et al., 2020; Tognotti, 2013). Likewise, other public health strategies that discourage physical contact—such as school and workplace closures and the prohibition of public gatherings—have also played an important role in controlling infectious diseases (Lemon et al., 2007; Tognotti, 2013) and COVID-19 specifically (Nussbaumer-Streit et al., 2020; Public Health Ontario, 2020a). Though

highly effective at reducing the spread of viruses (Chong et al., 2010), such practices can also be controversial as some argue that they limit the rights and freedom of the individual (Burns, 2020; Fine, 2020; Lemon et al., 2007; Ontario Human Rights Commission, n.d.; Tognotti, 2013). Concerns have also been raised about the potential impact(s) of such measures on the health and wellbeing of citizens (e.g., Brooks et al., 2020; Public Health Ontario, 2021).

While the necessity of the public health measures put in place to control the COVID-19 crisis cannot be denied (e.g., Dalton et al., 2020; Nussbaumer-Streit et al., 2020), it is important to acknowledge that many of the guidelines and practices outlined above can also be unpleasant or unusual for many individuals (Usher et al., 2020). Given that most humans are not accustomed to prolonged periods of social isolation, measures that encourage distancing from others—while critical to curb the spread of a highly infectious disease (Dalton et al., 2020)—also contradict our innate desire to connect with others (e.g., Abel & McQueen, 2020). In fact, the widespread recommendation to "socially distance" at the beginning of the COVID-19 pandemic quickly led to confusion, as some people interpreted this to mean limiting all forms of social connection (United Nations Children's Fund [UNICEF], 2020). As a result, UNICEF (2020) issued a statement to the public to address this concern:

> …the term social distancing has created some misunderstanding as some people mistakenly believe that the term social distancing means, changing your relationship status with people or that we need to be separated from family and friends. Due to this misconception, the WHO have begun to use the term "physical distancing". The terminology was changed in order to emphasize that

> while physical distance should be maintained people can remain socially and emotionally connected to their loved ones, and family. (paras. 2-3)

Thus, in an effort to reduce further confusion, the WHO officially announced the revised terminology (i.e., from *social distancing* to the more accurate term, *physical distancing*) on March 20, 2020 (WHO, 2020d). As such, for the purpose of the present thesis, the term physical distancing will be used throughout.

The Government of Canada continues to work with public health officials to inform Canadians about the importance of physical distancing while remaining socially connected (e.g., Government of Canada, 2021b; Public Health Ontario, 2020b). In fact, since the beginning of the pandemic (i.e., March/April 2020), a number of statements have been issued to the public about safe ways to connect with others (e.g., Government of Canada, 2021b; Public Health Ontario, 2020b; UNICEF, 2020; WHO, 2020e). Not surprisingly, the use of technology (e.g., social media, video chats, phone calls, etc.) remains a primary recommendation (Public Health Ontario, 2020b; UNICEF, 2020).

While many people have had to shift aspects of their daily lives (e.g., work, meetings, gatherings, shopping) to online spaces throughout the pandemic, certain populations have been spending more time online than others. According to a recent rapid review conducted by Vargo and colleagues (2021), *postsecondary students* have been one of the main user groups of digital technology (e.g., mobile devices, webcam-enabled computers, video-based communication platforms) since the start of the pandemic. According to these authors, the high technology use among postsecondary students has been attributed primarily to the need to communicate with others and as a result of the transition to online learning. These findings are consistent with those reported in other

studies (e.g., Aristovnik et al., 2020; Day et al., 2021); namely, that postsecondary students have identified using digital devices (e.g., computers, tablets, mobile phones) to connect with others and to participate in online learning during the pandemic. In short, reduced contact and in-person interactions with others has impacted university students' learning and school experiences (Day et al., 2021), as well as their social environments (Aristovnik et al., 2020).

Interactions with peers are an important aspect of socialization in postsecondary life (Padgett et al., 2010). As such, it is not surprising that emerging research throughout the pandemic suggests that students' adherence to physical distancing guidelines has been somewhat inconsistent. For example, a large study conducted across 10 countries examined university students' (N = 7,403; mean age = 22.8) compliance to public health recommendations at the beginning of the pandemic (i.e., April to May, 2020) and found significant variability in students' adherence to physical distancing guidelines (Wismans et al., 2020). Specifically, Wismans and colleagues found that being younger and male were negatively associated with physical distancing behaviours. Similar findings were observed later in the pandemic in a recent study by Statistics Canada (2020a) which showed that youth aged 15 to 34 had significantly increased their contact with people outside of their households (i.e., from 18% in May, 2020 to 44% in July, 2020). This age group was also more likely than those aged 35 and older to have come in close contact with people outside of their family 'bubble' in July 2020.

Indeed, young people—and university students more specifically—have a desire and need to remain socially connected (Jorgenson et al., 2018; Pittman & Richmond, 2008), and research has shown the importance of such connections in terms of students'

health (e.g., Nguyen et al., 2019; Whitlock et al., 2012) and academic success (e.g., Jorgenson et al., 2018; MacLeod et al., 2019). Unfortunately, some recent literature has also demonstrated the negative effects of the pandemic on university students' mental and emotional health (e.g., Aristovnik et al., 2020, Browning et al., 2021), as well as their academic experiences (e.g., Day et al., 2021, Westbrook et al., 2020). Therefore, it is important to explore university students' perceptions of social connectedness—as well as how they are using social media to facilitate such connections—as they have navigated this new reality and its consequences.

1.2 Social Connectedness

While there is no single, widely accepted definition used to describe the concept of 'social connectedness', it is often used synonymously with terms such as social support and social networks in reference to the bond or sense of belonging that people feel to other individuals, communities, and to the world more broadly (Haslam et al., 2015; Lee & Robins, 1995). Our internal drive to connect with others is deeply rooted and has been noted to play a key role in the survival and success of the human species as a whole (Bzdok & Dunbar, 2020; Deci & Ryan, 2000). To that end, in 1995, Baumeister and Leary proposed the *belongingness hypothesis*, which suggests that humans have a fundamental desire to form and maintain social connections with other humans, and that this internal drive has an evolutionary basis. Specifically, throughout evolutionary history, social relationships have been advantageous for survival, reproduction, defense and protection, parenting, labour, and access to food, resources, and information (e.g., Baumeister & Leary, 1995; Hall & Davis, 2016; Lamblin et al., 2017; Over, 2016).

In addition to its evolutionary benefits, social connectedness has been found to be critical to overall health and wellbeing (e.g., Baumeister & Leary, 1995; Haslam et al., 2015; Holt-Lunstad et al., 2017; Porges, 2020). Numerous researchers have found that social connectedness promotes positive psychological states such as feelings of belonging (Jose et al., 2012; Saeri et al., 2018), interpersonal support (Brown et al., 2003; Polizzi et al., 2020; Umberson & Montez, 2010), security (Kawachi & Berkman, 2001; Malaquias et al., 2015), and having a sense of purpose (Kawachi & Berkman, 2001; Stavrova & Luhmann 2016). Relationships characterized by high levels of social support have also been recognized as a protective factor for mental health (Umberson & Montez, 2010), especially in times of adversity (Saeri et al., 2018; Saltzman et al., 2020). Notably, researchers have also found that social interactions and feelings of connectedness play a fundamental role in promoting positive health outcomes and reducing the risk of premature mortality (Haslam et al., 2015; House et al., 1988; Holt-Lunstad, 2017; Martino et al., 2015). In particular, findings have shown that life expectancy is positively associated with social engagement (Holt-Lunstad et al., 2010; Pizzo, 2020), reinforcing the notion that social connections are important to our survival (e.g., Baumeister & Leary, 1995).

On the basis of the literature presented above, it is likely not surprising to learn that when human contact and connectivity is limited or restricted, a number of negative health-related issues begin to emerge. For example, Baumeister and Leary (1995) posited that being ignored or excluded from social situations can lead to psychological distress and negative feelings such as grief, jealousy, and loneliness. In addition, a lack of social connectedness has been associated with increases in mental illness (e.g., depression and

anxiety; Baumeister & Leary, 1995; Lamblin et al., 2017; Malaquias et al., 2015), physical health concerns (e.g., lowered immune function, cardiovascular mortality; Bzdok & Dunbar, 2020; Haslam et al., 2015; Holt-Lunstad et al., 2017; Martino et al., 2015), antisocial behaviour (Bzdok & Dunbar, 2020; Demeter & Rad, 2020), and criminal and/or violent behaviour (Brookmeyer et al., 2005; Steiner et al., 2019; Stoddard et al., 2011). While it is unethical to experimentally examine the effects of social isolation on humans, Harlow and colleagues (1965) are widely recognized for their work studying rhesus monkeys to gain insight into these issues. Their findings have provided important foundational knowledge regarding social connections and attachment, showing that after prolonged periods of complete isolation (i.e., for 6 or 12 months), the damage in the monkeys was almost irreversible and led to severely impaired social and behavioural development.

The COVID-19 pandemic, and previous disease outbreaks requiring individuals to quarantine, isolate, and physically distance from others, have presented what might be considered natural experiments on the impacts of such measures on human health and wellbeing. While recent reviews indicate that prolonged periods of isolation can have a negative impact on physical and psychological health and wellbeing (e.g., Brooks et al., 2020; Henssler et al., 2021; Loades et al., 2020; Morina et al., 2021), these effects may be particularly heightened in adolescents and young adults whose development and wellbeing rely significantly on regular social interactions (Dissing et al., 2019; Guyer et al., 2016).

1.2.1 Social Connectedness Among University Students

Social connectedness has been identified as a major contributor to the health and wellbeing of students, from children in elementary school through to adolescents and young adults enrolled in postsecondary education (Steiner et al., 2019). Research has shown that postsecondary students who experience a greater sense of connectedness are more likely to report decreases in loneliness and depressive symptoms (Chen & Chung, 2007; Jorgenson et al., 2018; Nguyen et al., 2019; Pittman & Richmond, 2008), better emotional wellbeing (Blau et al., 2016; Jorgenson et al., 2018; Lee et al., 2008), and higher rates of academic achievement than those who report feeling less connected (MacLeod et al., 2019; Steiner et al., 2019; Wilson & Gore, 2013). In contrast, postsecondary students who report experiencing lower perceptions of connectedness are more likely to experience adverse health outcomes (Jorgenson et al., 2018; Nguyen et al., 2019), as well as academic problems (Wilson & Gore, 2013; Whitlock et al., 2012).

Insofar as demographic variables are concerned, many studies that have been conducted with this population have found no differences in social connectedness between male and female postsecondary students (e.g., Chen & Chung, 2007; Jorgenson et al., 2018; Kim et al., 2016; Lee & Robbins, 2011; Turki et al., 2018; Whittaker, 2008). When considering age, Jorgenson et al. (2018) reported differences in specific *types* of connectedness, wherein younger students (aged 18-20) reported significantly higher levels of connectedness towards peers and friends, while older students (aged 21-25) reported significantly higher levels of connectedness towards faculty members at the university. On the other hand, a study by Rosenthal et al. (2007) showed that general

social connectedness was unrelated to age in a large sample (N = 979) of undergraduate and graduate students.

Over the course of the past ~16 months (i.e., from March 2020 to June 2021), university students have experienced drastic changes to one of their primary settings for achieving social connectedness—namely, the academic environment (Biwer et al., 2021). The COVID-19 pandemic has led to widespread changes in college and university education across the globe, leading to numerous disruptions in students' social and academic lives. While research on postsecondary students' perceptions of social connectedness during the pandemic is limited, recent studies have provided insights into how this population is being impacted. Specifically, studies conducted with college and university students during the COVID-19 pandemic have shown increased feelings of anxiety (Browning et al., 2021; Cao et al., 2020; Hamza et al., 2020; Wang & Zhao, 2020), loneliness (Elmer et al., 2020; Zheng et al., 2021;), and social isolation (Elmer et al., 2020; Fruehwirth et al., 2021; Hamza et al., 2020). University students have also expressed a desire for more connectivity during the pandemic (Westbrook et al., 2020), as public health measures and the move to online learning have restricted students' opportunities for in-person social interactions. In light of the fact that the COVID-19 pandemic has presented numerous challenges to university students and their feelings of (and opportunities for) connectedness, the ways in which they have sought to establish and maintain such connections is worthy of further exploration.

1.2.2 In-Person and Online Social Connectedness

Over the past few decades, there has been a significant shift in human social behaviour, with a growing number of people using online technologies to interact and

connect with others (Lieberman & Schroeder, 2020). While several researchers have explored the differences between in-person and online communication (e.g., impact on quality of life, Lee et al., 2011; structural differences, Lieberman & Schroeder, 2020; impressions of others, Okdie et al., 2011), less work has focused on how feelings of social connectedness might differ based on the method of interaction (i.e., in-person vs. online). That is, while it is widely recognized that digital technologies, such as the Internet and social media, are often used to connect with others (e.g., Allen et al., 2014; Holmberg, 2014; Ryan et al., 2017), uncertainty remains around whether such online interactions satisfy humans' need to connect and belong (Hall & Davis, 2016).

Generally speaking, there has been relatively little discussion in the psychology literature—either conceptually or from a measurement perspective—between perceptions of *in-person* and *online* social connectedness. In 2013, Grieve and colleagues were the first to identify in-person (i.e., referred to as "offline") and online connectedness as potentially separate constructs. To test this theory, they conducted a two-part study (Grieve et al., 2013). In Part one, the researchers investigated whether social connectedness derived from *online* social networks, specifically Facebook, was distinct from *in-person* social connectedness. The researchers adapted the Social Connectedness Scale-Revised (SCS-R), a previously validated measure of in-person social connectedness developed by Lee and colleagues (2001), to assess participants' perceptions of online social connectedness. A sample of Facebook users from an Australian university and the community (N = 344) were recruited to complete both the SCS-R and the new scale, named the *Facebook Social Connectedness Scale*. Grieve and colleagues then conducted an exploratory factor analysis to test their hypothesis and

found that indeed, online connectedness was distinct from in-person social connectedness. However, feelings of disconnectedness were harder to differentiate based on cross-loading items, suggesting that a lack of connection online may be similar to a lack of connection in-person (Grieve et al., 2013).

Part two of Grieve et al.'s (2013) study aimed to identify whether feelings of online connectedness were associated with psychological outcomes (i.e., depression, anxiety, and subjective wellbeing) among a different sample of Facebook users from an Australian university and the community (N = 274). As hypothesized, the researchers found that greater perceptions of online (Facebook) social connectedness, as measured by the full 20-item Facebook Social Connectedness Scale and a shorter 13-item version of the scale, were associated with significantly fewer symptoms of depression and anxiety, and significantly greater subjective wellbeing (Grieve et al., 2013). These results were echoed in a more recent study conducted by Khodabakhsh and Li (2018) with a sample of Malaysian undergraduate students (N = 419) who completed the Facebook Social Connectedness Scale, Lee and colleagues' measure of in-person connectedness (i.e., the SCS-R), as well as measures of general mental health. Khodabaksh and Li's results demonstrated a positive and significant relationship for both in-person and online connectedness and general mental health, providing further support for the importance of both types of social connectedness in this population.

Although other instruments have been developed to measure perceptions of connectedness in relation to specific online contexts (e.g., Social Connectedness Index, Bailey et al., 2018; Online Student Connectedness Survey, Bolliger & Inan, 2012; Internet Connectedness Index, Jung, 2008), the Facebook Social Connectedness Scale

(Grieve et al., 2013) remains the only measure that assesses feelings of connectedness in relation to social media. Given that social media platforms are becoming an increasingly popular method of social interaction among young people (Twenge et al., 2019), and that perceptions of connectedness derived through online spaces have been found to be associated with positive mental health outcomes (Grieve et al., 2013; Khodabakhsh & Li, 2018), exploring both in-person and online social connectedness is warranted, especially in the current pandemic context.

1.3 Social Media

We are living in a digital age, at a time in history where technological advancements are occurring rapidly and being online is simply an extension of life in the 'real' world (Lieberman & Schroeder, 2020; van Dijck, 2013). Social media platforms/apps (also referred to as social networking sites) are a form of technology that have grown drastically in popularity over the past decade (Guinta & John, 2018; Schønning et al., 2020). Social media has been defined in numerous ways. In 2015, Carr and Hayes explored a variety of definitions that have been proposed by researchers in different disciplines, and noted that a commonly agreed upon definition does not exist. Thus, Carr and Hayes advanced the following definition, meant to be applicable across all fields of research: "Social media are Internet-based channels that allow users to opportunistically interact and selectively self-present, either in real-time or asynchronously, with both broad and narrow audiences who derive value from user-generated content and the perception of interaction with others" (Carr & Hayes, 2015, p. 50).

In Canada and the United States, YouTube, Facebook, and Instagram remain the most popular social media sites among users of all ages (Grudz & Mai, 2020; Pew Research Center, 2021a). However, social media sites such as Instagram, Snapchat, and TikTok are more commonly used by young adults aged 18-29, who also happen to be the most active users of social media (Pew Research Center, 2021a). In fact, in a recent Statistics Canada survey, nearly 100% of respondents aged 15-30 reported the use of social media sites regularly, with usage rates declining as age increases (Statistics Canada, 2019). Perhaps even more noteworthy, usage statistics for individuals in the 15-30 age group were found to be consistently high across all Canadian provinces and territories, and household income groups (Statistics Canada, 2019). Such data provide support for the suggestion that young people in general seem to rely heavily on and use social media in almost all aspects of their daily lives (Schønning et al., 2020; Thomas et al., 2017).

Not surprisingly, given its nearly ubiquitous use in this demographic, much attention has been paid to the potential benefits and consequences of social media use among young people. Some of the most commonly reported and widely recognized benefits of social media use include the ability to share and receive information and content (Anderson & Jiang, 2018; Hruska & Maresova, 2020), to connect and communicate with others (Emerick et al., 2019; Naslund et al., 2020; Vishwanath et al., 2018), to create new relationships and strengthen or maintain existing ones (Hill & Zheng, 2018; Primack et al., 2019; Schønning et al., 2020; Thomas et al., 2017), and as a form of entertainment (Hruska & Maresova, 2020; Lin et al., 2016; Meşe & Aydın, 2019). Not surprisingly, opportunities for social interaction in a virtual space have been

found to lead to social and emotional benefits such as increased perceptions of social support (Clark et al., 2018; Thomas et al., 2017; Vishwanath et al., 2018) and social connectedness (Allen et al., 2014; Clark et al., 2018; Naslund et al., 2020; Primack et al., 2019; Seabrooke et al., 2016). In addition, social media has been recognized for its influence on young people's identity development, providing an opportunity for the creation of a *digital identity* by sharing images and details of their lives with others online (Dalton & Crosby, 2013; Uhls et al., 2017; Yang et al., 2017).

Unfortunately, what are arguably some of the greatest benefits of social media use might also be some of its biggest downfalls. Although social media has evolved as a means for connecting and communicating with others (van Dijck, 2013), a large body of research has identified consequences associated with the use (and overuse) of such platforms. Time spent on social media, for example, has been found to be positively associated with perceived social isolation (O'Keeffe & Clarke-Pearson, 2011; Primack et al., 2017) and feelings of loneliness (Hill & Zheng, 2018; Hunt et al., 2018; Lin et al., 2016), and negatively associated with frequency of in-person interactions (Twenge et al., 2019) among adolescents and young adult users. Additionally, in a 2016 systematic review of 70 studies which focused primarily on young adults (in their late teens to early 20s), the authors concluded that frequency of negative online interactions and social comparisons, as well as social media addiction or problematic use, were associated with greater levels of anxiety and depression (Seabrook et al., 2016). Similar findings have also been reported in studies focusing on adolescents and undergraduate students, in which the risks associated with social media use, including lost or stolen identities,

phishing attacks, and other cybercrimes (Guinta & John, 2018; O'Keeffe & Clarke-Pearson, 2011; Vishwanath et al., 2018), have been noted.

From a psychological wellbeing perspective, research has shown that *frequent social media use* (defined in various ways across studies) is associated with increased psychological distress (Sampasa-Kanyinga & Lewis, 2015; Tsitsika et al., 2014), lower self-esteem (Vandenbosch & Eggermont, 2016; Woods & Scott, 2016), and depression or depressive symptoms (Lin et al., 2016; Shensa et al., 2017) among adolescent and young adult populations. Interestingly, some research has also shown that *engagement behaviour* on social media (i.e., active or passive use) might also be related to important psychological outcomes among young people (Keles et al., 2020). While there remains no formal definition or measure of social media engagement (Trifiro & Gerson, 2019), active social media use commonly refers to actions that facilitate "direct exchanges" (Verduyn et al., 2017, p. 281) or lead to the production of content (Schønning et al., 2020), while passive use refers to the consumption of content (e.g., viewing photos, scrolling; Deters & Mehl, 2012; Orben et al., 2020) or activity not involving direct communication with others (Hill & Zheng, 2018; Trifiro & Gerson, 2019; Verduyn et al., 2017). Research has shown that active engagement on social media can lead to reduced loneliness (Burke et al., 2010; Deters & Mehl, 2012), as well as increased wellbeing (Orben et al., 2020) and feelings of social connectedness among different populations including adolescents and university students (Deters & Mehl, 2012; Orben et al., 2020; Verduyn et al., 2017). Conversely, studies have shown that passive engagement on social media is associated with increased loneliness (Lieberman & Schroeder, 2020; Lin et al., 2016) and decreased wellbeing among adolescents, young adults, and university students

more specifically (Lieberman & Schroeder, 2020; Orben et al., 2020; Verduyn et al., 2015). Given their differing associations with these outcomes, researchers have suggested that participants' social media-related engagement behaviour should be considered in future studies (Lin et al., 2016; Primack et al., 2017; Schønning et al., 2020).

1.3.1 Social Media Use Among University Students

Over the years it has become clear that social media use is influenced by a number of factors. Researchers have explored patterns and trends of social media use and found that younger populations—typically teenagers and young adults—tend to use and engage with social media differently than older populations (Hruska & Maresova, 2020; Pew Research Center, 2021a; Schimmele et al., 2021; Statistics Canada, 2019). Interestingly, while there is an abundance of literature on social media use by age category (e.g., Grudz & Mai, 2020; Pew Research Center, 2021b; Statistics Canada, 2019), less research has focused specifically on social media use among university students. In Canada, university students are comprised mainly of young adults between the ages of 20 and 24 years (Statistics Canada, 2020b), and are a diverse population (Statistics Canada, 2010); as such, social media use likely varies among individuals in this cohort.

The above notwithstanding, some research has shown that university students' social media use has increased drastically in the past decade (Sutherland et al., 2018). While there are various motivations for social media use, university students have reported using these platforms to aid in their transition to higher education (Pittman & Richmond, 2008; Thomas et al., 2017), to support pre-existing relationships and develop new ones (Hanna-Benson, 2019; Hill & Zheng, 2018; Nagel et al., 2018; Thomas et al.,

2017), to engage with their peers both within and outside of the classroom setting (Ferguson et al., 2016; Nagel et al., 2018), and to attain feelings of connectedness (Kim et al., 2016; Sutherland et al., 2018). Interestingly, some significant gender differences have emerged in the education literature whereby female university students have reported using social media more than their male counterparts for maintaining relationships (Krasnova et al., 2017; Muscanell & Guadagno, 2012), while male students have reported using social media more for information purposes (Kim et al., 2014; Krasnova et al., 2017). Additionally, there is some evidence to suggest that female university students use social media more frequently than male students (Knight-McCord et al., 2016; Nadkarni & Hoffman, 2012; Tufekci, 2008) which is consistent with studies conducted with the general population (e.g., Booker et al., 2018; Correa et al., 2010).

Although there is little data available regarding how university students are using social media during the COVID-19 pandemic, a recent Statistics Canada (2020c) study showed that Canadians have been spending more time online (and on social media) since the start of the pandemic, and that young people aged 15 to 34 were the most likely to have increased their social media use. Additionally, government officials and public health organizations have emphasized and recommended the use of online technologies such as social media to help individuals remain connected while navigating pandemic life and the associated public health restrictions (Government of Canada, 2021b, Public Health Ontario, 2020b; WHO, 2020e; UNICEF, 2020).

1.4 Theoretical Underpinnings

A theory developed recently by Hall and Davis (2016) could shed light on the concepts described above and explored in the present thesis, particularly in light of the

COVID-19 pandemic. The Communicate Bond Belong (CBB) theory was developed largely on the basis of Baumeister and Leary's (1995) work, and attempts to explain how people satisfy their needs to belong through different modes of social interaction. According to CBB theory, humans' underlying need for social connection and interaction drives us to engage in either *striving behaviours* (i.e., behaviours that form deep, meaningful connections; e.g., affectionate communication and self-disclosure), or *instrumental/impersonal behaviours* (i.e., behaviours that occur frequently but are not associated with a strong sense of connectedness among friends; e.g., small talk and catching up; Hall & Davis, 2016).

Hall and Davis note that humans have a limited amount of energy, therefore we are naturally driven to engage in behaviours that are socially rewarding, yet require minimal energy expenditure. Since in-person social interactions require a significant amount of energy, Hall and Davis (2016) have discussed how social media could represent an energy efficient means of social interaction, particularly in the absence of regular face-to-face communication. Specifically, they have suggested that social media use might resemble a behaviour known as "social snacking", a term initially proposed in 2005 by Gardner and colleagues who stated the following:

> When [in-person] social interaction is temporarily unavailable, people appear to turn to indirect social strategies to satisfy belonging needs. We refer to these behaviours as social snacking because they seem to be the temporary stopgaps to be used between opportunities for true social sustenance. (p. 238)

Similar to the way a snack might temporarily suppress hunger until the next meal, social snacks may fill belonging needs when in-person connections are unattainable.

While social snacking behaviours (e.g., looking at photos, reading old messages) might serve to reduce feelings of exclusion (Gardner et al., 2005), research on social snacking via social media is limited. As the COVID-19 pandemic has led to significant changes in the way people interact, there is a need to explore how people are maintaining a sense of connectedness amidst public health restrictions that limit physical contact, and whether these forms of interaction can satisfy our innate need for social connection.

1.5 Study Purpose and Objectives

To date, there is very little known about how young people have adapted to life during the COVID-19 pandemic; unfortunately, even less is known about university students. The overall purpose of the current study was to explore, via a single online survey, university students' social media use, perceptions of in-person and online social connectedness, and feelings about physical distancing during the early phases (i.e., March-April, 2020) of the COVID-19 pandemic in Ontario, Canada. The main study objectives were two-fold: (1) to describe university students' self-reported social media use (i.e., hours of use, types and number of accounts, changes in use during the pandemic, and engagement behaviour), their perceptions of social connectedness (i.e., in-person and online), and their feelings about physical distancing (i.e., adjustment, support, and attitudes) during the early phase of the COVID-19 pandemic; and (2) to examine potential relationships among these variables. With regard to the latter objective, the following research questions were examined:

1. Are age and gender associated with students' social media use, perceptions of in-person and online social connectedness, and/or feelings about physical distancing?

2. Is social media use associated with students' perceptions of in-person and online social connectedness?
3. Are students' feelings about physical distancing associated with their social media use and/or perceptions of in-person and online social connectedness?

Based on the limited research conducted in this area to date, some hypotheses were advanced. With regard to the demographic variables examined (age and gender), it was hypothesized that, similar to previous findings (e.g., Knight-McCord et al., 2016; Pew Research Center, 2021a; Statistics Canada, 2019), younger students and females would spend more hours using social media than older students and males. Further, given the findings reported by Wismans and colleagues (2020), it was also predicted that younger students and males would report more negative feelings about physical distancing compared to older students and females.

With regard to social media use and social connectedness, it was hypothesized that more time spent on social media would be negatively associated with in-person connectedness (e.g., Twenge et al., 2019), and positively associated with online connectedness given students' use of social media to maintain social relationships (e.g., Primack et al., 2019; Thomas et al., 2017). It was also hypothesized that active engagement behaviour on social media (versus passive use) would be positively associated with in-person and online social connectedness, as noted by Deters and Mehl (2012) and Verduyn and colleagues (2017).

Chapter 2

2 Methods

2.1 Study Design and Context

The current study was part of a larger survey-based research project (i*Belong* Phase 1) which was designed, using a cross-sectional mixed methods approach, to explore university students' social media use, perceptions of social connectedness, feelings about physical distancing, and overall health and wellbeing during the initial months of the COVID-19 pandemic in Ontario, Canada. For the purpose of the present study, participant responses to quantitative survey items pertaining to social media use, social connectedness (in-person and online), and physical distancing were used and analyzed. All components of this study, as well as the larger research project, were approved by the Western University Non-Medical Research Ethics Board (Project ID: 114497; see Appendix A).

This study took place during March and April, 2020, shortly following the declaration of COVID-19 as a global pandemic. At this time, there were several public health guidelines in place in Ontario, aimed at slowing the spread of COVID-19. For example, in March 2020, all post-secondary institutions and publicly funded schools (i.e., elementary and secondary) were closed for in-person learning and transitioned to an online format, non-essential workplaces were closed, public gatherings of more than five people were prohibited, and physical distancing was introduced (Canadian Digital Learning Association, 2020; Public Health Ontario, 2020c). In April 2020, school closures and social gathering restrictions remained in effect (Public Health Ontario,

2020d), and the Public Health Agency of Canada recommended the use of non-medical face masks (Government of Canada, 2020b).

2.2 Participants

Participants were eligible to complete the i*Belong* Phase 1 survey if they were enrolled as a full-time or part-time undergraduate or graduate student at any university in Ontario during the time of data collection (i.e., March-April, 2020). No age restrictions were applied to account for the wide age range of university students in Canada (e.g., < 20 years – 40+ years; Statistics Canada, 2020b). Individuals were excluded from the study if they: (a) were not attending an Ontario university at the time of data collection; and/or (b) did not provide online consent. For the purpose of the present study, participants were also excluded from analyses if they reported that they were *not* social media users.

2.2.1 Recruitment

Recruitment took place over a 5-week period (i.e., March 26, 2020 – April 30, 2020) during the early stages of the COVID-19 pandemic. Given the public health recommendations and guidelines in place in Ontario during this time, as well as the foci of the study (i.e., social media, social connectedness, and physical distancing), all recruitment took place online. A number of digital recruitment strategies were used, including postings on social media platforms (i.e., Facebook, Instagram, Twitter, and LinkedIn; see Appendix B for an example social media posting) which outlined the study purpose, eligibility criteria, study incentive (discussed below), the survey link, and the program coordinator's contact information. The study was also promoted through project-specific and university-affiliated social media accounts, researchers' personal

social media accounts, and via online class announcements and a mass recruitment e-mail sent to students at the host university.

2.2.2 Procedure

Participants completed a one-time online survey administered through Qualtrics (Qualtrics, Provo, UT; version March 2020, © 2020 Qualtrics), a web-based software licensed through the host university. Once potential participants accessed the survey link located in the social media post, class announcement, or mass email, they were directed to the first page of the survey where they were asked to read the letter of information (see Appendix C) and to provide electronic consent by clicking a button which read, "*I consent, begin the study*". If an individual did not provide consent, they were unable to proceed. Consenting participants were then directed to the second page of the survey which contained an overview of several local and provincial mental health resources available to students (see Appendix D). Next, individuals were prompted to complete a screening question to confirm their eligibility (i.e., enrollment as a student at an Ontario university). Eligible respondents were then able to access the full online survey, which took participants approximately 60-70 minutes to complete. Participants were able to skip questions they did not wish to answer, and they could modify their responses at any point in time. Skip logic (i.e., a functionality in Qualtrics that is used to change, skip, add, or remove questions based on participants' previous responses) was also enabled for efficiency and to allow participants to provide additional information about previous responses (often via open-ended questions). Upon completion of the survey, participants were directed to a final page where they were given the option to enter their e-mail address for entry into three study incentive draws (i.e., for a pair of Apple AirPods).

Recipients were randomly selected and contacted via email with details about how to claim the incentive.

2.3 Survey Items and Measures

The full i*Belong* survey was comprised of seven sections. These included: (1) demographic information; (2) social/physical distancing; (3) self-reported health and health behaviours; (4) internet use; (5) smartphone and social media use; (6) in-person and online social connectedness; and (7) psychological wellbeing. With the exception of the demographic questions, all sections were administered in random order to reduce order bias (Vannette, 2015) and to facilitate completion rates across all survey sections. Given the focus of this study, only data related to specific participant demographic information, social media use, perceptions of in-person and online connectedness, and feelings about physical distancing were used and analyzed. These variables and their associated measures are discussed below (see Appendix E for the full i*Belong* survey, including the [highlighted] items that were used for the purpose of this study).

2.3.1 Demographic Information

Participants were asked a total of 18 demographic questions, including (but not limited to): ethnicity, enrollment status (i.e., full-time or part-time), education level, and living arrangement (i.e., number of people and with whom participants were living). The demographic data that were used for analyses in the present study include: (a) age (i.e., groups based on Statistics Canada age categories, 2019; 17-19 years, 20-24 years, 25-29 years, 30+ years); and (b) gender (i.e., female, male, self-describe).

2.3.2 Social Media Use

A total of nine questions and eight sub-questions were used to assess university students' use of social media during the early stages of the pandemic (see Appendix E). Specifically, participants were asked about current social media use (i.e., hours per day), type(s) of social media platforms used, total number of social media accounts, changes in social media use, and engagement behaviour. Questions regarding type of social media and total number of accounts were adapted from the Canadian Internet Use Survey (Statistics Canada, 2018), while the remaining questions were developed by the researchers to further explore social media use during the COVID-19 pandemic.

With regard to current social media use, participants were asked, "*Do you use social networking websites or apps (e.g., Facebook, Twitter, Instagram, Snapchat)?*". Response options were "yes" or "no". If participants selected "yes", they were then asked, "*For approximately how many hours per day do you use social networking sites or apps?*". Five response options were included for this item, ranging from "less than 1 hour per day" to "more than 6 hours per day". Responses were then condensed into three groups created by the researchers to indicate "low" (< 1 hour per day), "moderate" (1-4 hours per day) and "high" (5+ hours per day) social media users. Participants who indicated that they use social media were then asked about the types of accounts they have, and the number of personal accounts they have on each platform. For example, participants were asked, "*Do you have Facebook?*", and if they selected "yes", they were asked to indicate the number of personal Facebook accounts they currently have (as an open-ended response option). Total number of social media accounts were categorized by the researchers into four groups: one account, 2-3 accounts, 4-5 accounts, and 6+

accounts. The same questions were repeated for four additional social media platforms (i.e., Instagram, Snapchat, Twitter, and TikTok), plus and an open-ended "other" category.

In an attempt to gain insights into the potential changes in social media use among university students as a result of the pandemic, participants were asked the following question, "*How has your use of social media (e.g., Facebook, Instagram, Twitter, Snapchat, etc.) changed during the COVID-19 pandemic?*". Five response options were provided, ranging from "it has increased greatly" to "it has decreased greatly". Lastly, with regard to engagement behaviour, participants were asked whether they used social media to "*actively engage with others*" or to "*scroll passively*" (in addition to an open-ended "other" response option).

2.3.3 Social Connectedness

Students were asked to complete two validated questionnaires to assess perceptions of social connectedness (see Appendix E for all items).

2.3.3.1 In-Person Social Connectedness

The Social Connectedness Scale – Revised (SCS-R; Lee et al., 2001) was used to assess university students' perceptions of *in-person* connectedness. The SCS-R assesses the degree to which an individual feels a sense of belonging and connectedness to others and their social environment (Lee et al., 2001). This scale consists of 20-items rated on a 6-point Likert scale ranging from "strongly disagree" to "strongly agree". Ten of these items are positively worded (e.g., "*I feel understood by the people I know*" and "*I see people as friendly and approachable*") and the remaining 10 are negatively worded (e.g., "*Even around people I know, I don't feel that I really belong*" and "*I catch myself losing*

a sense of connectedness with society"). The SCS-R has demonstrated strong internal reliability with Cronbach's alpha coefficients of .88 (Capanna et al., 2013) and .92 (Lee et al., 2001; Grieve et al., 2013) and has displayed evidence of convergent and discriminant validity (Lee et al., 2001; Grieve et al., 2013). This scale has also been shown to have good structural validity and excellent internal consistency, content validity, and hypotheses testing as evidenced in a recent systematic review (Cordier et al., 2017). The SCS-R has been validated with three separate samples of college students (Lee et al., 2001; Cordier et al., 2017) as well as with a general population sample (Capanna et al., 2013).

2.3.3.2 Online Social Connectedness

To assess students' perceptions of *online* connectedness, a modified version of the Facebook Social Connectedness Scale (FSCS; Grieve et al., 2013) was used. This tool was developed by Grieve and colleagues (2013), using the SCS-R (Lee et al., 2001) as a basis, to measure perceptions of online social connectedness (i.e., on Facebook). For the purpose of the present study, the FSCS survey items were modified by the research team to reflect social media sites more generally. Specifically, the term "Facebook" was changed to "social media sites and apps" for all items, and the term "friends" was expanded to include online "friends/followers". Similar to the SCS-R, the FSCS is comprised of 20 items which are scored on a 6-point Likert scale ranging from "strongly disagree" to "strongly agree". Again, 10 items are positively worded (e.g., "*I feel comfortable in the presence of strangers when I'm on social media sites and apps*" and "*I am in tune with the social media world*") and 10 items are negatively worded (e.g., "*Even around social media friends/followers I know, I don't feel that I really belong*" and "*I feel*

disconnected from the social media world around me"). The FSCS was validated with a sample of adult Facebook users from a large Australian university and the broader community, and has demonstrated good to excellent internal reliability with Cronbach's alpha coefficients of .89 and .92 (Grieve et al., 2013).

2.3.4 Physical Distancing

For the purpose of the present study, seven items were used to explore participants' feelings about physical distancing. Items were rated on a 5-point Likert scale ranging from "strongly disagree" to "strongly agree". A principal components analysis (PCA) was conducted to examine how these seven physical distancing variables related to one another, and whether it was possible to create physical distancing 'components'. The eigenvalues resulted in two principal components, however from a conceptual standpoint, three constructs were evident; namely, participants': (1) *adjustment* to; (2) perceived *support* to practice; and (3) *attitudes* towards physical distancing. Hence, a second PCA was run with three fixed factors. Given that the three-component solution explained a greater total variance than two components and had the best fit theoretically, these three components were retained. Three of the seven items assessed participants' adjustment to physical distancing (e.g., "*It has been difficult to change my behaviour to be more socially distant*"), two items addressed perceived support from others to practice physical distancing (e.g., "*My family members support me in practicing social distancing*"), and two items examined students' attitudes towards physical distancing (e.g., "*I feel that social distancing is effective*"). See Appendix F for additional information about the PCA including the rotated component matrix.

2.4 Data Analysis

IBM SPSS Statistics (Version 27) was used to conduct all analyses. As noted above, only participants who answered "yes" to using social networking sites or apps were included in the analyses.

Frequency counts and percentages were calculated for all demographic variables to provide descriptive information pertaining to participant characteristics, as well as for social media use. In addition, means and standard deviations were calculated for age, in-person and online social connectedness, and feelings about physical distancing. For both the SCS-R (in-person connectedness) and FSCS (online connectedness), negatively worded items were reverse scored and summed with the positively worded items to calculate mean scale scores ranging from 20 to 120 and mean item scores ranging from 1 to 6 (Grieve et al., 2013; Lee et al., 2001). The internal consistency of both scales was assessed using Cronbach's alpha. For both questionnaires, mean item scores equal to or greater than 3.5 ("slightly agree" to "strongly agree") indicate a greater tendency to feel socially connected, with higher scores reflecting a higher level of social connectedness (Lee et al., 2001; Sinclair & Grieve, 2017). Thus, mean item scores $\geq$ 3.5 were interpreted to reflect higher social connectedness, while scores < 3.5 were interpreted to reflect a greater tendency to feel socially disconnected (Lee et al., 2001). Mean item social connectedness scores were used in all analyses.

To determine whether age and gender were associated with students' social media use, Pearson's chi-square tests were used. A series of multivariate analysis of variance (MANOVA) tests were carried out to determine whether there were differences in social connectedness (in-person and online) and feelings about physical distancing by age (four

age groups), and independent sample *t*-tests were performed to examine such differences by gender (female and male).

To examine whether students' social media use was associated with perceptions of in-person or online connectedness, independent-sample *t*-tests were used for categorical variables with two categories (i.e., type and engagement behaviour) and MANOVAs were conducted for categorical variables with three or more categories (i.e., hours per day, number of accounts, and changes in use). Similarly, in order to examine whether students' feelings about physical distancing was associated with their social media use, independent-sample *t*-tests were run for categorical variables with two categories (i.e., type and engagement behaviour) and MANOVAs were conducted for variables with three or more categories (i.e., hours, number of accounts, and changes in use). Lastly, a Pearson's product-moment correlation was used to examine whether feelings about physical distancing were associated with perceptions of in-person and online social connectedness.

Chapter 3

3 Results

3.1 Participants

A total of 2,011 university students completed the i*Belong* Phase 1 survey. Given the focus of the current study, only participants who indicated that they were users of social media were included in the analyses. This resulted in the removal of 34 participants who indicated that they were not social media users and 376 participants who did not provide a response to the question. Another 13 participants who self-described their gender were removed from the sample due to the small number and given the power needed to adequately examine the gender-based research questions. Thus, the final sample consisted of 1,588 university students. A missing values analysis indicated that missing data were missing completely at random (MCAR) since Little's (1988) MCAR test was not significant, $\chi^2 = 12.43$, $df = 9$, $p = .190$. Missing data ranged from 0.1% to 21.0% across variables. Given the large sample size (i.e., > 1,200 participants for each analysis), pairwise deletion was used to handle missing data.

Of the 1,588 participants included in this study, the mean age was 22.4 years (*SD* = 5.1; age range = 17-77 years). The majority of respondents identified as female (*n* = 1,279; 80.6%), described their ethnicity as white (*n* = 950; 60.1%), identified as heterosexual (*n* = 1,348; 84.9%), and attended the host university (Western University; *n* = 1,464; 92.2%). Of those who responded to the education-related demographic questions, most indicated they were undergraduate students (*n* = 1,189; 74.9%) and enrolled full-time (1,545; 97.4%). With regard to living arrangements, close to half of participants reported living with 3-4 other people (*n* = 733; 46.9%) and most noted that

they were living with parents, siblings, and/or relatives (*n* = 1,003; 64.3%) at the time of data collection. Participant characteristics are presented in Table 1.

Table 1

Self-Reported Participant Characteristics

Participant Characteristic	*n* (%)
Age (*N* = 1,548)	
17-19 years	400 (25.8)
20-24	829 (53.6)
25-29	225 (14.5)
30+	94 (6.1)
Gender (*N* = 1,587)	
Female	1,279 (80.6)
Male	308 (19.4)
Sexual Orientation (*N* = 1,588)	
Asexual	32 (2.0)
Bisexual	125 (7.9)
Gay	21 (1.3)
Lesbian	16 (1.0)
Pansexual	6 (0.4)
Queer	12 (0.8)
Questioning	20 (1.3)

Participant Characteristic	*n* (%)
Same Gender Loving	2 (0.1)
Straight/Heterosexual	1,348 (84.9)
Self-Described	6 (0.4)
Ethnicity (*N* = 1,581)	
White	950 (60.1)
South Asian	177 (11.2)
Chinese	187 (11.8)
Black	28 (1.8)
Filipino	17 (1.1)
Latin American	30 (1.9)
Arab	41 (2.6)
Southeast Asian	27 (1.7)
West Asian	15 (0.9)
Korean	27 (1.7)
Japanese	3 (0.2)
Indigenous	
First Nations	20 (1.3)
Métis	8 (0.5)

Participant Characteristic	*n* (%)
Inuk (Inuit)	1 (0.1)
Self-Described	79 (5.0)
Education Level (*N* = 1,588)	
Undergraduate	1,189 (74.9)
Graduate	399 (25.1)
Enrollment Status (*N* = 1,587)	
Full-time student	1,545 (97.4)
Part-time student	42 (2.6)
Attends Western University (*N* = 1,588)	
Yes	1,464 (92.2)
No	124 (7.8)
Number of Household Members, Not Including Student (*N* = 1,563)	
0	99 (6.3)
1-2 Other People	596 (38.1)
3-4 Other People	733 (46.9)
5+ Other People	135 (8.6)
Who Students were Living With (*N* = 1,561)	
Alone	94 (6.0)

Participant Characteristic	*n* (%)
Parent(s)/Sibling(s)/Relative(s)	1,003 (64.3)
Friend(s)/Roommate(s)	257 (16.5)
Spouse/Partner/Co-Parent/Child(ren)	207 (13.3)

Note. Numbers vary across demographic variables due to missing data. Participants had a mean age of 22.4 (*SD* = 5.1).

3.2 Descriptive Statistics

3.2.1 Social Media Use

Table 2 contains an overview of data pertaining to social media use among university students. With regard to the number of hours per day spent on social media, approximately two thirds of students (*n* = 1,046; 65.9%) reported "moderate" use (1-4 hours per day), while 29.4% (*n* = 466) reported "high" use (> 5 hours per day) and only 4.7% (*n* = 75) reported "low" use (< 1 hour per day). Of the participants who provided responses regarding the type(s) of social media platforms they were using, Facebook (*n* = 1,186; 90.7%), Instagram (*n* = 1,175; 90.1%), and Snapchat (*n* = 989; 76.2%) were the top three selections, and the largest number of students (*n* = 546; 42.5%) reported having a total of 4-5 social media accounts. Some of the commonly reported "other" social media platforms reportedly used by students (*n* = 399; 31.4%) included LinkedIn, Reddit, and Youtube. With regard to changes in social media use from pre-pandemic through to the early stages of the pandemic, results showed that most students (*n* = 1,359; 85.6%) reported that their use had "increased somewhat" or "increased greatly". Lastly, more than two thirds of participants who responded to the question about engagement behaviour indicated that their social media use was passive (*n* = 879; 67.4%) rather than active (*n* = 400; 30.7%).

Table 2

Social Media Use Among University Students During the Early Phases of the COVID-19 Pandemic

Social Media Use Variable	*n* (%)
Hours Spent on Social Media (*N* = 1,587)	
Low use (< 1 hour/day)	75 (4.7)
Moderate use (1-4 hours/day)	1,046 (65.9)
High use (> 5 hours/day)	466 (29.4)
Type of Social Media Platform [a]	
Facebook (*N* = 1,307)	1,186 (90.7) [b]
Instagram (*N* = 1,304)	1,175 (90.1)
Snapchat (*N* = 1,298)	989 (76.2)
Twitter (*N* = 1,288)	539 (41.8)
TikTok (*N* = 1,283)	470 (36.6)
Other (*N* = 1,269)	399 (31.4)
Total Number of Social Media Accounts (*N* = 1,284)	
1 account	65 (5.1)
2-3 accounts	439 (34.2)
4-5 accounts	546 (42.5)
6+ accounts	234 (18.2)

Social Media Use Variable	*n* (%)
Changes in Social Media Use (*N* = 1,587)	
Increased greatly	638 (40.2)
Increased somewhat	721 (45.4)
No change	188 (11.8)
Decreased somewhat	35 (2.2) [c]
Decreased greatly	5 (0.3) [c]
Social Media Engagement Behaviour (*N* = 1,304)	
Active use	400 (30.7)
Passive use	879 (67.4)
Other	25 (1.9) [c]

[a] Participants were asked to indicate type of social media platform by answering "Yes" or "No" to having accounts with Facebook, Instagram, Twitter, Snapchat, TikTok, and/or "other". The numbers in the right column indicate the number of students who indicated "Yes" to having each type of account.

[b] Percentages for this variable add up to more than 100% because participants had the option to select more than one social media platform.

[c] Due to the small number of participants in these categories, they were not included in analyses.

3.2.2 Social Connectedness

3.2.2.1 In-Person Social Connectedness

The mean scale score for in-person connectedness was 88.0 (*SD* = 16.2; possible range = 20-120), and the mean item score was 4.4 (*SD* = 0.8; possible range = 1-6). As mean item scores greater than 3.5 reflect higher perceptions of social connectedness (Lee et al., 2001), the reported mean item score for university students in this study reflects a high level of in-person social connectedness. This scale also demonstrated excellent internal reliability with an alpha coefficient of .94, consistent with previous findings (e.g., Capanna et al., 2013; Lee et al., 2001).

3.2.2.2 Online Social Connectedness

The mean scale score representing students' perceptions of online social connectedness was 76.0 (*SD* = 13.3; possible range = 20-120) and the mean item score was 3.8 (*SD* = 0.7; possible range = 1-6). Again, participants reported high levels of online social connectedness as reflected by a mean item score greater than 3.5 (Lee et al., 2001). Internal reliability for this scale was also acceptable, with a Cronbach's alpha of .88 which is comparable to other studies (Grieve et al., 2013; Khodabakhsh & Li, 2018).

3.2.3 Physical Distancing

Mean scores, with a possible range of 1-5, were calculated for students' *adjustment* to (*M* = 2.9, *SD* = 0.9), perceived *support* to practice (*M* = 4.6, *SD* = 0.6), and *attitudes* towards physical distancing (*M* = 4.5, *SD* = 0.6). Given that higher scores reflect more positive feelings about physical distancing, students' overall adjustment to physical distancing was considered "moderate", while mean scores for perceived support from

others and attitudes towards physical distancing were deemed to be in the “high” range of the scale.

3.3 Research Question #1

A series of analyses were conducted to examine whether age and gender were associated with students’ social media use, perceptions of in-person and online social connectedness, and feelings about physical distancing. It should be noted that due to the large number of statistical tests conducted to answer the research questions outlined in this thesis, the significance level was adjusted to a more conservative value ($p < .01$) to limit the probability of Type I error (Jafari & Ansari-Pour, 2019).

3.3.1 Age

To analyze whether students’ age was associated with their social media use, a series of chi-square tests were performed (see Table 3 for chi-square values). With respect to hours of social media use per day, teenagers (i.e., students aged 17-19 years) were significantly more likely to report being high social media users (i.e., > 5 hours per day) in comparison to older students (i.e., those aged 20-24, 25-29, and 30+; $p = < .001$). A number of significant associations were also found when examining students’ age in relation to the type(s) of social media platforms used. Specifically, teenagers were significantly ($p = < .001$) more likely than older students (i.e., those aged 20-24, 25-29, and 30+) to have accounts with Instagram, Snapchat, and TikTok, while older students (i.e., those aged 20-24, 25-29, and 30+) were significantly more likely than teenagers to have accounts with Facebook ($p = .006$) and Twitter ($p = < .001$). A significant association was also found when examining students’ age and their total number of social

media accounts, whereby teenagers reported having more social media accounts than students in all other age categories (i.e., 20-24, 25-29, and 30+; $p = < .001$). With regard to changes in social media use, teenagers were also significantly ($p = < .001$) more likely than older students (i.e., those aged 20-24, 25-29, and 30+) to report that their social media use had “increased greatly” as a result of the pandemic. Lastly, a significant association was found for age and engagement behaviour in that teenagers were significantly more likely than older students (i.e., those aged 20-24, 25-29, and 30+; $p = < .001$) to use social media use “actively”.

Table 3

Chi-Square Statistics for University Students' Social Media Use by Age Category

	Chi-square		
Social Media Use Variable	χ^2	*df*	*p*
Hours Spent on Social Media	52.78	6	< .001*
Type of Social Media			
Facebook	12.51	6	.006*
Instagram	68.80	3	< .001*
Snapchat	194.31	3	< .001*
Twitter	17.15	3	< .001*
TikTok	113.61	3	< .001*
Other	2.92	3	.404
Total Number of Social Media Accounts	125.36	9	< .001*
Changes in Social Media Use	39.48	6	< .001*
Social Media Engagement Behaviour	16.71	3	< .001*

*$p < .01$.

To examine potential differences in students' perceptions of social connectedness by age category, a 4 (age category) x 2 (in-person and online connectedness) multivariate analysis of variance (MANOVA) was computed. Results revealed that there were no significant differences for either in-person (p = .465) or online social connectedness (p = .035) based on age category (see Table 4 for means, standard deviations, and MANOVA statistics).

Table 4

Means, Standard Deviations, and One-Way MANOVA Statistics for University Students' Perceptions of Social Connectedness by Age Category

Social Connectedness	17-19 years (n = 317)		20-24 years (n = 656)		25-29 years (n = 183)		30+ years (n = 68)			
Variable	*M*	*SD*	*M*	*SD*	*M*	*SD*	*M*	*SD*	*F*	*p*
In-person Connectedness	4.4	0.8	4.4	0.8	4.3	0.9	4.5	0.8	1.14	.331
Online Connectedness	3.9	0.6	3.8	0.7	3.7	0.7	3.7	0.7	2.86	.036

Note. MANOVA = multivariate analysis of variance.

*p < .01.

To explore differences in students' feelings about physical distancing by age, a 4 (age category) x 3 (physical distancing category) MANOVA was carried out. Results revealed a significant difference, $F(9, 2321.94) = 9.79$, $p = < .001$; Wilks' $\Lambda = .91$. Specifically, there was a significant difference in students' *adjustment to* physical distancing, $F(3, 1541) = 9.70$, $p = < .001$. Bonferroni post-hoc tests showed that students aged 30+ reported significantly higher levels of adjustment than all of the other (younger) age groups (i.e., 17-19, $p = < .001$; 20-24, $p = < .001$; 25-29, $p = .003$). No significant differences were found for perceived *support* or *attitudes* towards physical distancing based on student age. See Table 5 for means, standard deviations, and MANOVA statistics.

Table 5

Means, Standard Deviations, and One-Way MANOVA Statistics for University Students' Feelings About Physical Distancing by Age Category

Physical Distancing	17-19 years (n = 399)		20-24 years (n = 829)		25-29 years (n = 223)		30+ years (n = 94)			
Variable	*M*	*SD*	*M*	*SD*	*M*	*SD*	*M*	*SD*	*F*	*p*
Adjustment	2.9	0.9	2.9	0.9	3.0	0.9	3.4	0.9	9.70	< .001*
Support	4.6	0.6	4.6	0.6	4.7	0.5	4.7	0.5	2.54	.055
Attitudes	4.5	0.7	4.5	0.6	4.6	0.6	4.6	0.6	0.88	.451

Note. MANOVA = multivariate analysis of variance.

*$p < .01$.

3.3.2 Gender

To examine if gender was associated with students' social media use, a series of chi-square tests were conducted (see Table 6 for chi-square values). A significant association was found for gender and daily hours of social media use, with females more likely to be high (i.e., > 5 hours per day) social media users in comparison to male students (p = < .001). With respect to type(s) of social media platforms used, females were significantly more likely than males to report having accounts with Instagram (p = .005) and TikTok (p = < .001). A significant association was also found for gender and total number of social media accounts, as females were more likely to have a greater total number of social media accounts than males (p = .001). With regard to changes in social media use, female students were also significantly more likely than male students to report that their social media use had "increased greatly" at the beginning of the pandemic (p = < .001). No significant differences were observed for gender and social media engagement behaviour.

Table 6

Chi-Square Statistics for University Students' Social Media Use by Gender

	Chi-square		
Social Media Use Variable	χ^2	*df*	*p*
Hours Spent on Social Media	16.08	2	< .001*
Type of Social Media			
Facebook	0.33	1	.568
Instagram	8.01	1	.005*
Snapchat	1.81	1	.179
Twitter	1.27	1	.260
TikTok	16.43	1	< .001*
Other	3.71	1	.054
Total Number of Social Media Accounts	16.24	3	.001*
Changes in Social Media Use	21.74	2	< .001*
Engagement Behaviour on Social Media	0.18	2	.915

*$p < .01$.

To determine if there were significant differences in students' perceptions of social connectedness and feelings about physical distancing by gender, a series of independent sample *t*-tests were performed (see Table 7 for *t*-test values, as well as means and standard deviations for students based on gender). No significant differences were found for male and female students with regard to their perceptions of either in-person or online social connectedness. Insofar as physical distancing is concerned, a significant difference was found for *attitudes* towards physical distancing, with females reporting significantly ($p = < .001$) higher scores than males. A borderline significant finding was also observed ($p = .012$), wherein male students reported higher levels of *adjustment* to physical distancing than female students. No significant differences were found for perceived *support* from others to practice physical distancing.

Table 7

Independent Samples T-Test Statistics for University Students' Perceptions of Social Connectedness and Feelings About Physical Distancing by Gender

	Female Students		Male Students				
Variable	*M*	*SD*	*M*	*SD*	*t*	*df*	*p*
Social Connectedness							
In-person Connectedness	4.4	0.8	4.4	0.9	-0.60	1251	.547
Online Connectedness	3.8	0.7	3.7	0.7	-1.50	353.16	.133
Physical Distancing							
Adjustment	2.9	0.9	3.1	1.0	2.52	1585	.012*
Support	4.6	0.6	4.6	0.7	-1.75	411.89	.080
Attitudes	4.6	0.6	4.4	0.7	-3.94	415.34	< .001*

*$p < .01$.

3.4 Research Question #2

A series of analyses were conducted to examine our second research objective; that is, whether social media use was associated with university students' perceptions of in-person and online social connectedness. Five indicators of social media use were examined: (1) hours per day of social media use; (2) type(s) of social media platforms used; (3) total number of social media accounts; (4) changes in social media use; and (5) social media engagement behaviour.

A 3 (social media use [hrs/day] category) x 2 (in-person and online connectedness) MANOVA revealed a statistically significant difference, $F(4, 2500) = 20.33$, $p = < .001$; Wilks' $\Lambda = .94$, showing a significant effect for online social connectedness, $F(2, 1251) = 37.91$, $p = < .001$. Specifically, Bonferroni post-hoc tests revealed that "high" social media users (i.e., > 5 hrs/day) had significantly higher levels of online connectedness than "moderate" (i.e., 1-4 hrs/day; $p = < .001$) and "low" social media users (< 1 hr/day; $p = < .001$). Additionally, "moderate" users were found to have significantly higher levels of online social connectedness than "low" social media users ($p = < .001$). No significant differences were observed for hours of social media use and in-person social connectedness. See Table 8 for means, standard deviations, and MANOVA statistics.

Table 8

Means, Standard Deviations, and One-Way MANOVA Statistics for University Students' Social Media Use (Hours/Day) and Perceptions of Social Connectedness

Social Connectedness	"Low" Users [a] (n = 60)		"Moderate" Users [b] (n = 830)		"High" Users [c] (n = 364)			
Variable	*M*	*SD*	*M*	*SD*	*M*	*SD*	*F*	*p*
In-person Connectedness	4.2	1.0	4.4	0.8	4.4	0.8	2.21	.110
Online Connectedness	3.3	0.7	3.7	0.6	4.0	0.7	37.91	< .001*

Note. MANOVA = multivariate analysis of variance.

[a] Low Users = < 1 hour per day.

[b] Moderate Users = 1-4 hours per day.

[c] High Users = > 5 hours per day.

*p < .01

To examine differences in perceptions of social connectedness for users and non-users of specific social media platforms, a number of independent samples *t*-tests were conducted. With regard to in-person connectedness, significantly higher levels of connectedness were found among users of Instagram ($p = .005$), Snapchat ($p = .008$), and TikTok ($p = .005$), in comparison to non-users. Significantly higher levels of online connectedness were found for users of Instagram ($p = < .001$), Snapchat ($p = < .001$), Twitter ($p = < .001$), TikTok ($p = < .001$), and "other" social media platforms ($p = .004$) in comparison to non-users. *T*-test statistics are presented in Tables 9 and 10 for in-person and online connectedness, respectively.

Table 9

Independent Samples T-Test Statistics for Type of Social Media and University Students' Perceptions of In-Person Social Connectedness

	Users		Non-Users				
Social Media Platform	*M*	*SD*	*M*	*SD*	*t*	*df*	*p*
Facebook	4.4	0.8	4.5	0.8	1.01	996	.313
Instagram	4.4	0.8	4.2	0.8	-4.98	1018	.005*
Snapchat	4.4	0.8	4.3	0.9	-2.69	378	.008*
Twitter	4.4	0.8	4.4	0.8	0.37	984	.709
TikTok	4.5	0.8	4.3	0.8	-2.83	981	.005*
Other	4.4	0.8	4.4	0.8	-0.02	976	.842

Note. Total $N = 1588$; however, the number of users and non-users varied for each social media platform.

*$p < .01$.

Table 10

Independent Samples T-Test Statistics for Type of Social Media and University Students' Perceptions of Online Social Connectedness

	Users		Non-Users				
Social Media Platform	*M*	*SD*	*M*	*SD*	*t*	*df*	*p*
Facebook	3.4	0.7	3.4	0.7	-0.01	1019	.989
Instagram	3.8	0.7	3.5	0.6	-4.98	1018	< .001*
Snapchat	3.9	0.6	3.6	0.7	-4.70	1013	< .001*
Twitter	3.9	0.7	3.7	0.6	-3.86	1006	< .001*
TikTok	4.0	0.6	3.7	0.7	-6.24	836	< .001*
Other	3.9	0.7	3.8	0.7	-2.86	996	.004*

Note. Total $N = 1588$; however, the number of users and non-users varied for each social media platform.

*$p < .01$.

Another indicator of social media use utilized in the present study was total number of social media accounts (across all platforms). A 4 (total accounts category) x 2 (in-person and online connectedness) MANOVA was used to examine whether there were differences in students' perceptions of in-person and online connectedness based on this variable, and yielded significance, $F(6, 1956) = 8.27$, $p = < .001$; Wilks' $\Lambda = .95$. In particular, a significant association was found for online social connectedness, F (3,979) = 15.03, $p = < .001$. Bonferroni post-hoc analyses revealed that participants with 6+ social media accounts reported significantly higher levels of online connectedness than participants with one account ($p = < .001$), 2-3 accounts ($p = < .001$), or 4-5 accounts ($p = .004$). Participants with 4-5 social media accounts also reported significantly higher levels of online connectedness than participants with 2-3 social media accounts ($p = .004$). A borderline significant finding was also observed ($p = .012$), whereby participants with 4-5 social media accounts reported higher levels of online connectedness than participants with one account. No significant differences were found for number of accounts and in-person social connectedness. See Table 11 for means, standard deviations, and MANOVA statistics.

Table 11

Means, Standard Deviations, and One-Way MANOVA Statistics for University Students' Total Number of Social Media Accounts and Perceptions of Social Connectedness

Social Connectedness	1 Account (n = 51)		2-3 Accounts (n = 335)		4-5Accounts (n = 426)		6+ Accounts (n = 171)			
Variable	*M*	*SD*	*M*	*SD*	*M*	*SD*	*M*	*SD*	*F*	*p*
In-person Connectedness	4.4	0.8	4.3	0.9	4.4	0.8	4.4	0.9	1.10	.347
Online Connectedness	3.5	0.7	3.7	0.6	3.8	0.7	4.0	0.6	15.03	< .001*

Note. MANOVA = multivariate analysis of variance.

*p < .01.

With regard to social connectedness and changes in social media use from pre-pandemic to early pandemic, a 3 (change categories) x 2 (in-person and online social connectedness) MANOVA was conducted. Statistically significant differences were found for both in-person, F (2,1225) = 10.12, p = < .001, and online connectedness, F (2,1225) = 12.84, p = < .001. Bonferroni post-hoc analyses revealed that participants who reported that their social media use had "increased greatly" had significantly higher levels of in-person connectedness than those who reported no change in use (p = < .001). For online connectedness, participants whose social media use had "increased greatly" reported significantly higher levels of connectedness than those whose use had "increased somewhat" (p = .002) and those who reported no change in use (p = < .001). See Table 12 for means, standard deviations, and MANOVA statistics.

Table 12

Means, Standard Deviations, and One-Way MANOVA Statistics for University Students' Changes in Social Media Use and Perceptions of Social Connectedness

Social Connectedness	No Change (*n* = 147)		Increased Somewhat (*n* = 578)		Increased Greatly (*n* = 503)			
Variable	*M*	*SD*	*M*	*SD*	*M*	*SD*	*F*	*p*
In-person Connectedness	4.2	0.9	4.4	0.8	4.5	0.8	10.12	< .001*
Online Connectedness	3.6	0.7	3.8	0.7	3.9	0.7	12.84	< .001*

Note. MANOVA = multivariate analysis of variance.

*$p < 0.1$.

Lastly, two independent samples *t*-tests were conducted to examine differences in students' perceptions of in-person and online connectedness and their social media engagement behaviour (i.e., active and passive use). Results revealed significantly higher levels of in-person connectedness for participants who reported *active* social media engagement in comparison to those who reported *passive* engagement ($M = 4.6$, $SD = 0.7$ and $M = 4.3$, $SD = 0.8$, respectively), $t(981) = 4.54$, $p < .001$. A similar pattern emerged for online connectedness, whereby students who reported *active* engagement had significantly higher levels of online connectedness ($M = 4.0$, $SD = 0.7$) than those who reported *passive* engagement ($M = 3.7$, $SD = 0.6$), $t(999) = 6.91$, $p < .001$.

3.5 Research Question #3

Additional analyses were conducted to explore whether students' feelings about physical distancing (i.e., attitudes, perceived support, and adjustment) were associated with their: (a) social media use; and (b) perceptions of in-person and online social connectedness.

3.5.1 Physical Distancing and Social Media Use

A 3 (social media use [hrs/day] category) x 3 (physical distancing category) MANOVA was conducted to examine students' feelings about physical distancing based on hours of social media use per day yielded significance, $F(6, 3158) = 5.11$, $p = < .001$; Wilks' $\Lambda = .98$. In particular, a significant association was found for daily hours of social media use and *adjustment* to physical distancing, $F(2, 1581) = 9.10$, $p = < .001$. Bonferroni post-hoc tests showed that "low" (i.e., < 1 hour per day) social media users reported significantly ($p = < .001$) higher adjustment scores than "moderate" (i.e., 1-4

hours per day) and "high" (i.e., > 5 hours per day) social media users (see Table 13 for means, standard deviations, and MANOVA statistics). No significant differences were found for perceived *support* or *attitudes* towards physical distancing.

Table 13

Means, Standard Deviations, and One-Way MANOVA Statistics for University Students' Social Media Use (Hours/Day) and Feelings About Physical Distancing

Physical Distancing	"Low" Users [a] (n = 73)		"Moderate" Users [b] (n = 1,045)		"High" Users [c] (n = 466)			
Variable	*M*	*SD*	*M*	*SD*	*M*	*SD*	*F*	*p*
Adjustment	3.4	1.0	2.9	0.9	2.9	1.0	9.10	< .001*
Support	4.5	0.9	4.6	0.6	4.7	0.5	3.36	.035
Attitudes	4.5	0.7	4.6	0.6	4.5	0.6	1.07	.344

Note. MANOVA = multivariate analysis of variance.

[a] Low Users = < 1 hour per day.

[b] Moderate Users = 1-4 hours per day.

[c] High Users = > 5 hours per day.

*p < .01.

Next, independent samples *t*-tests were run to examine differences among users and non-users of different social media platforms in terms of their feelings about physical distancing. Results showed that in comparison to participants who had accounts with Instagram, Snapchat, and TikTok, participants who did *not* have accounts with these platforms reported significantly better *adjustment* to physical distancing ($p = < .001$, $p = < .001$, and $p = .008$, respectively; see Table 14 for *t*-test statistics). No significant differences were found for users and non-users of various social media platforms with regard to perceived *support* or *attitudes* towards physical distancing (see Tables G1 and G2 in Appendix G for *t*-test statistics for non-significant findings).

Table 14

Independent Samples T-Test Statistics for Type of Social Media and University Students' Adjustment to Physical Distancing

	Users		Non-Users				
Social Media Platform	*M*	*SD*	*M*	*SD*	*t*	*df*	*p*
Facebook	3.0	0.9	2.9	1.0	-0.96	1305	.339
Instagram	2.9	0.9	3.2	1.0	3.57	1302	< .001*
Snapchat	2.9	0.9	3.2	1.0	6.10	484	< .001*
Twitter	3.0	0.9	2.9	0.9	-0.65	1286	.517
TikTok	2.9	0.9	3.0	1.0	2.68	1281	.008*
Other	3.0	1.0	2.9	0.9	-0.98	1267	.330

Note. Total $N = 1588$; however, the number of users and non-users varied for each social media platform.

*$p < .01$.

To determine whether there were significant differences in university students' feelings about physical distancing based on the total number of social media accounts they reported, a 4 (total accounts category) x 3 (physical distancing category) MANOVA was conducted. No significant differences were found for *adjustment* to, perceived *support* to practice, or *attitudes* towards physical distancing (see Table G3 in Appendix G for means, standard deviations, and MANOVA statistics for non-significant findings).

As noted previously, another social media use variable explored in the present study was changes in use from pre-pandemic to the beginning of the pandemic. To address the current research question, a 3 (change categories) x 3 (physical distancing category) MANOVA was used to examine if student-reported changes in social media use were associated with their feelings about physical distancing. A significant difference was found, $F(6, 3078) = 15.95$, $p = < .001$; Wilks' $\Lambda = .94$, again regarding *adjustment* to physical distancing $F\ (2, 1541) = 47.34$, $p = < .001$. Bonferroni post-hoc tests indicated that participants who reported no change in social media use had significantly higher adjustment scores than those who reported increasing their use somewhat or greatly ($p = < .001$). Results also showed that participants who increased their use somewhat reported higher adjustment scores than those who increased their use greatly ($p = < .001$; see Table 15 for means, standard deviations, and MANOVA statistics). No significant differences were found for changes in social media use and perceived *support* and *attitudes* related to physical distancing.

Table 15

Means, Standard Deviations, and One-Way MANOVA Statistics for University Students' Changes in Social Media Use and Feelings About Physical Distancing

Physical Distancing	No Change (n = 187)		Increased Somewhat (n = 719)		Increased Greatly (n = 638)			
Variable	*M*	*SD*	*M*	*SD*	*M*	*SD*	*F*	*p*
Adjustment	3.5	0.9	3.0	0.9	2.8	0.9	47.34	< .001*
Support	4.6	0.6	4.6	0.6	4.6	0.6	0.23	.804
Attitudes	4.5	0.6	4.5	0.7	4.6	0.6	0.61	.542

Note. MANOVA = multivariate analysis of variance.

*$p < .01$.

Lastly, three independent samples *t*-tests were used to explore potential differences in students' feelings about physical distancing and their social media engagement behaviour (i.e., passive versus active use). No significant differences were found for *adjustment* to, perceived *support* for, and *attitudes* towards physical distancing in relation to engagement behaviour (see Table G4 in Appendix G for *t*-test statistics).

3.5.2 Physical Distancing and Social Connectedness

A Pearson's product-moment correlation was carried out to assess the relationship between university students' perceptions of in-person and online social connectedness and their feelings about physical distancing. Significant relationships were observed for both in-person and online connectedness and perceived *support* from others to practice physical distancing ($p = < .001$), as well as *attitudes* towards physical distancing ($p = < .001$). No significant correlations were found for in-person or online connectedness and *adjustment* to physical distancing (see Table 16 for correlation matrix).

Table 16

Correlation Matrix for University Students' Feelings About Physical Distancing and Perceptions of Social Connectedness

Physical Distancing Variable		In-person Connectedness	Online Connectedness
Adjustment	Pearson's *r*	-.019	.007
	p-value	.498	.805
	N	1254	1290
Support	Pearson's *r*	.170*	.142*
	p-value	< .001	< .001
	N	1254	1290
Attitudes	Pearson's *r*	.164*	.113*
	p-value	< .001	< .001
	N	1252	1288

*$p < .01$.

Chapter 4

4 Discussion

The primary purpose of this study was to examine university students' social media use, perceptions of in-person and online social connectedness, and feelings about physical distancing during the early phases of the COVID-19 pandemic in Ontario, Canada. To examine potential relationships among these variables, specific research questions were to examine whether: (1) age and gender were associated with students' social media use, perceptions of connectedness, and/or feelings about physical distancing; (2) social media use was associated with in-person and online connectedness; and (3) students' feelings about physical distancing were associated with social media use and/or in-person and online social connectedness. To date, only a handful of studies (globally) have focused on university students during the COVID-19 pandemic, most of which have addressed changes in students' learning environments (e.g., Biwer et al., 2021; Sobaih et al., 2020) or their mental and physical health and wellbeing (e.g., Ihm et al., 2021; Son et al., 2020). Thus, to our knowledge, this study is the first to explore social media use and social connectedness, with an additional and timely focus on physical distancing among university students in this unique pandemic context. Taking into consideration the results of this study, a number of key findings warrant further discussion.

First, with regard to the descriptive findings, university students reported using a variety of social media platforms, with the largest number of students indicating that they had four or more social media accounts. Most students (67.4%) also rated their engagement behaviour on social media as "passive" (i.e., scrolling) as opposed to "active" (i.e., commenting and sharing content). The vast majority (95.3%) of students

were categorized as “moderate” or “high” social media users based on their daily hours of use, and most students (85.6%) reported having increased their social media use “somewhat” or “greatly” from pre-pandemic to the early stages of the pandemic. These findings are consistent with studies showing that university students are typically highly involved on various social media sites (e.g., Knight-McCord et al., 2016; Nagel et al., 2018; Siddhartha et al., 2020), and that they have reported spending increasing amounts of time on social media since the COVID-19 pandemic began (Jiang, 2021; Pressly, 2021). Such behaviours might be expected given that postsecondary students have been highly dependent on digital technologies during the COVID-19 pandemic to connect with others and to assist in the transition to online learning (Aristovnik et al., 2020; Day et al., 2021; Vargo et al., 2021).

Generally speaking, students in the current study also reported high levels of social connectedness as evidenced by mean item scale scores for both in-person (4.4 out of 6) and online (3.8 out of 6) connectedness; both of which were above the 3.5 value noted by Lee et al. (2001) to represent high levels of social connectedness. It is interesting to note that despite the public health measures in place at the time of data collection (e.g., lockdown, physical distancing; Government of Ontario, 2020b), students’ *in-person* connectedness scores appeared to be slightly higher than those for *online* connectedness. Previous studies have noted that because online interactions tend to lack certain non-verbal social cues such as body language and tone of voice (Holmberg, 2014; Lieberman & Schroeder, 2020; Nguyen et al., 2021), it can be more difficult to foster high levels of online connectedness than it is to promote feelings of in-person connectedness (Holmberg, 2014). Despite this, both types of connectedness were

observed to be high among the university students in our study. One possible explanation for this is the period of time during which data collection took place. Students completed the online survey in March or April 2020, very shortly after the global pandemic was declared and lockdown had begun in Ontario. At this point in the pandemic, "*we're all in this together*" (Pelley, 2020; para. 1) was a common narrative in the province, which served to unite citizens around collective goals and causes, including following necessary public health guidelines, supporting frontline workers, protecting the vulnerable in society, and beating the virus *together* ("How Canadians", 2020; McNair, 2020; Pelley, 2020). Perhaps, given the novelty of the situation and the powerful messages of 'togetherness' that permeated the media (including social media), household conversations, and business windows, university students were experiencing feelings of *togetherness*, rather than disconnectedness, during these early days of the pandemic. Furthermore, given that the majority (~94%) of university students in our study reported living with other people at the time of data collection, being 'isolated' with others might also have contributed to greater perceptions of in-person connectedness. Lastly, it may also be the case that the measure used in the current study to assess in-person connectedness (i.e., SCS-R; Lee et al., 2001) did not explicitly tap into students' feelings of in-person connectedness, but rather feelings of connectedness overall. Indeed, many items (e.g., "*I am able to connect with other people*" and "*I find myself actively involved in people's lives*") could be interpreted by students as pertaining to general connectedness rather than in-person connectedness per se.

The high in-person social connectedness scores found for students in our study also align with those of a recent study conducted with Canadian undergraduate students

(*N* = 548) early in the pandemic (Okabe-Miyamoto et al., 2021). Okabe-Miyamoto and colleagues also used the SCS-R (Lee et al., 2001) to assess in-person social connectedness and reported a mean item score of 4.0 (in comparison to the score of 4.4 reported in the present study). These findings provide further support for the suggestion that university students' feelings of social connectedness may not have been negatively impacted during the early phases of the pandemic. Furthermore, in line with the Communicate Bond Belong (CBB) theory discussed previously, students' use of various social media platforms could have provided them with opportunities to *socially snack*—a behaviour that Hall and Davis (2016) suggest might readily occur when using social media—which could temporarily contribute to feelings of connectedness in the absence of in-person interactions (Hall & Davis, 2016). We did not assess students' social snacking behaviours in the current study; as such, it would be beneficial to explore this purported behaviour in future research to determine its potential impact on social connectedness.

With regard to our research question examining demographic differences in students' social media use, social connectedness, and feelings about physical distancing, we found that teenagers' (i.e., students in the 17-19 year-old category) and female students reported spending significantly more hours on social media per day than older (i.e., those aged 20 and above) and male students, as hypothesized. Teenagers and female students were also significantly more likely than older students and males to report that their social media use had "increased greatly" during the pandemic, and to have a greater total number of social media accounts. Interestingly, with regard to engagement behaviour, significantly more teenagers reported active engagement (versus passive

scrolling) compared to all other age groups. Conversely, older students (i.e., those in all other age categories) reported significantly more passive engagement on social media than the teenage group. This is consistent with a study conducted by Jang and colleagues (2015) in which they examined Instagram data from a large sample of teenagers (aged 13-19; n = 13,533) and adults (aged 25-29; n = 13, 352). These researchers found that teenagers had significantly more likes, tags, and comments on their photos than adults, which they noted resulted in a greater number of online interactions for the younger cohort. In addition, teenagers showed significantly higher levels of self-expression in their photos and profile bio descriptions in comparison to adult users. Taken together, these findings suggest that teenagers engage with social media differently than older cohorts, as has been noted in other studies (e.g., Chang et al., 2015; Correa et al., 2010).

Interestingly, the results of our study revealed no significant differences in students' perceptions of either in-person or online social connectedness based on their age or gender. These results are consistent with previous studies which have also shown no significant differences in social connectedness among postsecondary students based on gender (Jorgenson et al., 2018; Kim et al., 2016; Turki et al., 2018) or age (Rosenthal et al., 2007).

With regard to physical distancing, students in the oldest age category (30+ years) reported significantly better adjustment to physical distancing in comparison to all younger age groups, which also aligned with our hypothesis. It is worth noting that the oldest students in our sample are considered *adults*, while the remainder of students could be referred to as *emerging adults* (i.e., late teenage years through to the twenties; Arnett, 2000). As emerging adulthood is a period of life characterized by change and

development (Nelson, 2021), these individuals may not be fully equipped with the coping strategies needed to deal with major life changes and events (Jenzer et al., 2019), such as a global pandemic and the associated public health restrictions. In fact, the authors of a recent study conducted in the United States found that older adults aged 60-77 were able to draw on past hardships and life stressors as a source of resilience to cope with COVID-19 restrictions (Greenwood-Hickman et al., 2021). Our findings add to the literature in this area in that they suggest that adjustment to physical distancing might improve as one ages, although further research is needed.

Overall, the students in our study reported moderate levels of adjustment to physical distancing, high levels of support from others to practice physical distancing, and positive attitudes towards physical distancing. The findings pertaining to perceptions of support from others are important given that a recent study by Hills and Eraso (2021) showed that adults (M_{age} = 42.4; N = 681) who received lower normative pressure (i.e., support) from family and friends to physically/socially distance were significantly more likely to intentionally break physical distancing rules. Our results also showed that female students reported significantly higher (i.e., more positive) attitudes towards physical distancing than male students, which is consistent with the findings reported in a number of studies (e.g., Capraro & Barcelo, 2020; Coroiu et al., 2020; Galasso et al., 2020). This finding also aligns with our hypothesis that male students would report more negative feelings about physical distancing than female students.

In line with our hypothesis, we found that hours spent on social media was significantly and positively associated with online social connectedness, but not in-person connectedness. Interestingly, we also found that university students who increased their

social media use “greatly” as a result of the pandemic had significantly higher levels of *both* in-person and online connectedness (versus high levels of online connectedness only, which was expected). While many studies have shown that social media use has increased among adolescents and adults during the COVID-19 pandemic (e.g., Cauberghe et al., 2021; Drouin et al., 2020), few have assessed how this might impact feelings of social connectedness. Of those that did (e.g., Lisitsa et al., 2020; Nguyen et al., 2021), findings have shown that increased social media use during the pandemic was not related to greater levels of connectedness. For example, Lisitsa and colleagues (2020) found that increased social media use among adults (M_{age} = 36.4; N = 1,674) was associated with greater loneliness during the pandemic, especially for those aged 18-34 (in comparison to adults aged 35 and older). In another study examining digital media use and social connectedness in a large sample of adults (M_{age} = 46; N = 2,925), Nguyen and colleagues (2021) reported significantly lower levels of in-person social connectedness among those who had increased their social media use early in the pandemic (April-May, 2020). Although Nguyen et al. suggested that this negative relationship could be due to social media interactions lacking the same social opportunities as in-person dynamics and communication, they did not account for different *types* of social media which arguably, could allow for a greater social presence (i.e., social/communicative cues such as tone of voice). In addition, given that these authors measured *in-person* social connectedness, and our results supported a positive link between increased hours of use and *online* social connectedness, it is possible that the measure used by Nguyen et al. (2021) did not tap into perceptions of online connectedness.

Researchers have suggested that not all social media platforms allow for the same level of social interaction and connection based on their design (e.g., Alhabash & Ma, 2017; Pittman & Riche, 2016; Sheldon & Bryant, 2016). For example, Pittman and Riche (2016) found that photo-based platforms such as Instagram and Snapchat promoted a greater sense of intimate interpersonal connection among a sample of undergraduate students (N = 253) in comparison to text-based platforms like Twitter, and what they called "mixed platforms" like Facebook (p. 158). Similar results were also reflected in a study by Alhabash and Ma (2017) who found that college students reported significantly higher levels of social interaction when using photo-based platforms like Instagram and Snapchat, as opposed to Twitter and Facebook. The results of the current study contribute further to the literature in this area given that a number of social media platforms and their potential associations with perceptions of social connectedness were explored. In particular, we found that students who used 'photo-based platforms' including Instagram, Snapchat, and TikTok reported significantly higher levels of both in-person and online connectedness than those who did not use these platforms. In addition, significantly higher levels of online connectedness (but not in-person connectedness) were found for students who used Twitter and "other" social media platforms in comparison to non-users. While neither Pittman and Riche (2016) nor Alhabash and Ma (2017) reported associations between Twitter and connectedness, a study by Chen (2011) who surveyed adult Twitter users (M_{age} = 34.4; N = 317) found that more hours per week spent on Twitter had a significant, positive effect on participants' feelings of online connectedness. These authors noted that more hours on Twitter helped to satisfy peoples'

need to connect with other Twitter users, which also aligns with our findings of Twitter and increased feelings of online connectedness.

In addition to the types of social media used, the *ways* in which people engage with these platforms also play an important role in their overall mental health, including life satisfaction, subjective wellbeing, and feelings of connectedness (Orben et al., 2020; Verduyn et al., 2017). As hypothesized, active (as opposed to passive) engagement behaviour on social media was positively and significantly associated with students' perceptions of both in-person and online social connectedness. These findings align with those presented by Masciantonio et al. (2021) in their study examining active and passive social media use among adults (M_{age} = 33.8; N = 793) during the COVID-19 pandemic. These researchers found that active use of Instagram and Snapchat specifically, was positively related to perceptions of social support and satisfaction with life. The abovementioned study conducted by Chen (2011) also showed significantly higher levels of online connectedness among participants who reported *active* monthly usage of Twitter (i.e., tweeting, retweeting, replying to comments) compared to participants who were less active. Our findings pertaining to engagement behaviour are particularly noteworthy given that they too showed a link between active social media use and increased social connectedness while COVID-19-related public health restrictions (i.e., physical distancing) were in place. Active versus passive use is also a modifiable behaviour, and while additional research is warranted, it appears that these behaviours could have implications for university students in terms of their feelings of connectedness, as well as their overall subjective wellbeing (Orben et al., 2020; Verduyn et al., 2017).

In terms of students' feelings about physical distancing and their social media use, those who did *not* have accounts with Instagram, Snapchat, or TikTok reported significantly better *adjustment* to physical distancing in comparison to students who reported using these platforms. In addition, "low" (< 1 hour per day) social media users seem to have adjusted significantly better to physical distancing than those who were "moderate" (1-4 hours per day) or "high" (> 5 hours per day) users. Similarly, students who reported no changes in their social media use from pre-pandemic to the early stages had significantly better adjustment to physical distancing scores than those who increased their use. Taken together, these findings suggest that university students appear to have adjusted better to physical distancing when they spent *less* time on social media, and on photo-based platforms more specifically. One possible explanation for this could be that seeing others *not* physically distance was noted as a common experience on social media early in the pandemic (Brown, 2020). This could have been amplified by the anti-lockdown protests that took place across the country during this time, as well as the extensive media coverage of such events (e.g., Carruthers, 2020; Graham, 2020; Henri, 2020; Montgomery, 2020). Furthermore, the mass amount of information (and misinformation) shared on social media during the early stages of the pandemic was found to be associated with anxiety (Kecojevic et al., 2020; Lee et al., 2020) and confusion (Depoux et al., 2020; Naeem & Bhatti, 2020) among university students and the general population, which might have impacted students' adjustment to public health restrictions. As such, it is possible that while social media may have increased students' feelings of social connectedness at the start of the pandemic, it did not help them adjust to

physical distancing guidelines; such knowledge could be used to support the use of social media in targeting and promoting these distinct constructs in unique ways in the future.

With regard to students' feelings about physical distancing and their perceptions of social connectedness, we found a significant and positive association between perceived support from others and social connectedness (both in-person and online). A plausible explanation for this could be that students' perceptions of support from both family members and friends (i.e., important others in their lives) could have made them feel like they were 'in it together', enhancing perceptions of both in-person and online connectedness. In fact, this was seen in a recent study by Yu and colleagues (2021) who applied the Theory of Planned Behaviour (TPB; Ajzen, 1991) to explore compliance to physical distancing behaviours among a sample of adults (N = 300) in China. The TPB suggests that attitudes, subjective norms (i.e., support from important others), and perceived behavioural control influences an individual's decision to engage in a particular health behaviour (Yu et al., 2021). In their study, Yu et al. found that participants who reported more positive attitudes, higher levels of support from others, and increased feelings of behavioural control were more likely to adhere to physical distancing guidelines.

Lastly, and also in line with the findings noted Yu and colleagues (2021) regarding the TPB, we found that university students who reported greater (i.e., more positive) attitudes in relation to physical distancing had significantly higher levels of in-person and online social connectedness compared to those with lower (i.e., more negative) attitudes. This is not surprising, given that at the time of data collection, many students were likely practicing physical distancing as an act of altruism to protect the

vulnerable in society. As altruism can improve feelings of connectedness (Cherry, 2021), university students may have felt a greater sense of 'togetherness' through the collective practice of physical distancing. In fact, in the context of the social and behavioural motivations that could promote adherence to COVID-19 public health guidelines, Van Bavel and colleagues (2021) noted that when people feel confident that their "attitude is the 'moral' one to have" (p. 465), they are more likely to change their behaviours. It is certainly a possibility that the attitudes and motivations of students to physically distance were positive and intertwined, which further enhanced their perceptions of connectedness.

4.1 Implications

The results of this study provide important and unique insights which may be relevant for university students, the general public, and public health and policy makers, now and in the case of future waves and/or pandemics. More specifically, public health officials and policy makers might benefit from further understanding the perceptions, feelings, and behaviours that have been found to be associated with social connectedness among university students during the early stages of the pandemic, to aid in the development and implementation of future health practices and recommendations.

There are several important implications associated with this work. First, university students reported using social media at high levels during the early stages of the pandemic; as such and unsurprisingly, social media could be a valuable tool for relaying public health and safety messages to young people in times of emergency. Second, given the importance of active (versus passive) engagement on social media with regard to social connectedness and other important outcomes noted in previous literature

(e.g., enhanced life satisfaction and wellbeing; Orben et al., 2020; Verduyn et al., 2017), future efforts could be devoted to educating students on ways to actively and effectively engage with social media, particularly when in-person interactions are not possible. Third, the positive associations found for social connectedness and perceptions of support and attitudes towards physical distancing may be useful for public health and policy makers whose interests would likely be to increase adherence to public health guidelines while maximizing opportunities for social connectedness. As such, these findings—along with future work in this area—could provide a foundation for the development of strategies to increase social support and promote positive attitudes among university students and the general public in times of crisis.

4.2 Strengths and Limitations

Our study has a number of strengths that are worthy of mention. First, the online survey was administered approximately two weeks after COVID-19 had been declared a global pandemic (WHO, 2020b). This allowed us to gather data to provide a very early 'snapshot' of university students' social media use, perceptions of social connectedness, and feelings about physical distancing (amongst other variables) at the beginning of the pandemic. Additionally, our study accounted for perceptions of both in-person and online connectedness, as opposed to a single general measure, or a measure of in-person connectedness only as was used in many other studies. This is a noteworthy strength given that in-person and online connectedness have been identified as separate constructs (Grieve et al., 2013), and also in light of the unique pandemic context and public health guidelines in place during the time of data collection. Lastly, a large number of university

students completed the online survey, providing sufficient power for the statistical analyses.

This study also has several important limitations. The first is that due to the cross-sectional design of the study, cause-and-effect relationships cannot be drawn. Future research using a longitudinal study design would provide insight into such cause-and-effect relationships, and allow for the observation of changes over time. A second limitation of our study was that approximately 92% of participants were from the host university, potentially limiting the generalizability of our results to a broader university student population. Additionally, while our study sample was fairly representative of sexual orientations reported by university students in Canada (Burczycka, 2020), it was largely comprised of females (80.6%) and we were unable to include participants who self-described their gender in our analyses due to the small sample size. Another limitation, as noted above, is that the items used in the in-person social connectedness scale (i.e., SCS-R; Lee et al., 2001) did not explicitly refer to feelings of in-person connectedness, and could have been interpreted by students as relating to connectedness more generally. Lastly, the physical distancing tool used was created for the purpose of the present study and was not validated, which may have influenced the representations of and conclusions about students' feelings about physical distancing. Despite this, an important strength of our study is the assessment of physical distancing, and unfortunately, there was no tool available to measure such behaviours among university students (or young people in general).

4.3 Conclusions

This research sheds light on how university students in Ontario were adapting to life during the early phases of the COVID-19 pandemic. Specifically, this study aimed to examine potential relationships among university students' social media use, perceptions of social connectedness, and feelings about physical distancing amidst a provincial lockdown. Generally speaking, our findings suggested that university students were heavily involved on social media at the start of the pandemic, with many reporting an increase in their usage since pre-pandemic times. While most students reported having multiple social media accounts and engaging with these platforms passively, active engagement—such as photo sharing, commenting, and interacting with others online—was associated with higher levels of both in-person and online social connectedness. Furthermore, the use of photo-sharing platforms such as Instagram, Snapchat, and TikTok appeared to be particularly beneficial for students in terms of their perceptions of in-person and online social connectedness.

Students' feelings about physical distancing—that is, their adjustment to, perceived support from others, and attitudes towards physical distancing—were also assessed. Although students' adjustment was deemed moderate, their scores for perceived support from friends and family, as well as their attitudes, were in the high range. Moreover, students with greater perceived support and more positive attitudes about physical distancing reported higher levels of both in-person and online connectedness. While the impact of the pandemic will likely be long-lasting and extend beyond the scope of this study, the findings of this research will make a valuable contribution to the COVID-19 literature regarding students' feelings and behaviours during the early stages

of the pandemic in Ontario, Canada. Ideally, these findings will be utilized by researchers, students, policy makers, and health professionals to engage in research and to develop programs, supports, and policies to improve the health and wellbeing of university students now and in future crises.

References

Abel, T., & McQueen, D. (2020). The COVID-19 pandemic calls for spatial distancing and social closeness: Not for social distancing! *International Journal of Public Health, 65*, 231. https://doi.org/10.1007/s00038-020-01366-7

Ajzen, I. (1991). The Theory of Planned Behavior. *Organizational Behavior and Human Decision Processes, 50*(2), 179-211. https://doi.org/10.1016/0749-5978(91)90020-T

Alhabash, S., & Ma, M. (2017). A tale of four platforms: Motivations and uses of Facebook, Twitter, Instagram, and Snapchat Among College Students? *Social Media + Society, 3*(1). https://doi.org/10.1177%2F2056305117691544

Allen, K. A., Ryan, T., Gray, D. L., McInerney, D. M., & Waters, L. (2014). Social media use and social connectedness in adolescents: The positives and the potential pitfalls. *The Educational and Developmental Psychologists, 31*(1), 18-31. https://doi.org/10.1017/edp.2014.2

Anderson, M., & Jiang, J. (2018). *Teens, social media & technology 2018*. Pew Research Center. https://www.pewresearch.org/internet/2018/05/31/teens-social-media-technology-2018/

Aristovnik, A., Keržič, D., Ravšelj, D., Tomaževic, N., & Umek, L. (2020). Impacts of the COVID-19 pandemic on life of higher education students: A global perspective. *Sustainability, 12*(20). https://doi.org/10.3390/su12208438

Arnett, J. J. (2000). Emerging adulthood: A theory of development from the late teens through the twenties. *American Psychological Association, 55*(5), 469-480.

Bailey, M., Cao, R., Kuchler, T., Stroebel, J., & Wong, A. (2018). Social connectedness: Measurement, determinants, and effects. *Journal of Economic Perspectives, 32*(3), 259-280. https://doi.org/10.1257/jep.32.3.259

Baumeister, R. F., & Leary, M. R. (1995). The need to belong: Desire for interpersonal attachments as a fundamental human motivation. *Psychological Bulletin, 117*(3), 497-529. https://doi.apa.org/doi/10.1037/0033-2909.117.3.497

Biwer, F., Wiradhany, W., oude Egbrink, M., Hospers, H., Wasenitz, S., Jansen, W., & de Bruin, A. (2021). Changes and adaptations: How university students self-regulate their online learning during the COVID-19 pandemic. *Frontiers in Psychology, 12*. https://doi.org/10.3389/fpsyg.2021.642593

Blau, G., DiMino, J., DeMaria, P. A., Beverly, C., Chessler, M., & Drennan, R. (2016). Social connectedness and life satisfaction: Comparing mean levels for 2 undergraduate samples and testing for improvement based on brief counseling. *Journal of American College Health, 64*(8), 585-592. https://doi.org/10.1080/07448481.2016.1207645

Bolliger, D. U., & Inan, F. A. (2012). Development and validation of the online student connectedness survey (OSCS). *International Review of Research in Open and Distributed Learning, 13*(3), 41-65. https://doi.org/10.19173/irrodl.v13i3.1171

Booker, C. L., Kelly, Y. J., & Sacker, A. (2018). Gender differences in the associations between age trends of social media interaction and well-being among 10-15 year olds in the UK. *BMC Public Health, 18*. https://doi.org/10.1186/s12889-018-5220-4

Brookmeyer, K. A., Henrich, C. C., & Schwab-Stone, M. (2005). Adolescents who witness community violence: Can parent support and prosocial cognitions protect them from committing violence? *Child Development, 76*(4), 917–929. https://doi.org/10.1111/j.1467-8624.2005.00886.x

Brooks, S. K., Webster, R. K., Smith, L. E., Woodland, L., Wessely, S., Greenberg, N., & Rubin, G.J. (2020). The psychological impact of quarantine and how to reduce it: Rapid review of the evidence. *The Lancet, 395*, 912-920. https://doi.org/10.1016/S0140-6736(20)30460-8

Brown, J. (2020, April 1). *Social media shaming is spiking during the coronavirus pandemic, for better or worse.* The Colorado Sun. https://coloradosun.com/2020/04/01/social-media-shaming-about-coronavirus/

Brown, S. L., Nesse, R. M., Vinokur, A. D., & Smith, D. M. (2003). Providing social support may be more beneficial than receiving it: Results from a prospective study of mortality. *Psychological Sciences, 14*(4), 320-327. https://doi.org/10.1111%2F1467-9280.14461

Browning, M. H. E. M., Larson, L. R., Sharaievska, I., Rigolon, A., McAnirlin, O., Mullenbach, L., Cloutier, S., Vu, T. M., Thomsen, J., Reigner, N., Covelli Metcalf, E., D'Antonio, A., Helbich, M., Bratman, G. N., & Olvera Alvarez, H. (2021). Psychological impacts from COVID-19 among university students: Risk factors across seven states in the United States. *PLoS ONE, 16*(1). https://doi.org/10.1371/journal.pone.0245327

Burczycka, M. (2020, September 15). *Students' experiences of discrimination based on gender, gender identity or sexual orientation at postsecondary schools in the Canadian provinces, 2019.* Statistics Canada. https://www150.statcan.gc.ca/n1/pub/85-005-x/2020001/article/00001-eng.htm

Burke, M., Marlow, C., & Lento, T. (Eds.). (2010). *Proceedings of the SIGCHI Conference on Human Factors in Computing Systems*. Association for Computing Machinery. https://dl.acm.org/doi/10.1145/1753326.1753613

Burns, I. (2020). *COVID-19 gatherings restrictions likely violate Charter, legal observers say*. The Lawyers Daily. https://www.thelawyersdaily.ca/articles/22052/covid-19-gathering-restrictions-likely-violate-charter-legal-observers-say

Bzdok, D., & Dunbar, R. I. M. (2020). The neurobiology of social distance. *Trends in Cognitive Sciences, 24*(9), 717-733. https://doi.org/10.1016/j.tics.2020.05.016

Canadian Digital Learning Association. (2020). *Digital Learning in Canadian Higher Education in 2020*. https://www.ecampusontario.ca/wp-content/uploads/2021/04/Digital-Learning-in-Canadian-Higher-Education-in-2020-The-Ontario-Report-EN.pdf

Cao, W., Fang, Z., Hou, G., Han, M., Xu, X., Dong, J., & Zheng, J. (2020). The psychological impact of the COVID-19 epidemic on college students in China. *Psychiatry Research*. http://dx.doi.org/10.1016/j.psychres.2020.112934

Capanna, C., Stratta, P., Collazzoni, A., D'Ubaldo, V., Pacifico, R., Di Emidio, G., Ragusa, M., & Rossi, A. (2013). Social connectedness as resource of resilience: Italian validation of the Social Connectedness Scale – Revised. *Journal of Psychopathology, 19*(4), 320-326.

Capraro, V., & Barcelo, H. (2020). The effect of messaging and gender on intentions to wear a face covering to slow down COVID-19 transmission. PsyArXiv. https://doi.org/10.31234/osf.io/tg7vz

Carr, C. T., & Hayes, R. A. (2015). Social media: Defining, developing, and divining. *Atlantic Journal of Communication, 23*(1), 46–65. https://doi.org/10.1080/15456870.2015.972282

Carruthers, D. (2020, November 12). *Anti-restrictions protesters defiant after St. Thomas police warning*. The London Free Press. https://lfpress.com/news/local-news/anti-restrictions-protest-organizers-not-backing-down-after-st-thomas-police-email

Cauberghe, V., Van Wesenbeeck, I., De Jans, S., Hudders, L., & Ponnet, K. (2021). How adolescents use social media to cope with feelings of loneliness and anxiety during COVID-19 lockdown. *Cyberpsychology, Behavior, and Social Networking, 24*(4), 250-257. https://doi.org/10.1089/cyber.2020.0478

Chang, P. F., Choi, Y. H., Bazarova, N. N., & Löckenhoff, C. E. (2015). Age differences in online social networking: Extending socioemotional selectivity theory to social network sites. *Journal of Broadcasting & Electronic Media, 59*(2), 221-239. https://doi.org/10.1080/08838151.2015.1029126

Chen, G. M. (2011). Tweet this: A uses and gratifications perspective on how active Twitter use gratifies a need to connect with others. *Computers in Human Behavior, 27*(2), 755-762. https://doi.org/10.1016/j.chb.2010.10.023

Chen, L-J., & Chung, S-K. (2007). Loneliness, social connectedness, and family income among undergraduate females and males in Taiwan. *Social Behavior and Personality, 35*(10), 1353-1364. https://doi.org/10.2224/sbp.2007.35.10.1353

Cherry, K. (2021, April 26). *What is altruism?* Very Well Mind. https://www.verywellmind.com/what-is-altruism-27948288

Chong, S. A., Capps, B. J., Subramaniam, M., Voo, T. C., & Campbell, A. V. (2010). Clinical Research in Times of Pandemics. *Public Health Ethics, 3*(1), 35-38. https://doi.org/10.1093/phe/phq005

Clark, J. L., Algoe, S. B., & Green, M. C. (2018). Social network sites and well-being: The role of social connection. *Current Directions in Psychological Science, 27*(1), 32–37. https://doi.org/10.1177%2F0963721417730833

Cordier, R., Milbourn, B., Martin, R., Buchanan, A., Chung, D., & Speyer, R. (2017). A systematic review evaluating the psychometric properties of measures of social inclusion. *PLoS ONE, 12*(6). https://doi.org/10.1371/journal.pone.0179109

Coroiu, A., Moran, C., Campbell, T., & Geller, A. C. (2020). Barriers and facilitators of adherence to social distancing recommendations during COVID-19 among a large international sample of adults. *PLoS ONE, 15*(10). https://doi.org/10.1371/journal.pone.0239795

Correa, T., Hinsley, A. W., & Gil de Zúñiga, H. (2010). Who interacts on the Web?: The intersection of users' personality and social media use. *Computers in Human Behavior, 26*(2), 247-252. https://doi.org/10.1016/j.chb.2009.09.003

Dalton, C. B., Corbett, S. J., & Katelaris, A. L. (2020). COVID-19: Implementing sustainable low cost physical distancing and enhanced hygiene. *Medical Journal of Australia, 212*(10), 443-446. https://doi.org/10.5694/mja2.50602

Dalton, J. C., & Crosby, P. C. (2013). Digital identity: How social media are influencing student learning and development in college. *Journal of College and Character,14*(1), 1-4. https://doi.org/10.1515/jcc-2013-0001

Day, T., Chang, I., Chung, C., Doolittle, W. E., Housel, J., & McDaniel, P. N. (2021). The immediate impact of COVID-19 on postsecondary teaching and learning. *The Professional Geographer,73*(1), 1-13. https://doi.org/10.1080/00330124.2020.1823864

Deci, E. L., & Ryan, R. M. (2000). The "what" and "why" of goal pursuits: Human needs and the self-determination of behavior. *Psychological Inquiry, 11*(4), 227-268.

Demeter, E., & Rad, D. (2020). Global life satisfaction and general antisocial behaviour in young individuals: The mediating role of perceived loneliness in regard to social sustainability – A preliminary investigation. *Sustainability,12*(10). https://doi.org/10.3390/su12104081

Depoux, A., Martin, S., Karafillakis, E., Preet, R., Wilder-Smith, A., & Larson, H. (2020). The pandemic of social media panic travels faster than the COVID-19 outbreak. *Journal of Travel Medicine, 27*(3). https://doi.org/10.1093/jtm/taaa031

Deters, F. G., & Mehl, M. R. (2012). Does posting Facebook status updates increase or decrease loneliness? An online social networking experiment. *Social Psychological and Personality Science, 4*(5), 579-586.

Dissing, A. S., Jørgensen, T. B., Gerds, T. A., Rod, N. H., & Lund, R. (2019). High perceived stress and social interaction behaviour among young adults. A study based on objective measures of face-to-face and smartphone interactions. *PLoS ONE, 14*(7). https://doi.org/10.1371/journal.pone.0218429

Drouin, M., McDaniel, B. T., Pater, J., Toscos, T. (2020). How parents and their children used social media and technology at the beginning of the COVID-19 pandemic and associations with anxiety. *Cyberpsychology, Behavior, and Social Networking, 23*(11), 727-736. https://doi.org/10.1089/cyber.2020.0284

Elmer, T., Mepham, K., & Stadtfeld, C. (2020). Students under lockdown: Comparisons of students' social networks and mental health before and during the COVID-19 crisis in Switzerland. *PLoS ONE 15*(7). https://doi.org/10.1371/journal.pone.0236337

Emerick, E., Caldarella, P., & Black, S. J. (2019). Benefits and distractions of social media as tools for undergraduate student learning. *College Student Journal, 53*(3), 265–276.

Ferguson, C., DiGiacomo, M., Saliba, B., Green, J., Moorley, C., Wyllie, A., & Jackson, D. (2016). First year nursing students' experiences of social media during the transition to university: A focus group study. *Contemporary Nurse: A Journal for the Australian Nursing Profession, 52*(5), 625–635. http://dx.doi.org/10.1080/10376178.2016.1205458

Fine, S. (2020). *How measures to contain COVID-19 may clash with Canadians' charter rights*. The Globe and Mail. https://www.theglobeandmail.com/canada/article-how-measures-to-contain-covid-19-may-clash-with-canadians-charter/

Fruehwirth, J. C., Biswas, S., & Perreira, K. M. (2021). The Covid-19 pandemic and mental health of first-year college students: Examining the effect of Covid-19 stressors using longitudinal data. *PLoS ONE 16*(3). https://doi.org/10.1371/journal.pone.0247999

Galasso, V., Pons, V., Profeta, P., Becher, M., Brouard, S., & Foucault, M. (2020). Gender differences in COVID-19 attitudes and behavior: panel evidence from eight countries. *Proceedings of the National Academy of Sciences of the United States of America, 117*(44), 27285-27291. https://doi.org/10.1073/pnas.2012520117

Gardner, W. L., Pickett, C. L., & Knowles, M. (2005). Social Snacking and Shielding. In K. D. Williams, J. P. Forgas, W. von Hippel (Eds.), *The Social Outcast: Ostracism, Social Exclusion, Rejection, and Bullying* (227-241). Taylor & Francis Group.

Government of Canada. (2021a). *Coronavirus disease (COVID-19): Prevention and risks.* https://www.canada.ca/en/public-health/services/diseases/2019-novel-coronavirus-infection/prevention-risks.html

Government of Canada. (2021b). *Taking care of your mental and physical health during the COVID-19 pandemic.* https://www.canada.ca/en/public-health/services/diseases/2019-novel-coronavirus-infection/mental-health.html#_Tips_for_taking

Government of Canada. (2020a). *Physical distancing: How to slow the spread of COVID-19.* https://www.canada.ca/en/public-health/services/publications/diseases-conditions/social-distancing.html

Government of Canada. (2020b). *Council of Chief Medical Officers of Health Communication: Use of Non-Medical Masks (or Facial Coverings) by the Public*. https://www.canada.ca/en/public-health/news/2020/04/ccmoh-communication-use-of-non-medical-masks-or-facial-coverings-by-the-public.html

Government of Ontario. (2020a). *COVID-19: Stop the spread.* https://www.ontario.ca/page/covid-19-stop-spread

Government of Ontario. (2020b). *Ontario prohibits gatherings of more than five people with strict exceptions.* https://news.ontario.ca/en/release/56507/ontario-prohibits-gatherings-of-more-than-five-people-with-strict-exceptions

Graham, A. (2020, November 15). *Coronavirus: 80 anti-lockdown protesters converge on downtown Woodstock*. Global News. https://globalnews.ca/news/7464452/coronavirus-woodstock-anti-lockdown-rally/

Greenwood-Hickman, M. A., Dahlquist, J., Cooper, J., Holden, E., McClure, J. B., Mettert, K. D., Perry, S. R., & Rosenberg, D. E. (2021). “They’re going to zoom it”: A qualitative investigation of impacts and coping strategies during the COVID-19 pandemic among older adults. *Frontiers in Public Health, 9*. https://doi.org/10.3389/fpubh.2021.679976

Grieve, R., Indian, M., Witteveen, K., Tolan, G. A., & Marrington, J. (2013). Face-to-face or Facebook: Can social connectedness be derived online? *Computers in Human Behaviour, 29*(3), 604-609. https://doi.org/10.1016/j.chb.2012.11.017

Grudz, A., & Mai, P. (2020). The state of social media in Canada 2020. *Scholars Portal Dataverse*. https://doi.org/10.5683/SP2/XIW8EW

Guinta, M. R., & John, R. M. (2018). Social media and adolescent health. *Pediatric Nursing*, *44*(4), 196–201.

Güner, R., Hasanhoglu, I., & Aktas, F. (2020). COVID-19: Prevention and control measures in community. *Turkish Journal of Medical Sciences, 50,* 571-577. https://doi.org/10.3906/sag-2004-146

Guyer, A., Silk, J. S., & Nelson, E. E. (2016). The neurobiology of the emotional adolescent: From the inside out. *Neuroscience and Biobehavioral Reviews, 70,* 74-85. https://doi.org/10.1016/j.neubiorev.2016.07.037

Hall, J. A., & Davis, D. C. (2016). Proposing the communicate bond belong theory: Evolutionary intersections with episodic interpersonal communication. *Communication Theory, 27*(1), 21-47. https://doi.org/10.1111/comt.12106

Hamza, C. A., Ewing, L., Heath, N. L., & Goldstein, A. L. (2020). When social isolation is nothing new: A longitudinal study psychological distress during COVID-19 among university students with and without preexisting mental health concerns. *Canadian Psychology*. http://dx.doi.org/10.1037/cap0000255

Hanna-Benson, C. (2019). *Development and evaluation of an online university readiness course furthered by capturing the lived experience of students during this transition: a multi-perspective understanding of the transition to university* (Publication No. 6092) [Doctoral dissertation, The University of Western Ontario]. Semantic Scholar.

Harlow, H. F., Dodsworth, R. O., & Harlow, M. K. (1965). Total social isolation in monkeys. *Proceedings of the National Academy of Sciences of the United States of America, 54*(1), 90-97.

Haslam, C., Cruwys, T., Haslam, S. A., & Jetten, J. (2015). Social connectedness and health. *Encyclopedia of Geropsychology*. https://doi.org/10.1007/978-981-287-080-3_46-1

Henri, V. (2020, September 26). *Anti-lockdown protesters believe COVID restrictions threaten freedom*. Toronto Sun. https://torontosun.com/news/local-news/anti-lockdown-protestors-believe-covid-restrictions-threaten-freedom

Henssler, J., Stock, F., van Bohemen, J., Walter, H., Heinz, A., & Brandt, L. (2021). Mental health effects of infection containment strategies: Quarantine and isolation – A systematic review and meta-analysis. *European Archives of Psychiatry and Clinical Neuroscience, 217,* 223-234. https://doi.org/10.1007/s00406-020-01196-x

Hill, L., & Zheng, Z. (2018). A desire for social media is associated for a desire with solitary but not social activities. *Psychological Reports, 121*(6), 1120-1130. https://doi.org/10.1177%2F0033294117742657

Hills, S., & Eraso, Y. (2021). Factors associated with non-adherence to social distancing rules during the COVID-19 pandemic: A logistic regression analysis. *BMC Public Health, 21*(352). https://doi.org/10.1186/s12889-021-10379-7

Holmberg, L. (2014). Seeking social connectedness online and offline: Does happiness require real contact? *Semantic Scholar*.

Holt-Lunstad., J. (2017). The potential public health relevance of social isolation and loneliness: Prevalence, epidemiology, and risk factors. *Public Policy & Aging Reports, 27*(4), 127-130. https://doi.org/10.1093/ppar/prx030

Holt-Lunstad, J., Robles, T. F., & Sbarra, D. A. (2017). Advancing social connection as a public health priority in the United States. *The American Psychologist, 72*(6), 517–530. http://dx.doi.org/10.1037/amp0000103

Holt-Lunstad, J., Smith, T. B., & Layton, J. B. (2010). Social relationships and mortality risk: A Meta-analytic review. *PLoS Medicine, 7*(7). https://doi.org/10.1371/journal.pmed.1000316

House, J. S., Landis, K. R., & Umberson, D. (1988). Social Relationships and Health. *American Association for the Advancement of Science, 241,* 540-545.

How Canadians are helping each other amid the COVID-19 outbreak. (2020, March 16). CBC News. https://www.cbc.ca/news/entertainment/community-support-coronavirus-1.5498521

Hruska, J., & Maresova, P. (2020). Use of social media platforms among adults in the United States – Behavior on social media. *Societies, 10*(1). https://doi.org/10.3390/soc10010027

Hunt, M. G., Marx, R., Lipson, C., & Young, J. (2018). No more FOMO: Limiting social media decreases loneliness and depression. *Journal of Social and Clinical psychology, 37*(10), 751-768. https://doi.org/10.1521/jscp.2018.37.10.751

Ihm, L., Zhang, H., van Vijfeijken, A., & Waugh, M. G. (2021). Impacts of the Covid-19 pandemic on the health of university students. *International Journal of Health Planning and Management, 36*, 618-627. https://doi.org/10.1002/hpm.3145

Jafari, M., & Ansari-Pour, N. (2019). Why, when and how to adjust your p values? *Cell Journal*, *20*(4), 604–607. https://doi.org/10.22074/cellj.2019.5992

Jang, J. Y., Han, K., Shih, P. C., & Lee, D. (Eds.). (2015). *Proceedings of the 33rd Annual CHI Conference on Human Factors in Computing Systems*. Association for Computing Machinery. https://doi.org/10.1145/2702123.2702555

Jenzer, T., Read, J. P., Naragon-Gainey, K., & Prince, M. A. (2019). Coping trajectories in emerging adulthood: The influence of temperament and gender. *Journal of Personality*, *87*(3), 607-619. https://doi.org/10.1111/jopy.12419

Jiang Y. (2021). Problematic social media usage and anxiety among university students during the COVID-19 pandemic: The mediating role of psychological capital and the moderating role of academic burnout. *Frontiers in Psychology*, *12*. https://doi.org/10.3389/fpsyg.2021.612007

Jorgenson, D. A., Farrell, L. C., Fudge, J. L., & Pritchard, A. (2018). College connectedness: The student perspective. *Journal of the Scholarship of Teaching and Learning*, *18*(1), 75-95. https://doi.org/10.14434/josotl.v18i1.22371

Jose, P. E., Ryan, N., & Pryor, J. (2012). Does social connectedness promote a greater sense of well-being in adolescence over time? *Journal of Research on Adolescence, 22*(2), 235-251. https://doi.org/10.1111/j.1532-7795.2012.00783.x

Jung, J. (2008). Internet connectedness and its social origins: An ecological approach to postaccess digital divides. *Communication Studies, 59*(4), 322-339. https://doi.org/10.1080/10510970802467387

Kang, Y., & Xu, S. (2020). Comprehensive overview of COVID-19 based on current evidence. *Dermatologic Therapy, 33*(5). https://doi.org/10.1111/dth.13525

Kawachi, I., & Berkman, L. F. (2001). Social ties and mental health. *Journal of Urban Health, 78*(3), 458-467. https://doi.org/10.1093/jurban/78.3.458

Kecojevic, A., Basch, C. H., Sullivan, M., & Davi, N. K. (2020). The impact of the COVID-19 epidemic on mental health of undergraduate students in New Jersey, cross-sectional study. *PLoS ONE, 15*(9). https://doi.org/10.1371/journal.pone.0239696

Keles, B., McCrae, N., & Grealish, A. (2020). A systematic review: The influence of social media on depression, anxiety and psychological distress in adolescents. *International Journal of Adolescence and Youth, 25*(1), 79-93. https://doi.org/10.1080/02673843.2019.1590851

Khodabakhsh S., & Li, S. S. (2018). Relationship between online and face-to-face connectedness and general health among undergraduate students in Malaysia. *Malaysian Online Journal of Counseling, 5*(1).

Kim, K-S., Joanna Sin, S-C., & Tsai, T-I. (2014). Individual differences in social media use for information seeking. *The Journal of Academic Librarianship, 40*(2), 171-178. https://doi.org/10.1016/j.acalib.2014.03.001

Kim, Y., Wang, Y., & Oh, J. (2016). Digital media use and social engagement: How social media and smartphone use influence social activities of college students. *Cyberpsychology, Behavior, and Social Networking, 19*(4), 264-269. http://doi.org/10.1089/cyber.2015.0408

Knight-McCord, J., Cleary, D., Grant, N., Herron, A., Lacey, T., Livingston, T., Robinson, S., Smith, R., & Emanuel, R. (2016). What social media sites do college students use most? *Journal of Undergraduate Ethnic Minority Psychology*.

Krasnova, H., Veltri, N. F., Eling, N., Buxmann, P. (2017). Why men and women continue to use social networking sites: The role of gender differences. *The Journal of Strategic Information Systems, 26*(4), 261-284. https://doi.org/10.1016/j.jsis.2017.01.004

Lamblin, M., Murawski, C., Whittle, S., & Fornito, A. (2017). Social connectedness, mental health and the adolescent brain. *Neuroscience and Biobehavioral Reviews, 80*, 57-68. https://doi.org/10.1016/j.neubiorev.2017.05.010

Lee, J. J., Kang, K-A., Wang, M. P., Zhao, S. Z., Wong, J. Y. H., O'Conor, S., Yang, S. C., & Shin, S. (2020). Associations between COVID-19 misinformation exposure and belief with COVID-19 knowledge and preventive behaviors: Cross-sectional online study. *Journal of Medical Internet Research, 22*(11). https://doi.org/10.2196/22205

Lee, P. S. N., Leung, L., Lo, V., Xiong, C., & Wu, T. (2011). Internet communication versus face-to-face interaction in quality of life. *Social Indicators Research, 100*(3), 375-389.

Lee, R. M., Dean, B. L., Jung, K-R. (2008). Social connectedness, extraversion, and subjective well-being: Testing a mediation model. *Personality and Individual Differences, 45*(5), 414-419. https://doi.org/10.1016/j.paid.2008.05.017

Lee, R. M., Draper, M., & Lee, S. (2001). Social connectedness, dysfunctional interpersonal behaviors, and psychological distress: Testing a mediator model. *Journal of Counseling Psychology, 48* (3), 310-318.

Lee, R. M., & Robbins, S. B. (2011). Understanding social connectedness in college women and men. *Journal of Counseling and Development, 78*(4), 484-491. http://dx.doi.org.proxy1.lib.uwo.ca/10.1002/j.1556-6676.2000.tb01932.x

Lee, R. M., & Robins, S. B. (1995). Measuring belongingness: The social connectedness and the social assurance scales. *Journal of Counselling Psychology, 42*(2), 232-241. https://doi.apa.org/doi/10.1037/0022-0167.42.2.232

Lemon, S. M., Hamburg, M. A., Sparling, F., Choffnes, E. R., & Mack, A. (2007). *Ethical and legal considerations in mitigating pandemic disease* [eBook edition]. The National Academia Press. https://doi.org/10.17226/11917

Lieberman, A., & Schroeder, J. (2020). Two social lives: How differences between online and offline interaction influence social outcomes. *Current Opinion in Psychology, 31*, 16-21. https://doi.org/10.1016/j.copsyc.2019.06.022

Lin, L. Y., Sidani, J. E., Shensa, A., Radovic, A., Miller, E., Colditz, J. B., Hoffman, B. L., Giles, L. M., Primack, B. A. (2016). Association between social media use and depression among U.S. young adults. *Depression and Anxiety, 33*(4), 323-331. https://doi.org/10.1002/da.22466

Lisitsa, E., Benjamin, K. S., Chun, S. K., Skalisky, J., Hammon, L. E., & Mezulis, A. H. (2020). Loneliness among young adults during COVID-19 pandemic: The mediational roles of social media use and social support seeking. *Journal of Social and Clinical Psychology, 39*(8), 708-726. https://doi.org/10.1521/jscp.2020.39.8.708

Little, R. J. A. (1988). A test of missing completely at random for multivariate data with missing values. *Journal of the American Statistical Association, 83*, 1198-1202. http://dx.doi.org/10.1080/01621459.1988.10478722

Loades, M. E., Chatburn, E., Higson-Sweeney, N., Reynolds, S., Shafran, R., Brigden, A., Linney, C., McManus, M. N., Borwich, C., & Crawley, E. (2020). Rapid systematic review: The impact of social isolation and loneliness on the mental health of children and adolescents in the context of COVID-19. *Journal of the American Academy of Child & Adolescent Psychiatry, 59*(11), 1218-1239. https://doi.org/10.1016/j.jaac.2020.05.009

MacLeod, J., Yang, H. H., & Shi, Y. (2019). Student-to-student connectedness in higher education: A systematic literature review. *Journal of Computing in Higher Education, 31*, 426–448. https://doi.org/10.1007/s12528-019-09214-1

Malaquias, S., Crespo, C., & Francisco, R. (2015). How do adolescents benefit from family rituals? Links to social connectedness, depression and anxiety. *Journal of Child and Family Studies, 24*, 3009–3017. https://doi.org/10.1007/s10826-014-0104-4

Martino, J., Pegg, J., & Frates, E. P. (2015). The connection prescription: Using the power of social interactions and the deep desire for connectedness to empower health and wellness. *American Journal of Lifestyle Medicine, 11*(6), 466-475. https://doi.org/10.1177%2F1559827615608788

Masciantonio, A., Bourguignon, D., Bouchat, P., Balty, M., & Rimé, B. (2021). Don't put all social network sites in one basket: Facebook, Instagram, Twitter, TikTok, and their relations with well-being during the COVID-19 pandemic. *PLoS ONE, 16*(3). https://doi.org/10.1371/journal.pone.0248384

McNair, J. (2020). *Commentary: Our renewed sense of community during the despair of the COVID-19 pandemic*. Chicago Tribune. https://www.chicagotribune.com/opinion/commentary/ct-opinion-coronavirus-community-20201116-obd3ctsv5vdrhhhaq4qgp3woam-story.html

Meşe, C., & Aydın, G. S. (2019). The use of social networks among university students. *Educational Research and Reviews, 14*(6), 190-199. https://doi.org/10.5897/ERR2018.3654

Montgomery, M. (2020, May 18). *Toronto sees largest anti-lockdown protest so far*. Radio Canada International. https://www.rcinet.ca/en/2020/05/18/toronto-sees-largest-anti-lockdown-protest-so-far/

Morina, N., Kip, A., Hoppen, T. H., Priebe, S., Meyer, T. (2021). Potential impact of physical distancing on physical and mental health: A rapid narrative umbrella review of meta-analyses on the link between social connection and health. *BMJ Open, 11*(3). http://dx.doi.org/10.1136/bmjopen-2020-042335

Muscanelle, N. L., & Guadagno, R. E. (2012). Make new friends or keep the old: Gender and personality differences in social networking use. *Computers in Human Behavior, 28*(1), 107-112. https://doi.org/10.1016/j.chb.2011.08.016

Nadkarni, A., & Hoffman, S. G. (2012). Why do people use Facebook? *Personality and Individual Differences, 52*(3), 243-249. https://doi.org/10.1016/j.paid.2011.11.007

Naeem, S. B., & Bhatti, R. (2020). The Covid-19 'infodemic': A new front for information professionals. *Health Information and Libraries Journal, 37*(3), 233–239. https://doi.org/10.1111/hir.12311

Nagel, T. W. S., Remillard, C., Robert, A., & Akari, T. (2018). Findings on student use of social media at the collegiate, undergraduate, and graduate levels: Implications for post-secondary educators. *Journal of University Teaching & Learning Practice, 15*(1).

Naslund, J. A., Bondre, A., Torous, J., & Aschbrenner, K. A. (2020). Social media and mental health: Benefits, risks, and opportunities for research and practice. *Journal of Technology and Behavioral Science, 5*, 245-257. https://doi.org/10.1007/s41347-020-00134-x

Nelson, L. J. (2021). The theory of emerging adulthood 20 years later: A look at where it has taken us, what we know now, and where we need to go. *Emerging Adulthood, 9*(3), 179-188. https://doi.org/10.1177%2F2167696820950884

Nguyen, M. H., Gruber, J., Marler, W., Hunsaker, A., Fuchs, J., & Hargittai, E. (2021). Staying connected while physical apart: Digital communication when face-to-face interactions are limited. *New Media & Society*. https://doi.org/10.1177%2F1461444820985442

Nguyen, M. H., Le, T. T., Meirmanov, S. (2019). Depression, acculturative stress, and social connectedness among international university students in Japan: A statistical investigation. *Sustainability, 11*(3). https://doi.org/10.3390/su11030878

Nussbaumer-Streit, B., Mayr, V., Dobrescu, AI., Chapman, A., Persad, E., Klerings, I., Wagner, G., Siebert, U., Ledinger, D., Zachariah, C., & Gartlehner, G. (2020).

Quarantine alone or in combination with other public health measures to control COVID-19: A rapid review. *Cochrane Database of Systematic Reviews*, (9). https://doi.org/10.1002/14651858.CD013574.pub2

Okabe-Miyamoto, K., Folk, D., Lyubomirsky, S., & Dunn, E. W. (2021). Changes in social connection during COVID-19 social distancing: It's not (household) size that matters, it's who you're with. *PLoS ONE, 16*(1). https://doi.org/10.1371/journal.pone.0245009

Okdie, B. M., Guadagno, R. E., Bernieri, F. J., Geers, A. L., Mclarney-Vesotski, A. R. (2011). Getting to know you: Face-to-face versus online interactions. *Computers in Human Behavior, 27*, 153-159. https://doi.org/10.1016/j.chb.2010.07.017

O'Keeffe, G.S., & Clarke-Pearson, K. (2011). Clinical report: The impact of social media on children, adolescents, and families. *Pediatrics, 127*(4), 800-804. https://doi.org/10.1542/peds.2011-0054

Ontario Human Rights Commission. (n.d.*). Policy statement on human rights-based approach to managing the COVID-19 pandemic.* http://www.ohrc.on.ca/en/policy-statement-human-rights-based-approach-managing-covid-19-pandemic

Orben, A., Tomova, L., & Blakemore, S-J. (2020). The effects of social deprivation on adolescent development and mental health. *The Lancet Child & Adolescent Health, 4*(8), 634-640. https://doi.org/10.1016/S2352-4642(20)30186-3

Over, H. (2016). The origins of belonging: Social motivation in infants and young children. *Philosophical Transactions of the Royal Society B: Biological Sciences, 371*(1686). http://dx.doi.org/10.1098/rstb.2015.0072

Padgett, R. D., Goodman, K. M., Johnson, M. P., Saichaie, K., Umback, P. D., & Pascarella, E. T. (2010). The impact of college student socialization, social class, and race on need for cognition. *Diversity and Educational Benefits, 2010*(145), 99-111. https://doi.org/10.1002/ir.324

Pelley, L. (2020, March 29). *'We're all in this together': The paraphrase uniting Toronto in long, lonely battle against COVID-19.* CBC News. https://www.cbc.ca/news/canada/toronto/we-re-all-in-this-together-the-phrase-uniting-toronto-in-long-lonely-battle-against-covid-19-1.5508850

Pew Research Center. (2021a). *Social media use in 2021*. https://www.pewresearch.org/internet/2021/04/07/social-media-use-in-2021/

Pew Research Center. (2021b). *Social media fact sheet*. https://www.pewresearch.org/internet/fact-sheet/social-media/

Pittman, L. D., & Richmond, A. (2008). University belonging, friendship quality, and psychological adjustment during the transition to college. *The Journal of Experimental Education, 76*(4), 343-362.

Pittman, M., & Riche, B. (2016). Social media and loneliness: Why an Instagram picture may be worth more than a thousand Twitter words. *Computers in Human Behavior, 62*, 155-167. https://doi.org/10.1016/j.chb.2016.03.084

Pizzo P. A. (2020). A prescription for longevity in the 21st century: Renewing purpose, building and sustaining social engagement, and embracing a positive lifestyle. *JAMA, 323*(5), 415-416. https://doi-org.proxy1.lib.uwo.ca/10.1001/jama.2019.21087

Polizzi, C., Lynn, S. J., & Perry, A. (2020). Stress and coping in the time of COVID-19: Pathways to resilience and recovery. *Clinical Neuropsychiatry, 17*(2), 59-62.

Porges, S. W. (2020). The COVID-19 pandemic is a paradoxical challenge to our nervous system: A polyvagal perspective. *Clinical Neuropsychiatry, 17*(2), 135-138. https://doi.org/10.36131/CN20200220

Pressly, V. (2021). *College students' use of social media and its effects on well-being during COVID-19.* [Unpublished honors thesis]. The University of Southern Mississippi.

Primack, B. A., Karim, S. A., Shensa, A., Bowman, N., Knight, J., & Sidani, J. E. (2019). Positive and negative experiences on social media and perceived social

isolation. *American Journal of Health Promotion*, *33*(6), 859–868. https://doi.org/10.1177%2F0890117118824196

Primack, B. A., Shensa, A., Sidani, J. E., Whaite, E. O., Lin, L. Y., Rosen, D., Colditz, J. B., Radovic, A., & Miller, E. (2017). Social media use and perceived social isolation among young adults in the U.S. *American Journal of Preventive Medicine, 53*(1), 1-8. https://doi.org/10.1016/j.amepre.2017.01.010

Public Health Ontario. (2021). *Negative impacts of community-based public health measures on children, adolescents and families during the COVID-19 pandemic: Update.* https://www.publichealthontario.ca/-/media/documents/ncov/he/2021/01/rapid-review-neg-impacts-children-youth-families.pdf?la=en

Public Health Ontario. (2020a). *Environmental scan: Community-based public health measures for COVID-19 resurgence.* https://www.publichealthontario.ca/-/media/documents/ncov/main/2020/09/community-based-public-health-measures-covid-19-resurgence.pdf?la=en

Public Health Ontario. (2020b). *Take care of yourself and each other – COVID-19* [Fact sheet]. Retrieved from https://www.publichealthontario.ca/-/media/documents/ncov/factsheet/factsheet-covid-19-guide-take-care-yourself-others.pdf?la=en

Public Health Ontario. (2020c). *COVID-19 Modelling.* https://files.ontario.ca/po-covid-19-technical-briefing-en-2020-04-03.pdf

Public Health Ontario. (2020d). *Ontario Takes Further Action to Stop the Spread of COVID-19*. https://news.ontario.ca/en/release/56642/ontario-takes-further-action-to-stop-the-spread-of-covid-19

Rosenthal, D. A., Russell, J., & Thomson, G. (2007). Social connectedness among international students at an Australian university. *Social Indicators Research*, *84*, 71-82. https://doi.org/10.1007/s11205-006-9075-1

Ryan, T., Allen, K. A., Gray, D. L., McInerney, D. M. (2017). How social are social media? A review of online social behaviour and connectedness. *Journal of Relationships Research, 8*(8), 1-8. https://doi.org/10.1017/jrr.2017.13

Saeri, A. K., Cruwys, T., Barlow, F. K., Stronge, S., & Sibley, C. G. (2018). Social connectedness improves public mental health: Investigating bidirectional relationships in the New Zealand attitudes and values survey. *Australian & New Zealand Journal of Psychiatry, 52*(4), 365–374. https://doi.org/10.1177%2F0004867417723990

Saltzman, L. Y., Cross Hansel, T., & Bordnick, P. S. (2020). Loneliness, isolation, and social support factors in post-COVID-19 mental health. *Psychological Trauma: Theory, Research, Practice, and Policy, 12*(S1). http://dx.doi.org/10.1037/tra0000703

Sampasa- Kanyinga, H., & Lewis, R. F. (2015). Frequent use of social networking sites is associated with poor psychological functioning among children and adolescents. *Cyberpsychology, Behavior, and Social Networking, 18*(7), 380-385. https://doi.org/10.1089/cyber.2015.0055

Schimmele, C., Fonberg, J., & Schellenberg, G. (2021). *Canadians' assessments of social media in their lives*. https://www150.statcan.gc.ca/n1/pub/36-28-0001/2021003/article/00004-eng.htm

Schønning, V., Hietland, G. J., Aarø, L. E., & Skogen, J. C. (2020). Social media use and mental health and well-being among adolescents – A scoping review. *Frontiers in Psychology, 11*. https://doi.org/10.3389/fpsyg.2020.01949

Seabrooke, E. M., Kern, M. L., & Rickard, N. S. (2016). Social networking sites, depression, and anxiety: A systematic review. *JMIR Mental Health, 3*(4). https://doi.org/10.2196/mental.5842

Sheldon, P., & Bryant, K. (2016). Instagram: Motives for its use and relationship to narcissism and contextual age. *Computers in Human Behavior, 58*, 89-97. https://doi.org/10.1016/j.chb.2015.12.059

Shensa, A., Escobar-Viera, C. G., Sidani, J. E., Bowman, N. D., Marshal, M. P., & Primack, B. A. (2017). Problematic social media use and depressive symptoms among U.S. young adults: A nationally-representative study. *Social Sciences & Medicine, 182*, 150-157. http://dx.doi.org/10.1016/j.socscimed.2017.03.061

Siddhartha, S., Adil, A. H., Mulla, M., Mulla, M., Sayed, F. R., Singh, K. S., Tripathi, S., Sowmya, R., & Eusufzai, S. Z. (2020). Usage of social media among undergraduate university students. *European Journal of Molecular & Clinical Medicine, 7*(8), 1605-1617.

Sinclair, T. J., & Grieve, R. (2017). Facebook as a source of social connectedness in older adults. *Computers in Human Behavior*, *66*, 363-369. http://dx.doi.org/10.1016/j.chb.2016.10.003

Sobaih, A. E. E., Hasanein, A. M., & Abu Elnasr, A. E. (2020). Responses to COVID-19 in higher education: Social media usage for sustaining formal academic communication in developing countries. *Sustainability*, *12*(16). https://doi.org/10.3390/su12166520

Son, C., Hegde, S., Smith, A., Wang, X., & Sasangohar, F. (2020). Effects of COVID-19 on college students' mental health in the United States: Interview survey study. *Journal of Medical Internet Research, 22*(9). https://doi.org/10.2196/21279

Statistics Canada. (2020a). *Canadian Perspectives Survey Series 4: Information sources consulted during the pandemic, July 2020.* https://www150.statcan.gc.ca/n1/daily-quotidien/200817/dq200817b-eng.htm

Statistics Canada. (2020b). *Postsecondary enrolments by credential type, age group, registration status, program type and gender*. https://www150.statcan.gc.ca/t1/tbl1/en/cv.action?pid=3710001501

Statistics Canada. (2020c). *Canadians spend more money and time online during pandemic and over two-fifths report a cyber incident.* https://www150.statcan.gc.ca/n1/daily-quotidien/201014/dq201014a-eng.htm

Statistics Canada. (2019). *A portrait of Canadian youth: March 2019 updates*. https://www150.statcan.gc.ca/n1/pub/11-631-x/11-631-x2019003-eng.htm#a2

Statistics Canada. (2018). *Canadian Internet Use Survey 2018*. https://www.statcan.gc.ca/eng/statistical-programs/instrument/4432_Q2_V2

Statistics Canada. (2010). *Trends in the age composition of college and university students and graduates*. https://www150.statcan.gc.ca/n1/pub/81-004-x/2010005/article/11386-eng.htm

Stavrova, O., & Luhmann, M. (2016). Social connectedness as a source and consequence of meaning in life. *The Journal of Positive Psychology*, 11(5), 470-479. https://doi.org/10.1080/17439760.2015.1117127

Steiner, R. J., Sheremenko, G., Lesesne, C., Dittus, P. J., Sieving, R. E., & Ethier, K. A. (2019). Adolescent connectedness and adult health outcomes. *Pediatrics, 144*(1). https://doi.org/10.1542/peds.2018-3766

Stoddard, S. A., McMorris, B. J., & Sieving, R. E. (2011). Do social connections and hope matter in predicting early adolescent violence? *American Journal of Community Psychology 48*(3-4), 247-256. https://doi.org/10.1007/s10464-010-9387-9

Sutherland, K. E., Davis, C., Terton, U., & Visser, I. (2018). University student social media use and its influence on offline engagement in higher educational communities. *Student Success, 9*(2), 13–24. https://doi.org/10.5204/ssj.v9i2.400

Thomas, L., Briggs, P., Hart, A., & Kerrigan, F. (2017). Understanding social media and identity work in young people transitioning to university. *Computers in Human Behavior, 76*, 541-553. http://dx.doi.org/10.1016/j.chb.2017.08.021

Tognotti, E. (2013). Lessons from the history of quarantine, from plague to influenza A. *Emerging Infectious Diseases*, *19*(2), 254-259. https://dx.doi.org/10.3201/eid1902.120312

Trifiro, B. M., & Gerson, J. (2019). Social media usage patterns: Research note regarding the lack of universal validated measures for active and passive use. *Social Media + Society, 5*(2). https://doi.org/10.1177%2F2056305119848743

Tsitsika, A. K., Tzavela, E. C., Janikian, M., Ólafsson, K., Iordache, A., Schoenmakers, T. M., Tzavara, C., & Richardson, C. (2014). Online social networking in adolescence: Patterns of use in six European countries and links with psychosocial functioning. *Journal of Adolescent Health*, *55*(1), 141-147. http://dx.doi.org/10.1016/j.jadohealth.2013.11.010

Tufekci, Z. (2008). Grooming, gossip, Facebook and Myspace. *Information, Communication & Society*, *11*(4), 544-564. https://doi.org/10.1080/13691180801999050

Turki, F. J., Jdaitawi, M., & Sheta, H. (2018). Fostering positive adjustment behaviour: Social connectedness, achievement motivation and emotional-social learning among male and female university students. *Active Learning in Higher Education, 19*(2), 145-158. https://doi.org/10.1177%2F1469787417731202

Twenge, J. M., Spitzberg, B. H., & Campbell, W. K. (2019). Less in-person social interaction with peers among U.S. adolescents in the 21st century and links to loneliness. *Journal of Social and Personal Relationships, 36*(6), 1892-1913. https://doi-org.proxy1.lib.uwo.ca/10.1177%2F0265407519836170

Uhls, Y. T., Ellison, N. B., Subrahmanyam, K. (2017). Benefits and costs of social media in adolescence. *Pediatrics, 140*(2), s67-70. https://doi.org/10.1542/peds.2016-1758E

Umberson, D., & Montez, J. K. (2010). Social relationships and health: A flashpoint for health policy. *Journal of Health and Social Behavior, 51*, 54-66. https://doi.org/10.1177/0022146510383501

United Nations Children's Fund. (2020). *Physical not social distancing*. https://www.unicef.org/sudan/press-releases/physical-not-social-distancing

Usher, K., Bhullar, N., & Jackson, D. (2020). Life in the pandemic: Social isolation and mental health. *Journal of Clinical Nursing*, 1-2. https://doi.org/10.1111/jocn.15290

Van Bavel, J. J., Baicker, K., Boggio, P. S., Capraro, V., Cichocka, A., Cikara, M., Crockett, M. J., Crum, A. J., Douglas, K. M., Druckman, J. N., Drury, J., Dube, O., Ellemers, N., Finkel, E. J., Fowler, J. H., Gelfand, M., Han, S., Haslam, S. A., Jetten, J., … Willer, R. (2021). Using social and behavioural science to support COVID-19 pandemic response. *Nature Human Research*, *4*, 460-471. https://doi.org/10.1038/s41562-020-0884-z

Vandenbosch, L., & Eggermont, S. (2016). The interrelated roles of mass media and social media in adolescents' development of an objectified self-concept: A longitudinal study. *Communication Research, 43*(8), 1116-1140. https://doi.org/10.1177%2F0093650215600488

van Dijck, J. (2013). *The culture of connectivity: A critical history of social media* [eBook edition]. Oxford University Press. https://books.google.ca/books?hl=en&lr=&id=t5RpAgAAQBAJ&oi=fnd&pg=PP1&dq=beginning+of+social+media&ots=pm5rVOtvJL&sig=W2LmUHyal1PDKTY6BvMbnEvop8I#v=onepage&q&f=false

Vannette, D. (2015). *Biased data are bad data: How to think about question order*. Qualtrics. https://www.qualtrics.com/blog/biased-data-is-bad-data-how-to-think-about-question-order/

Vargo, D., Zhu, L., Benwell, B., & Yan, Z. (2021). Digital technology use during COVID-19 pandemic: A rapid review. *Human Behaviour and Emerging Technology, 3*(1), 13-24. https://doi.org/10.1002/hbe2.242

Verduyn, P., Lee, D. S., Park, J., Shablack, H., Orvell, A., Bayer, J., Ybarra, O., Jonides, J., & Kross, E. (2015). Passive Facebook usage undermines affective well-being: Experimental and longitudinal evidence. *Journal of Experimental Psychology: General, 144*(2), 480–488. https://doi.apa.org/doi/10.1037/xge0000057

Verduyn, P., Ybarra, O., Résibois, M., Jonides, J., & Kross, E. (2017). Do social network sites enhance or undermine subjective well-being? A critical review. *Social Issues and Policy Review, 11*(1), 274–302. https://doi.org/10.1111/sipr.12033

Vishwanath, A., Xu, W., & Ngoh, Z. (2018). How people protect their privacy on Facebook: A cost-benefit view. *Journal of the Association for Information Science & Technology, 69*(5), 700–709. https://doi.org/10.1002/asi.23894

Wang, C., & Zhao, H. (2020). The impact of COVID-19 on anxiety in Chinese university students. *Frontiers in Psychology, 11*. https://doi.org/10.3389/fpsyg.2020.01168

Westbrook, F., Tibb, A., Blackall, L., & Zabde, H. (2020). Web-conference lecturing: In dialogue with student experiences during a pandemic. *Video Journal of Education and Pedagogy, 5*(1), 1-17. https://doi.org/10.1163/23644583-00501009

Whitlock, J., Wyman, P. A., & Barreira, P. (2012). *Connectedness and suicide prevention in college settings: Directions and implications for practice*. Bronfenbrenner Center for Translational Research. http://www.selfinjury.bctr.cornell.edu/perch/resources/connectedness-suicide-prevent.pdf

Whittaker, S. S. (2008). *Investigation of social connectedness in a college population and its relationship to perceived stress and health symptoms.* [Unpublished master's thesis]. University of North Florida.

Wilson, S., & Gore, J. (2013). An attachment model of university connectedness. *The Journal of Experimental Education, 81*(2), 178-198. https://doi.org/10.1080/00220973.2012.699902

Wismans, A., Letina, S., Thurik, R., Wennberg, K., Franken, I., Baptista, R., Barrientos Marín, J., Block, J., Burke, A., Dejardin, M., Janssen, F., Mukerjee, J., Santarelli, E., Millán, J. M., & Torrès, O. (2020). Hygiene and social distancing as distinct public health related behaviours among university students during the COVID-19 pandemic. *Social Psychological Bulletin, 15*(4), 1-26. https://doi.org/10.32872/spb.4383

Woods, H. C., & Scott, H. (2016). #Sleepyteens: Social media use in adolescence is associated with poor sleep quality, anxiety, depression and low self-esteem. *Journal of Adolescence, 51*, 41-49. https://doi.org/10.1016/j.adolescence.2016.05.008

World Health Organization. (2020a). *Pneumonia of unknown cause – China*. https://www.who.int/csr/don/05-january-2020-pneumonia-of-unkown-cause-china/en/

World Health Organization. (2020b). *Archived: WHO timeline – COVID-19*. https://www.who.int/news-room/detail/27-04-2020-who-timeline---covid-19

World Health Organization. (2020c). *Considerations for quarantine of contacts of COVID-19 cases.* https://www.who.int/publications/i/item/considerations-for-quarantine-of-individuals-in-the-context-of-containment-for-coronavirus-disease-(covid-19)

World Health Organization. (2020d, March 20). *COVID-19* [Speech audio recording]. Retrieved from https://www.who.int/docs/default-source/coronaviruse/transcripts/who-audio-emergencies-coronavirus-press-conference-full-20mar2020.pdf?sfvrsn=1eafbff_0

World Health Organization. (2020e). *Looking after our mental health*. https://www.who.int/campaigns/connecting-the-world-to-combat-coronavirus/healthyathome/healthyathome---mental-health

Yang, C-C., Holden, S. M., Carter, M. D. K. (2017). Emerging adults' social media self-presentation and identity development at college transition: Mindfulness as a moderator. *Journal of Applied Developmental Psychology, 52*, 212-221. http://dx.doi.org/10.1016/j.appdev.2017.08.006

Yu, Y., Lau, J. T. F., & Lau, M. M.C. (2021). Levels and factors of social and physical distancing based on the Theory of Planned Behavior during the COVID-19 pandemic among Chinese adults. *Translational Behavioral Medicine*, *11*(5), 1179–1186. https://doi.org/10.1093/tbm/ibaa146

Zheng, Q., Lin, X., Freudenreich, T., & Liu, T. Impact of the perceived mental stress during the COVID-19 pandemic on medical students' loneliness feelings and future career choice: A preliminary survey study. *Frontiers in Psychiatry, 12*. https://doi.org/10.3389/fpsyt.2021.666588

Appendices

Appendix A: Notice of Ethics Approval

Western Research

Date: 25 March 2020

To: Dr. Shauna Burke

Project ID: 114497

Study Title: iBelong: Exploring the influence of social media on first-year university students' perceptions of social connectedness, wellbeing, and transition to university

Short Title: iBelong: Exploring the influence of social media on first-year university students

Application Type: NMREB Initial Application

Review Type: Delegated

Full Board Reporting Date: May 1 2020

Date Approval Issued: 25/Mar/2020

REB Approval Expiry Date: 25/Mar/2021

Dear Dr. Shauna Burke

The Western University Non-Medical Research Ethics Board (NMREB) has reviewed and approved the WREM application form for the above mentioned study, as of the date noted above. NMREB approval for this study remains valid until the expiry date noted above, conditional to timely submission and acceptance of NMREB Continuing Ethics Review.

This research study is to be conducted by the investigator noted above. All other required institutional approvals must also be obtained prior to the conduct of the study.

Documents Approved:

Document Name	Document Type	Document Date	Document Version
CLEAN_Email_Recruitment_21-03-20	Recruitment Materials	21/Mar/2020	
CLEAN_iBelong_FocusGroup_Guide_02-03-20	Focus Group(s) Guide	02/Mar/2020	2
CLEAN_iBelong_LOI and Consent_FocusGroup_18-03-20	Written Consent/Assent	18/Mar/2020	
CLEAN_iBelong_LOI and consent_Survey_22-03-20	Implied Consent/Assent	22/Mar/2020	
CLEAN_iBelong_Script for Verbal Recruitment_22-03-20	Oral Script	22/Mar/2020	3
CLEAN_iBelong_SocialMediaRecruitment_22-03-20	Recruitment Materials	22/Mar/2020	
CLEAN_iBelong_Survey_23-03-20	Online Survey	23/Mar/2020	
CLEAN_Invitational_FocusGroup_Email_18-03-20	Recruitment Materials	18/Mar/2020	
CLEAN_NoticeofIncentive_02-03-20	Other Data Collection Instruments	02/Mar/2020	2
CLEAN_PosterClass_PPT_Recruitment 22_03_20	Recruitment Materials	22/Mar/2020	
CLEAN_Social_Distancing_Survey_REVISED-23-03-20_FINAL	Online Survey	23/Mar/2020	2
FINAL_Social_Distancing_Email_Recruitment_18-03-20	Recruitment Materials	18/Mar/2020	
FINAL_Social_Distancing_LOI:C_18-03-20	Implied Consent/Assent	18/Mar/2020	

FINAL_Social_Distancing_NoticeofIncentive_18-03-20	Other Data Collection Instruments	18/Mar/2020
FINAL_Social_Distancing_Online_Classes_PPT_Recruitment_18_03_20	Recruitment Materials	18/Mar/2020
FINAL_Social_Distancing_SMRecruitment_18-03-20	Recruitment Materials	18/Mar/2020

Documents Acknowledged:

Document Name	Document Type	Document Date	Document Version
CLEAN_iBelong_ScreeningQuestions_02-03-20	Screening Form/Questionnaire	02/Mar/2020	
FINAL_Social_Distancing_ScreeningQuestions_18-03-20	Screening Form/Questionnaire	18/Mar/2020	
MENTAL HEALTH RESOURCES_16-03-20	Other Materials	16/Mar/2020	1

No deviations from, or changes to the protocol should be initiated without prior written approval from the NMREB, except when necessary to eliminate immediate hazard(s) to study participants or when the change(s) involves only administrative or logistical aspects of the trial.

The Western University NMREB operates in compliance with the Tri-Council Policy Statement Ethical Conduct for Research Involving Humans (TCPS2), the Ontario Personal Health Information Protection Act (PHIPA, 2004), and the applicable laws and regulations of Ontario. Members of the NMREB who are named as Investigators in research studies do not participate in discussions related to, nor vote on such studies when they are presented to the REB. The NMREB is registered with the U.S. Department of Health & Human Services under the IRB registration number IRB 00000941.

Please do not hesitate to contact us if you have any questions.

Sincerely,

Kelly Patterson, Research Ethics Officer on behalf of Dr. Randal Graham, NMREB Chair

Note: This correspondence includes an electronic signature (validation and approval via an online system that is compliant with all regulations).

Appendix B: Example Social Media Posting

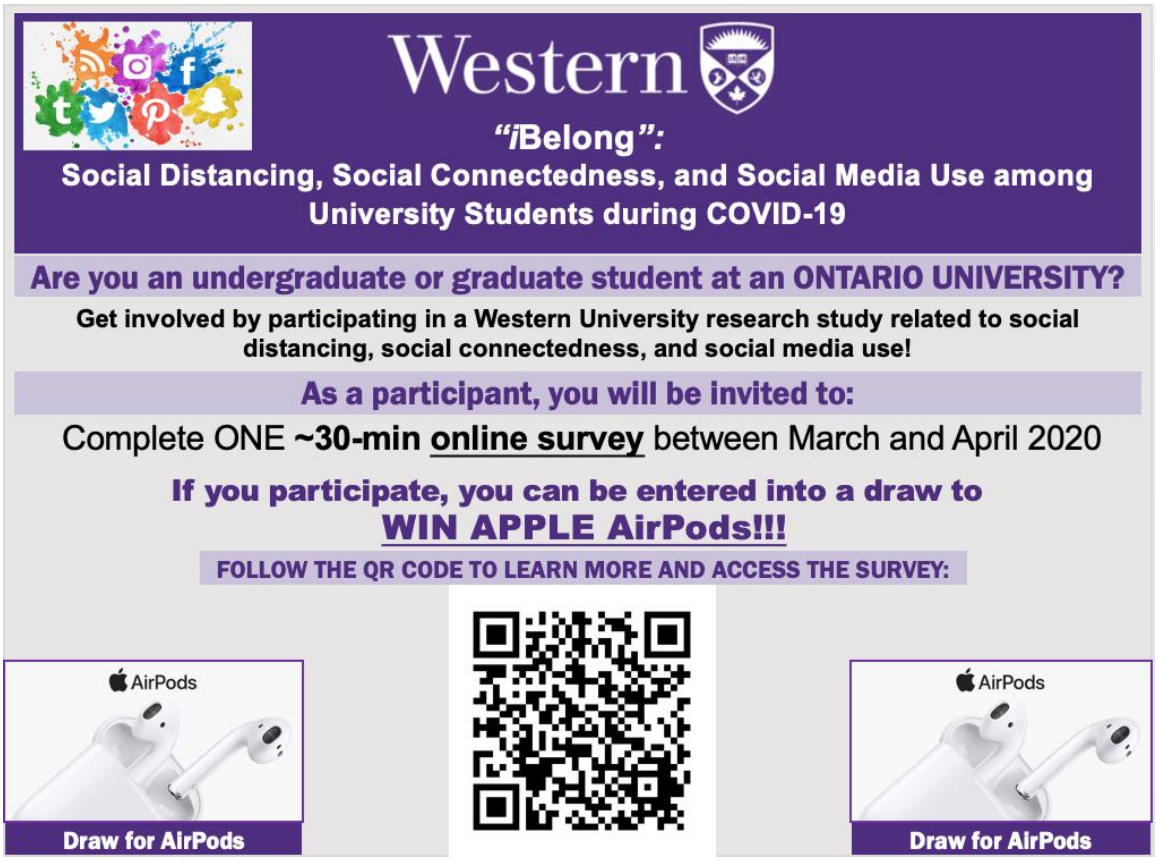
Caption (Facebook, LinkedIn, Instagram):

Are you a university student in Ontario? Dr. Shauna Burke and the iBelong research team at Western University would like to know your thoughts on **#socialdistancing, #socialconnectedness,** and **#socialmedia** during the COVID-19 pandemic. As a participant, you will be asked to complete an **online survey** (approx. 30 min) anytime between March and April 2020. If you choose to participate, you can be entered into a draw to win **AirPods!**

If you would like to participate now, please click the link below to access the survey:

Survey link: https://uwo.eu.qualtrics.com/jfe/form/SV_ac7YSScxDi67xSl

If you have any questions, please contact Ms. Nerida K. van der Linden or Dr. Shauna Burke.



Appendix C: Letter of Information

Letter of Information for University Students in Ontario

iBelong: Social Distancing, Social Connectedness, and Social Media Use Among University Students During COVID-19

Thank you for your interest in participating in the "*iBelong*" research study. Before you decide whether to participate, the investigators would like you to read some important information about the study. There are also mental health resources available to you on the next page. If you choose to participate, the "consent" button can be found at the end of this letter of information:

Invitation to Participate

You are invited to participate in the *iBelong* research study; a study regarding university students' use of social media and their perceptions of social connectedness, social distancing, and health/wellbeing.

Purpose of the Letter

The purpose of this letter is to provide you with information required for you to make an informed decision regarding participation in this research study.

Purpose of this Study

The primary purpose of this study is to examine university students' perceptions of social distancing, social connectedness, social media use, and overall student health and well-being.

Inclusion Criteria

You are eligible to participate in this study if you are currently enrolled as a university student (undergraduate or graduate) in any program at a post-secondary institution in Ontario.

Exclusion Criteria

Individuals who are not currently enrolled at an Ontario university are not eligible to participate in this study.

Study Procedures

If you consent to participate in this study, you will be asked to complete an online survey between March and April 2020. It is anticipated that the survey will take approximately 30 minutes to complete. You will be asked to complete the survey before the survey link expires on April 30th 2020. You will be able to complete

the survey on your own time at a location of your choice (where internet is available).

We would also like to request that if you know of other students or friends attending Western University or other Ontario universities, that you please notify them of the study. If they are interested, please share the survey with them or tell them to contact Ms. Nerida K. van der Linden at or Dr. Shauna Burke.

Possible Benefits

While there are no direct benefits to participation in this study, a reflection of your own social media use and the strategies used during social distancing may be beneficial. Findings from this study could also benefit society, as findings regarding students' perceptions of belonging and wellness, as well as their social media use, during social distancing and the COVID-19 pandemic might be particularly relevant and timely.

Compensation

We aim to recruit as many participants as possible. If you participate in the survey and wish to leave your e-mail address, you will be entered in a draw to win one of three Apple AirPods. You may only win one draw. If you win a draw, you will be notified by e-mail and will be asked to provide your mailing address so that we can mail the prize to your home address (as you will be unable to pick this prize up in-person). E-mail and mailing addresses will be collected and stored separately from research data and only used to notify you of winning the prize; this information will be deleted after mailing winners their prize.

Voluntary Participation

Participation in this study is voluntary. You may refuse to participate, refuse to answer any questions, or withdraw from the study at any time with no effect on your future or current academic or professional standing.

Confidentiality

Your survey responses will be collected through a secure online survey platform called Qualtrics. Qualtrics uses encryption technology and restricted access authorizations to protect all data collected. In addition, Western's Qualtrics server is in Ireland, where privacy standards are maintained under the European Union safe harbour framework. The data will then be exported from Qualtrics and securely stored on a Western University server. All data collected will remain confidential and accessible only to the

investigators of this study. While we will do our best to protect your information, there is no guarantee that we will be able to do so.

We are collecting some sensitive information. For example, in order to calculate body mass index (BMI), full date of birth (i.e., day/month/year), height, and weight information is required. E-mail addresses are being requested as we require them to notify winners of the incentive. If you have entered your e-mail address for the draw to win AirPods, we will also require your address, postal code, and full name (as we will be mailing all prizes). We are also collecting information such as ethnicity, year of study, sex, year of study, and university program, which may allow the research team members to link the data and identify you.

After a minimum of 7 years, all data (electronic and paper) will be destroyed. By participating in this research, you agree that the results may be used for scientific purposes, including publication in scientific journals. No individual information will be reported. Only group-level and aggregated data will be reported. You do not waive any legal rights by consenting to this study. The results of the study will be reported without identifying you personally, thus maintaining your confidentiality. Representatives of The University of Western Ontario Non-Medical Research Ethics Board may contact you or require access to your study-related records to monitor the conduct of the research.

Contacts for Further Information

If you require any further information regarding this research project or your participation in the study, you may contact Ms. Nerida K. van der Linden or Dr. Shauna Burke.
If you have any questions about your rights as a research participant or the conduct of this study, you may contact The Office of Human Research Ethics.

Publication

If the results of the study are published, your name will not be used. If you would like to receive a copy of any potential study results, please e-mail Ms. Nerida L. van der Linden or Dr. Shauna Burke.

Consent

Prior to participating in this study, you will be asked to provide consent. If you do not provide consent, you will not be able to proceed to the survey.

Thank you for considering participation in this study.

Below are two buttons. If you do not consent and do not wish to participate in the study, please choose the appropriate option. You will not be penalized in any way if you choose not to participate.

By clicking “I consent and begin the study”, you acknowledge that you understand the terms and conditions of participating in this study and are making an informed decision to participate. Furthermore, submitting the survey is also an indication of your consent to participate in the study. Thank you.

Please note that this survey will be best displayed on a laptop or desktop computer. Some features may be less compatible for use on a mobile device.

Appendix D: Mental Health Resources

While we (the researchers) do not foresee any potential risks associated with filling out the following online survey, we acknowledge that answering some questions (for example, those related to anxiety, depression, and social relationships) might elicit difficult or negative thoughts and emotions in some individuals. Thus, we have included a list of mental health support services, available to students in Ontario and at Western University.

Please keep this for your records.

First and foremost, **if you are in an emergency situation or in immediate danger, please call 911**, or go to nearest hospital/emergency department

Ontario Mental Health Support Services:

Ontario university students seeking help regarding mental health concerns can use these Ontario mental health resources:

- General Mental Health Support:
  - Website: https://www.ontario.ca/page/find-mental-health-support
- Kids Help Phone (ages 5 – 20):
  - Phone: 1 800 668 6868
- Good2Talk (ages 17 – 25):
  - Phone: 1 866 925 5454
- ConnexOntario:
  - Phone: 1 866 531 2600
  - Social Media: ConnexOntario app

Western University and City of London Resources:

Information regarding health- and wellness-related services available to Western University students may be found outline at: http://www.health.uwo.ca/.

Western University students seeking help regarding mental health concerns are advised to speak to someone they feel comfortable confiding in. Campus mental health resources may be found online at: http://www.health.uwo.ca/mental_health/resources.html.

City of London mental health resources:

- ReachOUT – Mobile and Chat Services:
  - Phone: 519 433 2023
  - Website: ReachOut247.ca

- The Mental Health & Addiction Crisis Centre:
  - 648 Huron Street, London, ON
  - Walk in: Open 24/7 for crisis and support
  - Phone: 519 434 9191 (8:30am-4:30pm)

- Anova Woman's Community House:
  - 24 Hour Phone:
    - Abused Women's Helpline: 519 642 3000
    - Crisis and Support line: 519 438 2272

Appendix E: Full i*Belong* Survey

SECTION I: <u>Demographic Information</u>

What is your height?

In feet/inches: _____

What is your weight?

In pounds: _____

What is your date of birth? (DD/MM/YYYY)

What is your sex at birth? *(Refers to sex assigned at birth.)*

- Male
- Female

What is your gender? *(Refers to current gender which may be different from sex assigned at birth and may be different from what is indicated on legal documents.)*

- Male
- Female

OR

- Other: _____

What term best describes your sexual orientation (National Centre for Health Statistics [NCHAS], 2018)?

- Asexual
- Bisexual
- Gay
- Lesbian
- Pansexual
- Queer
- Questioning
- Same Gender Loving
- Straight/Heterosexual
- Another identity (please specify: _____)

Are you an Indigenous person, that is, First Nations, Métis or Inuk (Inuit)? *(Note: First Nations includes Status and Non-Status.)*

- No, not an Indigenous person
- Yes, First Nations (Status or Non-Status)
- Yes, Métis
- Yes, Inuk (Inuit)

Do you identify as:

- White
- South Asian (e.g., East Indian, Pakistani, Sri Lankan, etc.)
- Chinese
- Black
- Filipino
- Latin American
- Arab
- Southeast Asian (e.g., Vietnamese, Cambodian, Laotian, Thai, etc.)
- West Asian (e.g., Iranian, Afghan, etc.)
- Korean
- Japanese
- Other – specify: _____

Education:

Are you enrolled as a full-time or part-time university student?

- Full-time student
- Part-time student

Are you an undergraduate or graduate student?

- Undergraduate

  What year are you currently enrolled in?

  1

  2

  3

  4

  5+

- Graduate

  What degree are you currently taking?
  Masters
  PhD
  Professional
  Other – Please specify: _____

Please tell us what program you are currently enrolled in:_____

Are you currently enrolled as an international student?

- Yes
- No

Do you currently attend Western University?

- Yes
- No

If NO, what university do you currently attend?:_____

If YES, which campus at Western University are you currently enrolled in?

- Main (Western)
- Huron
- King's
- Brescia

Living Arrangements:

Where do you currently live (amidst the COVID-19 pandemic)?

- Campus residence hall
- Other college/university housing
- Parent/guardian's house
- Other off-campus housing: Please specify _____
- Other: Please specify: _____

Where did you previously live (prior to the COVID-19 pandemic)?

- Campus residence hall
- Other college/university housing
- Parent/guardian's house
- Other off-campus housing: Please specify _____
- Other: Please specify: _____

How many people (*not* *including yourself*) are you currently in isolation with?

- 0
- 1
- 2
- 3
- 4
- 5
- 6+
- I am not currently self-isolating

Who are you currently in isolation with? Please check all that apply.

- Parents/guardians
- Siblings
- Other relatives
- Friends

- Other: Please specify: _____
- I am not currently self-isolating

Before you begin the survey it's important for you to know there are no right or wrong answers. Please answer questions openly and honestly. Thank you.

**The following sections will be administered in random order via Qualtrics with the exception of Section 1.*

SECTION I: <u>Social Distancing and Social Media Use</u>

In the wake of the COVID-19 pandemic, numerous strategies have been proposed to reduce the risk and spread of this virus. One such strategy is **SOCIAL DISTANCING** (also referred to as **"physical distancing"**), which has been defined as deliberately increasing the amount of physical space between people to avoid spreading illness (Johns Hopkins Medicine, 2020).

1. Have you engaged in ***social distancing*** during the COVID-19 pandemic?
    - Yes
        - Please tell us about your reasons for engaging in social distancing.
          **leave blank space in Qualtrics for open-ended responses*
    - No
        - Please tell us about your reasons for NOT engaging in social distancing.

          **leave blank space in Qualtrics for open-ended responses*

2. Which, if any, of the following measures have you taken to practice ***social distancing*** during the COVID-19 pandemic?

a. Avoided travel to other countries?
- Yes
- No
- Not applicable

b. Avoided large crowds (e.g., music concerts, live theatre, conferences), prior to them being cancelled or banned?
- Yes
- No
- Not applicable

c. Avoided family gatherings?
- Yes
- No
- Not applicable

d. Avoided gatherings with friends?
- Yes

- No
- Not applicable

e. Avoided the mall?
- Yes
- No
- Not applicable

f. Avoided public transit?
- Yes
- No
- Not applicable

g. Avoided public and/or university libraries?
- Yes
- No
- Not applicable

h. Avoided the gym (prior to them closing)?
- Yes
- No
- Not applicable

i. Moved out of residence?
- Yes
- No
- Not applicable

j. Avoided residence dining halls?
- Yes
- No
- Not applicable

k. Avoided coffee shops?
- Yes
- No
- Not applicable

l. Avoided the grocery store, pharmacy, or other essential service locations?
- Yes
- No
- Not applicable

m. Avoided any one-on-one social interaction(s)?
- Yes
- No
- Not applicable

n. Avoided going outside?
- Yes
- No
- Not applicable

o. Engaged in paid work (outside of school work) from home?
- Yes
- No
- Not applicable

p. Avoided restaurants and bars (prior to them closing)?
- Yes
- No
- Not applicable

q. Avoided, in general, other public places prior to them closing (e.g., recreation centres, movie theatres, etc.)?
- Yes
- No
- Not applicable

r. Stayed at least 2 metres (6 feet) away from other individuals? (Please note that this does **not** include individuals you live with).
- Yes
- No
- Not applicable

s. Avoided food and beverage take-out services?
- Yes
- No
- Not applicable

t. Avoided food and beverage delivery services?
- Yes
- No
- Not applicable

u. Engaged in a self-isolation procedure for at least two weeks?
- Yes
- No
- Not applicable

3. What, if any, of the following strategies have you used to ***remain socially connected*** during the COVID-19 pandemic? Please select all that apply.
- Video calls (e.g., FaceTime)
- Telephone
- Online video games
- Text

- Social media
- E-mail
- Staying home with family
- Outdoor time with friends or family
- Other: Please specify

  _____
- I did not change any of my social behaviours

4a. The following questions relate to your ***thoughts and feelings about social distancing***. Please rate the extent to which you agree or disagree with the statements using the following scale (*Strongly disagree* to *Strongly agree*).

	Strongly disagree	Somewhat disagree	Neither agree nor disagree	Somewhat agree	Strongly agree
It has been difficult to change my behaviours to be more socially distant.					
I feel that social distancing is effective.					
I feel comfortable with social distancing.					
I feel isolated when I am socially distancing.					
It has been easy to remain connected with my friends while socially distancing.					
It has been easy to remain connected with my family while socially distancing.					
I feel anxious when I am socially distancing.					
I feel relieved when I am socially distancing.					
I am more social online when I am socially distancing.					

I am more social in my home environment when I am socially distancing.					
I feel pressure from others to **not** socially distance.					
I feel that social distancing is unnecessary.					
I feel judged by others when I am socially distancing.					
I feel self-conscious when I am socially distancing.					
I feel in control when I am socially distancing.					
I feel angry when I am socially distancing.					
I feel sad when I am socially distancing.					
My peers support me in practicing social distancing.					
My family members support me in practicing social distancing.					
I feel happy when I am socially distancing.					
I feel stressed when I am socially distancing.					
I feel irritable when I am socially distancing.					
I feel confused when I am socially distancing.					
I have trouble sleeping because of social distancing.					

Social distancing has left me feeling numb.					
I feel guilty when I am socially distancing.					
I feel scared when I am socially distancing.					
I have argued with other people about social distancing.					
Social distancing has made me feel closer to the people I live with.					
Social distancing has made me feel closer to the people I am <u>not</u> living with.					

4b. Please share any other comments you have about how social distancing makes you feel in the space below:

***Leave space in Qualtrics for open-ended responses.*

5. How has your use of social media (e.g., Facebook, Instagram, Twitter, Snapchat, etc.) ***changed*** during the COVID-19 pandemic?

- It has increased greatly
- It has increased somewhat
- It has not changed
- It has decreased somewhat
- It has decreased greatly
    - Please explain: **leave space for open-ended responses*

6. For what ***purpose(s)*** are you are using the following social media sites or apps during the current COVID-19 pandemic? Please select all that apply.

FACEBOOK

a. I am using **Facebook** during the COVID-19 pandemic to:

- Stay connected with friends and family
- Share and receive information, photos, and videos **<u>unrelated</u>** to COVID-19
- Share and receive news and information and **<u>related</u>** to COVID-19
- Other (please specify):_____
- I do not use Facebook

b. Please rate the extent to which you agree or disagree with the statement below using the following scale (*Strongly disagree* to *Strongly agree*).

	Strongly disagree	Somewhat disagree	Neither agree nor disagree	Somewhat agree	Strongly agree
Using **Facebook** has been helpful for me during the COVID-19 pandemic.					

Please explain: _____

INSTAGRAM

a. I am using **Instagram** during the COVID-19 pandemic to:

- Stay connected with friends and family
- Share and receive information, photos, and videos **unrelated** to COVID-19
- Share and receive news and information and **related** to COVID-19
- Other (please specify):_____
- I do not use Instagram

b. Please rate the extent to which you agree or disagree with the statement below using the following scale (*Strongly disagree* to *Strongly agree*).

	Strongly disagree	Somewhat disagree	Neither agree nor disagree	Somewhat agree	Strongly agree
Using **Instagram** has been helpful for me during the COVID-19 pandemic.					

Please explain: _____

SNAPCHAT

a. I am using **Snapchat** during the COVID-19 pandemic to:

- Stay connected with friends and family
- Share and receive information, photos, and videos **unrelated** to COVID-19
- Share and receive news and information and **related** to COVID-19
- Other (please specify):_____

- I do not use Snapchat

b. Please rate the extent to which you agree or disagree with the statement below using the following scale (*Strongly disagree* to *Strongly agree*).

	Strongly disagree	Somewhat disagree	Neither agree nor disagree	Somewhat agree	Strongly agree
Using **Snapchat** has been helpful for me during the COVID-19 pandemic.					

Please explain: _____

TWITTER

a. I am using **Twitter** during the COVID-19 pandemic to:

- Stay connected with friends and family
- Share and receive information, photos, and videos **unrelated** to COVID-19
- Share and receive news and information and **related** to COVID-19
- Other (please specify):_____
- I do not use Twitter

b. Please rate the extent to which you agree or disagree with the statement below using the following scale (*Strongly disagree* to *Strongly agree*).

	Strongly disagree	Somewhat disagree	Neither agree nor disagree	Somewhat agree	Strongly agree
Using **Twitter** has been helpful for me during the COVID-19 pandemic.					

Please explain: _____

TIK TOK

a. I am using **Tik Tok** during the COVID-19 pandemic to:

- Stay connected with friends and family
- Share and receive information, photos, and videos **unrelated** to COVID-19
- Share and receive news and information and **related** to COVID-19

- Other (please specify):_____
- I do not use TikTok

b. Please rate the extent to which you agree or disagree with the statement below using the following scale (*Strongly disagree* to *Strongly agree*).

	Strongly disagree	Somewhat disagree	Neither agree nor disagree	Somewhat agree	Strongly agree
Using **Tik Tok** has been helpful for me during the COVID-19 pandemic.					

Please explain: _____

Are there any other social media sites or apps that you are using during the <u>current COVID-19 pandemic</u>? If so, please specify: _____

a. I am using **other social media sites or apps** during the COVID-19 pandemic to:

- Stay connected with friends and family
- Share and receive information, photos, and videos **<u>unrelated</u>** to COVID-19
- Share and receive news and information and **<u>related</u>** to COVID-19
- Other (please specify):_____
- I do not use any other social media sites or apps

b. Please rate the extent to which you agree or disagree with the statement below using the following scale (*Strongly disagree* to *Strongly agree*).

	Strongly disagree	Somewhat disagree	Neither agree nor disagree	Somewhat agree	Strongly agree
Using **"Other"** (social media sites and apps) has been helpful for me during the COVID-19 pandemic.					

Please explain: _____

SECTION II: <u>Self-Reported Health and Health Behaviours</u>

<u>General Health:</u>

How would you describe your current health?

- Excellent
- Very good
- Good
- Fair
- Poor

Current Physical Activity and Screen Time:

Think about the physical activities you are currently engaging in ***during the COVID-19 pandemic****. Think about both* ***moderate-intensity physical activities*** *that will cause you to sweat a little and breather harder (e.g., brisk walking, bike riding), and* ***vigorous-intensity physical activities*** *that will cause you to sweat and make you breathe much harder than normal (e.g., jogging).*

Keeping in mind the above definitions, approximately how many minutes per day do you currently engage in moderate- to-vigorous intensity physical activity?

- Less than 15 minutes per day
- 15-30 minutes per day
- 31-45 minutes per day
- 46-60 minutes per day
- More than 60 minutes per day

During the COVID-19 pandemic, approximately how many hours of recreational screen time (e.g., time spent watching television, browsing the internet, using a cell phone, playing video games, etc.) do you currently engage in per day?

- Less than 1 hour per day
- 1-2 hours per day
- 3-4 hours per day
- 5-6 hours per day
- 7-8 hours per day
- 9-10 hours per day
- More than 10 hours per day

SECTION III: Use of the Internet

How many hours per week are you currently using the Internet (during the COVID-19 pandemic)?

- Less than 5 hours per week
- 5 to less than 10 hours per week
- 10 to less than 20 hours per week
- 20 to less than 40 hours per week
- 40 hours or more per week

Prior to the COVID-19 pandemic, how many hours did you use the Internet in a "typical" week?

- Less than 5 hours per week

- 5 to less than 10 hours per week
- 10 to less than 20 hours per week
- 20 to less than 40 hours per week
- 40 hours or more per week

Which of the following activities related to communication do you <u>currently</u> engage in using the Internet?

Do you:

- Use social networking websites or apps (e.g., Facebook, Twitter, Instagram, Snapchat)?
  - Yes
    For approximately how many hours per day?
    - Less than 1 hour per day
    - 1-2 hours per day
    - 3-4 hours per day
    - 5-6 hours per day
    - More than 6 hours per day
  - No

- Use dating websites or apps (e.g., Tinder, Plenty of Fish, Bumble, Match)?
  - Yes
    For approximately how many hours per day?
    - Less than 1 hour per day
    - 1-2 hours per day
    - 3-4 hours per day
    - 5-6 hours per day
    - More than 6 hours per day
  - No

During the past 12 months (prior to the COVID-19 pandemic), have you felt that you were a victim of any of the following incidents on the Internet?

Did you experience:

- Bullying?
  - Yes
    How many times in the past 12 months? _____
  - No

- Harassment?
  - Yes
    How many times in the past 12 months? _____
  - No

- Discrimination?
  - Yes
    How many times in the past 12 months? _____
  - No

- Stalking?
  - Yes
    How many times in the past 12 months? _____
  - No

- Misuse of personal pictures, videos or other content?
  - Yes
    How many times in the past 12 months? _____
  - No

- Fraudulent use of your identity?
  - Yes
    How many times in the past 12 months? _____
  - No

Have you been the victim of any of the following incidents on the Internet <u>during the COVID-19 pandemic</u>?

Have you experienced:

- Bullying?
  - Yes
    How many times? _____
  - No

- Harassment?
  - Yes
    How many times? _____
  - No

- Discrimination?
  - Yes
    How many times? _____
  - No

- Stalking?
  - Yes
    How many times? _____

- No

- Misuse of personal pictures, videos or other content?
  - Yes
    How many times? _____
  - No

- Fraudulent use of your identity?
  - Yes
    How many times? _____
  - No

For this question, please select the number twelve to demonstrate your attention.
- 6
- 2
- 12
- 10

SECTION IV: <u>Use of Smartphone and Social Networking Sites/Apps</u>

Do you have a smartphone that you use for personal use? (e.g., Apple iPhone, Samsung Galaxy, etc.)
- Yes
- No

IF YES:

Approximately how often do you ***currently*** check your smartphone **within a 30-minute span (during the COVID-19 pandemic)**?
- 0 – 5 times
- 6 – 10 times
- 11 – 15 times
- 16 – 20 times
- More than 20 times

In a typical day during the COVID-19 pandemic, please rate the extent to which of the following scenarios apply to you:

	Never	Rarely	Sometimes	Often	Always
I check my smartphone right before going to sleep.					
I check my smartphone as soon as I wake up.					
I use my smartphone while watching television.					

I use my smartphone while in class.					
I use my smartphone while eating.					
I use my smartphone at the dinner table.					
I use my smartphone when I am with friends.					

Use of Social Networking Websites or Apps

Do you have any social networking accounts? (e.g., Facebook, Instagram, Snapchat, Twitter, LinkedIn, etc.)

- Yes
- No

Please list which social networking sites or apps you use, and how many personal accounts you have with each.

Facebook

- Yes → # of personal accounts: _____

  If yes, what do you typically use Facebook for? (check all that apply)

  - Connect with friends and family
  - Share information, photos, and videos
  - Entertainment
  - News
  - Other (please specify):_____

- No

Instagram

- Yes → # of personal accounts: _____

  If yes, what do you typically use Instagram for? (check all that apply)

  - Connect with friends and family
  - Share information, photos, and videos
  - Entertainment
  - News
  - Other (please specify):_____

- No

Snapchat

- Yes → # of personal accounts: _____

  If yes, what do you typically use Snapchat for? (check all that apply)

  - Connect with friends and family

- Share information, photos, and videos
- Entertainment
- News
- Other (please specify):_____

- No

Twitter
- Yes → # of personal accounts: _____

  If yes, what do you typically use Twitter for? (check all that apply)
  - Connect with friends and family
  - Share information, photos, and videos
  - Entertainment
  - News
  - Other (please specify):_____
- No

Tik Tok
- Yes → # of personal accounts: _____

  If yes, what do you typically use Tik Tok for? (check all that apply)
  - Connect with friends and family
  - Share information, photos, and videos
  - Entertainment
  - News
  - Other (please specify):_____
- No

Other (please list): _____
- Yes → # of personal accounts: _____

  If yes, what do you typically use this other form of social media for? (check all that apply)
  - Connect with friends and family
  - Share information, photos, and videos
  - Entertainment
  - News
  - Other (please specify):_____
- No

Do you have social media accounts for reasons other than personal? (i.e., business pages, pet pages, photography pages, etc.)

- Yes

  If yes, how many?
  - 1
  - 2
  - 3
  - 4

- More than 4
- No

In general, why do you engage with other social media accounts? (Select all that apply)

- To share photos and videos with friends, family, and followers
- To stay connected with friends, family, and followers
- To be noticed or recognized by followers and other social media accounts
- Other (please specify):_____

IF NONE: Why do you not regularly use social networking websites or apps?

Select all that apply.

- No need, no interest or no time
- Security or privacy concerns
- Lack of confidence, knowledge, skills or training
- Restricted access to the Internet
- Been bullied or harassed
- Negative experience other than being bullied or harassed
- Other

Specify other reasons: _____

What activities do you regularly do on social networking websites or apps?

Select all that apply.

- Keep up to date with the activities of friends and family
- Communicate with friends and family
- Share or post your own thoughts, pictures or videos with friends and family
- Share or post your own thoughts, pictures or videos publicly
- Viewing public pages (i.e., celebrity or meme accounts)
- Follow current events
- Other (please list) :

_____

OR

- None

How do you <u>most often</u> use your social networking websites or apps?

- I actively engage with others via online communication, sharing photos, commenting, etc.
- I scroll passively through other peoples' posts
- Other

OR

- None

During the past 12 months, have you experienced any negative effects in your life because of <u>your use of social networking websites or apps</u>?

Specifically, how often have you:

	Never	Rarely	Sometimes	Often	Always
Stayed online for longer than you originally wanted to?					
Lost sleep?					
Had less physical activity?					
Had trouble concentrating on tasks or activities (e.g., school, work)?					
Had relationship issues with friends or family?					
Felt anxious?					
Felt depressed?					
Felt envious of the lives of others?					
Felt bullied or harassed?					
Felt frustrated or angry?					

During the past 12 months, have you ever spread a rumour or written nasty things about another individual using social networking sites or apps?

- Yes

  If yes, how many times in the past 12 months? _____
- No

During the past 12 months, have you ever posted an embarrassing photo of another individual using social networking sites or apps?

- Yes

  If yes, how many times in the past 12 months? _____
- No

For this question, please select the number two to demonstrate your attention.

- 8
- 2
- 4
- 10

SECTION V: <u>Perceptions of Belonging and 'Connectedness'</u>

The following questions relate to your thoughts about interacting with others online and in-person. Please rate the extent to which you agree or disagree with the statements using the following scale (Strongly disagree to Strongly agree).

	Strongly disagree	Somewhat disagree	Neither agree nor disagree	Somewhat agree	Strongly agree
I feel more comfortable interacting with my **friends** through social networking sites than I do in person					
I feel more comfortable interacting with my **family** through social networking sites than I do in person					
I feel more comfortable interacting with my **partner** through social networking sites than I do in person					
I feel more comfortable interacting with **strangers** through social networking sites than I do in person					
It is easier to make **friends** using social networking sites than it is in person					
I prefer to interact with people in person, rather than through social networking sites					
I would like to gain more social skills to be able to interact comfortably with people in person					
I would like to gain more social skills to be able to interact comfortably with people online					
I am more social online than I am in person					
I am more outgoing online than I am in person					
Being on my smartphone takes away or distracts me from the face-to-face social interactions I have with my **friends**					

Being on my smartphone takes away or distracts me from the face-to-face interactions I have with my **family**					
Being on my smartphone prevents me from initiating or engaging in conversation with others in person					
Being on my smartphone prevents me from engaging in friendly behaviours (including small-talk) with **strangers** when I am out in public					
Being on my smartphone helps to **distract me** when I am in stressful situations					
I feel **anxious** when I don't have my smartphone with me					
I feel **uncomfortable** when I am in a social situation and I don't have my phone					
Social networking sites and apps have helped with my **transition to college/university**					

The Facebook Social Connectedness Scale (Grieve et al., 2013) – Online Connectedness:

Following are a number of statements that reflect various ways in which we view ourselves. Rate the degree to which you agree or disagree with each statement using the following scale

(1 = Strongly Disagree and 6 = Strongly Agree).

Since each social media site has different ways to describe their users (e.g., friends, followers, subscribers) the term, "social media friends/followers", is an integrated definition which includes offline friends, online friends, followers, etc.

	1- Strongly disagree	2-Disagree	3-Slightly disagree	4-Slightly agree	5-Agree	6-Strongly agree
I feel comfortable in the presence of strangers when I'm on social media sites and apps.						
I am in tune with the social media world.						

Even among my social media friends, there is no sense of brother/sisterhood.						
I fit in well in new social media situations.						
I feel close to people on social media sites and apps.						
I feel disconnected from the social media world around me.						
Even around social media friends/followers I know, I don't feel that I really belong.						
I see social media friends/followers as friendly and approachable.						
I feel like an outsider when I'm on social media sites and apps.						
I feel understood by the people I know when I'm on social media sites and apps.						
I feel distant from social media friends/followers.						
I am able to relate to my social media friends/followers.						
I have little sense of togetherness with my social media friends/followers.						
I find myself actively involved in my social media friends/followers' lives.						
I catch myself losing a sense of connectedness with society when I am on social networking sites/apps.						

I am able to connect with other people through social media.						
I see myself as a loner when I am on social media.						
I don't feel related to most people on social media.						
My social media friends/followers feel like family.						
I don't feel I participate with anyone or any group on social media sites or apps.						

Social Connectedness Scale – Revised (Lee et al., 2001) – In-Person Connectedness:

	1-Strongly disagree	2-Disagree	3-Slightly disagree	4-Slightly agree	5-Agree	6-Strongly agree
I feel distant from people.						
I don't feel that I can relate to most people.						
I feel like an outsider.						
I see myself as a loner.						
I feel disconnected from the world around me.						
I don't feel I participate with anyone or any group.						
I feel close to people.						
Even around people I know, I don't feel that I really belong.						
I am able to relate to my peers.						

I catch myself losing a sense of connectedness with society.						
I am able to connect with other people.						
I feel understood by the people I know.						
I see people as friendly and approachable.						
I fit in well in new situations.						
I have little sense of togetherness with my peers.						
My friends feel like family.						
I find myself actively involved in people's lives.						
Even among my friends, there is no sense of brother/sisterhood.						
I am in tune with the world.						
I feel comfortable in the presence of strangers						

SECTION VI: Psychological WellBeing

Brief Symptom Inventory - 18 (Derogatis, 2001)

Following are a number of statements that reflect various ways in which we may be distressed. Rate the degree to which you relate to each statement using the following scale

(0 = Not at all; 1 = A little bit; 2 = Moderately; 3 = Quite a bit; 4 = Extremely; R = Refused).

During the past 7 days, how much were you distressed by:

	0-Not at all	1-A little bit	2-Moderately	3-Quite a bit	4-Extremely	R-Refused
Faintness or dizziness						
Feeling no interest in things						
Nervousness or shakiness inside						
Pains in heart or chest						
Feeling lonely						
Feeling tense or keyed up						
Nausea or upset stomach						
Feeling blue						
Suddenly scared for no reason						
Trouble getting your breath						
Feeling of worthlessness						
Spells of terror or panic						
Numbness or tingling in parts of your body						
Feeling of hopeless of the future						
Feeling so restless you couldn’t sit still						
Feeling weak in parts of your body						

Thoughts of ending your life						
Feeling fearful						

Satisfaction with Life Scale (Diener et al., 1985)

Following are a number of statements that reflect various ways in which we my view our life. Rate the degree to which you agree or disagree with each statement using the following scale

(1 = Strongly Disagree and 7 = Strongly Agree).

	1-Strongly disagree	2-Disagree	3-Slightly disagree	4-Neither agree nor disagree	5-Slightly agree	6-Agree	7-Strongly agree
In most ways my life is close to my ideal							
The conditions of my life are excellent							
I am satisfied with my life							
So far I have gotten the important things I want in life							
If I could live my life over, I would change almost nothing							

*LAST PAGE (after student submits survey they will be redirected to one additional **optional** survey about the incentive):

Congratulations! You have successfully submitted the online survey.

Would you like to be entered into a draw to win Apple Airpods for completion of this survey?

- Yes

If you would like to be entered in the draw for AirPods, please provide your email address. *Please note that the e-mail address you provide here will not be connected in any way with the responses you provided in the online survey.*

E-mail address: _____

- No, I am not interested

Appendix F: Principal Components Analysis

Rotated Component Matrix of Physical Distancing Variables

Item	Component 1: Adjustment	Component 2: Support	Component 3: Attitude
It has been difficult to change my behaviours to be more socially distant. (R)	**.821**	.001	.074
I feel isolated when I am socially distancing. (R)	**.808**	.021	.015
I feel comfortable with social distancing.	**-.640**	.000	.468
My peers support me in practicing social distancing.	-.023	**.839**	.064
My family members support me in practicing social distancing.	.052	**.798**	.173
I feel that social distancing is effective.	.034	.027	**.876**
I feel that social distancing is unnecessary. (R)	.051	-.306	**-.615**

Note. The extraction was based on a principal component analysis (PCA) using a Varimax rotation with Kaiser normalization. The data were suitable for PCA with an overall Kaiser-Meyer-Olkin Measure of Sampling Adequacy of 0.63. Bartlett's test of sphericity was statistically significant: χ^2 (21) = 1423.47, p = < .001. Reverse-scored items are denoted with (R).

Appendix G: Statistics for Non-Significant Findings

Table G1

Independent Samples T-Test Statistics for Type of Social Media and University Students' Perceived Support from Others to Practice Physical Distancing

	Users		Non-Users				
Social Media Platform	*M*	*SD*	*M*	*SD*	*t*	*df*	*p*
Facebook	4.6	0.6	4.7	0.6	.628	1305	.530
Instagram	4.6	0.6	4.6	0.5	-0.05	1302	.960
Snapchat	4.6	0.6	4.7	0.5	2.20	1296	.028
Twitter	4.7	0.6	4.6	0.6	-1.24	1286	.215
TikTok	4.7	0.5	4.6	0.6	-0.99	1281	.322
Other	4.6	0.6	4.6	0.5	0.14	1267	.889

Note. Total $N = 1588$; however, the number of users and non-users varied for each social media platform.

*$p < .01$.

Table G2

Independent Samples T-Test Statistics for Type of Social Media and University Students' Attitudes Towards Physical Distancing

	Users		Non-Users				
Social Media Platform	*M*	*SD*	*M*	*SD*	*t*	*df*	*p*
Facebook	4.5	0.6	4.5	0.7	-0.64	1303	.520
Instagram	4.5	0.6	4.6	0.6	0.87	1301	.385
Snapchat	4.5	0.6	4.6	0.6	1.12	1295	.263
Twitter	4.5	0.6	4.6	0.6	.073	1285	.942
TikTok	4.5	0.7	4.6	0.6	-0.99	1280	.318
Other	4.5	0.6	4.5	0.6	-0.58	1266	.564

Note. Total $N = 1588$; however, the number of users and non-users varied for each social media platform.

*$p < .01$.

Table G3

Means, Standard Deviations, and One-Way MANOVA Statistics for University Students' Total Number of Social Media Accounts and Feelings About Physical Distancing

Physical Distancing	1 Account (n = 63)		2-3 Accounts (n = 439)		4-5Accounts (n = 546)		6+ Accounts (n = 234)			
Variable	*M*	*SD*	*M*	*SD*	*M*	*SD*	*M*	*SD*	*F*	*p*
Adjustment	3.1	1.0	3.0	0.9	2.9	0.9	2.8	0.9	3.73	.011*
Support	4.7	0.5	4.6	0.6	4.6	0.6	4.6	0.6	0.19	.901
Attitudes	4.7	0.5	4.5	0.7	4.5	0.6	4.6	0.6	1.39	.245

Note. MANOVA = multivariate analysis of variance.

*$p < .01$.

Curriculum Vitae

Name: Olivia Holmes

Post-Secondary Education and Degrees

2019 – Present Masters of Science in Health and Rehabilitation Sciences
Western University, London, Ontario

2015 – 2019 Honours Bachelor of Arts in Child Health
Brock University, St. Catharines, Ontario

Honours and Awards

2020 – 2021 Canada Graduate Scholarship – Masters: SSHRC
Total Award: $17,500

2020 – 2021 Western Graduate Research Scholarship
Total Award: $1,666.66

2017 – 2019 Dean's Honour List
Distinction awarded to students who achieved over an 80% average
Brock University, St. Catharines, Ontario

2015 Brock Entrance Scholar's Award
Total Award: $1,000

Related Work Experience

2021 Judge of Undergraduate Research Showcase
Western University, London, Ontario

2021 Guest Lecture
HS 3910G: Fundamentals of Academic Communication in Health Science

2020 – 2021 Teaching Assistant
HS 1001a: Personal Determinants of Health
Western University, London, Ontario

2020 Guest Lecture
HS 3910G: Fundamentals of Academic Communication in Health Science

2019 – 2020 Teaching Assistant
HS 1001a: Personal Determinants of Health
Western University, London, Ontario

Conference Presentations

Holmes, O.K., Koert van der Linden, N., Omar, M., Dumas, T., Zarbatany, L., Ellis, W., Donelle, L., Irwin, J. , Tucker, T., Pearson, E. S., Gilliland, J., & Burke, S.M. (2021, June 8-10). University students' social media use and social connectedness during the COVID-19 pandemic [Online verbal presentation]. International Society of Behavioral Nutrition and Physical Activity (ISBNPA) Xchange Initiative 2021 Virtual Conference.

Koert van der Linden, N., **Holmes, O.K.,** Omar, M., Dumas, T., Zarbatany, L., Ellis, W., Donelle, L., Irwin, J. D., Tucker, T., Pearson, E. S, Gilliland, J., & Burke, S.M. (2021, June 8-10). Self-reported health, health behaviours, and psychological wellbeing among university students during the COVID-19 pandemic [Online verbal presentation]. International Society of Behavioral Nutrition and Physical Activity (ISBNPA) Xchange Initiative 2021 Virtual Conference.

Omar, M., Koert van der Linden, N., **Holmes, O. K.,** Dumas, T., Zarbatany, L., Ellis, W., Donelle, L., Irwin, J. D., Tucker, T., Pearson, E. S, Gilliland, J., & Burke, S.M. (2021, June 8-10). Internet use and risks reported by university students during the COVID-19 pandemic [Online verbal presentation]. International Society of Behavioral Nutrition and Physical Activity (ISBNPA) Xchange Initiative 2021 Virtual Conference.

Holmes, O.K., Koert van der Linden, N., Omar, M., Dumas., T., Zarbatany, L., Ellis, W., Donelle, L., Irwin, J., Tucker, T., Pearson, E. S., Gilliland, J., & Burke, S.M. (2021, March 25-26). A cross-sectional investigation of Ontario university students' social media use and social connectedness during the COVID-19 pandemic [Online verbal presentation]. Eastern Canada Sport and Exercise Psychology Symposium. Virtual conference hosted by the University of Windsor, Ontario, Canada.

Koert van der Linden, N., **Holmes, O. K.,** Omar, M., Dumas., T., Zarbatany, L., Ellis, W., Donelle, L., Irwin, J., Tucker, T., Pearson, E. S., Gilliland, J., & Burke, S.M. (2021, March 25-26). A cross-sectional examination of self-reported health, health behaviours, and psychological wellbeing among Ontario university students during COVID-19 [Online verbal presentation]. Eastern Canada Sport and Exercise Psychology Symposium. Virtual conference hosted by the University of Windsor, Ontario, Canada.

Omar, M., Koert van der Linden, N., **Holmes, O.K.,** Dumas, T., Zarbatany, L., Ellis, W., Donelle, L., Irwin, J., Tucker, T., Pearson, E. S., Gilliland, J., & Burke, S.M. (2021, March 25-26). A cross-sectional examination of internet use and risks among university students during the COVID-19 pandemic [Online verbal presentation]. Eastern Canada Sport and Exercise Psychology Symposium. Virtual conference hosted by the University of Windsor, Ontario, Canada.

Holmes, O., Koert van der Linden, N., Donelle, L., Zarbatany, L., Ellis, W., Dumas, T., & Burke, S. M. (2020, May). iBelong: A qualitative exploration of first-year university students' social media use, perceptions of connectedness and transition to university [Conference presentation abstract]. Child Health Symposium, London, Ontario, Canada. (*Conference cancelled due to COVID-19)

Holmes, O., Koert van der Linden, N., Donelle, L., Zarbatany, L., Ellis, W., Dumas, T., & Burke, S. M. (2020, March 27-28). A qualitative exploration of social media use, connectedness, and the transition to university among first-year university students: A proposed study [Conference presentation abstract]. Eastern Canada Sport and Exercise Psychology Symposium, St. Catharines, Ontario, Canada. (*Conference cancelled due to COVID-19)