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Coping During COVID: Child Technology Use and Coping During the COVID-19 Pandemic

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By

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ABSTRACT

Many children spend a significant amount of time using technology throughout the day. This was particularly true during the COVID-19 pandemic, as many activities that had initially been conducted in-person had to transition to an online modality. Some technology use could be seen as beneficial, whereas others could be seen as harmful. The present study used baseline data from a longitudinal study examining the effects of COVID-19 on child mental health to explore how technology had been used during the pandemic, as well as the perceived benefits and problems associated with its use. In total, 190 families (190 caregivers and 158 children) completed an online questionnaire in June/July of 2020; questions related to child technology use, psychopathology symptoms, demographics, and other contextual variables. Caregivers and children reported changes in the frequency of child technology use; patterns generally showed higher percentages of participants reporting higher frequencies of use, with the exception of computer use. Discrepancies were found between caregiver and child reports of child texting, social media, internet, and video game use. There was evidence to suggest that problem-focused technology-based coping strategies and social-focused technology-based coping strategies were associated with reports of higher levels of child well-being compared to emotion-focused technology-based coping strategies. Higher child internalizing symptoms were generally found to be associated with using higher proportions of emotion-focused technology-based coping strategies. No significant associations were found between COVID-19 saliency in children's lives and the types of technology-based coping strategies used by children. Few caregivers and children reported that technology use had a negative impact on children's well-being, suggesting that overall, technology appeared to be a helpful coping strategy during the pandemic.

Keywords: COVID-19, technology use, well-being, depression, anxiety, social support.

DEDICATION

I would like to dedicate this thesis to my grandfather, Dr. Peter Connelly. Your love of learning and lifelong quest for knowledge is a constant inspiration.

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CHAPTER 1

Introduction

While technology already plays a substantial role in many Canadian children's lives, the COVID-19 pandemic has made it increasingly important, as more aspects of a child's offline world have moved online. Many parents have reported that children have increased their screen time since the pandemic has started (Ozturk Eyimaya & Yalçin Irmak, 2021). The physical distancing restrictions, quarantines, school and business closures, and lockdowns that have been implemented in many countries around the world have resulted in children being away from school, recreational activities, friends, and family for extended periods of time (Ozturk Eyimaya & Yalçin Irmak, 2021). Technology has become the primary tool for socialization, education, and entertainment.

During times of stress, technology can be used as a coping strategy (Nabi et al., 2017). Coping can be seen as having two functions: *problem-focused coping* relates to changing factors that are sources of stress, and *emotion-focused coping* involves modifying stressful feelings (Folkman & Lazarus, 1980). Some strategies of emotion-focused coping, such as avoidance, can be seen as more maladaptive, whereas aspects of problem-focused coping, such as direct action, can be seen as more adaptive (Folkman & Lazarus, 1980). However, context can play a significant role in determining whether a coping strategy is adaptive or not. Technology use could be characterized as a maladaptive strategy when used as a distractor, such as by avoiding engagement with the true source of one's stress, or it can be considered an adaptive strategy when used for social support that acts as a buffer against stressful situations (Cohen & Wills, 1985).

The pandemic has been extremely stressful for many children and, as a result, has had negative impacts on youth mental health (Hawke et al., 2020; Xie et al., 2020). Technology has been found to be useful in helping individuals cope with the stress of COVID-19 (Pahayahay & Khalili-Mahani, 2020). The purpose of this study was to explore how the pandemic has affected children's use of technology and the perceived benefits and problems of increased technology use. In particular, it examined the types of technology that children used, the purpose behind their use, and whether child technology use was associated with higher reports of well-being. As there has not been a worldwide crisis to this scale during which children have had access to such sophisticated technology, this study helped to further the understanding of technology use as a coping mechanism, particularly during unique, highly stressful times, such as the COVID-19 global pandemic.

CHAPTER 2

Review of the Literature

Context of the COVID-19 Pandemic

The Coronavirus Disease 2019 (COVID-19) was first reported in Wuhan, Hubei Province, China in December 2019 (Zheng et al., 2020). Due to its highly contagious nature, COVID-19 spread across the world, quickly leading to a global pandemic. The first case in Canada was reported in Toronto, Ontario in late January, 2020 (Silverstein et al., 2020). By June 1, 2020 (the time at which data for the current study was being collected), in Canada, over 8,300 people had died from the virus and there had been over 92,800 confirmed cases (Global Change Data Lab, 2022). As of August 27, 2022, in Canada, over 43,500 people have died from the virus and there have been over 4,100,000 confirmed cases (World Health Organization, 2022). Additionally, as of August 19, 2022, over 86,700,000 doses of COVID-19 vaccines have been administered (World Health Organization, 2022). The Ontario government currently has vaccines widely available for all who wish to be immunized (Government of Ontario, 2021); however, during the time period of the current study (June to July 2020), the COVID-19 vaccines had not yet become available.

Throughout the pandemic, Canada has implemented public health orders in an effort to reduce the spread of the virus. Mandatory isolation and quarantine measures have been used to separate out and restrict the movement of those infected with the virus to prevent spread to healthy individuals (Wilder-Smith & Freedman, 2020). Measures such as social distancing, and the closures of schools, workplaces, and non-essential businesses have limited contact among community members and helped prevent the spread from asymptomatic or non-diagnosed individuals (Wilder-Smith & Freedman, 2020). Additionally, when infection and death rates

became high, extreme measures such as city- or province-wide lockdowns permitted only essential movement outside of the home (Wilder-Smith & Freedman, 2020).

COVID-19 in Ontario

In Ontario, various measures and orders have been put in place throughout the course of the pandemic to protect the public and reduce the spread of COVID-19. On March 17, 2020, Ontario Premier Doug Ford declared a state of emergency during which indoor recreational facilities, libraries, daycares, bars, restaurants, theatres, and concert venues were ordered to close, and gatherings of more than 50 people were banned (Government of Ontario, 2020). A day later, travel across the Canada-U.S. border was restricted (Nielsen, 2020). On March 23, 2020, non-essential businesses in Ontario were ordered to close (Nielsen, 2020). After the 2020 school spring break, it was announced that schools in Ontario would not re-open for in-person learning until May, however, classes did not return to in-person learning for the remainder of the school year (Nielsen, 2020).

Social Isolation as a Result of COVID-19

During the pandemic, many people have experienced considerable disruption to their daily lives. They have periodically been required to stay home from work, school, and other social gatherings, and to distance themselves from family, friends, and loved ones, resulting in increased loneliness and social isolation (Anastasiou & Duquenne, 2021; Dib et al., 2020; Labrague et al., 2020; Tull et al., 2020) As a result, many have experienced increased symptoms of anxiety, depression, stress, and other psychological concerns (Anastasiou & Duquenne, 2021; Dib et al., 2020; Labrague et al., 2020; Tull et al., 2020). People have had to find alternative ways to socialize with others, often by using forms of technology and the internet (Anastasiou &

Duquenne, 2021). For example, online learning, video call applications (apps), streaming, and social media use have been used to seek social support (Garfin, 2020).

This reliance on technology for socializing has become particularly important during the COVID-19 pandemic; there has been some indication that individuals who have higher levels of social support have experienced better psychological well-being during the pandemic (Garfin, 2020; Labrague et al., 2020; Skody et al., 2020). For example, Szkody et al. (2020) found that greater perceived social support in American college students was associated with better psychological health during the pandemic, as measured by the psychological health scale on the WHO Quality of Life Instrument (which examined factors such as enjoyment of life, ability to concentrate, and feelings of depression and anxiety). Additionally, Labrague et al. (2020) found that reports of greater social support during the pandemic were associated with reports of lower levels of loneliness among college students in the Philippines. More research in this area is needed, particularly with younger populations.

Child Mental Health

Child Stress and Mental Health

Experiencing significantly stressful events, such as disasters, has been found to have negative impacts on mental health. Disasters can be defined as large-scale, unexpected events that result in death, trauma and destruction; they affect social processes and services, and frequently result in negative mental and physical health outcomes (Goldman & Galea, 2014). There are several different types of disasters, including natural disasters, biological disasters, and human-made disasters (which can be intentional or non-intentional; Goldman & Galea, 2014).

Natural disasters frequently lead to negative mental health outcomes. For example, Evans & Oehler-Stinnett (2006) conducted a study with 152 children from Oklahoma who experienced

a severe tornado and its aftermath in May 1999 that killed 45 individuals and injured 597. Researchers found that 41% of children met criteria for posttraumatic stress disorder (PTSD) symptoms one year after the event. Similarly, van Griensven et al. (2006) conducted a study with 371 displaced and 322 non-displaced individuals (aged 15 and older) from Phang Nga and 368 nondisplaced people (aged 15 and older) from Krabi and Phuket in Thailand to examine the mental health outcomes following the 2004 Indian Ocean earthquake and tsunami. Participants reported elevated rates of PTSD, anxiety (37% of displaced and 30% of nondisplaced participants in Phang Nga, and 22% of nondisplaced participants in Krabi and Phuket), and depression (30% of displaced and 31% of nondisplaced participants in Phang Nga, and 10% of nondisplaced participants in Krabi and Phuket) 8 weeks after the tsunami.

Wars are another example of disasters that frequently lead to significant mental health concerns. Traumatic war experiences involve exposure to death, injury, starvation, illness, loss of homes, and loss of loved ones. Children who are exposed to war often have higher reports of PTSD, depression, and anxiety symptoms (Diab et al., 2018; Yayan et al., 2020). For example, Diab et al. (2018) conducted a study with 303 Palestinian children (aged 10 to 13) years old to examine the effects of war on mental health. Researchers found that traumatic stress predicted child mental health concerns; this effect was mediated by parental depression, poor parenting, and low-quality peer relations. Diab et al. (2018) also found that school and family relationships acted as protective factors for children in war conditions. Related to this, Yayan et al. (2020) conducted a study with 1,115 Syrian refugee children (aged 9 to 15) in Turkey to examine levels of PTSD, depression, and anxiety. They found high levels of all three disorders, particularly in children who had lost a parent or were separated from their family during the war.

Terrorist attacks are also highly distressing disasters that frequently result in high reports of negative mental health symptoms. For example, Galea et al. (2002) conducted a study with 1,008 adults in Manhattan 5 to 8 weeks after the September 11, 2001, terrorist attacks in New York City and found that 7.5% of participants reported symptoms of PTSD and 9.87% of participants reported symptoms of a current episode of depression. Those who lived closer to the World Trade Center were found to have higher rates of PTSD.

Additionally, more long-term biological disasters such as epidemics and pandemics have been found to lead to an increase in negative mental health symptoms. The severe acute respiratory syndrome (SARS) epidemic of 2003 was a result of a highly contagious respiratory illness spreading worldwide; the epidemic was eventually contained after strict hygiene precautions and quarantine measures were put in place (Bonanno et al., 2008). During and after the SARS epidemic, people experienced high levels of fear, distress, and psychological effects, such as depression (Bonanno et al., 2008). Mak et al. (2009) conducted a study of the impact of SARS on adult participants ($N = 90$) in Hong Kong. They found the incidence rate of diagnosable psychiatric disorders was 58% and that 15.6% of participants had depressive disorders, whereas one-quarter of them had symptoms of PTSD. Similarly, Hawryluck et al. (2004) conducted a study with 129 quarantined adults in Toronto during the SARS epidemic to examine mental health outcomes. They found that there were high reports of psychological distress: 28.9% of participants reported symptoms of PTSD and 31.2% reported symptoms of depression. Findings also suggested that factors such as longer quarantine times and knowing someone directly exposed to SARS were related to increased reports of mental health symptoms.

COVID-19 and Child Mental Health

The COVID-19 pandemic has resulted in significant suffering, loss, and disruptions to children's daily routines, which has led to reports of increased negative mental health symptoms worldwide. Community-related risks to child mental health that have resulted from the pandemic include interruptions to basic services (e.g., childcare and school), lack of resources for mental health care, limited leisure time activities (e.g., playground closures and postponed extracurricular activities), and limited peer contact (Fegert et al., 2020). The COVID-19 pandemic has also resulted in family challenges, such as the inability to see extended family, the fear of losing family members, and economic difficulties due to job loss (Fegert et al., 2020).

Cao et al. (2020) led a study with 7,143 Chinese undergraduate students to examine the psychological impact of the COVID-19 pandemic and found that 24.9% of participants were experiencing symptoms of anxiety as a result of COVID-19. Researchers found that protective factors against symptoms included living in urban areas, family stability, and social support, whereas risk factors included having relatives or acquaintances infected with COVID-19. Likewise, Wang et al. (2020) conducted an online survey study with 1,210 participants from China (aged 12 to 59) to examine the psychological response to COVID-19. They found that 53.8% of participants reported moderate to severe psychological impact (i.e., higher scores on measures of avoidance, intrusive thoughts, and hyperarousal) of COVID-19, 16.5% reported moderate to severe depressive symptoms, 28.8% reported moderate to severe anxiety symptoms, and 8.1% reported moderate to severe levels of stress.

Children and adolescents have also been found to have experienced significant negative mental health outcomes as a result of the pandemic. Mohler-Kuo et al. (2021) led a study with 1,627 young adults (aged 19 to 24) and 1,146 children (aged 12 to 17) in Switzerland to examine

the impact that COVID-19 has had on youth stress and mental health. Participants reported that disruption to their social life and activities and uncertainty surrounding how long the pandemic would last were their greatest causes of stress. Researchers found that one-fifth of the young adult participants and one-third of the child participants reported having at least one mental health problem (depression, anxiety, attention-deficit/hyperactivity disorder or oppositional defiant disorder-related symptoms) during the pandemic. In young adults, the most common mental health problems reported were depression, anxiety, and attention-deficit/hyperactivity disorder (ADHD) symptoms. In children, ADHD and oppositional defiant disorder (ODD) symptoms were most frequently reported, followed by anxiety and depression symptoms.

Additionally, Bignardi et al. (2021) conducted a longitudinal study with 168 children (aged 7 to 11) from the United Kingdom to examine child mental health symptoms before (baseline timepoint was 18 months prior to the United Kingdom lockdown) and during the United Kingdom lockdowns (from April to June of 2020). The researchers examined caregiver, teacher, and child self-reports on measures of mental health symptoms (including depression and anxiety symptoms) and emotional difficulties. The researchers found that reports of child depression symptoms increased from before to during the United Kingdom lockdown.

Families with essential workers have been particularly affected by the pandemic; frontline workers have frequently been put in high exposure risk situations, resulting in more direct threats to their own safety and the safety of their family members. This has resulted in increased reports of stress, anxiety, and depression amongst frontline workers (Antonijevic et al., 2020), as well as increased reports of psychological stress among children of frontline workers (Sugg et al., 2021). For example, Sugg et al. (2020) analyzed 4,835 frontline worker and 7,749 children of frontline workers' text conversations from an American crisis text line to examine the

association between being a frontline essential worker during the pandemic and reports of psychological stress. They found that children of frontline workers were at greater risk of experiencing a psychological crisis event such as depression, stress, anxiety, self-harm, or abuse (Sugg et al., 2020) than children whose parents were not frontline workers.

In summary, the COVID-19 pandemic has resulted in increased stress and negative mental health symptoms, particularly symptoms of anxiety and depression, among the general population, for both children and adults. More research is needed to examine the effects that different forms of coping may have on children's ability to deal with the stress of the pandemic, as well as on other factors that may help children avoid experiencing negative mental health outcomes during the pandemic.

Vulnerability and Resilience in the Face of Stress

Researchers have examined long-term patterns of functioning in individuals who are recovering from trauma. It has been suggested that after being exposed to a disaster, individuals often follow one of four symptom trajectories: *resistance*, in which no mental health symptoms are experienced; *resilience*, in which mental health symptoms are experienced immediately following the disaster but rapidly decline; *recovery*, in which symptoms occur following the disaster and decline after a longer period of time; and *chronic dysfunction*, in which moderate or severe mental health symptoms are present and stable for a long period of time (Goldman & Galea, 2014; Norris et al., 2009). For example, Bonanno et al. (2008) conducted a longitudinal study with 997 adult survivors of the 2003 SARS epidemic in Hong Kong. Participants were interviewed at 6, 12, and 18 months after hospitalization in order to obtain information on their psychological and physical functioning. The researchers identified four latent classes of psychological functioning that would later inform the identification of the four symptom

trajectories discussed above. Bonanno et al.'s (2008) chronic dysfunction group experienced the worst outcomes, with the greatest number of health concerns. Their resilient and recovered groups had significantly less SARS-related worry than the chronic group. The researchers concluded that the lower levels of worry helped with these participants' resilience and helped them return to baseline functioning.

Resilience involves two components: being exposed to risk or adversity and being able to positively adapt despite this adversity (Luthar, 2003, Luthar et al., 2000). Specific attributes and contextual elements known as protective factors are often associated with higher levels of resilience (Luthar, 2003). Three types of protective factors greatly contribute to the development of resilience in children; characteristics of the child themselves (e.g., cognitive abilities, self-esteem, temperament, and self-regulation skills), characteristics of the child's relationships (e.g., relationship with parents, relationship with mentors, and relationships with prosocial peers), and the child's community resources and opportunities (e.g., neighbourhood safety, school opportunities, social services, and healthcare opportunities; Luthar, 2000). A child may not possess all of these protective factors, yet still demonstrate resilience; it is possible for children to exhibit resilience in some domains of their life, but not in others (Luthar, 2000). A child's developmental history can have an impact on their ability to experience resilience, as it influences their ability to develop coping strategies and successfully use resources from their environment (Luthar, 2003).

Resilience and resistance are more adaptive symptom trajectories that both involve being able to continue functioning after experiencing trauma (Goldman & Galea, 2014); they require adequate coping strategies that are effective enough to block or combat the stressor related to the trauma (Norris et al., 2009). As children do not typically have advanced coping strategies

(Goldman & Galea, 2014), it is possible that they may be less likely to follow the resilience or resistance trajectory after experiencing a traumatic event. Additionally, usually only a small number of individuals experience the chronic dysfunction trajectory after a trauma (Bonanno, 2008). Therefore, a reasonable prediction might be that children may be more likely to follow the slightly more maladaptive recovery trajectory after experiencing trauma. This trajectory involves a more extended period (several months or more) of psychological dysfunction before a return to baseline functioning (Norris et al., 2009).

Social Support

Social support is defined as comfort, assistance, or information provided by an individual or group that is perceived as helpful (Flannery, 1990). Seeking social support has been shown to be an effective coping strategy that acts as a buffer against stressful situations (Cohen & Wills, 1985). The buffering hypothesis postulates that social support "buffers", or protects, against the harmful effects of stressful events through two main paths. First, social support can prevent a stress appraisal response when an individual is in a stressful situation. An individual with higher levels of perceived social support may feel as if people in their life can provide relevant coping resources, thereby lessening the appraisal of harm in the stressful situation and increasing their perceived ability to cope. Additionally, social support may act as a buffering mechanism in between the time where an individual experiences stress and before they experience negative psychological outcomes. Social support can decrease the impact of the stress appraisal, reduce the perceived impact of the problem, and lead to a decreased physiological reaction to the stressor. Overall, perceived social support can decrease the stress reaction by helping to increase an individual's confidence in their ability to cope with the situation, thereby preventing it from being seen as extremely stressful (Cohen & Wills, 1985).

There are several types of social resources that can act as buffers to stressful situations (Cohen & Wills, 1985). *Esteem support* involves having emotional support and feeling accepted. Esteem support may help decrease feelings of helplessness and threats to self-esteem in stressful situations by allowing an individual to perceive that they are valued and accepted. *Informational support* involves assisting in defining, understanding, and coping with stressful situations. Informational support can act as a stress buffer by allowing an individual to view a stressor as less harmful and assist them in planning coping responses through the provision of advice, support, and cognitive guidance. *Social companionship* involves spending time with others and participating in shared activities. Social companionship can reduce stress by fulfilling an individual's need for social contact with others, helping to distract them from the stress, and increasing their sense of belongingness. *Instrumental support* involves providing material resources or services. It can act as a stress buffer by giving an individual a direct solution to financial or material problems or providing them with more time for self-care activities or recreation (Cohen & Wills, 1985).

Social support has been found to be able to buffer the association between victimization and symptoms of depression. For example, Spiekerman et al. (2021) conducted a study with American adolescents (N = 1,058) who completed self-report measures relating to peer victimization, depressive symptoms, social support, and coping strategies. Researchers found that peer victimization was related to increased depressive symptoms, and that internalizing coping (an avoidance coping strategy that includes rumination, worry, and self-blame) interacted with victimization to worsen depressive symptoms (Spiekerman et al., 2021). However, victimized students who reported higher levels of internalizing coping did not experience as

many depressive symptoms if they also had higher levels of social support (Spiekerman et al., 2021).

Social support has also been found to be associated with greater well-being (Chu et al., 2010). For example, in their meta-analysis of 246 studies of individuals (aged 3 to 20), Chu et al. (2010) found that social support (particularly perceived social support) was associated with greater well-being. The researchers found that support from a teacher or school staff had a particularly strong association with child well-being, as compared to support from family or peers (with peer support having the weakest relationship with child well-being; Chu et al., 2010). Chu et al. (2010) suggested that this could be due to the fact that family and friend relationships may be more likely to also be sources of conflict. Chu et al. (2020) also found that the relationship between social support and well-being was stronger for female participants than for male participants, suggesting that relationships may have a greater impact on well-being for females.

Social support has also been found to be a buffer against mental health symptoms. For example, Mactavish et al.'s (2021) study, which the present study will be using baseline data from, examined questionnaire responses from 190 families with children (aged 8 to 13) from Southwestern Ontario. Participants reported on children's well-being, irritability, social support, anxiety, and PTSD symptoms prior to and during the pandemic. It was found that children and parents reported worse overall child well-being (higher irritability, anxiety, and depressive symptoms) and higher levels of distress during the pandemic than prior to the pandemic. However, social support was found to be associated with less distress and reduced symptom severity; in other words, it acted as a buffer against higher levels of distress and symptom severity.

In summary, when exposed to risk, some children demonstrate resilience and are able to positively adapt (Luthar, 2003, Luthar et al., 2000). Protective factors, including characteristics of the child, their relationships, or their community resources greatly contribute to their development of resilience (Luthar, 2003). Social support could be considered as a protective factor; it has been found to "buffer" against the harmful effects of stress (Cohen & Wills, 1985). Research has found that higher levels of social support have buffered against distress and negative mental health symptoms during the COVID-19 pandemic (Mactavish et al., 2021). As social interactions had to occur primarily online during much of the early COVID-19 pandemic, additional research is required to further explore the effectiveness of technology-based forms of social support during this time.

Coping

Coping, as defined by Folkman & Lazarus (1980), involves cognitions and behaviours used to master, tolerate, or lessen external and internal demands in stressful situations, as well as the conflicts between them. Coping strategies can assist with survival during threatening situations and can be triggered as a result of both fear (which can help prompt avoidance or escape behaviours) or anger (which can result in confrontation or attack behaviours; Folkman & Lazarus, 1988).

An important concept related to coping is appraisal; this is the cognitive process during which a situation is assessed in regard to what is at stake (primary appraisal), as well as the coping choices that are accessible (secondary appraisal; Folkman & Lazarus, 1980; Lazarus & Folkman, 1987). There are three main types of appraisals that can occur in stressful situations: (1) harm or loss, (2) threat, and (3) challenge (Folkman & Lazarus, 1980). Harm or loss involves situations in which negative consequences have already occurred, threat is when harm or loss has

not occurred but is expected, and challenge is when there is a chance for an individual to experience gains in the situation (Carver & Connor-Smith, 2010; Folkman & Lazarus, 1980).

Another critical concept related to coping is stress, which is the impetus for coping and occurs as a result of negative person-environment relationships, cognitive appraisals, and emotional responses (Lazarus & Folkman, 1987). A person may experience stress when faced with adversity while trying to achieve goals or when personal resources are either threatened or lost (Carver & Connor-Smith, 2010). An individual's experience of psychological stress is determined by how much harm, threat, or challenge they experience; this is influenced by the person-environment relationship during the event, what the person perceives is at stake, and the perceived effectiveness of their coping resources (Folkman & Lazarus, 1980). For example, an individual may experience significant psychological distress if they are in an unknown and uncomfortable environment, perceive the situation as extremely high stakes, and do not feel as if they are capable of coping in the particular situation.

Problem-Focused and Emotion-Focused Coping

Coping behaviours can be grouped into two categories based on their function (Lazarus & Folkman, 1987): *problem-focused* or *emotion-focused*. *Problem-focused coping* involves managing or changing a person-environment relationship that is causing stress. Problem-focused coping strategies include attempts to remove or lessen the effects of a stressor, such as by developing a plan of action (Carver & Connor-Smith, 2010; Folkman & Moskowitz, 2004); for example, an individual could lessen the stress surrounding an upcoming exam by developing a study plan. In contrast, *emotion-focused coping* involves regulating stressful emotions (Folkman & Lazarus, 1980; Lazarus & Folkman, 1987). Examples of emotion-focused coping strategies centre around targeting and reducing the distress that is caused by the stressor and include

aspects such as seeking emotional support, expressing negative emotions through yelling or crying, or escaping stressful situations using avoidance or denial (Carver & Connor-Smith, 2010). Both problem-focused and emotion-focused strategies are often used in combination to cope with a single stressful event (Lazarus & Folkman, 1987).

Adaptive vs. Maladaptive. Problem-focused coping has often been considered the more adaptive strategy compared to emotion-focused coping. This is because problem-focused coping seeks to eliminate the source of the stress and is regularly associated with higher reports of subjective well-being (Ben-Zur, 2009). Emotion-focused coping is often viewed as maladaptive or relatively less adaptive than problem-focused coping. Emotion-focused coping lessens the negative emotions involved in stressful situations, but this is often temporary, and it does not address the source of the stressor. As a result, it is frequently accompanied with lower reports of subjective well-being (Ben-Zur, 2009). For example, Ben-Zur (2009) examined responses to questionnaires assessing coping (COPE Scale) and affect (Positive Affect Negative Affect Schedule) from 480 adolescents, university students, and adults from Israel pooled from three studies. Researchers found that participants who used problem-focused coping strategies had higher reports of positive affect and lower negative affect, whereas those who used more emotion-focused strategies had higher reports of negative affect (Ben-Zur, 2009).

Use of problem-focused coping strategies has also been associated with reports of fewer negative mental health symptoms, whereas use of emotion-focused coping has been associated with reports of greater negative mental health symptoms. For example, Quy et al. (2018) examined the relationship between coping styles and anxiety symptoms in a non-clinical sample of 2,566 English children (aged 7 to 11) years and found that problem-solving coping strategies,

feeling confident in one's abilities, and maintaining a positive outlook were related to lower reports of anxiety.

Similarly, VanMeter et al.'s (2020) study found that using emotion-focused coping strategies put maltreated children at greater risk for experiencing externalizing behaviours. The researchers examined the relation between child maltreatment, externalizing and internalizing disorders, and coping strategies in 198 maltreated and 222 non-maltreated children in New York. Reports of greater maltreatment were associated with increased internalizing and externalizing symptoms, as well as less problem-focused and more emotion-focused coping (VanMeter et al., 2020). Further analyses suggested that emotion-focused coping mediated the association between maltreatment and externalizing symptoms.

Likewise, Richardson et al. (2020) conducted a longitudinal online questionnaire study with 532 Australian caregivers and their children in Grade 6 and 7 and found that avoidant coping, an emotion-focused strategy, resulted in increased reports of negative mental health symptoms such as generalized anxiety disorder, social anxiety, and eating pathology. The researchers postulated that avoidance coping might serve to maintain generalized anxiety and social anxiety by contributing to unhelpful beliefs, suppressing worries, and limiting the child's exposure to feared stimuli. The researchers also found that higher reports of depressive symptoms were a predictor for the use of more avoidant coping strategies, and a decrease in problem-solving coping. They suggested that symptoms of depression, such as decreased energy, withdrawal, and feelings of worthlessness, might result in a decreased ability to engage in more proactive coping strategies, thus resulting in more avoidance. Richardson et al. (2020) also suggested that as problem-focused strategies are more likely to be employed in controllable situations, avoidant strategies may be more common in a child experiencing symptoms of

depression such as helplessness and low self-efficacy as these symptoms may be perceived as uncontrollable by the child.

Such effects have also been seen in regard to coping with the COVID-19 pandemic. For example, Orgilés et al. (2021) examined questionnaire responses from 1,480 Spanish, Italian, and Portuguese parents relating to the effects of COVID-19 on their child's emotions and behaviour, as well as the coping strategies that their child used to manage these difficulties. It was found that parents of children who used more emotion-focused coping reported higher levels of behavioural and emotional problems.

Controllable vs. Uncontrollable Situations. It is important to note that context matters when considering how adaptive problem-focused or emotion-focused coping strategies may be. In stressful situations in which individuals feel that they have control or can make a change, problem-focused coping strategies are frequently used and are often most effective (Folkman & Lazarus, 1980; Folkman & Moskowitz, 2004; Lazarus & Folkman, 1987). Problem-focused strategies would not be adaptive in an uncontrollable situation, as it is unlikely that the individual would be able to make a significant change in such conditions. For situations in which individuals feel as if the events must be accepted, are out of their control, and/or cannot be changed, emotion-focused coping strategies are therefore often favoured (Folkman & Lazarus, 1980; Folkman & Moskowitz, 2004; Lazarus & Folkman, 1987).

Results of studies have suggested that individuals may cope with uncontrollable situations such as natural disasters using emotion-focused strategies. For example, Jensen et al. (2013) conducted semi-structured interviews with 56 Norwegian children who had been on holiday in Southeast Asia during the 2004 tsunami to determine what they did to make themselves feel better during the aftermath of the disaster. The researchers found that few of the

participants reported problem-focused strategies. Instead, they favoured emotion-focused strategies such as distraction, avoidance, and support seeking to cope with the aftereffects of the natural disaster. Participants also reported that these strategies helped them feel relaxed, distracted them from distressing thoughts, and helped them feel protected and safe.

Similar results have been found when researching children's coping strategies during uncontrollable situations surrounding illness or disease. For example, Han et al. (2017) conducted a qualitative interview study examining coping styles with Chinese children (N = 29) hospitalized with leukemia and found that coping strategies varied based on age: younger children (aged 7 to 12) more frequently used problem-focused coping (for example, finding information on their disease to decrease anxiety and making new friends to enjoy the hospital environment more), whereas older children (aged 12 to 14) used more emotion-focused coping (for example, looking for support from other people, and accepting the illness to lower emotional stress; Han et al., 2017). The researchers reasoned that the older children may have had a greater understanding of their illness and viewed it as uncontrollable, which is often associated with the use of more emotion-focused coping strategies (Folkman & Lazarus, 1980; Folkman & Moskowitz, 2004).

During the COVID-19 pandemic, which could be viewed as an uncontrollable situation, children have faced many stressors, such as school closures and various restrictions that have had impacts on their well-being. Domínguez-Álvarez et al. (2020) conducted an online questionnaire study with parents of 1,123 Spanish children (aged 3 to 12) to examine how children coped with the stress of the pandemic. The researchers differentiated between disengagement coping, which is when an individual orients their emotions and thoughts away from the source of their stress, and engagement coping, in which a person orients their emotions and thoughts toward the source

of their stress; these strategies could be paralleled with emotion-focused and problem-focused coping, respectively. Contrary to the prediction that engagement coping in an uncontrollable situation such as COVID-19 would result in increased negative psychological symptoms, the researchers found that disengagement coping was more associated with negative psychological outcomes (higher reports of externalizing and internalizing problems), and engagement coping was more associated with psychosocial adjustment.

When examining the COVID-19 pandemic, exposure to the virus or having a family member at-risk of exposure (such as if they were an essential worker) could be viewed as an uncontrollable situation for children. Further research is needed to determine whether children in such uncontrollable COVID-19-related situations would be more likely to use problem-focused or emotion-focused coping strategies.

Person-Specific Factors. Selection and use of coping strategies also appears to be affected by person-specific factors such as age, gender, mental health and trauma exposure. For example, a study involving 1,990 children and adolescents in grades 3 to 8 found that girls were more likely to seek social support and use problem-solving coping strategies, whereas boys were more likely to use emotion-focused coping strategies such as avoidance, and that older children were less likely to use emotion-focused coping strategies (Eschenbeck et al., 2007). As age and gender differences have been found to influence the selection of coping strategies, it is important to consider these factors in studies examining coping.

The selection of coping strategies has been found to be associated with mental health symptoms. For example, Gunthert et al. (2002) found that undergraduate university students (N = 197) who reported more symptoms of depression at the start of the 14-day study also reported lower coping efficacy and less positive affect over the course of the study. They also found that

individuals with higher depression symptoms reported coping in the form of emotion expression to be particularly unsuccessful, and that those with higher reported anxiety symptoms found problem-focused coping to be particularly unsuccessful. As such, it is important to consider the influence of mental health symptoms in studies examining factors that can affect an individual's selection of coping strategies.

Trauma exposure also appears to be related to coping behaviours. Vaughn-Coaxum et al. (2018) examined 9,427 adolescent self-reports on measures relating to exposure to traumas (e.g., violence, accidents, and disasters), as well as coping behaviours, and found that exposure to trauma was associated with higher reports of negative emotion-focused coping (e.g., yelling, crying, avoidance, etc.). Therefore, in studies that examine coping with a specific trauma, it is important to investigate the extent to which the trauma has impacted the participants' lives.

Child Coping

Considering children, specifically, there are different coping strategies that appear to be more common throughout certain stages of typical development (Skinner & Zimmer-Gembeck, 2007). During infancy, the stress response is primarily controlled by the child's reflexes; caregivers play a central role in the child's ability to cope, as the caregiver carries out coping actions for the infant, such as by feeding or comfort to them when they cry. As children age, they are better able to cope through their own direct action using self-regulation strategies. In middle childhood, children begin to use cognitive coping strategies, such as distracting themselves or problem-solving. In adolescence, meta-cognitive coping strategies become more common; these include planning coping strategies for future concerns and making long-term goals (Skinner & Zimmer-Gembeck, 2007).

Skinner & Zimmer-Gembeck (2007) identified four categories of coping that are frequently used by children: escape, support seeking, problem-solving, and distraction. *Escape strategies* involve leaving stressful situations or avoiding directly confronting the problem; use of this strategy has been found to decline as children become adolescents. S*upport seeking* is frequently used by children of all ages. During the first few years of children's lives, they will look to their caregivers when experiencing stress, often seeking support through facial responses or eye contact. Young children will often still look to their caregivers to directly intervene during times of stress, or to distract them with different activities. There are declines in seeking social support from adults as children age, as they frequently rely on peers for support. However, in uncontrollable situations, older children will often still seek support from caregivers. *Problem-solving* is a coping strategy that is more commonly seen in older children and adolescents and involves taking direct action in order to modify a stressful situation. Cognitive problem-solving strategies are typically seen in older children and adolescents and include planning ahead, making lists, and reflecting on situations. *Distraction* is another coping strategy often seen in children, and includes both behavioural distraction, such as keeping busy or playing games, as well as cognitive distraction, such as thinking about pleasant things or trying to forget about the stressor. Cognitive distraction strategies are more commonly seen as children get older, particularly as they move into adolescence (Skinner & Zimmer-Gembeck, 2007).

Summary of Coping

Overall, problem-focused coping is viewed as more adaptive and associated with less negative mental health symptoms, whereas emotion-focused coping is viewed as more maladaptive and associated with an increase in negative mental health symptoms (Ben-Zur, 2009). Individuals have been found to use emotion-focused coping strategies in uncontrollable

situations; using problem-focused strategies in such situations, which would involve attempting to control something that is not controllable, is less effective and more frustrating for the individual (Folkman & Lazarus, 1980; Folkman & Moskowitz, 2004; Lazarus & Folkman, 1987). Additionally, social support has been found to be associated with greater well-being (Chu et al., 2010). It is therefore necessary to examine what types of coping strategies have been used during the COVID-19 pandemic, and whether social support has acted as a buffer for preventing negative mental health symptoms.

Child Technology Use

Many children spend a considerable amount of time each day using technology. For example, Granich et al. (2011) examined self-report questionnaires relating to electronic media use from 298 Australian children (aged 11 and 12) and found that 87% of participants reported spending more than 2 hours each day using technology. Additionally, boys were found to spend more time using electronic media than girls, particularly during the weekend. Similarly, Houghton et al. (2015) conducted a study examining screen-based media use with Australian children (aged 8 to 16, N = 2,620), and found that 63% of children had more than 2 hours per day of screen time; older participants and girls were more likely to have over 2 hours of daily screen time.

Technology use appears to be higher among children in recent years than it was in the past, as various sources of media such as wireless internet and smartphones are more accessible and affordable to the general public (Goode et al., 2020). Goode et al. (2020) conducted a study with two cohorts (one from 1997; N = 2,193, and one from 2014 to 2016; N = 1,009) examining technology use, physical activity, play and sleep in American children. They found that the total amount of time children spent using technology increased from the 1997 cohort to the 2014 to

2016 cohort for children in early childhood (ages 2 to 5, up 32%) and middle childhood (ages 6 to 11, up by 23%). In the 2014 to 2016 cohort, children were spending upwards of 3 hours each day using technology. Researchers also found that television was the most common form of technology used among both cohorts, and that children with more highly educated caregivers were spending less time using technology.

There are various factors that have been found to influence or predict amount of technology use in children. For example, Morgan et al. (2021) examined longitudinal data from 10,460 American children that assessed socio-demographic, family, and child characteristics (e.g., ethnicity, frequency of parent reading to the child, parental warmth, academic achievement, and externalizing problem behaviour) present during kindergarten that predicted frequent child technology use in grade 5. Researchers found that coming from a higher income family and participating in more literary activities (such as reading with a parent) predicted lower risk of frequent technology use in grade 5.

Many parents have expressed feelings of uncertainty surrounding the benefits and harms of technology use in children. Elmquist & McLaughlin (2018) noted that a benefit of technology, particularly social media, is that it provides youth with a feeling of connectedness and belonging. However, a downside is that some forms of technology use are hard to supervise; for example, social media apps are often free to download and use, making it difficult for parents to monitor cyberbullying or potentially triggering content. Radesky et al. (2016) conducted a semi-structured interview study with 35 American caregivers of children (aged 0 to 8) on perceptions of mobile technology use and found that parents were uncertain about whether technology use would be beneficial for their child. Some main parent concerns that emerged from the study included the negative impact on child thinking and imagination, not being able to regulate

internet use or peer influence online, and technology use disrupting family time. As a result of these various concerns surrounding technology and its effects on children, parents often report monitoring their child's media use. For example, Dinleyici et al. (2016) conducted a survey study with Turkish parents (N = 333) examining media use in children and found that a large majority of parents (82%) reported supervising their child's media use through co-viewing (watching media together), filtering content, and checking search histories.

Concern relating to the effects of technology use on vulnerable populations such as children and youth is not new. Orben (2020) refers to "The Sisyphean Cycle of Technology Panics," wherein with each new type of technology a panic is initiated surrounding how the technology might adversely affect people. Rather than new studies building on previous research, with each new technology, Orben (2020) suggests that the cycle of academic study is reinitiated, despite the similarities in concerns surrounding the technologies and their effects on vulnerable populations.

Concerns relating to the effects of technology have resulted in guidelines being recommended for its use. Orben (2021) notes that a variety of factors must be considered regarding screen time guidelines; one numerical value may not be appropriate for everyone. For example, it may be important to consider the type of technology used (e.g., device used or content consumed), how much technology is consumed and in what context, whether different forms of technology are used in combination, individual differences (personality, life experience, age, etc.), the purpose behind technology use (e.g., used as a necessity or out of boredom), as well as population inequalities in regards to access to technology (Orben, 2021).

The present study incorporates some of these recommendations from Orben (2021) by examining the type and frequency of technology that have been used by children during the

COVID-19 pandemic (e.g., how much time children spend watching television, playing video games, or using social media), and the purpose behind its use (e.g., reduce worry, reduce loneliness, or keep in touch with friends).

Differences in Technology Use

Children use technology for a variety of reasons, including entertainment, education, and socialization; some factors, such as age and cultural differences, have been found to influence the purpose behind media use. For example, Bolenbaugh et al. (2020) conducted a qualitative study with 48 American parents of children (aged 10 to 17) that examined gender differences in technology use. They found that parents reported that both male and female children overused technology (parent reports of the child being "addicted" or constantly using technology), and that girls used technology more for social connection, social interaction, and validation than did boys. Additionally, Jackson et al. (2008) compared 600 Chinese and 600 American children's self-report questionnaire responses relating to technology use patterns to determine whether there were gender or cultural influences on media use. They found that American children used the computer and internet more than Chinese children. Males were generally found to play video games more than females, Chinese females used the least amount of technology and were least likely to use cell phones, and American females had the highest rates of cell phone use. In general, researchers found that females were more likely to report communication as their primary activity on the computer, whereas males reported that playing games was their primary activity. Due to these differences, it is important to examine demographic variables such gender, ethnicity, and age when conducting research on child technology use.

Technology and Psychosocial Adjustment

Technology use has been linked to behavioural and psychosocial adjustment in children. For example, Limtrakul et al. (2018) conducted a questionnaire study with 339 international and Thai students (aged 10 to 15) and their parents to examine psychosocial problems and technology use (time per day spent using various forms of technology, such as television, video games, and computers). Researchers found that reports of greater child behavioural problems, as well as less prosocial behaviour, were associated with reports of greater technology use. Similarly, Parkes et al. (2013) conducted a longitudinal study with 11,014 United Kingdom mothers examining the effects of child screen time on psychosocial adjustment and found that children who watched television for 3 hours or more at age 5 had parent reports that indicated slightly higher conduct problems at age 7. However, it was also found that child screen time was not associated with any other elements of psychosocial adjustment. Poulain et al. (2019) found similar results in their study with 553 German mothers of children (aged 2 to 9) examining technology use (hours per day spent using types of technology, such as television, video games, and computers), child behaviour, and parent-child interactions. Parent reports of higher screen time in children were related to more reports of conduct problems, hyperactivity, inattention, and less prosocial behaviour.

Technology use has also been found to be related to some aspects of children's relationships. For example, Jake-Schoffman et al. (2017) conducted a study with 1,727 American children (aged 8 to 18) on recreational technology use (time per day spent using various types of technology including watching television, going to a movie theatre to see a movie, or listening to music) and parent-child relationships and found that for children (aged 11 to 13) child reports of higher quality parent-child relationships were related to less time spent using technology for fun.

Studies on child technology use should therefore consider its impact and association with psychosocial factors such as behavioural problems, inattention, and prosocial behaviour.

Technology and Mental Health

A major concern surrounding technology use is its potential impact on child mental health and well-being. Kaye et al. (2021) mentioned that findings regarding the impact of screen time on well-being have been mixed. In studies of technology use, screen time is frequently not the only factor that predicts negative psychosocial functioning or health outcomes, and it is often unclear how important screen time is to these other factors (Kaye et al., 2021). Kaye et al. (2021) noted that many studies do not clearly or consistently define screen time, use self-reports, and do not acknowledge that different activities surrounding screen time (for example, social media use), can occur on different devices (phones, tablets, computers, etc.).

Some research has found that more screen and media time has been associated with reports of poorer mental health. For example, Barthorpe et al. (2020) examined self-report questionnaires and time use diaries of social media use and mental health symptoms from 4,032 adolescents from the United Kingdom and found that reports of greater social media use were related to more risk of self-harm, depression, and low self-esteem in female participants than in male participants. Similarly, Kremer et al. (2014) conducted a study with 8,256 Australian children (aged 10 to 16) examining screen time, physical activity, and depressive symptoms and found that results of child self-reports indicated that more physical activity and less leisure screen time was related to lower reports of symptoms of depression. Fuchs et al. (2018) conducted another relevant questionnaire study with 111 Austrian child and adolescent psychiatry inpatients and their parents, as well as 398 student controls, about clinical symptoms and internet use. They found that the inpatient sample reported more problematic internet use

than the control sample and that this use was related to reports of difficulties with psychopathology including suicidality, establishing a stable identity, and peer victimization.

Screen time use has also been found to be associated with ADHD symptoms and conduct problems. For example, Nikkelen et al. (2014) conducted a meta-analysis of 45 studies related to ADHD-related behaviours (i.e., attention problems, hyperactivity, and impulsivity) and technology use in children and adolescents and found a small relation between greater media use and attention and impulsivity problems. Additionally, George et al. (2018) conducted a self-report study on the association between daily technology use (self-reported time per day spent using technology including social media, the internet, and texting) and mental health symptoms with 151 American adolescents at risk for mental health problems. Researchers found that technology use and texting was related to problems with self-regulation and more reports of conduct problems from baseline to follow-up (18 months later).

Odgers & Jensen (2020) noted that with recent studies surrounding adolescent media use and well-being, often only small associations are found, and it is difficult to determine the cause and the effect in the relationship between media and well-being. For example, Kaur et al. (2020) conducted a questionnaire study with 44,482 American adolescents examining media use and substance use and found that using digital technology to interact with other people was related to an increased risk in drinking, using cannabis, and vaping in the past 30 days, whereas media used for gaming and watching videos was not associated with substance use. The researchers concluded that social interactions appeared to be the primary driving force behind substance use, rather than media use. Orben & Przybylski (2019) conducted a study using 3 data sets from America and the United Kingdom (total N = 355,358) examining the relationship between well-being and technology use that also suggested the impact of media use may not be as large as

other studies have indicated. They found that there was a small negative effect of using technology on well-being; however, they noted that the magnitude of impact on well-being was larger for other factors. For example, they found that smoking marijuana and bullying had larger negative effects, and getting enough sleep and eating breakfast had larger positive effects, than using technology. Therefore, in studies that examine child technology use it is important to consider its potential impact on well-being and mental health symptoms.

Technology and Coping

Technology is frequently used as a coping strategy to help individuals deal with stress; however, findings surrounding the effectiveness of technology for coping have been mixed. For example, Duvenage et al. (2020) conducted two studies to explore how Australian adolescents used technology to improve their mental health. Their first study involved a focus group comprised of 16 adolescents. Findings suggested that these adolescents often used technology as an emotion-focused coping strategy in order to lessen the pain of negative experiences, rather than dealing with the trigger of the pain directly. The second study involved 156 student adolescents who completed surveys about coping, psychopathology, stressors, well-being, technology use, and life events. Students reported using technology to help cope with stress; however, it was found that students who more frequently used technology to cope experienced more feelings of worry and jealousy after stressful events. Researchers concluded that relying too much on online coping was related to higher levels of worrying and jealousy in adolescents.

By contrast, Nabi et al. (2017)'s study suggested that technology can be a useful coping strategy. They conducted two self-report questionnaire studies - one with 421 American undergraduate students and another with 102 breast cancer survivors - to examine how media was viewed as a coping strategy. Nabi et al. (2017) found that in both studies, participants who

were heavy television users and participants who were under more stress were more likely to use media as a coping strategy. Researchers also found that participants who reported using technology to cope indicated that they found it to be an effective strategy to manage stress (Nabi et al., 2017).

Prestin & Nabi (2020) conducted a study with 248 American undergraduate students that indicated media-based interventions may be helpful to combat stress and increase a sense of well-being. Students were randomly assigned to one of three media treatment conditions or a control condition; treatment groups watched a five-minute YouTube video once per day for five days that were chosen to evoke either the feeling of hope (group 1), amusement (group 2), or calmness (group 3). Participants also reported on their stress, coping, physical and psychological well-being, and motivational state during the study. It was found that all three media-based intervention groups had lower reports of stress compared to the control group. As the findings relating to the effectiveness of using technology for coping have been mixed, it is important that studies on technology-based coping investigate both the harms and the benefits of technology use.

Technology, Coping, and COVID-19

During the COVID-19 pandemic, technology has been used to assist with the social, physical, and intellectual well-being of children (Goldschmidt, 2020). With regards to social well-being, children have used technology to keep in contact with friends and family through telephone calls and video chats (Goldschmidt, 2020). Technology has also been used to maintain both physical and mental well-being through telehealth medical appointments (Goldschmidt, 2020). In addition, when many schools across the world were forced to move to remote learning,

technology was also used to assist with intellectual well-being through various online learning platforms (Goldschmidt, 2020).

Several studies have examined how media has been used to cope with the stress of the pandemic. For example, Pahayahay & Khalili-Mahani (2020) conducted an online questionnaire study with 685 adult participants (the study was open world-wide but the majority of the participants were from Canada) to investigate how media was used to cope with the stress of the COVID-19 pandemic. Individuals who felt stressed by COVID-19 reported higher use of more passive media coping tools, including Facebook, television, YouTube, and online streaming services. Those who indicated that they were struggling with their mental health were twice as likely as individuals who did not report such mental health concerns to prefer online streaming as a coping mechanism, and women and nonbinary participants were twice as likely as men to report social media as a coping tool.

Eden et al. (2020) also studied the effects of media as a coping tool during the pandemic. They examined self-reports from 425 American university students and found that feelings of stress and anxiety were related to increased media use. In particular, students reported dealing with stress through more avoidant and escapist media coping strategies (e.g., using media because they refused to believe what was happening, or using media to distract themselves). The researchers reasoned that stress may have been prompting students to attempt to emotionally escape their worries using media. Additionally, it was found that avoidant technology-based coping strategies were related to worse reports of mental health symptoms. In contrast, students reported that they successfully dealt with anxiety with more adaptive, problem-focused media-based coping strategies (e.g., getting advice from others or to come up with a strategy of what to do).

Cauberghe et al. (2021) also examined the effects of technology as a coping tool during the COVID-19 pandemic, specifically with children. The researchers examined online questionnaire responses from 667 Belgian children and found that seeking support on social media and using technology as a distraction were the most common coping strategies endorsed. They also found that older children were more likely to seek information related to COVID-19, compared to younger children. Problem-focused coping was generally found to be more helpful for older children; the researchers postulated that this was due to the fact that as children age, their cognitive and emotional capacity increases and allows them to use more complex coping strategies. The researchers also found that older children, in particular, reported that using social media to keep in touch with friends was a helpful strategy.

In general, many children and youth spend a significant amount of time using technology throughout the day. Some of this use could be seen as beneficial, such as using social media to feel connected with others (Elmquist & McLaughlin, 2018), whereas other forms of technology use could be seen as harmful, such as when video games are used as a distraction from directly facing a stressor. Further research is needed to determine how technology has been used during the COVID-19 pandemic, and whether its use has been beneficial or harmful for children.

The Present Study and Hypotheses

This study examined how children have been using technology during the COVID-19 pandemic, as well as the perceived benefits and problems associated with its use. I examined child and caregiver reports of child technology use prior to and during the pandemic, whether the use of technology as a coping strategy has been beneficial or harmful for children, and whether the ways in which children used technology have been associated with mental health symptoms.

This study builds on previous work relating to child technology use, coping, and child mental health in several ways. It allowed for the exploration of the frequency and types of technology that have been used by children during the COVID-19 pandemic. This study also explored the different technology-based coping strategies that children have used during the pandemic, whether these coping strategies have been associated with psychological well-being outcomes such as anxiety and depression symptoms, and whether technology-based social support may have acted as a buffer for preventing negative mental health outcomes. It also examined the effect of uncontrollable situations, such as exposure to the virus or having a family member at-risk of exposure, on a child's selection of technology-based coping strategies.

Hypothesis 1

Caregiver and child reports will indicate that children's technology use has increased from 3 months prior to the pandemic to the early pandemic time point in the areas of education, socialization, and entertainment. Technology use has increased in recent years as a result of internet and smartphones becoming more widely accessible (Goode et al., 2020). During COVID-19, this technology has been used to attend healthcare appointments, keep in contact with friends and family, and attend school (Goldschmidt, 2020). Many of these activities had initially been conducted in-person, therefore, as a result of the transition to the online modality, it was predicted that overall technology use had likely increased.

Hypothesis 2

Caregiver and child reports will indicate that problem-focused technology-based coping strategies are more associated with children feeling better, whereas emotion-focused technology-based coping strategies are more associated with children feeling worse. Problem-focused coping strategies aim to directly eliminate sources of stress for more long-lasting effects, whereas

emotion-focused strategies often only provide distraction and temporary relief from the stressor (Ben-Zur, 2009). In previous studies, problem-focused coping strategies have been found to be associated with fewer negative mental health symptoms when compared to emotion-focused coping strategies (Ben-Zur, 2009).

Hypothesis 3

Caregivers and children who report children experiencing higher levels of depression and anxiety symptoms will also report children using more maladaptive technology-based coping patterns (e.g., using technology as a distraction). Previous studies have found that individuals with higher reports of negative mental health symptoms have also reported lower coping efficacy (Gunthert et al., 2002). Emotion-focused coping strategies, such as seeking distraction, could be conceptualized as more maladaptive and less efficacious, as they do not address the source of the stressor (Ben-Zur, 2009).

Hypothesis 4

Caregiver and child reports will indicate that technology used for social support during the pandemic helped children feel better, whereas technology used as a distraction from the pandemic did not make them feel better. Social support often acts as a buffer against stressful situations and has been found to be associated with higher reports of well-being (Chu et al., 2010; Cohen & Wills, 1985). Emotion-focused, distraction-based coping strategies, such as playing video games, may be used to avoid engaging with the actual cause of one's stress, and may therefore not improve overall well-being.

Hypothesis 5

There will be significant differences between caregiver and child reports of the frequency of child technology use. Although it was expected that caregivers and children would report

similar patterns of increase in technology use from 3 months prior to the pandemic to the early pandemic time point (see Hypothesis 1), it was also expected that there would be discrepancies in the actual numbers that they would report within each time period, with children having self-reports of greater use of technology, overall. Previous studies have found discrepancies when examining parent versus child reports on recreational screen time use (Nagata et al., 2021). Parents often underestimate the amount of time that their children spend using technology (Thorn et al., 2013).

Hypothesis 6

Caregiver and child reports of a higher saliency of COVID-19 (e.g., the child has been exposed to COVID-19 or has a family member at high risk of being exposed to COVID-19) in a child's life will be related to more emotion-focused technology-based coping strategies. Having a family member who is a frontline worker during the pandemic has been found to be associated with higher reports of psychological stress (Sugg et al., 2021). As having a frontline worker as a family member is an uncontrollable situation for a child, it may therefore be more likely that they would engage in more emotion-focused coping strategies (Folkman & Lazarus, 1980; Folkman & Moskowitz, 2004; Lazarus & Folkman, 1987) to cope with this stress.

Hypothesis 7

Child reports of higher levels of perceived social support will be associated with more socially-oriented technology-based coping strategies by the child. Those with greater perceived social support may select more social support coping-based media use, such as using social media or video calling friends or family.

As there has not been a worldwide disaster during which children have had access to such advanced technology, this study helps to provide a greater understanding about children's ability

to stay socially connected through technology use during stressful life events. It contributes to our understanding of technology use as a coping mechanism, particularly during stressful events, such as the COVID-19 global pandemic. Further, it allowed us to explore how maladaptive and adaptive coping using technology may be associated with mental health outcomes during a pandemic. The information gained from this study may also be applied to improve or develop technology-based educational and mental health resources for youth during and after the pandemic.

CHAPTER 3

Method

Participants

Baseline data from the "Acute and Long-Term Impact of the COVID-19 Pandemic on Children's Mental Health" longitudinal study (WE-SPARK Health Institute Igniting Discovery Grant [ORS Fund # 820473], Ontario Ministry of Colleges and Universities COVID-19 Rapid Research Fund [ORS Fund # 820800]; REB # 20-123; PI: Lance Rappaport) were used for the present study. Participants were from 190 families who lived in Southwestern Ontario. These families were recruited through schools and advertisements in the news and on social media and were required to have internet access and to be proficient in English in order to participate. Of particular note, 32 children (16.8% of child participants) did not complete any of the child section of the study questionnaire. Therefore, data from 190 caregivers and 158 children were used in the present study.

The majority of caregiver participants (50%) reported that their child's ancestry was English, Irish, Scottish, or Welsh; other reported ancestries included Western European (25.26%), Southern European (25.26%), North American (24.21%), Eastern European (15.26%), Middle Eastern (8.42%), and Aboriginal North American (7.37%), with a small percentage of participants reporting Northern European, Eastern Asian, South Asian, Hispanic, Southeastern Asian or African ancestry. These reports are comparable to Ontario census findings that approximately 54% of the population of Ontario identify as English, Irish, Scottish or Welsh, and approximately 29% identify as an ethnic minority (Government of Ontario, 2022). Child participants ranged in age from 8 to 13 (M = 10.83). It was found that 49.47% of child participants were female, and 50.53% were male. It was also found that 10.53% of child

participants had a previous diagnosis of generalized anxiety disorder, 8.95% had a previous diagnosis of ADHD, 2.11% had a previous diagnosis of social anxiety disorder, 1.58% had a previous diagnosis of depression, 1.58% had a previous diagnosis of autism spectrum disorder, 1.05% had a previous diagnosis of panic disorder, 1.05% had a previous diagnosis of separation anxiety disorder, and 1.05% had a previous diagnosis of PTSD. These rates are in contrast to reports that approximately 1 in 5 Ontario children will experience a mental health difficulty (Canadian Mental Health Association, 2022). Additionally, 40% of caregivers reported that their child lived with an essential worker.

Caregiver participants ranged in age from 21 to 58 (M = 41.34). It was found that 89.47% of caregiver participants were female, and 10.5% were male. The majority of caregiver participants reported that they were the child participant's mother (88.9%), with a smaller number of fathers (10%) and stepmothers (1.1%) also participating in the study. It was also found that 20.53% of caregivers had a previous diagnosis of depression, 20.53% had a previous diagnosis of generalized anxiety disorder, 5.26% had a previous diagnosis of social anxiety disorder, 4.21% had a previous diagnosis of PTSD, 3.68% had a previous diagnosis of panic disorder, and 2.63% had a previous diagnosis of ADHD. These rates are in contrast with reports that approximately 10.1% of Canadians experience symptoms of mental health disorders (Government of Canada, 2013). Regarding education, 2.1% of caregivers had some high school education, 5.3% had a high school diploma or GED, 22.6% had some college or a 2-year degree, 34.2% were a 4-year college or university graduate, 5.8% had some school beyond college/university, and 29.5% had a graduate or professional degree.

Procedure

Participants were recruited for the larger longitudinal study from advertisements in the news, social media, private schools, and a local school board. Interested caregivers contacted the researchers by email to sign up for the study. Only one caregiver and one child per family were allowed to participate. Participants who provided informed consent/assent were given access to the online questionnaire that contained questions about the child's mental health and activities during the pandemic, such as technology usage. The baseline measures, which are the data used in the present study, were completed in June or July of 2020 and the family was compensated for their time with a $12 gift card. Although beyond the scope of the present study, caregiver and child participants were invited to complete monthly follow-up online questionnaires consisting of the same measures in an abbreviated protocol for the larger longitudinal study.

Measures

Data were used from baseline caregiver and child self-reports obtained from the measures assessing variables such as technology use, psychopathology symptoms, as well as demographic and other contextual variables, etc. These measures were completed at a baseline time shortly after the start of the pandemic (June or July of 2020).

Anxiety (The Screen for Child Anxiety Related Emotional Disorders, SCARED; Birmaher et al., 1997). The parent and child versions of the *SCARED* are 41-item questionnaires that assess symptoms relating to anxiety disorders including somatic/panic anxiety, general anxiety, separation anxiety, social phobia, and school avoidance (e.g., "When I feel frightened, it is hard to breathe" and "I worry about other people liking me"). Participants rate their agreement with each item for the last 2 weeks on a 3-point Likert-type scale ranging from 0 (*not true*) to 2 (*true*). A total score is calculated from the sum of each item score, with

scores greater than 25 indicating the possible presence of an anxiety disorder. For the present study, the questions relating to school avoidance were not included in the measure given to participants because the timing of the study was at the end of the school year. Total overall scores were computed for the *SCARED* measure for both caregiver and child reports. These total overall score variables were used in the main analysis for Hypothesis 3. Specific questions are used in the calculation of various domain scores, with high scores in each specific domain indicating the presence of panic disorder or significant somatic symptoms, generalized anxiety disorder, separation anxiety disorder, social phobic disorder or significant school avoidance symptoms. Birmaher et al. (1997) found good internal consistency for the *SCARED*, with Cronbach alpha coefficients ranging from .74 to .93. They also found good test-retest reliability (ranging from .70 to .90) and good discriminant validity (between and within anxiety disorders). The Cronbach alpha coefficients for both the caregiver and *SCARED* measures in the current study were .94.

Depression (The Short Mood and Feelings Questionnaire, SMFQ; Angold et al., 1995). The parent and child versions of the *SMFQ* are 13-item questionnaires that are used to screen for depression symptoms experienced over the past 2 weeks in children aged 6 to 19. The *SMFQ* contains 13 phrases relating to how an individual has been feeling and acting (e.g., “I feel miserable or unhappy” and “I did everything wrong”). Participants rate their agreement with the phrases on a 3-point Likert-type scale ranging from 0 (*not true at all*) to 2 (*true*). Item scores are summed to obtain a total score, with values greater than 8 indicating a significant presence of depressive symptoms. Total *SMFQ* scores for both caregiver and child reports, and these total score variables were used in the main analysis for Hypothesis 3.

Angold et al. (1995) found internal reliability values for the *SMFQ* ranging from .85 to .87. Moderately high criterion validity was found between the child version of the *SMFQ* and the *Children's Depression Inventory* (CDI; 0.67), as well as the child version of the *SMFQ* and the *Diagnostic Interview Schedule for Children* (DISC; 0.65). The Cronbach alpha coefficient for the caregiver *SMFQ* in the current study was .90, and for the child *SMFQ* it was .92.

Impact of COVID-19 (The CoRonavIruS Health Impact Survey, CRISIS; Merikangas et al., 2020; Nikolaidis et al., 2021). The *CRISIS* is a questionnaire (99 items in the child version, 110 items in the parent version) that assesses the impact of the COVID-19 pandemic on various areas of an individual's daily life 3 months prior to the pandemic and within the past 2 weeks of the completion of the questionnaire, including behaviours, emotions, well-being, and media use. It examines several domains, including demographic characteristics (e.g., "What grade is your child currently in"), physical and mental health (e.g., How would you rate your child's overall physical health"), COVID-19 exposure (e.g., "Has your child been suspected of having Coronavirus/COVID-19 infection"), life changes as a result of the pandemic (e.g., "How easy or hard has it been for your child to adjust to online classes/assignments"), life changes due to the pandemic (e.g., "Does your child worry whether money would run out"), and current well-being and behavioural factors including media use, sleep, physical activity and substance use (e.g., "how much time per day did your child spend watching TV or digital media"). Participants have a variety of response methods throughout the questionnaire; some items provide multiple choice responses, some are yes/no questions, and others are fill-in-the-blank. Nikolaidis et al. (2021) found the test-retest reliability of the original *CRISIS* measure to be high for Mood States and COVID Worries (ranging from .79 to .87) and found good construct validity between domains of the questionnaire.

The original *CRISIS* questionnaire assessed technology use for 3 types of technology; television or digital media, social media, and video games. The media use section of the *CRISIS* was expanded for the initial longitudinal study. Questions were added to assess the frequency of use of 3 additional types of technology (internet, texting or messaging, and using the computer for general computing purposes), along with the original 3 types of technology assessed by the original measure (television or digital media, social media, and video games). Questions were also added to assess how children used each type of technology (e.g., "How does your child use TV or Digital Media?") and how using each type of technology made the children feel (e.g., "How do you think watching TV or Digital Media made your child feel in dealing with the coronavirus/COVID-19 crisis?"). The selection of the new technology types to be added, as well as the additional questions relating to how technology use made the child feel were based off of MacMullin et al.'s (2016) questionnaire relating to electronic activities and the impact of electronics use. Additionally, questions related to how children used each type of technology were based off of Strange et al.'s (2018) *Online Communication Survey*.

For the current study, questions from both the parent and child versions of the demographic, background, COVID-19 exposure, media use, and supports sections of the *CRISIS* were used. Questions from the demographic and background sections of the *CRISIS* were presented in multiple choice or fill in the blank format. The present study focused on questions relating to the child's gender, the child's ancestry, and whether or not the child lived with an essential worker. Questions from the COVID-19 exposure section of the *CRISIS* had response options that were multiple choice. For the current study, I focused on questions relating to whether or not the child or their family members had been exposed to COVID-19. I also

examined questions relating to COVID-19 exposure and whether the child lived with an essential worker as measures of how salient COVID-19 is in the child's life.

For the media use section of the *CRISIS*, for each of the time periods (3 months prior to the pandemic, and within the past 2 weeks of when the questionnaire was completed by the participant) there were six multiple choice questions that asked both caregivers and children about the frequency of the children's technology use (no use, under 1 hour, 1 to 3 hours, 4 to 6 hours or more than 6 hours) for the six different types of technology and media (i.e., watching TV or digital media, using the internet to search/view things they are interested in, using social media, texting or messaging, playing video games, or using the computer for school or general computing purposes such as writing a story for fun). In addition to the frequency of usage, the section relating to media use in the past 2 weeks during the pandemic also asked participants to answer multiple choice questions relating to how each type of media was used by the children (to seek information about coronavirus, to reduce worry, to distract themselves, to reduce feelings of loneliness, to keep up with schoolwork, to pass the time, to keep in touch with friends, to keep in touch with family, and to meet new people). Participants also rated how using each of the six types of technology made the children feel on a 5-point Likert-type scale (1 = *it made him/her feel a lot better*, 2 = *it made him/her feel a little better*, 3 = *it did not make him/her feel better or worse*, 4 = *it made him/her feel a little worse*, and 5 = *it made him/her feel a lot worse*).

The supports section of the child *CRISIS* has four questions relating to what sources of social support the child had in their life. These questions from the child report *CRISIS* questionnaire were used to create a perceived social support score. The caregiver report questionnaire did not contain questions relating to the child's perceived social support, therefore, only child report scores were used in this calculation. The questions related to the child's report

of the extent to which (1) when they needed help doing something, they could count on their family to help them, (2) when they needed help doing something, they could count on their friends to help them, (3) when they were sad, worried, or in a bad mood, they could count on their family to help them feel better, and (4) when they were sad, worried, or in a bad mood, they could count on their friends to help them feel better. Children were asked to rate their agreement on a 5-point Likert-type scale (0 = *strongly disagree,* 1 = *agree,* 2 = *neither agree nor disagree,* 3 = *disagree,* and 4 = *strongly agree)* as to whether they could count on family or friends when they needed help doing something or were sad, worried, or in a bad mood. A perceived social support score was calculated by summing the responses to these 4 questions, with higher scores corresponding to greater perceived social support. This new perceived social support variable was used in the main analysis for Hypothesis 7.

Coding

The responses that caregivers and children gave for the children's purpose of using the different types of technology were categorized into types of problem- and emotion-focused coping, as well as into social purposes and distraction purposes. Reponses about the child's living situation were recoded to provide a measure of COVID-19 saliency.

Problem- and Emotion-Focused Coping

Caregiver and child responses on the *CRISIS* relating to how each type of technology (television, internet, social media, texting, video games, and general computer use) were used were coded dichotomous variables; they were coded as 1 if a participant responded that the child used the type of technology in that particular way (no use, to seek information about COVID-19, to reduce their worry, to distract themself, to reduce feelings of loneliness, to keep up with schoolwork, so that they will not be bored or to pass the time, to keep in touch with friends, to

keep in touch with family, to meet new people, and other reason), and 0 if they did not. So, for example, if a child responded that he watched television or digital media to distract himself and so that he would not be bored or to pass the time, the child would have scores of 1 for those two purposes for the "television or digital media" type of technology, but scores of 0 for all other purposes of using the technology.

These purposes of using the different types of technology use were first coded as problem-focused (i.e., to seek information about COVID-19, to keep up with schoolwork, to keep in touch with friends, to keep in touch with family, and to meet new people) or emotion-focused coping (i.e., to reduce worry, to distract themselves, to reduce feelings of loneliness, and so that they will not be bored or to pass the time), using a theory-based coding system based on definitions by Folkman and Lazarus (1980). The decisions regarding coping were determined in meetings with the research supervisor, Dr. Babb. Based on these discussions, as well as on previous research that identified that more social-based coping strategies are commonly used by children (Skinner & Zimmer-Gembeck, 2007), we decided that, as there were strong social connotations to some of the designated problem-focused coping strategies (i.e., to keep in touch with friends, to keep in touch with family, and to meet new people), the problem-focused category would be further split into social problem-focused coping, and non-social problem-focused coping (i.e., to seek information about COVID-19, and to keep up with schoolwork). Ultimately, one main category and two subcategories of problem-focused coping (social problem-focused and non-social problem-focused) and one category of emotion-focused coping were created for each type of technology.

Participants had the option to select "other" as a reason for using a certain type of technology, and they were able to provide additional commentary to clarify the nature of the

other purpose. During the coding discussions, it was decided that a more conservative approach would be taken with the "other" responses, in that the additional commentaries for the "other" responses were not recoded or included in the analysis due to the ambiguity surrounding the responses. Many of the additional commentary provided simply listed the activities that the participant engaged in when using the technology (e.g., "to watch favourite shows," "YouTube videos," and "to catch up with video games"), rather than the coping component that the analyses of the present study were trying to capture. Therefore, it was decided to not read in to the purpose of using the technology for these open-ended responses.

Not all participants who selected the "other" response option provided this additional commentary. For those who did provide further commentary, between 0 and 5 caregivers provided additional commentary for each technology type, and between 1 and 12 children provided commentary for each technology type. One interesting thing to note was that 45 children provided additional write-in commentary for the purpose of using the computer, even though they did not select the "other" response option. This was likely because the write-in field was available even without selecting "other" and children may not have understood that it was specifically meant for the "other" option and not a general space to write comments.

To create the problem-focused (including the composite score, the non-social problem-focused, and the social problem-focused) and emotion-focused coping category variables for each type of technology, the number of "1" scores within the specified purposes related to the type of coping strategy were first summed. This was repeated for all types of technology used, for both caregiver and child reports. For example, if a child had scores of 1 for using television or digital media to distract himself and so that he would not be bored or to pass the time, and

scores of 0 for all other purposes of using the television or digital media, these two "1" scores would be summed to obtain a score of "2" for the emotion-focused coping category sum score.

Next, proportion scores were calculated by dividing the coping category sum score by the total coping strategies score. The total coping strategies score was calculated for each type of technology used, for both caregiver and child reports, by summing all of the dichotomous variables. The dichotomous variable relating to the purpose indicating that the child did not use the technology was not included in this total, as "no use" was not considered to be a reason for using technology. The proportions for each of the types of coping strategies were used in the main analyses for Hypotheses 2, 3, 4, 6, and 7. For Hypothesis 4, the proportion scores of the social problem-focused coping strategies were used as the measure of social-focused strategies.

Distraction-Focused Uses

To create the distraction-focused reasons for technology use variables, a similar procedure was used to calculate proportion scores. Specifically, the scores for the corresponding dichotomous variables relating to using technology as a distraction were summed. This was repeated for all types of technology used, for both caregiver and child reports. Next, proportion scores were calculated by dividing the sum score of the distraction-focused technology use variable by the total coping strategies score. These proportion variables were used in the main analysis for Hypothesis 4.

COVID-19 Saliency Score

Five variables from the caregiver report questionnaire were used to create a COVID-19 saliency score, which indicated how prominent of a role COVID-19 played in the child's family life during the early stages of the pandemic. The child report questionnaire did not contain questions relating to essential workers, and caregivers were presumed to have accurate

information relating to COVID-19 exposure in their home; therefore, child responses were not used to calculate this variable. The saliency score was created using information relating to whether there was an essential worker living with the child, if the essential worker was a first responder/healthcare provider/worked in a facility treating COVID-19, if anyone close to the child had been diagnosed with COVID-19 in the past 2 weeks, if the child had been exposed to COVID-19 in the past 2 weeks, and if the child had been suspected of having COVID-19 in the past 2 weeks. The essential worker, first responder/healthcare provider/works with COVID-19 variables had yes/no response options and were therefore treated as dichotomous variables. The variables relating to a diagnosis of COVID-19, being exposed to COVID-19, and if the child was suspected of having COVID-19 were recoded to be dichotomous variables. For example, for the exposed to COVID-19 variable, original response options were "yes, someone with a positive test," "yes, someone with a medical diagnosis, but no test," ""yes, someone with possible symptoms, but no diagnosis by doctor," and "no, not to my knowledge." Responses were coded as "1" for yes (positive test, medical diagnosis but no test, or possible symptoms), or "0" for no. A saliency score was then calculated by summing the responses of these dichotomous variables, with higher scores indicating higher saliency of COVID-19 in the child's life. This new saliency score variable was used in the main analysis for Hypothesis 6.

CHAPTER 4

Results

Preliminary Data Analysis

Missing Data

Missing Value Analysis was used to check for missing data. Although 32 children did not complete the child portion of the baseline questionnaire, to preserve as much caregiver data as possible, caregiver participants were included in analyses even if their child did not fill out their portion of the questionnaire. No caregiver or child variable was missing more than 3.2% of cases. Little's MCAR test was used to check whether data was missing completely at random. Little's MCAR test was not significant, $\chi^2(5262, N = 190) = 5339.70$, $p = .224$, indicating that data were missing completely at random (Tabachnick & Fidell, 2013). Pairwise deletion was used for missing data during analyses.

Prior to analyzing the baseline data, I conducted preliminary analyses, including data cleaning, checking for coding inconsistencies, examining the data for errors in data entry, and examining the data for covariates. As child age and sex of the child have been found to be related to media use (e.g., Bolenbaugh et al., 2020; Jackson et al, 2008) they were examined for correlations with study variables. Significant correlations were found between child age and the following variables: caregiver report of child's internet use prior to the pandemic ($r = .24$, $p < .01$), caregiver report of child's social media use prior to the pandemic ($r = .28$, $p < .01$), caregiver report of child's texting prior to the pandemic ($r = .32$, $p < .01$), caregiver report of child's computer use prior to the pandemic ($r = .32$, $p < .01$), caregiver report of child's social media use during the pandemic ($r = .23$, $p < .01$), caregiver report of child's texting during the pandemic ($r = .18$, $p < .05$), caregiver report of the impact of internet use on child's wellbeing (r

= .16, $p < .05$), caregiver report of the impact of texting on child's wellbeing ($r = .14$, $p < .05$), caregiver report of the impact of video game use on child's wellbeing ($r = -.19$, $p < .01$), child report of their social media use prior to the pandemic ($r = .19$, $p < .05$), child report of their texting prior to the pandemic ($r = .24$, $p < .01$), child report of their computer use prior to the pandemic ($r = .32$, $p < .01$), child report of their computer use during the pandemic ($r = .23$, $p < .01$), and child report of the impact of texting on their wellbeing ($r = .17$, $p < .05$).

Significant correlations were found between the sex of the child and the following variables: caregiver report of the child's social media use prior to the pandemic ($r = -.27$, $p < .01$), caregiver report of the child's texting prior to the pandemic ($r = -.26$, $p < .01$), caregiver report of the child's video game use prior to the pandemic ($r = .44$, $p < .01$), caregiver report of the child's social media use during the pandemic ($r = -.23$, $p < .01$), caregiver report of the child's texting during the pandemic ($r = -.29$, $p < .01$), caregiver report of the child's video game use during the pandemic ($r = .48$, $p < .01$), caregiver report of the impact of video game use on child's wellbeing ($r = .22$, $p < .01$), child report of their social media use prior to the pandemic ($r = -.18$, $p < .05$), child report of their texting prior to the pandemic ($r = -.24$, $p < .01$), child report of their video game use prior to the pandemic ($r = .40$, $p < .01$), child report of their social media use during the pandemic ($r = -.19$, $p < .05$), child report of their texting during the pandemic ($r = -.24$, $p < .01$), child report of their video game use during the pandemic ($r = .40$, $p < .01$). Where possible, I controlled for the sex of the child and/or the age of the child in relevant analyses that used these variables.

Assumptions

Prior to conducting the main analyses, the data set was examined for the presence of outliers through the visual inspection of histograms and box plots of study variables (Tabachnick

& Fidell, 2013). Additionally, standardized scores for study variables were examined. Using Tabachnick and Fidell's (2013) guidelines, scores that were +/-3.29 were considered to be potential outliers. Two cases on the caregiver report of social media use prior to the pandemic, one case on the child report of texting prior to the pandemic, three cases on the Child *SMFQ* Total score, and one case on the caregiver *SMFQ* Total Score were considered to be outliers. All potentially outlying cases were only outliers on one variable.

Analyses were run with and without outlying cases, and some changes in the significance of results were found for Hypothesis 2, Hypothesis 3, Hypothesis 4, and Hypothesis 7. For Hypothesis 2, removing outliers resulted in new significant associations between the child feeling better and caregiver reports of higher proportions of video game-based problem-focused coping and video game-based social problem-focused coping, as well as the child feeling worse and higher proportions of video game-based emotion-focused coping strategies used. The one new significant association that was not in support of the hypothesis was between the child feeling better and child reports of higher proportions of computer-based emotion-focused coping strategies used.

For Hypothesis 3, removing outliers resulted in new significant associations between higher caregiver *SCARED* total scores and lower proportions of texting-based problem-focused coping strategies used and higher proportions of texting-based emotion-focused coping strategies used. It also resulted in new significant associations between caregiver *SMFQ* total scores and higher proportions of video game-based emotion-focused strategies used. Additionally, outlier removal resulted in new significant associations between child *SMFQ* total scores and higher proportions of internet-based emotion-focused and lower proportions of computer-based social problem-focused coping strategies used. Removing outliers also resulted in some previously

significant results becoming non-significant. This included child *SCARED* total scores and the proportion of texting-based emotion-focused and computer-based social problem-focused coping strategies used, as well as child *SMFQ* total scores and the proportion of television-based problem-focused, television-based social-focused, television-based emotion-focused, and texting-based problem-focused coping strategies used.

For Hypothesis 4, outlier removal resulted in a new significant association between children feeling better and caregiver reports of higher proportions video game-based social focused coping strategies used.

Finally, for Hypothesis 7, outlier removal resulted in some associations becoming non-significant, including the association between child perceived social support and caregiver reports of the proportion of television-based problem-focused, television-based emotion-focused, and texting-based emotion-focused coping strategies used, as well as child reports of television-based emotion-focused and internet-based problem-focused coping strategies used.

Ultimately, outliers were left in the dataset for all of the main analyses. There were two main reasons for this. Notably, outlier removal did not change the main overall findings from the results. Additionally, variability in reports of mental health symptoms and frequency of media use is expected. Both of the participants that were outliers on the frequency of media use variables reported frequency of use that was more than 6 hours per day, and the outliers on the *SMFQ* variables reported high total scores. Although high frequency of media use and high reports of symptoms of depression were not common in the sample, variability in these types of scores is expected in the population.

The assumption of normality was then tested. The normality assumption applied to paired samples *t*-tests, correlation analyses, and linear regression analyses, therefore, all study variables

were examined to determine whether this assumption was met. Visual inspection of histograms and Q-Q plots of the study variables, as well as skewness and kurtosis values, were used to determine whether this assumption was violated. Skewness and kurtosis values greater than 2 were flagged for concern (Pituch & Stevens, 2016). The variables relating to the caregiver report of child television use prior to the pandemic and the child *SMFQ* total score had kurtosis values that were outside of normal limits (kurtosis values 2.50 and 2.10 respectively). Upon inspection of histograms and Q-Q plots, these variables did not appear to greatly deviate from normality, therefore the assumption of normality was not considered to be violated.

The assumption of linearity was also examined. The linearity assumption applied to the regression and correlation analyses, therefore, bivariate scatterplots of variables relevant to these analyses were examined to determine whether there was a linear relationship between them (Tabachnick & Fidell, 2013). As no curvilinear patterns were seen in the bivariate scatterplots, this assumption was considered to be not violated.

Linear regression also has the additional assumptions of homoscedasticity and multicollinearity. Multicollinearity states that there should not be a perfect linear relationship between two of the predictor variables (Field et al., 2012). VIF and tolerance values were examined to determine whether they were within acceptable rates (below 10 for VIF, above 0.2 for tolerance) to avoid violating this assumption; no violations were found. The assumption of homoscedasticity was then checked. Residual scatterplots and histograms were examined for random scatter as opposed to a funnel shape (Field et al., 2012), and no violations were found.

Descriptive Statistics

Descriptive statistics for relevant study variables are presented in Table 1. The mean total scores on the *SCARED* for caregivers (M = 19.22) and children (M = 19.27) were below the

threshold of high anxiety (total score of ≥ 25 may indicate the presence of an anxiety disorder). The mean total scores on the *SMFQ* for caregivers (*M* = 5.47) and children (*M* = 4.77) were also below the threshold of high depression (scores greater than 8 indicate significant presence of depressive symptoms). Additionally, COVID-19 was not reported by caregivers to be highly salient in their children's lives (*M* = 0.59 out of a possible maximum score of 5). Child participants also indicated that they had moderately high perceived social support from family and friends to help them in times of need (*M* = 12.15 out of a possible maximum score of 16).

Table 1

Descriptive Statistics

	N	Minimum	Maximum	*M*	*SD*
Total *SCARED* Score- Caregiver Report	170	0.00	57.00	19.22	13.11
Total *SCARED* Score- Child Report	143	0.00	59.00	19.27	14.21
Total *SMFQ* Score- Caregiver Report	185	0.00	23.00	5.47	5.23
Total *SMFQ* Score- Child Report	151	0.00	24.00	4.77	5.29
Total COVID Saliency Score- Caregiver Report	189	0.00	5.00	0.59	0.80
Total Social Support Score- Child Report	158	4.00	16.00	12.15	2.70

Main Analyses

The relations between child technology use, child coping, and child mental health symptoms (i.e., anxiety and depression) during the COVID-19 pandemic were explored by analyzing responses from select data from The Screen for Child Anxiety Related Emotional Disorders (*SCARED*; Birmaher et al., 1997), The Short Mood and Feelings Questionnaire (*SMFQ*; Angold et al., 1995), and modified version of the The CoRonavIruS Health Impact Survey V0.3 *(CRISIS;* Merikangas et al., 2020; Nikolaidis et al., 2021) taken approximately three months into the pandemic. These questionnaires facilitated an examination of caregiver self-reports of child anxiety and depression symptoms, as well as factors such as COVID-19 exposure, impacts on mental health, media use, and social connection. All analyses were conducted using Statistical Package for the Social Sciences (SPSS 28; IBM Corp).

Hypothesis 1

Hypothesis 1, which predicted that children's technology use has increased during the pandemic, was partially supported. Chi-square tests were used to examine the changes in caregiver and child reports of the frequency of technology use from the pre-pandemic time point (3 months before the pandemic) to the early pandemic time point. All chi-square tests were significant (see Table 3), indicating that there were significant differences between frequencies of technology use from the pre-pandemic timeline to the early pandemic timeline.

Shifts in patterns of technology use from the pre-pandemic timeline to the early pandemic timeline were found (see Table 2). Generally, greater percentages of participants reported higher frequency of technology use in the early pandemic timeline, compared to the pre-pandemic timeline. For caregiver-rated child television use, those who reported that their children watched television between 4 to 6 hours increased from 6.3% to 29.5%, and those who reported that their

children watched television for more than 6 hours increased from 2.6% to 11.1%. Additionally, children who reported that they watched television between 4 to 6 hours increased from 8.9% to 21.6%, and those who reported that they watched television for over 6 hours increased from 2.1% to 6.8%.

For caregiver-rated child internet use, those who reported that their children used the internet between 4 to 6 hours increased from 6.3% to 15.8%, and those who reported that their children used the internet for more than 6 hours increased from 2.6% to 9.5%. Additionally, children who reported that they used the internet between 4 to 6 hours increased from 7.9% to 9.5%, and those who reported that they used the internet for over 6 hours increased from 2.6% to 7.9%.

For caregiver-rated child social media use, those who reported that their children used social media between 4 to 6 hours increased from 2.1% to 11.6%, and those who reported that their children used social media for more than 6 hours increased from 1.1% to 5.8%. Additionally, children who reported that they used social media between 4 to 6 hours increased from 4.7% to 7.4%, and those who reported that they used social media for over 6 hours increased from 1.6% to 6.8%.

For caregiver-rated child texting, those who reported that their children texted between 4 to 6 hours increased from 3.7% to 10.0%, and those who reported that their children texted for more than 6 hours increased from 0% to 3.2%. Additionally, children who reported that they texted between 4 to 6 hours increased from 1.1% to 5.3%, and those who reported that they texted for over 6 hours increased from 0.5% to 2.6%.

For caregiver-rated child video game use, those who reported that their children used video games between 4 to 6 hours increased from 5.8% to 17.4%, and those who reported that

their children used video games for more than 6 hours increased from 3.2% to 11.6%. Additionally, children who reported that they used video games between 4 to 6 hours increased from 3.7% to 13.2%, and those who reported that they used video games for over 6 hours increased from 4.2% to 8.9%.

The shift in patterns of the frequency of technology use were not as clear for computer use; patterns that did shift were not always in the hypothesized direction. For example, caregiver reports of their children not using the computer increased from 23.7% to 29.5% from the pre-pandemic time point to the early pandemic time point, and child reports of not using the computer similarly increased from 16.8% to 24.2%. Additionally, caregiver reports of their children using the computer between 1 to 3 hours decreased from 31.6% to 27.4%, and child reports of using the computer between 1 to 3 hours increased from 20.5% to 25.3%.

A large percentage of caregivers and children reported that their child/they had low frequencies of certain types of technology use (see Table 2). A large majority of caregivers and children reported low amounts of child social media use both prior to and during the pandemic. Prior to the pandemic, 55.3% of caregivers and 32.1% of children reported no social media use by the child, and during the pandemic, 36.3% of caregivers and 26.3% of children reported no use. There were also high numbers of no use reported for texting both prior to (caregiver report = 41.1%, child report = 26.3%) and during the pandemic (caregiver report = 18.4%, child report = 14.7%). No use was also relatively high for video games both prior to (caregiver report = 24.7%, child report = 29.5%) and during the pandemic (caregiver report = 18.4%, child report = 24.2%).

Table 2

Caregiver and Child Reports of Frequency of Technology Use

	No Use		Under 1 Hour		1-3 Hours		4-6 Hours		More Than 6 Hours	
Media Type	*n*	%	*n*	%	*n*	%	*n*	%	*n*	%
Television										
Caregiver Past	4	2.1	37	19.5	132	69.5	12	6.3	5	2.6
Caregiver Current	3	1.6	14	7.4	96	50.5	56	29.5	21	11.1
Child Past	2	1.1	37	19.5	98	51.6	17	8.9	4	2.1
Child Current	1	0.5	18	9.5	85	44.7	41	21.6	13	6.8
Internet										
Caregiver Past	7	3.7	85	44.7	81	42.6	12	6.3	5	2.6
Caregiver Current	1	0.5	38	20.0	103	54.2	30	15.8	18	9.5
Child Past	9	4.7	72	37.9	57	30.0	15	7.9	5	2.6
Child Current	3	1.6	53	27.9	69	36.3	18	9.5	15	7.9
Social Media										
Caregiver Past	105	55.3	44	23.2	34	17.9	4	2.1	2	1.1
Caregiver Current	69	36.3	44	23.2	44	23.2	22	11.6	11	5.8
Child Past	61	32.1	41	21.6	44	23.2	9	4.7	3	1.6
Child Current	50	26.3	34	17.9	47	24.7	14	7.4	13	6.8
Texting										
Caregiver Past	78	41.1	83	43.7	22	11.6	7	3.7	0	0
Caregiver Current	35	18.4	92	48.4	38	20.0	19	10.0	6	3.2
Child Past	50	26.3	65	34.2	40	21.1	2	1.1	1	0.5
Child Current	28	14.7	74	38.9	41	21.6	10	5.3	5	2.6
Video Games										
Caregiver Past	47	24.7	61	32.1	65	34.2	11	5.8	6	3.2
Caregiver Current	35	18.4	41	21.6	59	31.1	33	17.4	22	11.6
Child Past	56	29.5	43	22.6	44	23.2	7	3.7	8	4.2
Child Current	46	24.2	26	13.7	44	23.2	25	13.2	17	8.9
Computer										
Caregiver Past	45	23.7	75	39.5	60	31.6	7	3.7	3	1.6
Caregiver Current	56	29.5	64	33.7	52	27.4	13	6.8	5	2.6
Child Past	32	16.8	73	38.4	39	20.5	11	5.8	3	1.6
Child Current	46	24.2	51	26.8	48	25.3	9	4.7	4	2.1

Note. "Past" refers to 3 months before the start of the pandemic, and "Current" refers to the last 2 weeks during which the participant completed the questionnaire (approximately three months into the pandemic). For caregivers, N =190, and for children, N =158.

Table 3

Chi-Square Test Results for Frequencies of Using Technology from Pre-Pandemic to Early Pandemic

	Caregiver Report				Child Report			
Type of Media	χ^2	*df*	*N*	*p*	χ^2	*df*	*N*	*p*
Television	132.89	16	190	**<.001**	193.64	16	158	**<.001**
Internet	135.05	16	190	**<.001**	108.52	16	158	**<.001**
Social Media	148.65	16	189	**<.001**	148.04	16	158	**<.001**
Texting	101.80	12	190	**<.001**	168.76	16	158	**<.001**
Video Games	225.62	16	190	**<.001**	213.58	16	158	**<.001**
Computer	84.10	16	190	**<.001**	103.95	16	158	**<.001**

Hypothesis 2

Hypothesis 2, which predicted that problem-focused technology-based coping strategies would be associated with children feeling better, and emotion-focused technology-based coping strategies would be associated with children feeling worse, was partially supported.

Frequencies were examined for the purpose behind how using technology made children feel (see Table 4) and the different types of technology that children used (see Table 5). As the frequencies showed that there were many different purposes behind technology use endorsed, further analyses were conducted within each media type, rather than collapsing scores across different types of media.

Correlation and partial correlation analyses (controlling for age and/or sex of the child) were used to examine whether higher levels of using either problem-focused or emotion-focused technology-based coping strategies were associated with scores on the *CRISIS* relating to how using the technology made the child feel (from a lot better to a lot worse; see Table 6). Of note, for the variable relating to how technology use made the child feel, higher scores were related to feeling worse and lower scores were related to feeling better.

In support of the hypothesis, for caregiver reports, significant associations were found between children feeling better and higher proportions of internet-based (i.e., using the internet for web searches that they were interested in) social problem-focused coping strategies, pr = -.15, p = .04, and computer-based (i.e., using the computer for school or general computing purposes such as writing a story, drawing a picture, or writing an assignment) social problem-focused coping strategies used, r = -.23, p = .002. Additionally, significant associations were found between children feeling worse and higher proportions of computer-based emotion-focused coping strategies used, r = .20, p = .01.

For child reports, significant associations were found between children feeling better and higher proportions of social media-based problem-focused coping strategies, $r = -.23$, $p = .02$, social media-based social problem-focused coping strategies, $r = -.22$, $p = .02$, video game-based problem-focused coping strategies, $r = -.22$, p = .02, video game-based social problem-focused coping strategies, $r = -.21$, $p = .03$, and computer-based social problem-focused coping strategies, $r = -.21$, $p = .02$ used. Additionally, a significant association was found between children feeling worse and a higher proportion of social media-based emotion-focused coping strategies used, $r = .28$, $p = .002$.

In contradiction to the hypothesis, for caregiver reports, significant associations were found between children feeling worse and higher proportions of computer-based problem-focused coping strategies, $r = .19$, $p = .02$, and computer-based non-social problem-focused coping strategies used, $r = .30$, $p < .001$.

Table 4

Caregiver and Child Reports on How Using Technology Made the Child Feel

Media Type	No Use (%)	Lot Better (%)	Little Better (%)	No Change (%)	Little Worse (%)	Lot Worse (%)
Television						
Caregiver (*N*= 190)	1.1	14.2	42.6	34.2	6.3	1.6
Child (*N*= 158)	0.5	10.5	36.3	32.1	2.1	1.6
Internet						
Caregiver (*N*= 190)	1.1	15.3	40.0	35.8	5.8	2.1
Child (*N*= 158)	0	13.2	31.1	34.7	3.7	0.5
Social Media						
Caregiver (*N*= 185)	28.4	15.8	33.7	14.7	4.2	0.5
Child (*N*=156)	20.0	13.2	23.2	23.2	2.1	0.5
Texting						
Caregiver (*N*= 189)	16.8	16.8	45.8	17.9	1.6	0.5
Child (*N*=156)	11.1	16.3	30.5	23.7	0.5	0
Video Games						
Caregiver (*N*= 189)	16.3	23.2	34.7	23.7	1.6	0
Child (*N*= 158)	21.6	18.9	18.4	23.7	0.5	0
Computer						
Caregiver (*N*= 188)	10.5	11.1	31.1	35.3	7.9	3.2
Child (*N*= 156)	12.1	6.8	21.6	38.4	2.1	1.1

Table 5

Frequencies of Participant-Reported Purposes of Using Each Type of Technology

	Purpose of Technology Use										
Media Type	0	1	2	3	4	5	6	7	8	9	10
Television											
Caregiver (*N*= 190)	2	21	24	120	43	54	161	92	73	6	6
Child (*N*= 158)	1	19	27	86	36	25	119	51	43	7	10
Internet											
Caregiver (*N*= 190)	2	21	29	108	49	82	139	86	62	8	8
Child (*N*=157)	0	24	27	78	24	45	107	58	49	7	16
Social Media											
Caregiver (*N*= 189)	62	5	17	57	45	24	73	112	73	10	4
Child (*N*= 157)	45	9	19	53	23	17	67	91	64	13	4
Texting											
Caregiver (*N*= 188)	35	1	12	37	45	18	56	134	121	4	1
Child (*N*= 157)	26	5	10	32	24	19	42	116	102	3	1
Video Games											
Caregiver (*N*= 189)	36	0	23	95	47	3	125	78	17	13	7
Child (*N*= 158)	44	2	21	60	22	4	91	52	18	11	10
Computer											
Caregiver (*N*= 190)	23	18	12	28	16	136	50	31	12	4	4
Child (*N*= 157)	33	13	7	22	9	92	37	32	16	3	12

Note. 0 = does not use that type of media, 1 = to seek information about COVID-19, 2 = to reduce worry, 3 = to distract themselves, 4 = to reduce feelings of loneliness, 5 = to keep up with schoolwork, 6 = so that they will not be bored/to pass the time, 7 = to keep in touch with friends, 8 = to keep in touch with family, 9 = to meet new people, 10 = other.

Table 6

Correlations between Impact of Using Media and Proportion of Problem- or Emotion-Focused Coping Strategies Used

	Caregiver Report			Child Report		
Coping Strategy	*N*	*r*	*p*	*N*	*r*	*p*
Television						
Problem-Focused	188	-0.04	0.58	157	-0.07	0.38
Social Problem-Focused	188	-0.05	0.53	157	-0.05	0.53
Non-Social Problem- Focused	188	-0.01	0.86	157	-0.07	0.40
Emotion-Focused	188	0.01	0.90	157	0.02	0.86
Internet						
Problem-Focused	188	-0.13 [a]	0.08	158	0.03	0.69
Social Problem-Focused	188	**-0.15*** [a]	0.04	158	-0.08	0.31
Non-Social Problem-Focused	188	-0.01 [a]	0.87	158	0.12	0.13
Emotion-Focused	188	0.11 [a]	0.13	158	0.03	0.67
Social Media						
Problem-Focused	124	-0.07	0.44	112	**-0.23***	0.02
Social Problem-Focused	124	-0.10	0.26	112	**-0.22***	0.02
Non-Social Problem-Focused	124	0.07	0.44	112	-0.05	0.58
Emotion-Focused	124	0.07	0.47	112	**0.28****	0.002
Texting						
Problem-Focused	153	-0.09 [a]	0.28	131	0.12 [a]	0.19
Social Problem-Focused	153	-0.03 [a]	0.71	131	0.14 [a]	0.12
Non-Social Problem-Focused	153	-0.13 [a]	0.12	131	-0.07 [a]	0.46
Emotion-Focused	153	0.09 [a]	0.28	131	-0.12 [a]	0.16
Video Games						
Problem-Focused	155	-0.13 [b]	0.11	115	**-0.22***	0.02
Social Problem-Focused	155	-0.14 [b]	0.09	115	**-0.21***	0.03
Non-Social Problem-Focused	155	0.03 [b]	0.73	115	-0.06	0.52
Emotion-Focused	155	0.11 [b]	0.17	115	**0.19***	0.04
Computer						
Problem-Focused	167	**0.19***	0.02	123	-0.01	0.95
Social Problem-Focused	167	**-0.23****	0.002	123	**-0.21***	0.02
Non-Social Problem-Focused	167	**0.30****	<0.001	123	0.12	0.20
Emotion-Focused	167	**0.20***	0.01	123	-0.18	0.05

Note. Coping strategies are calculated as a proportion (number of problem/emotion-focused coping strategies used out of all coping strategies endorsed on the *CRISIS*). Impact of media use was measured on a 5-point scale, with 1= it made them feel a lot better, 2 = it made them feel a little better, 3 = it did not make them feel better or worse, 4 = it made them feel a little worse, and 5 = it made them feel a lot worse.

*Correlation is significant at the 0.05 level (2-tailed).

**Correlation is significant at the 0.01 level (2-tailed).

[a] Partial correlation controlling for child age.

[b] Partial correlation controlling for child age and sex of the child.

Hypothesis 3

Hypothesis 3, which predicted that caregivers and children who reported more child depression and anxiety symptoms would also report more emotion-focused technology-based coping patterns, was partially supported. All significant results found were in support of the hypothesis, however, there were numerous variables for which no association was found.

Separate regression analyses were used to determine whether depression or anxiety symptoms obtained from the *SMFQ* and *SCARED*, respectively, were associated with technology use patterns in children. Total *SMFQ* and *SCARED* scores were used as the predictor variables in the regression analyses, and the proportion of problem-focused, social problem-focused, non-social problem-focused, and emotion-focused coping strategies used were used as the outcome variables.

Results of the linear regression analyses between total scores on the caregiver *SCARED* and the proportion of problem- or emotion-focused coping strategies used by children are presented in Table 7. Total caregiver *SCARED* scores significantly predicted the proportion of internet-based emotion-focused coping strategies used by children. Total caregiver *SCARED* scores explained 1.9% of the variance, and higher total caregiver *SCARED* scores were significantly associated with higher proportions of internet-based emotion-focused coping strategies used. Additionally, total caregiver *SCARED* scores significantly predicted the proportion of social media-based problem-focused coping strategies used by children. Total caregiver *SCARED* scores explained 3.7% of the variance, and higher total caregiver *SCARED* scores were significantly associated with lower proportions of social media-based problem-focused coping strategies. Total caregiver *SCARED* scores also significantly predicted the proportion of social media-based emotion-focused coping strategies used by children. Total

caregiver *SCARED* scores explained 5.6% of the variance, and higher total caregiver *SCARED* scores were significantly associated with higher proportions of social media-based emotion-focused coping strategies. Total caregiver *SCARED* scores significantly predicted the proportion of texting-based social problem-focused coping strategies used by children. Total caregiver *SCARED* scores explained 2.4% of the variance, and higher total caregiver *SCARED* scores were significantly associated with lower proportions of texting-based social problem-focused coping strategies.

Results of the linear regression analyses between total scores on the child *SCARED* and the proportion of problem- or emotion-focused coping strategies used by children are presented in Table 8. Total child *SCARED* scores significantly predicted the proportion of texting-based problem-focused coping strategies used by children. Total child *SCARED* scores explained 3.3% of the variance, and higher total child *SCARED* scores were significantly associated with lower proportions of texting-based problem-focused coping strategies. Additionally, total child *SCARED* scores significantly predicted the proportion of texting-based emotion-focused coping strategies used by children. Total child *SCARED* scores explained 2.4% of the variance, and higher total child *SCARED* scores were significantly associated with higher proportions of texting-based emotion-focused coping strategies. Total child *SCARED* scores also significantly predicted the proportion of video game-based non-social problem-focused coping strategies used by children. Total child *SCARED* scores explained 4.1% of the variance, and higher total child *SCARED* scores were significantly associated with lower proportions of video game-based non-social problem-focused coping strategies. Total child *SCARED* scores significantly predicted the proportion of video game-based emotion-focused coping strategies used by children. Total child *SCARED* scores explained 3.2% of the variance, and higher total child *SCARED* scores were

significantly associated with higher proportions of video game-based emotion-focused coping strategies. Furthermore, total child *SCARED* scores significantly predicted the proportion of computer-based social problem-focused coping strategies used by children. Total child *SCARED* scores explained 2.6% of the variance, and higher total child *SCARED* scores were significantly associated with lower proportions of computer-based social problem-focused coping strategies.

Results of the linear regression analyses between total scores on the caregiver *SMFQ* and the proportion of problem- or emotion-focused coping strategies used by children are presented in Table 9. Total caregiver *SMFQ* scores significantly predicted the proportion of internet-based non-social problem-focused coping strategies used by children. Total caregiver *SMFQ* scores explained 1.5% of the variance, and higher total caregiver *SMFQ* scores were significantly associated with lower proportions of internet-based non-social problem-focused coping strategies. Additionally, total caregiver *SMFQ* scores significantly predicted the proportion of texting-based problem-focused coping strategies used by children. Total caregiver *SMFQ* scores explained 7.5% of the variance, and higher total caregiver *SMFQ* scores were significantly associated with lower proportions of texting-based problem-focused coping strategies. Total caregiver *SMFQ* scores also significantly predicted the proportion of texting-based social problem-focused coping strategies used by children. Total caregiver *SMFQ* scores explained 5.4% of the variance, and higher total caregiver *SMFQ* scores were significantly associated with lower proportions of texting-based social problem-focused coping strategies. Furthermore, total caregiver *SMFQ* scores significantly predicted the proportion of texting-based emotion-focused coping strategies used by children. Total caregiver *SMFQ* scores explained 8.6% of the variance, and higher total caregiver *SMFQ* scores were significantly associated with higher proportions of texting-based emotion-focused coping strategies.

Results of the linear regression analyses between total scores on the child *SMFQ* and the proportion of problem- or emotion-focused coping strategies used by children are presented in Table 10. Total child *SMFQ* scores significantly predicted the proportion of television-based problem-focused coping strategies used by children. Total child *SMFQ* scores explained 2.6% of the variance, and higher total child *SMFQ* scores were significantly associated with lower proportions of television-based problem-focused coping strategies. Total child *SMFQ* scores also significantly predicted the proportion of television-based social problem-focused coping strategies used by children. Total child *SMFQ* scores explained 2.2% of the variance, and higher total child *SMFQ* scores were significantly associated with lower proportions of television-based social problem-focused coping strategies. Additionally, total child *SMFQ* scores significantly predicted the proportion of television-based emotion-focused coping strategies used by children. Total child *SMFQ* scores explained 2.7% of the variance, and higher total child *SMFQ* scores were significantly associated with higher proportions of television-based emotion-focused coping strategies. Furthermore, total child *SMFQ* scores significantly predicted the proportion of internet-based problem-focused coping strategies used by children. Total child *SMFQ* scores explained 2.5% of the variance, and higher total child *SMFQ* scores were significantly associated with lower proportions of internet-based problem-focused coping strategies. Total child *SMFQ* scores also significantly predicted the proportion of texting-based problem-focused coping strategies used by children. Total child *SMFQ* scores explained 2.6% of the variance, and higher total child *SMFQ* scores were significantly associated with lower proportions of texting-based problem-focused coping strategies.

In sum, patterns generally showed that for many of the types of technology, higher total scores for caregiver and child reports on the *SCARED* and *SMFQ* were associated with higher

proportions of emotion-focused and lower proportions of problem-focused coping strategies being used.

Table 7

Linear Regressions Between Total Scores on Caregiver SCARED and Proportion of Problem- or Emotion-Focused Coping Strategies Reported by Caregivers

Coping Strategy	*B*	*SE B*	*β*	*t*	*p*	*F(df)*	*p*	Adjusted R^2
Television								
Problem-Focused	-0.002	0.002	-0.09	-1.22	0.23	1.49 (1,166)	0.23	0.003
Social Problem-Focused	-0001	0.001	-0.08	-1.08	0.28	1.16 (1, 166)	0.28	0.001
Non-Social Problem-Focused	-0.001	0.001	-0.65	-0.84	0.40	0.71 (1, 166)	0.40	-0.002
Emotion-Focused	0.003	0.002	0.14	1.87	0.06	3.48 (1, 166)	0.06	0.015
Internet								
Problem-Focused	-0.003	0.002	-0.14	-1.76	0.08	3.09 (1, 166)	0.08	0.012
Social Problem-Focused	-0.001	0.001	-0.07	-0.93	0.35	0.87 (1, 166)	0.35	-0.001
Non-Social Problem-Focused	-0.002	0.001	-0.11	-1.38	0.17	1.90 (1, 166)	0.17	0.005
Emotion-Focused	0.004	0.002	0.16	2.07	**0.04**	4.29 (1, 166)	0.04	0.019
Social Media								
Problem-Focused	-0.005	0.002	-0.21	-2.30	**0.02**	5.30 (1, 112)	0.02	0.037
Social Problem-Focused	-0.004	0.002	-0.17	-1.80	0.07	3.26 (1, 112)	0.07	0.020
Non-Social Problem-Focused	-0.001	0.001	-0.07	-0.77	0.45	0.59 (1, 112)	0.45	-0.004
Emotion-Focused	0.006	0.002	0.25	2.78	**0.006**	7.72 (1, 112)	0.006	0.056
Texting								
Problem-Focused	-0.003	0.002	-0.16	-1.92	0.06	3.67 (1, 138)	0.06	0.019
Social Problem-Focused	-0.004	0.002	-0.18	-2.12	**0.04**	4.48 (1, 138)	0.04	0.024
Non-Social Problem-Focused	0.000	0.001	0.05	0.58	0.56	0.34 (1, 138)	0.56	-0.005
Emotion-Focused	0.003	0.002	0.16	1.92	0.06	3.67 (1, 138)	0.06	0.019
Video Games								
Problem-Focused	0.000	0.002	-0.03	-0.29	0.77	0.09 (1, 138)	0.77	-0.007
Social Problem-Focused	-0.001	0.002	-0.03	-0.37	0.71	0.14 (1, 138)	0.71	-0.006
Non-Social Problem-Focused	0.000	0.000	0.05	0.57	0.57	0.32 (1, 138)	0.57	-0.005
Emotion-Focused	0.001	0.002	0.03	0.37	0.71	0.14 (1, 138)	0.71	-0.006
Computer								
Problem-Focused	0.001	0.002	0.02	0.28	0.78	0.08 (1, 149)	0.78	-0.006
Social Problem-Focused	-0.001	0.001	-0.08	-0.92	0.36	0.85 (1, 149)	0.36	-0.001
Non-Social Problem-Focused	0.002	0.003	0.06	0.76	0.45	0.57 (1, 149)	0.45	-0.003
Emotion-Focused	-0.001	0.002	-0.03	-0.35	0.73	0.12 (1, 149)	0.73	-0.006

Note. Coping strategies are calculated as a proportion (number of problem/emotion-focused coping strategies used out of all coping strategies endorsed on the *CRISIS*).

Table 8

Linear Regressions Between Total Scores on Child SCARED and Proportion of Problem- or Emotion-Focused Coping Strategies Reported by Children

Coping Strategy	*B*	*SE B*	*β*	*t*	*p*	*F(df)*	*p*	Adjusted R^2
Television								
Problem-Focused	-0.002	0.002	-0.10	-0.19	0.24	1.42 (1, 140)	0.24	0.003
Social Problem-Focused	-0.002	0.001	-0.13	-1.57	0.12	2.46 (1, 140)	0.12	0.010
Non-Social Problem-Focused	0.000	0.001	0.01	0.07	0.95	0.01 (1, 140)	0.95	-0.007
Emotion-Focused	0.003	0.002	0.12	1.42	0.16	2.01 (1, 140)	1.16	0.007
Internet								
Problem-Focused	-0.002	0.002	-0.08	-0.91	0.36	0.83 (1, 141)	0.36	-0.001
Social Problem-Focused	-0.002	0.002	-0.11	-1.25	0.21	1.57 (1, 141)	0.21	0.004
Non-Social Problem-Focused	0.000	0.002	0.001	0.02	0.99	0.00 (1, 141)	0.99	-0.007
Emotion-Focused	0.002	0.002	0.08	0.93	0.36	0.86 (1, 141)	0.36	-0.001
Social Media								
Problem-Focused	-0.001	0.002	-0.04	-0.44	0.66	0.19 (1, 100)	0.66	-0.008
Social Problem-Focused	-0.001	0.002	-0.03	-0.25	0.81	0.06 (1, 100)	0.81	-0.009
Non-Social Problem-Focused	0.000	0.001	-0.06	-0.59	0.56	0.35 (1, 100)	0.56	-0.006
Emotion-Focused	0.002	0.002	0.09	0.89	0.38	0.79 (1, 100)	0.38	-0.002
Texting								
Problem-Focused	-0.004	0.002	-0.20	-2.24	**0.03**	5.00 (1, 118)	0.03	0.033
Social Problem-Focused	-0.004	0.002	-0.17	-1.92	0.06	3.69 (1, 118)	0.06	0.022
Non-Social Problem-Focused	0.000	0.001	-0.04	-0.42	0.68	0.17 (1, 118)	0.68	-0.007
Emotion-Focused	0.004	0.002	0.18	1.98	**0.05**	3.93 (1, 118)	0.05	0.024
Video Games								
Problem-Focused	-0.004	0.002	-0.17	-1.78	0.08	3.17 (1, 103)	0.08	0.020
Social Problem-Focused	-0.001	0.002	-0.06	-0.56	0.58	0.31 (1, 103)	0.58	-0.007
Non-Social Problem-Focused	-0.003	0.001	-0.23	-2.34	**0.02**	5.47 (1, 103)	0.02	0.041
Emotion-Focused	0.005	0.002	0.20	2.11	**0.04**	4.43 (1, 103)	0.04	0.032
Computer								
Problem-Focused	0.000	0.003	0.01	0.15	0.89	0.02 (1, 112)	0.89	-0.009
Social Problem-Focused	-0.003	0.001	-0.19	-2.01	**0.05**	4.04 (1, 112)	0.05	0.026
Non-Social Problem-Focused	0.003	0.003	0.12	1.29	0.20	1.66 (1, 112)	0.20	0.006
Emotion-Focused	0.000	0.002	0.01	0.13	0.90	0.02 (1, 112)	0.90	-0.009

Note. Coping strategies are calculated as a proportion (number of problem/emotion-focused coping strategies used out of all coping strategies endorsed on the *CRISIS*).

Table 9

Linear Regressions Between Total Scores on Caregiver SMFQ and Proportion of Problem- or Emotion-Focused Coping Strategies Reported by Caregivers

Coping Strategy	*B*	*SE B*	*β*	*t*	*p*	*F(df)*	*p*	Adjusted R^2
Television								
Problem-Focused	-0.002	0.004	-0.03	-0.39	0.69	0.16 (1, 182)	0.69	-0.005
Social Problem-Focused	-0.002	0.003	-0.05	-0.62	0.54	0.39 (1, 182)	0.54	-0.003
Non-Social Problem-Focused	0.000	0.002	0.01	0.14	0.89	0.02 (1, 182)	0.89	-0.005
Emotion-Focused	0.005	0.004	0.08	1.12	0.26	1.26 (1, 182)	0.26	0.001
Internet								
Problem-Focused	-0.005	0.004	-0.09	-1.20	0.23	1.45 (1, 181)	0.23	0.002
Social Problem-Focused	0.001	0.003	0.02	0.32	0.75	0.10 (1, 181)	0.75	-0.005
Non-Social Problem-Focused	-0.006	0.003	-0.14	-1.95	**0.05**	3.82 (1, 181)	0.05	0.015
Emotion-Focused	0.006	0.004	0.11	1.45	0.15	2.09 (1, 181)	0.15	0.006
Social Media								
Problem-Focused	-0.005	0.005	-0.08	-0.91	0.37	0.83 (1, 125)	0.37	-0.001
Social Problem-Focused	-0.006	0.005	-0.09	-1.03	0.30	1.07 (1, 125)	0.30	0.001
Non-Social Problem-Focused	0.001	0.003	0.03	0.30	0.76	0.09 (1, 125)	0.76	-0.007
Emotion-Focused	0.006	0.005	0.10	1.07	0.29	1.15 (1, 125)	0.29	0.001
Texting								
Problem-Focused	-0.015	0.004	-0.29	-3.64	**<0.001**	13.23 (1, 149)	<0.001	0.075
Social Problem-Focused	-0.014	0.004	-0.25	-3.08	**0.002**	9.51 (1, 149)	0.002	0.054
Non-Social Problem-Focused	-0.002	0.002	-0.08	-0.93	0.35	0.87 (1, 149)	0.35	-0.001
Emotion-Focused	0.016	0.004	0.30	3.89	**<0.001**	15.12 (1, 149)	<0.001	0.086
Video Games								
Problem-Focused	-0.004	0.004	-0.07	-0.87	0.38	0.76 (1, 151)	0.38	-0.002
Social Problem-Focused	-0.004	0.004	-0.08	-0.93	0.35	0.86 (1, 151)	0.35	-0.001
Non-Social Problem-Focused	0.000	0.000	0.03	0.32	0.75	0.10 (1, 151)	0.75	-0.006
Emotion-Focused	0.008	0.004	0.14	1.71	0.09	2.91 (1, 151)	0.09	0.012
Computer								
Problem-Focused	-0.002	0.005	-0.03	-0.39	0.70	0.15 (1, 162)	0.70	-0.005
Social Problem-Focused	-0.004	0.003	-0.09	-1.15	0.25	1.31 (1, 162)	0.25	0.002
Non-Social Problem-Focused	0.002	0.006	0.02	0.28	0.78	0.08 (1, 162)	0.78	-0.006
Emotion-Focused	0.002	0.005	0.03	0.40	0.69	0.16 (1, 162)	0.69	-0.005

Note. Coping strategies are calculated as a proportion (number of problem/emotion-focused coping strategies used out of all coping strategies endorsed on the *CRISIS*).

Table 10

Linear Regressions Between Total Scores on Child SMFQ and Proportion of Problem- or Emotion-Focused Coping Strategies Reported by Children

Coping Strategy	*B*	*SE B*	*β*	*t*	*p*	*F(df)*	*p*	Adjusted R^2
Television								
Problem-Focused	-0.011	0.005	-0.18	-2.25	**0.03**	5.05 (1, 148)	0.03	0.026
Social Problem-Focused	-0.008	0.004	-0.17	-2.08	**0.04**	4.34 (1, 148)	0.04	0.022
Non-Social Problem-Focused	-0.003	0.002	-0.11	-1.31	0.19	1.71 (1, 148)	0.19	0.005
Emotion-Focused	0.012	0.005	0.18	2.25	**0.03**	5.06 (1, 148)	0.03	0.027
Internet								
Problem-Focused	-0.012	0.005	-0.18	-2.21	**0.03**	4.89 (1, 149)	0.03	0.025
Social Problem-Focused	-0.005	0.004	-0.10	-1.17	0.25	1.36 (1, 149)	0.25	0.002
Non-Social Problem-Focused	-0.007	0.004	-0.14	-1.77	0.08	3.12 (1, 149)	0.08	0.014
Emotion-Focused	0.010	0.006	0.15	1.82	0.07	3.31 (1, 149)	0.07	0.015
Social Media								
Problem-Focused	-0.007	0.006	-0.11	-1.12	0.23	1.43 (1, 108)	0.23	0.004
Social Problem-Focused	-0.004	0.006	-0.07	-0.74	0.46	0.55 (1, 108)	0.46	-0.004
Non-Social Problem-Focused	-0.003	0.002	-0.13	-1.36	0.18	1.84 (1, 108)	0.18	0.008
Emotion-Focused	0.009	0.006	0.15	1.56	0.12	2.43 (1, 108)	0.12	0.013
Texting								
Problem-Focused	-0.010	0.005	-0.18	-2.08	**0.04**	4.31 (1, 124)	0.04	0.026
Social Problem-Focused	-0.008	0.005	-0.15	-1.68	0.10	2.83 (1, 124)	0.10	0.014
Non-Social Problem-Focused	-0.001	0.002	-0.05	-0.52	0.61	0.27 (1, 124)	0.61	-0.006
Emotion-Focused	0.008	0.004	0.15	1.74	0.08	3.03 (1, 124)	0.08	0.016
Video Games								
Problem-Focused	-0.008	0.005	-0.15	-1.54	0.13	2.37 (1, 110)	0.13	0.012
Social Problem-Focused	-0.005	0.005	-0.10	-1.01	0.31	1.02 (1, 110)	0.31	0.000
Non-Social Problem-Focused	-0.003	0.003	-0.11	-1.15	0.25	1.33 (1, 110)	0.25	0.003
Emotion-Focused	0.010	0.006	0.16	1.67	0.10	2.79 (1, 110)	0.10	0.016
Computer								
Problem-Focused	-0.001	0.006	-0.02	-0.24	0.82	0.06 (1, 118)	0.82	-0.008
Social Problem-Focused	-0.008	0.004	-0.17	-1.90	0.06	3.62 (1, 118)	0.06	0.022
Non-Social Problem-Focused	0.006	0.007	0.09	0.94	0.35	0.88 (1, 118)	0.35	-0.001
Emotion-Focused	0.004	0.006	0.07	0.74	0.46	0.54 (1, 118)	0.46	-0.004

Note. Coping strategies are calculated as a proportion (number of problem/emotion-focused coping strategies used out of all coping strategies endorsed on the *CRISIS*).

Hypothesis 4

Hypothesis 4, which predicted that technology used for social support during the pandemic would help children feel better, whereas technology used as a distraction from the pandemic would not help them feel better, was partially supported. Correlation and partial correlation analyses (controlling for age and/or sex of the child) were used to examine whether higher levels of using technology for either social support or as a distraction were associated with scores on the *CRISIS* relating to how using the technology made the child feel (from a lot better to a lot worse; see Table 6). Of note, this analysis was similar to the correlation analysis from Hypothesis 2, as social problem-focused and social-focused technology are equivalent. However, Hypothesis 4 examines differences between social-focused coping and using technology as a distraction, specifically, rather than using technology in an emotion-focused way more generally. Results of these analyses are presented in Table 11.

In support of the hypothesis, for caregiver reports, significant associations were found between children feeling better and higher proportions of internet-based (i.e., using the internet for web searches that they were interested in) social-focused technology use, *pr* = -.15, *p* = .04, and computer-based (i.e., using the computer for school or general computing purposes such as writing a story, drawing a picture, or writing an assignment) social-focused technology use, *r* = -.23, *p* = .002.

For child reports, significant associations were found between children feeling better and higher proportions of social media-based social-focused technology use, *r* = -.22 *p* = .02, video game-based social-focused technology use, *r* = -.21, *p* = .03, and computer-based social-focused technology use, *r* = -.21, *p* = .02. Additionally, a significant association was found between

children feeling worse and a higher proportion of social media-based distraction-focused technology use, $r = .22$, $p = .02$.

In contradiction to the hypothesis, for caregiver reports, a significant association was found between children feeling better and a higher proportion of computer-based distraction-focused technology use, $r = -.16$, $p = .04$.

Table 11

Correlations between Impact of Using Media and Proportion of Social- or Distraction-Focused Coping Strategies Used

	Caregiver Report			Child Report		
Coping Strategy	*N*	*r*	*p*	*N*	*r*	*p*
Television						
Social-Focused	188	-0.05	0.53	157	-0.05	0.53
Distraction- Focused	188	-0.03	0.72	157	0.09	0.25
Internet						
Social- Focused	188	**-0.15*** [a]	0.04	158	-0.08	0.31
Distraction- Focused	188	0.12 [a]	0.10	158	0.10	0.21
Social Media						
Social- Focused	124	-0.10	0.26	112	**-0.22***	0.02
Distraction- Focused	124	-0.02	0.80	112	**0.22***	0.02
Texting						
Social- Focused	153	-0.03 [a]	0.71	131	0.14	0.12 [a]
Distraction- Focused	153	0.08 [a]	0.31	131	-0.11	0.23 [a]
Video Games						
Social- Focused	155	-0.14 [b]	0.09	115	**-0.21***	0.03
Distraction- Focused	155	0.01 [b]	0.94	115	-0.05	0.61
Computer						
Social- Focused	167	**-0.23****	0.002	123	**-0.21***	0.02
Distraction- Focused	167	**-0.16***	0.04	123	-0.03	0.73

Note. Coping strategies are calculated as a proportion (number of problem/emotion-focused coping strategies used out of all coping strategies endorsed on the *CRISIS*). Impact of media use was measured on a 5-point scale, with 1= it made them feel a lot better, 2 = it made them feel a little better, 3 = it did not make them feel better or worse, 4 = it made them feel a little worse, and 5 = it made them feel a lot worse.

*Correlation is significant at the 0.05 level (2-tailed).

**Correlation is significant at the 0.01 level (2-tailed).

[a] Partial correlation controlling for child age.

[b] Partial correlation controlling for child age and sex of the child.

Hypothesis 5

Hypothesis 5, which predicted that there would be significant differences in caregiver and child reports of the frequency of technology use for each of the six types of technology discussed in the *CRISIS* (watching TV or digital media, using the internet for things they are interested in, using social media, texting or messaging, playing video games, or using the computer for school or general computing purposes) was partially supported.

Paired samples *t*-tests were used in order to examine the differences between caregiver and child reports of the frequency of media use. Results of the analyses are presented in Table 12. Children reported significantly greater use of social media and texting prior to the pandemic than did their caregivers. Additionally, caregivers reported significantly greater child internet and video game use during the pandemic than did their children.

Hypothesis 6

Hypothesis 6, which predicted that a higher saliency of COVID-19 in a child's life would be related to more emotion-focused technology-based coping strategies, was not supported.

Correlation analyses were used to examine whether higher COVID-19 saliency scores would be related to the proportion of problem-focused or emotion-focused technology-based coping strategies used. No significant correlations between saliency scores and the proportion of any of the technology-based coping strategies were found for either caregiver or child reports. Results of the analyses are presented in Table 13.

Table 12

Differences Between Caregiver and Child Reports of Time Spent Using Technology

	Pre-Pandemic				During Pandemic			
Type of Media	Caregiver *M (SD)*	Child *M (SD)*	Difference *t(df)*	*p*	Caregiver *M (SD)*	Child *M (SD)*	Difference *t(df)*	*p*
Television	1.89 (0.66)	1.90 (0.70)	*t*(157) = -0.23, d = -0.02	0.82	2.39 (0.82)	2.30 (0.80)	*t*(157) = 1.74, d = 0.14	0.08
Internet	1.61 (0.76)	1.59 (0.86)	*t*(157) = 0.30 , d=0.02	0.77	2.16 (0.85)	1.93 (0.95)	*t*(157) = 3.49, d = 0.28	**<0.001**
Social Media	0.71 (0.93)	1.06 (1.03)	*t*(157) = -4.97, d = -0.40	**<0.001**	1.30 (1.21)	1.41 (1.25)	*t*(157) = -1.16, d = -0.09	0.25
Texting	0.80 (0.79)	0.98 (0.83)	*t*(157) = -3.10, d = -0.25	**0.002**	1.34 (1.00)	1.30 (0.94)	*t*(157) = 0.58, d = 0.05	0.56
Video Games	1.30 (1.03)	1.16 (1.12)	*t*(157) = 1.81, d = 0.14	0.07	1.85 (1.27)	1.63 (1.34)	*t*(157) = 2.58, d = 0.21	**0.01**
Computer	1.20 (0.92)	1.24 (0.92)	*t*(157) = -0.44, d = -0.04	0.66	1.20 (1.03)	1.20 (1.01)	*t*(157) = -0.09, d = -0.01	0.93

Note. For media use variables, 0 = no use, 1 = under 1 hour, 2 = 1-3 hours, 3 = 4-6 hours, and 4 = more than 6 hours.

Table 13

Correlations between COVID-19 Saliency and Proportion of Problem- or Emotion-Focused Coping Strategies Used

	Caregiver Report			Child Report		
Coping Strategy	*N*	*r*	*p*	*N*	*r*	*p*
Television						
Problem-Focused	187	0.05	0.52	156	0.00	0.98
Social Problem-Focused	187	0.07	0.35	156	-0.01	0.90
Non-Social Problem-Focused	187	-0.01	0.91	156	0.02	0.79
Emotion-Focused	187	-0.03	0.65	156	0.05	0.51
Internet						
Problem-Focused	187	-0.04	0.59	157	-0.01	0.94
Social Problem-Focused	187	0.01	0.92	157	-0.02	0.81
Non-Social Problem-Focused	187	-0.06	0.34	157	0.01	0.89
Emotion-Focused	187	0.05	0.52	157	0.03	0.71
Social Media						
Problem-Focused	129	0.00	0.98	114	-0.01	0.93
Social Problem-Focused	129	-0.05	0.61	114	0.02	0.83
Non-Social Problem-Focused	129	0.10	0.27	114	-0.08	0.38
Emotion-Focused	129	0.02	0.79	114	0.04	0.68
Texting						
Problem-Focused	154	0.02	0.84	132	-0.03	0.75
Social Problem-Focused	154	0.05	0.52	132	0.02	0.85
Non-Social Problem-Focused	154	-0.09	0.27	132	-0.09	0.28
Emotion-Focused	154	0.00	0.99	132	0.02	0.86
Video Games						
Problem-Focused	155	-0.08	0.35	114	-0.12	0.26
Social Problem-Focused	155	-0.07	0.39	114	-0.05	0.63
Non-Social Problem-Focused	155	-0.07	0.41	114	-0.13	0.18
Emotion-Focused	155	0.12	0.15	114	0.16	0.10
Computer						
Problem-Focused	168	0.02	0.77	124	-0.14	0.13
Social Problem-Focused	168	-0.02	0.82	124	-0.06	0.51
Non-Social Problem-Focused	168	0.03	0.69	124	-0.10	0.29
Emotion-Focused	168	-0.06	0.46	124	-0.02	0.81

Note. Coping strategies are calculated as a proportion (number of problem/emotion-focused coping strategies used out of all coping strategies endorsed on the *CRISIS*). Saliency score was calculated based on caregiver reports from the *CRISIS*.

Hypothesis 7

Hypothesis 7, which predicted that child reports of greater perceived social support would be associated with more socially-oriented technology-based coping strategies, was partially supported.

Correlation analyses were used to examine whether higher levels of using either problem-focused or emotion-focused technology-based coping strategies were associated with child reports of perceived level of social support. Results of the analyses are presented in Table 14.

In support of the hypothesis, for caregiver reports, significant associations were found between higher perceived social support scores and higher proportions of television-based social problem-focused coping strategies, $r = .16$, $p = .04$, and computer-based social problem-focused coping strategies $r = .18$, $p = .03$. For child reports, a significant association was found between higher perceived social support scores and higher proportions of television-based social problem-focused coping strategies, $r = .26$, $p = .001$.

Other significant correlations were found. For caregiver reports, a significant association was found between higher perceived social support scores and higher proportions of television-based problem-focused coping strategies, $r = .16$, $p = .04$. Additionally, significant associations were found between lower perceived social support scores and higher proportions of television-based emotion-focused coping strategies, $r = -.19$, $p = .02$, and texting-based emotion-focused coping strategies, $r = -.19$, $p = .03$.

For child reports, significant associations were found between higher perceived social support scores and higher proportions of television-based problem-focused coping strategies, $r = .25$, $p = .001$, and internet-based problem-focused coping strategies, $r = .16$, $p = .05$.

Additionally, a significant association was found between lower perceived social support scores and higher proportions of television-based emotion-focused coping strategies, $r = -.18$, $p = .03$

Table 14

Correlations between Perceived Social Support and Proportion of Problem- or Emotion-Focused Coping Strategies Used

	Caregiver Report			Child Report		
Coping Strategy	*N*	*r*	*p*	*N*	*r*	*p*
Television						
Problem-Focused	157	**0.16***	0.04	157	**0.25****	0.001
Social Problem-Focused	157	**0.16***	0.04	157	**0.26****	0.001
Non-Social Problem-Focused	157	0.09	0.26	157	0.10	0.20
Emotion-Focused	157	**-0.19***	0.02	157	**-0.18***	0.03
Internet						
Problem-Focused	157	0.11	0.19	158	**0.16***	0.05
Social Problem-Focused	157	0.07	0.39	158	0.11	0.17
Non-Social Problem-Focused	157	0.07	0.41	158	0.10	0.21
Emotion-Focused	157	-0.13	0.09	158	-0.04	0.58
Social Media						
Problem-Focused	110	0.02	0.88	114	0.11	0.24
Social Problem-Focused	110	-0.01	0.91	114	0.10	0.27
Non-Social Problem-Focused	110	0.05	0.59	114	0.03	0.80
Emotion-Focused	110	-0.03	0.73	114	-0.14	0.15
Texting						
Problem-Focused	131	0.15	0.09	133	0.01	0.93
Social Problem-Focused	131	0.13	0.15	133	-0.01	0.91
Non-Social Problem-Focused	131	0.03	0.71	133	0.04	0.67
Emotion-Focused	131	**-0.19***	0.03	133	-0.01	0.95
Video Games						
Problem-Focused	129	0.10	0.27	115	0.14	0.14
Social Problem-Focused	129	0.10	0.26	115	0.10	0.29
Non-Social Problem-Focused	129	-0.01	0.93	115	0.09	0.32
Emotion-Focused	129	-0.16	0.07	115	-0.14	0.13
Computer						
Problem-Focused	141	0.10	0.26	125	0.06	0.51
Social Problem-Focused	141	**0.18***	0.03	125	0.16	0.08
Non-Social Problem-Focused	141	-0.02	0.86	125	-0.04	0.68
Emotion-Focused	141	-0.11	0.21	125	-0.12	0.18

Note. Coping strategies are calculated as a proportion (number of problem/emotion-focused coping strategies used out of all coping strategies endorsed on the *CRISIS*). Perceived social support is a sum obtained from 4 social support-based questions on the Child *CRISIS*.

*Correlation is significant at the 0.05 level (2-tailed).

**Correlation is significant at the 0.01 level (2-tailed).

CHAPTER 5

Discussion

The goal of the present study was to explore how children have been using technology during the COVID-19 pandemic, as well as the perceived benefits and problems of its use. Using an online questionnaire, this study examined caregiver and child reports of how often different types of technology have been used during the pandemic, how different technology-based coping strategies have been used by children, how these coping strategies have impacted children's psychological well-being, and whether factors such as the saliency of COVID-19 in a child's life or their perceived level of social support were associated with their selection of technology-based coping strategies.

Technology Use

Hypothesis 1, which predicted that child technology use would increase from 3 months prior to the pandemic to the early pandemic time point, was partially supported. Both caregiver and child reports of child technology use showed statistically significant changes in frequencies of technology use from 3 months prior to the pandemic to June/July of 2020 (early pandemic time point) across all technology types. Higher percentages of participants were generally reporting higher frequencies of technology use in the early pandemic time point, with the exception of computer use. This was likely due to the fact that technology became a primary mode of communication, entertainment, socialization, and education among most individuals. Activities that had previously been conducted in-person, such as social activities and keeping in touch with friends and family, had to transition to an online modality (Goldschmidt, 2020). Families had to problem-solve ways to keep their children entertained and connected with family

and friends, and it is likely that technology use increased in order to help children meet these new needs.

In contradiction to the hypothesis, caregiver and child reports suggested that patterns of the frequency of computer use did not necessarily increase. Of particular note, caregiver and child reports indicated higher frequencies of participants reporting no computer use in the early pandemic time point as compared to the pre-pandemic time point. This was likely due to a combination of factors. The questionnaire data were collected during June and July of 2020, and during a significant portion of this time period some children may not have been in school. The most frequently endorsed purpose for using the computer by both caregivers and children was to keep up with schoolwork; therefore, as children did not have a need to complete schoolwork during this time, this could have been one of the reasons for the perceived lack of increase in computer use. However, although children may have used the computer for assignments 3 months prior to the pandemic, they were likely not using the computer for active learning during school time at this time point. As the early pandemic time point was in June and July of 2020, it is possible that some children were using the computer for active learning during online schooling in early June of 2020, and that some children were not, as they would be on summer break during late June and July. It will be interesting to explore whether these findings relating to computer use will change at other time points in the longitudinal study when children were attending school primarily online because of the pandemic.

It is also important to note that when asked how frequently their child/they used technology, 14.7% to 55.3% of caregivers and children reported that their child/they did not use social media, texting, video games, and the computer both 3 months prior to and during the early pandemic. One possible explanation for these findings is that these participants did not have

access to the devices, such as smartphones, required to conduct these types of technology use on. Future research could incorporate questions relating to what types of technology children have access to in their home. This would help clarify whether this lack of use is due to a disinterest in these activities, or a lack of availability of the devices to conduct them on.

There was some evidence for shifts in patterns of technology use from the pre-pandemic time point to the early pandemic time point. In general, for all forms of technology aside from computer use, patterns of use shifted from 3 months prior to the pandemic to the early pandemic time point, with higher percentages of participants reporting higher frequency of use. For example, for television use, 3 months prior to the pandemic, 69.9% of caregivers reported that their child used television for 1 to 3 hours per day, and 6.3% reported that their child used 4 to 6 hours of television per day. However, during the early pandemic, 50.5% of caregivers reported 1 to 3 hours of television use per day by their child, and 29.5% reported 4 to 6 hours per day of use. Overall, television was the most highly used form of technology. A large percentage of caregivers and children reported that their child/they watched television between 1 to 3 hours per day both prior to and during the early pandemic. Additionally, a larger percentage of children were using television for more than 3 hours per day during the early pandemic time point as compared to the pre-pandemic time point. Closely following that was internet use, with a large percentage of caregivers and children reporting under 1 hour of use per day 3 months prior to the pandemic, and between 1 to 3 hours per day during the early pandemic. A considerable percentage of caregivers and children reported under 1 hour of use per day for texting and computer both prior to and during the early pandemic. There was a discrepancy with video game use; the largest percentage of caregivers reported 1 to 3 hours of child video game use per day both 3 months prior to and during the early pandemic, whereas the largest percentage of children

reported no video game use. Social media use was widely reported as not used by both caregivers and children both 3 months prior to and during the early pandemic. As previously mentioned, a possible reason for this could be due to the fact that these activities are often conducted on smartphones or video game consoles, which not all children have access to in their home.

One important question to ask when assessing children's use of technology from both a self- and caregiver-report perspective is whether those reports are consistent, as previous research has found differences in parent and child reports of recreational screen time use (Nagata et al., 2012). Hypothesis 5 predicted that there would be significant differences in caregiver and child reports of the frequency of technology use, and this hypothesis was only partially supported. There were no significant differences between caregiver and child reports of television use or computer use 3 months prior to and during the early pandemic. One explanation for these non-significant differences could be due to the fact that caregivers and children may have watched television or used the computer together, or under close supervision, leading to more similar reports of frequency of use.

Consistent with Hypothesis 5, however, significant differences were found between caregiver and child reports for some of the other types of technology use. More specifically, children reported significantly higher texting and social media use than did caregiver reports of their children's use 3 months prior to the pandemic. This is consistent with previous research findings that parents often underestimate the amount of time that their children spend using technology (Thorn et al., 2013). One explanation for this could be that social media use and texting are often solitary activities; as such, parents may not be as aware of how often their children are engaging in these activities.

In contrast, during the early pandemic, caregivers reported significantly higher child internet and video game use than did children. The reasoning behind this finding is unclear. It may have been that parents assumed that their children were on the internet or playing video games while using devices such as smartphones or tablets, when in actuality, they were engaging in other activities. Future research that examines what specific devices are used for specific technology-based activities could help clarify these results. Additionally, it would be helpful for future research to track application usage on different types of technology so that an objective measure of technology-based activities could be obtained.

Technology-Based Coping and Well-being

Hypothesis 2 proposed that during the pandemic problem-focused technology-based coping strategies, which aim to directly eliminate sources of stress for more long-lasting effects (Ben-Zur, 2009), would be more associated with children feeling better, and that emotion-focused technology-based coping strategies, which often only provide distraction or temporary relief from stressors (Ben-Zur, 2009), would be more associated with children feeling worse. As previous research has identified that more social-based coping strategies are commonly used by children (Skinner & Zimmer-Gembeck, 2007), and as social support has been found to offer unique protective factors against stressful situations (Cohen & Wills, 1985), the problem-focused coping category was further divided into the social problem-focused and non-social problem-focused coping categories.

This hypothesis was partially supported. Caregiver reports suggested that using the computer or internet in more social problem-focused ways were associated with children feeling better. Child reports indicated that using social media, video games, or the computer in problem-focused or social problem-focused ways were associated with them feeling better. Overall, using

the internet, computer, social media, or video games to directly address the stress caused by COVID-19 through seeking information about the pandemic, completing work, or seeking social interaction when it was unavailable in-person appeared to be effective coping strategies for children. This is consistent with previous research which suggests that problem-focused coping strategies are associated with higher reports of well-being (Ben-Zur, 2009; Quy et al., 2018). Though not consistent with theories that individuals in uncontrollable situations are more likely to use emotion-focused coping strategies (Folkman & Lazarus, 1980; Folkman & Moskowitz, 2004; Lazarus & Folkman, 1987), these results are also consistent with previous findings from Domínguez-Álvarez et al. (2020) that engagement coping, which is conceptually similar to problem-focused coping, is more associated with psychosocial adjustment when coping with uncontrollable situations such as the COVID-19 pandemic. Additionally, it is likely that more social technology-based coping strategies were effective at helping children manage stress relating to the isolation from friends and family as a result of lockdowns and physical distancing restrictions implemented during the COVID-19 pandemic. These social technology-based coping strategies may have helped children remain socially connected during this time when in-person connection was not possible.

In contradiction to Hypothesis 2, caregiver reports of higher proportions of computer-based problem-focused and non-social problem-focused coping strategies were associated with children feeling worse. This stands in contrast to the findings that caregiver reports of higher proportions of computer-based *social* problem-focused coping strategies were associated with children feeling better. It may therefore be that the non-social problem-focused strategies, such as using the computer to seek information about COVID-19 or to keep up with schoolwork, were more responsible for the association with children feeling worse. It is possible that caregivers

conceptualized COVID-19 as an uncontrollable situation in these specific circumstances, in which the child was unable to make considerable changes. This would result in problem-focused strategies, such as using the computer to look up information on the pandemic, being not particularly effective at reducing the child's stress/negative feelings (Folkman & Lazarus, 1980; Folkman & Moskowitz, 2004; Lazarus & Folkman, 1987). It is interesting that these results were only found for caregiver reports, as it suggests that perhaps children did not perceive COVID-19 as an uncontrollable situation to the same extent that caregivers did. It will therefore be important for future research to explore the subtleties of events such as COVID-19, and how they may produce a number of separate controllable and uncontrollable stressors in children's' lives, as well as differences in how these stressors are perceived by both caregivers and children. It may be that different types of coping strategies, particularly those that differ on the social or non-social dimension, may play important roles in managing different types of stress depending on the context.

For caregiver reports, computer-based emotion-focused coping was associated with children feeling worse, and for child reports, social media-based emotion-focused coping was associated with children feeling worse. This suggests that using the computer or social media to regulate stressful emotions was not an effective coping strategy for children. It is interesting that the type of technology used for emotion-focused coping differed between caregivers and children. One explanation for this is that perhaps caregivers perceived that children were using the computer for school purposes, when in actuality, they were using social media. Overall, these results are consistent with previous findings that more emotion-focused coping strategies are often associated with lower reports of well-being, as they often only provide temporary emotional relief from the stressor rather than directly addressing the stressor itself for more long-

term relief (Ben-Zur, 2009; Orgilés et al., 2021; Richardson et al., 2020; VanMeter et al., 2020). These results are also consistent with previous research that disengagement coping, which is conceptually similar to emotion-focused coping, is more associated with negative psychological outcomes during uncontrollable situations such as COVID-19 pandemic (Domínguez-Álvarez et al., 2020). Results from the present study, as well as from Domínguez-Álvarez et al.'s (2020) study suggest that children may view COVID-19 as more of a controllable situation than researchers might assume, suggesting that emotion-focused coping may not be as effective in dealing with stress caused by the pandemic as more problem-focused approaches.

Additionally, no significant associations were found between children's well-being and caregiver or child reports of television or texting-based coping strategies, child reports of internet-based coping strategies, or caregiver reports of video game-based coping strategies. These strategies may not be particularly effective coping strategies in regards to helping children feel better, but results suggest that their use does not negatively impact children's well-being.

Interestingly, upon closer examination, the majority of both caregiver and child reports indicated that using many of the different types of technology resulted in children feeling a little better. However, the majority of both caregiver and child participants reported that computer use did not change how the child was feeling. Additionally, children most frequently reported that internet and video game use did not change how they were feeling. As many findings in the present study have suggested that more problem-focused or social-based coping strategies were often effective at helping children feel better, one explanation for these types of technology not resulting in children feeling better is that children engaged with them in a more solitary, non-social manner. It should be noted that very low percentages of caregivers and children reported that technology use negatively impacted how they felt. Overall, it appears that using technology,

generally, was a helpful strategy in allowing children to feel better during the COVID-19 pandemic, particularly if it was used in a more social way.

Hypothesis 3, which predicted that higher reports of depression and anxiety symptoms would be associated with higher reports of emotion-focused coping strategies, was partially supported. Although all significant results were in support of the hypothesis, there were numerous variables for which no association was found.

In support of the hypothesis, reports of greater anxiety symptoms were significantly associated with lower proportions of problem-focused coping strategies using social media, texting, video games, and the computer for general computing purposes. Additionally, greater child anxiety symptoms were associated with higher proportions of emotion-focused coping strategies using the internet, social media, texting, and video games.

Similarly, in support of the hypothesis, reports of greater depression symptoms were significantly associated with lower proportions of problem-focused coping strategies using the internet, texting, and television. Additionally, reports of greater depression symptoms were significantly associated with higher proportions of emotion-focused coping strategies using texting and television.

Patterns generally showed that higher reports of internalizing symptoms were associated with higher proportions of emotion-focused and lower proportions of problem-focused coping strategies being used. This is consistent with previous studies that have found associations between higher reports of negative mental health symptoms and lower coping efficacy (Gunthert et al., 2002), if problem-focused strategies are conceptualized as more efficacious as in Folkman and Lazarus' (1980) definition. These findings may also complement findings from previous research (Ben-Zur, 2009; Quy et al., 2018) and the present study suggesting that problem-

focused coping strategies are associated with greater well-being. Individuals experiencing internalizing symptoms such as decreased energy, withdrawal, and feelings of worthlessness, might have less ability to engage in more proactive coping strategies, (Richardson et al., 2020), thus resulting in more use of emotion-focused coping. This may perpetuate lower reports of well-being in individuals with internalizing symptoms. Future research should aim to explore the differences in coping strategies used and their effectiveness in individuals both with and without mental health symptoms to help clarify these relationships between mental health symptoms, coping strategies used, and well-being.

Social Support

Hypothesis 4 predicted that using technology for social support during the pandemic would be associated with children feeling better, and that using technology as a distraction would not. This hypothesis was partially supported. In support of the hypothesis, caregiver reports of higher proportions of internet and computer-based social-focused technology use were associated with children feeling better. For child reports, higher proportions of social media, video game, and computer-based social-focused technology use were significantly related to children feeling better. This is consistent with the idea that social support acts as a buffer, or protective factor, against stressors such as the COVID-19 pandemic, and is associated with reports of greater well-being (Chu et al., 2010; Cohen & Wills, 1985). It may also be that social support as a protective factor contributed to these children demonstrating more resilience when exposed to the stress of COVID-19 (Luthar, 2003; Luthar et al., 2000). Child reports of social-based uses for social media and video games being associated with feeling better is understandable, as these activities often involve a social interaction component to them (e.g., keeping in touch with friends through using social media or playing video games online). Although computer and internet use are

frequently more solitary activities, children may have used these types of technology to keep in touch with friends and family through video chat or messaging.

In further support of the hypothesis, child reports of a higher proportion of social media-based distraction-focused technology use was significantly associated with children feeling worse. This was consistent with the idea that distraction-based coping strategies, which are a part of the broader category of emotion-focused coping strategies, have often been found to be associated with lower reports of well-being; they often provide temporary relief rather than directly confronting the stressor in order to obtain a more long-term solution (Ben-Zur, 2009; Orgilés et al., 2021; Richardson et al., 2020; VanMeter et al., 2020).

In contradiction to the hypothesis, caregiver reports of higher proportions of computer-based distraction-focused technology use was associated with children feeling better. These results are more consistent with theories that emotion-focused coping strategies are most often favoured in uncontrollable situations such as the COVID-19 pandemic (Folkman & Lazarus, 1980; Folkman & Moskowitz, 2004; Lazarus & Folkman, 1987). One possible explanation for this finding is that caregivers perceived that when children used the computer for more general computing purposes to distract themselves, such as by writing a story for fun or drawing a picture, they were able to completely remove themselves from thinking about the uncontrollable nature of the COVID-19 pandemic, and focus on these activities as an escape. It may be that caregivers did not perceive other types of technology as providing children with this same escape, as there would be some potential to be exposed to COVID-19-related news or information on many other forms of technology (for example, news stories on the television, internet, or social media). Additionally, although video games may not often allow for the potential to be exposed to COVID-19-related information, it is possible that the more creative

aspect of using the computer for general computing purposes as mentioned above is what was more responsible for children feeling better.

Hypothesis 7 predicted that higher levels of perceived social support would be associated with children using more socially-oriented technology-based coping strategies. It was predicted that children with greater levels of perceived social support would be more inclined to use technology to keep in contact with those who provide them with social support. This hypothesis was partially supported. In support of the hypothesis, caregiver reports of higher proportions of television and computer-based social problem-focused coping strategies and child reports of higher proportions of television-based social problem-focused coping strategies were significantly associated with higher perceived social support scores. Perhaps during the COVID-19 lockdowns, children who perceived that they had high levels of social support from friends and family were using television to socialize and feel connected with individuals who provided social support to them inside their household, and were using the computer to video chat and message their support system outside of their home.

Interestingly, caregiver reports of higher proportions of television and texting-based emotion-focused coping strategies and child reports of higher proportions of television-based emotion-focused coping strategies were associated with lower perceived social support scores. It is possible that children who perceive that they have lower social support are using television in a more solitary, emotion-focused way. Thus, if they do not perceive that they have a support system that they can rely on, they may not have individuals with whom they want to socialize through television use. Emotion-focused strategies endorsed for using texting included to distract themselves, to reduce feelings of loneliness, and so that they will not be bored/to pass the time. One explanation for these findings is that children with lower perceived social support may be

engaging in these strategies through texting with individuals whom they do not consider to be significant sources of social support to them.

COVID-19 Saliency

Hypothesis 6 predicted that higher saliency of COVID-19 in a child's life would be associated with more emotion-focused technology-based coping strategies. I reasoned that factors contributing to the COVID-19 saliency score, such as having a family member who is a frontline worker, would be conceptualized as uncontrollable situations, which have been associated with the adaptive use of emotion-focused coping strategies mentioned in previous research (Folkman & Lazarus, 1980; Folkman & Moskowitz, 2004; Lazarus & Folkman, 1987). However, no significant associations between saliency and the proportion of technology-based coping strategies used were found in the present study. One reason for this finding is that there were not many participants who reported high COVID-19 saliency scores in the current study. Less than half of the caregiver participants (40%) reported that their child lived with an essential worker, and only a small number of participants endorsed living with a first responder/healthcare provider/worker in a facility treating COVID-19 (10.5%), having someone close to the child be diagnosed with COVID-19 in the past 2 weeks (4.7%), having the child be exposed to (1.6%) or suspected of having COVID-19 (2.1%) in the past 2 weeks. This may be because the current study did not specifically recruit participants who had high saliency of COVID-19 in their lives. It would be interesting for future research to specifically recruit participants with high COVID-19 saliency in their lives in order to examine any differences in coping strategies used by this group compared to those who have low COVID-19 saliency. An additional interesting component could be to explore whether there were differences in coping strategies seen in children living with essential workers who were first responders, healthcare providers, or

individuals directly treating COVID-19, as compared to individuals who were not directly treating COVID-19.

Limitations and Future Directions

The current study had several limitations. Firstly, retrospective reports were used for most of the questionnaire items. Past research has shown that at times, retrospective reports can be unreliable due to factors such as recall inaccuracies and the impact of mood state at the time of reporting (Hardt & Rutter, 2004). As the current study only used baseline data from an ongoing longitudinal study, it is likely that information from successive timepoints may allow for further exploration on changes between timepoints, and less reliance on retrospective reports.

The current study removed questions relating to school avoidance from the *SCARED* (Birmaher et al., 1997). As a result, total scores for the *SCARED* did not include this subscale and results relating to anxiety symptoms from this study may not directly compare to results from other studies that have used the *SCARED* to measure anxiety symptoms.

Additionally, the current study contained several outliers in the dataset. Cases that were outliers reported frequency of media use that was more than 6 hours per day, or high total scores on the *SMFQ*. Although variability in these types of scores is expected in the population, it will be important for future research to explore more extreme cases of media use or internalizing symptoms to clarify whether any differences would be found among populations with overall higher media use or higher levels of internalizing symptoms.

The study also had some limitations relating to demographics. The majority of participants reported having either European or North American ancestry. It is possible that the requirement that participants be proficient in English in order to participate did not allow the study to capture a more diverse sample of participants. As Southwestern Ontario is home to

many immigrants, future research in this area should aim to capture the perspectives of a more diverse sample of participants order to understand differences in coping styles and how the pandemic was perceived as a stressor. This may allow for results to be more generalizable to the general population, as well as for the ability to gain a greater understanding of any cultural differences.

Another limitation of the present study was that not many participants reported high levels of COVID-19 saliency in the child's life, which may account for why COVID-19 saliency was not associated with other variables in the study. It would be important for future research to directly recruit individuals for which COVID-19 is highly salient. It may be difficult to recruit such a population during the pandemic due to the extreme stress that they have experienced in the workplace, resulting in less time to be able to participate in such research. Another interesting area for future research would be to explore whether there are differences between how children coped using technology in families that had frontline workers treating COVID-19, such as healthcare workers, families that had frontline workers in positions in the school system, such as teachers, and families that had essential workers in positions such as at grocery store or retail workers. Due to the nature of their work involving being directly exposed to a dangerous stressor, COVID-19, such families have experienced increased reports of stress, anxiety, and depression (Antonijevic et al., 2020), as well as increased reports of psychological stress among children of frontline workers (Sugg et al., 2021). As a result, children in families with frontline workers may have used different coping strategies or found specific types of coping to be more effective.

It is also important to consider that it may have been difficult for caregivers or children to describe the reasons why they were using certain types of technology. For caregivers, it is

unlikely that they were able to know the reason behind why their child was using different types of technology with certainty unless explicitly told by their child. Additionally, it may have been difficult, particularly for younger children, to reflect on why they had engaged in certain types of technology use. For example, it might be difficult for both a caregiver or a child to tell whether the child is watching a cooking show with their family on television to spend time socializing with their parents, to distract themselves from a stressful school day, or to learn new baking skills. However, as there seemed to be relatively good consistency between caregiver and child reports of technology use, it did not appear that this was a major concern for the present study.

There were some limitations regarding coding of the coping strategies. The coping strategies were coded using theory-based categories (Folkman & Lazarus, 1980); however, this approach may miss the purpose of the coping strategy if it involves a combination of multiple purpose. More in-depth studies, such as interview studies, may be able to better explore such nuances in coping strategies used by children during the pandemic. Additionally, the *CRISIS* questionnaire gave participants the option to provide additional commentary when selecting "other" as the purpose behind their technology use. These responses were not coded or used in the calculation of sum or proportion scores for technology-based coping strategies for several reasons. Not every participant who selected "other" provided information clarifying the nature or purpose of how they use the technology. Additionally, participants who did provide additional commentary commonly named the activity that they used the type of technology for, but not the specific coping strategy. The responses did not capture the coping component that the analyses of the present study were trying to examine, and it was inappropriate to assume the participants' intent. It is primarily due to the ambiguity surrounding this additional "other" responses that I chose to take a conservative approach and not code these responses. It would be interesting for

future research to ensure that participants provide additional detail about their "other" purpose for using the technology and to change the wording of these questionnaire items to more directly ask for coping strategies in this commentary.

Practical and Clinical Implications

The current study allowed for the exploration of how technology was used by children to cope during the COVID-19 pandemic. It is possible that information from the current study, as well as future research on this topic, may provide a greater understanding of how individuals cope during highly stressful life events such as the COVID-19 pandemic. Such information may be useful for planning technology-based coping interventions for children undergoing difficult life situations. More specifically, as the present study found that social-based coping strategies were associated with children feeling better, technology-based interventions that incorporate social interaction, bolstering social support, and promoting staying connected to a support system during highly stressful events may prove to be beneficial.

Additionally, findings that social technology-based coping was associated with children feeling better may also have implications for everyday technology use with children. It may be that social-based everyday technology use, such as actively watching and discussing television shows or movies together with children, is more beneficial than more solitary technology use, such as allowing children to spend long hours passively watching television alone in their rooms.

As clinicians, it is also important to understand the different modalities that children are using to stay connected with one another. Many children used technology as their primary mode of communication with their peers during the COVID-19 pandemic. It will be interesting to see whether this has any long-term effects on social development and communication skills, particularly for children who started their first years of school during the pandemic.

Conclusion

In summary, most types of technology use increased from 3 months prior to the COVID-19 pandemic to June and July of 2020, during the early part of the COVID-19 pandemic. Contextual factors, such as not having access to devices needed to use certain types of technology and not all children being in school during the time of the study, may have contributed to patterns of frequencies of use not uniformly increasing for all types of technology. The purposes and impacts of technology use told an interesting story. Using technology to seek information about the pandemic, complete work, or seek social interaction seemed to be effective coping strategies for children. It is likely that social technology-based coping strategies helped children manage stress relating to the isolation from friends and family experienced during the COVID-19 pandemic, allowing them to remain socially connected during this time when in-person connection was not possible. A very low percentage of caregivers and children reported that using technology had a negative impact on children's well-being. When using technology was associated with more negative outcomes, such as internalizing symptoms, it was dependent on how the technology was being used, such as whether it was being used as an emotion-focused coping strategy or in a distraction-based way. Overall, using technology, particularly in a more social way, appeared to be an effective strategy in helping children feel better during the COVID-19 pandemic.

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