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Screen time use and Children's Mental Health During the COVID-19 Pandemic

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Abstract

Parents with school-aged children have experienced numerous hardships during the 2020-2021 academic school year, including school closures, lockdowns, and travel restrictions. Higher levels of parent stress and screen time may adversely impact children's behavioural outcomes. This longitudinal survey study examined the associations of parent stress, parenting styles, and prolonged screen time on internalizing and externalizing behaviours in school aged children. Parents (n = 108) completed survey measures at two time points over the 2020-2021 academic school year. Two generalized estimating equations were performed. There was a significant positive interaction between parent stress and screen time (B = < .001; p = .001) on children's internalizing behaviours. Parent stress was positively associated with externalizing behaviours (B = 0.43, p < .001). These findings indicate that parent stress and screen time are key risk factors for child mental health. Targeted family intervention plans may be essential to curtailing parent stress and screen time use.

Keywords

Parent stress, parenting styles, screen time, behavioural outcomes, education, COVID-19

Summary for Lay Audience

Children's screen time activity has increased significantly during the pandemic. Extended school closures and heightened parent stress are associated with children's behavioural difficulties and time spent watching screens. This cross-sectional longitudinal survey study examined the association between screen time and internalizing and externalizing behaviours in school aged children (6-12 years) at two time points over the 2020-2021 academic school year. Parents (n = 108) completed survey measures on their parenting styles, stress levels, along with their child's patterns of screen time and emotional and behavioural difficulties. Children's average daily screen time was 4.42 hours (SE = 19.04) at baseline and 3.93 hours (SE = 16.35) at 1-year follow up, with no change across the school year (p= 0.12). Increased screen time was associated with a greater incidence of internalizing behaviours in children (p= 0.03). Children who spent more time on screens who were in households with parents reporting higher stress levels had increased internalizing behaviours (p= .001). No association between screen time use and externalizing behaviours was evident; however, parent stress was positively associated with externalizing behaviours (p< .001). Children's screen time use has remained high during the pandemic and is associated with anxious and depressive symptoms. Targeted family intervention plans focused on reducing parent stress and screen time use may aid in improving children's mental health during the ongoing pandemic.

Co-Authorship Statement

Chapter 2 was adapted from the manuscript title “Children’s screen time use and mental health during the COVID-19 pandemic” that is under review at Clinical Child Psychology and Psychiatry. The co-authors of this study are Drs. Diane Seguin, and Emma G. Duerden. Emma G. Duerden and Diane Seguin were involved in study conception and design. I, Amira Hmidan, was involved in study design, analysis, conception, and writing of the full manuscript.

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Chapter 1

1 Introduction

Technology is ubiquitous among children and adolescents. Before the pandemic, children ages 6 – 10 spent an average of 2-3 hours per day on screens (Seguin et al., 2021; Twenge & Campbell, 2018), with social media, video games and television accounting for the most screen time (Nagata et al., 2022). Screen time has nearly doubled since the emergence of the COVID-19 virus, with countries worldwide reporting daily estimates of over 5 hours per day (Eyimaya & Irmak, 2021; Nagata et al., 2022; Seguin et al., 2021; Xiang et al., 2020). Children's screen time in Ontario reached an astonishing apogee of 6 hours per day during the initial lockdown period (Seguin et al., 2021). This daily average is nearly three times more than the recommended screen time guidelines for Canadian children (Canadian Paediatric Society, Digital Health Task Force, Ottawa, Ontario, 2019; World Health Organization, 2020). A parallel issue emerged in parents of school-aged children during the pandemic, who reported stress levels in the moderate to high range (Li & Zhou, 2021; Seguin et al., 2021). This is a concern as parent stress is a known risk factor for adverse parent and child mental health (Humphreys et al., 2020, Khoury et al., 2021; Oliveira et al., 2021).

Hitherto, screen time and parent stress were conceptualized as independent risk factors for child internalizing and externalizing behaviour problems (Calvano et al., 2021; Khoury et al., 2021). Albeit nascent cross-sectional studies discuss the compound risks associated with parent stress and screen duration, little is known about the enduring implications on child mental health over the pandemic. Identifying critical risk and resilience factors related to child mental health is

essential to promoting family cohesion, attenuating pandemic-related stressors, and improving mental health outcomes in school-aged children.

The present study investigated whether screen time and parent stress/involvement during the pandemic adversely impact mental health outcomes in school-aged children. We addressed these gaps using longitudinal online survey methods. We collected data at two-time points between November 2020-2021. Parents completed measures on their stress levels, parenting styles, mental health, and their child's screen time, internalizing, and externalizing behaviours.

1.1 Screen time

Screen time is the amount of time spent using a device with a digitized interface, such as computers, television, video games, and smartphones (Tang et al., 2020). Health care professionals caution that excessive screen time may adversely impact childhood development and mental health outcomes (Hutton et al., 2020; Seguin et al., 2021; Tang et al., 2018; World Health Organization, 2020; Xiang et al., 2020). In response to these concerns, the Canadian Paediatric Society recommends limiting screen time to two hours per day for children over the age of five (Canadian Paediatric Society, Digital Health Task Force, Ottawa, Ontario, 2019).

The unparalleled impact of COVID-19 engendered nationwide upticks in children's time spent on devices (Eyimaya & Irmak, 2021; Nagata et al., 2022; Orgilés et al., 2020; Velde et al., 2021; Xiang et al., 2020). Based on early cross-sectional data in Ontario, children's average recreational screen time increased from 2.6 hours to 5.9 hours a day during the initial phases of the pandemic (Seguin et al., 2021). This daily average is almost three times more than the recommended guidelines for Canadian children. Factors such as socioeconomic status, race/ethnicity, school satisfaction (for both children and parents), and having a child with special

needs contributed to more screen time in children (Assari, 2020; Barroso et al., 2018; Nagata et al., 2022; Seguin et al., 2021).

Upward trends in screen time occurred in other parts of the world during the initial pandemic lockdown where families experienced the most significant changes to school, home, and work routines (Eyimaya & Irmak, 2021; Orgilés et al., 2020; Velde et al., 2021; Xiang et al., 2020). Researchers in China surveyed children and adolescents across five school districts between January and March 2020. Children's physical activity significantly decreased by 435 minutes per week, while screen time increased by 1730 minutes per week (Xiang et al., 2020). The average child in the United States spent 7.70 hours on screens, with Black and Native American children's screen time exceeding 9 hours per day (Nagata et al., 2022). Children in Italy and Spain spent more time on screens and less time engaged in physical activity, and displayed more inattentiveness, irritability, hyperactivity, and anxiety (Orgilés et al., 2020). Similarly, 71.7% of Turkish parents considered the pandemic as the likely source of their child's excessive screen time use, which was estimated to be 6.42 hours a day (Eyimaya & Irmak, 2021).

1.2 Child internalizing and externalizing behaviours

The most prevalent mental health concerns affecting school-aged children are anxiety (7.1%), depression (3.2%), and conduct problems (7.4%; Ghandour et al., 2019). Since March 2020, internalizing and externalizing problems have increased dramatically in school-aged children (Khoury et al., 2021), with an estimated 20-25% of children experiencing symptoms of depression and anxiety (Racine et al., 2021). Lockdowns contributed to the most pervasive emotional problems, including anxiety, restlessness, worry, and depression (Khoury et al., 2021; McArthur et al., 2022; Orgilés et al., 2020; Racine et al., 2021).

Early evidence indicates that internalizing and externalizing problems may be an enduring issue for children and youth during the pandemic. Longitudinal increases in internalizing and externalizing symptoms from pre-pandemic to the initial lockdown period were found in Canada and the United Kingdom (Bignardi et al., 2021; Khoury et al., 2021). In a cohort of Norwegian children, an overall increase in mental health issues was reported during the pandemic's early stages to 9 months after the initial outbreak, with internalizing symptoms accounting for the most increases (Lehmann et al., 2022). Factors such as parent stress, dysregulated family dynamics, and screen time contributed to increases in children's mental health problems (Khoury et al., 2021; Li et al., 2021; Oliveira et al., 2021).

1.3 Impact of screen time on child mental health

Screen time may adversely contribute to children's mental health outcomes (McArthur et al., 2022; Tamana et al., 2019; Tandon et al., 2021). A large longitudinal study of brain development and child wellbeing in the United States (ABCD study; https://abcdstudy.org) found associations between screen time and impaired social skills (Jericho & Elliott, 2020, Paulus et al., 2019) depression and anxiety (Fors & Barch, 2019); behavioural and social issues (Guerrero et al., 2019); and reduced sleep duration, fatigue, and insomnia in children (Hisler et al., 2020). Screen time appears to have a dose-dependent influence on depressive symptoms (Liu et al., 2016). For example, youth who spend over 4 hours a day on screens are at significant risk for meeting the criteria for major depressive episode, social phobia, and generalized anxiety disorder (Kim et al., 2020). A systematic review (n= 159, 425) on children's screen time behaviours found weak associations between screen time and children's externalizing and internalizing problems (Eirich et al., 2022). Age-related factors appear to influence the strength and direction of the association (Neville et al., 2021). For example, screen time and internalizing behaviours appear to be

bidirectionally associated, while externalizing behaviours appear to be directionally associated with screen time in preschoolers. By contrast, higher levels of screen time in 5-year old's are directionally associated with internalizing behaviours in 7 year old's, but the association reverses from ages 7 to 9; that is, screen time is associated with less internalizing behaviours in 9 year old's (Neville et al., 2021).

Adverse mental health outcomes associated with excessive screen time are emergent concerns amid the ongoing pandemic. In a cohort of 2026 Ontario children, more digital media and TV consumption was associated with conduct and hyperactivity/inattention problems in younger children (age 2-4) and internalizing problems in older children (Li et al., 2021). Cross-sectional evidence from the early stages of the pandemic demonstrates a relationship between excessive screen time and incidence of general mental health difficulties in children and youth, with sleep duration, physical activity and sedentary behaviour moderating these relationships (Olive et al., 2022; Seguin et al., 2021; Tandon et al., 2021; Velde et al., 2021).

1.4 Parent Stress

Parents with school-aged children had to navigate several economic, social, and financial hardships due to the pandemic, such as sudden school closures, prolonged lockdown periods, changing work environments, unemployment, disruptions to childcare, and managing their children's online schooling (Hartshorne et al., 2020; Kochanova et al., 2022; Seguin et al., 2021). In Ontario, parents were experiencing stress levels in the moderate to high range (Seguin et al., 2021), with 36.8% of mothers exhibiting clinically significant levels of depression (Khoury et al., 2021). Over half of parents in the United States (Adams et al., 2020; Hartshorne et al., 2020), Germany (Calvano et al., 2021), and one-third of Italian parents (Orgilés et al., 2020) reported feeling overwhelmed by their ability to manage work and home responsibilities.

Recent research suggests that parent stress and low parental involvement may be key risk factors associated with screen time. Parents with over-reactive and inconsistent parenting practices increased children's screen time during the pandemic (Eyimaya & Irmak, 2021). Parents who are unconfident about their parenting abilities or have difficulties managing their child's problem behaviours are likely to use technology as a distractor mechanism to attenuate the stress of parenting (Nikken, 2019). Gender differences in parenting styles and perceived stress contribute to differences in screen time monitoring and limit setting (Tang et al., 2018). For example, a cross-sectional study conducted in Guelph, Ontario found negative associations between maternal stress and screen time monitoring/limit setting in children; while a positive association was found between paternal stress and screen time monitoring (Tang et al., 2018).

Parent stress is not experienced nor perceived equally. Low income families, single parent households, racial minorities, and essential workers have experienced the brunt of the pandemic (Assari, 2020; Chen et al., 2022). For example, families of colour are overrepresented in the lower end of the socioeconomic continuum than white families, who are often represented in higher income brackets (Chen et al., 2022). Nearly half (49%) of parents from low-income families, compared to 22% of high-income families, faced disproportionate levels of unemployment amid the pandemic, with an overrepresentation of black families in the former socioeconomic group.

Children from low-income or racialized families are at risk for higher rates of screen time than their white or upper-middle-class counterparts (Assari, 2020; Chen et al., 2022; Nagata et al., 2022; Lee et al., 2022). For example, a large cross in a sectional study (n= 15,022) of screen time in children ages 9 to 11 found that the average screen time for white children was 3.17 while the average for black children was 5.56 hours (Assari, 2020). A separate study (n = 5412) found similar disproportionate rates of screen time across racial/ethnic groups during the pandemic, with

the average being 7 hours for white children, and over 9 – 10 hours for black and Native American children (Nagata et al., 2022).

Parent mental health, parenting strategies, and screen time are modifiable risk factors for child mental health and behavioural outcomes (Arundell et al., 2020; Barroso et al., 2018). Research indicates that parents' screen time monitoring and limit-setting behaviours may be an index of societal and economic hardship rather than an index of superior parenting (Hartshorne et al., 2020). For example, children's screen time activity increased in tandem with school closures and periods of limited childcare resources. This finding suggests that under-resourced parents may use screen time as a distractor method to keep their children occupied (Hartshorne et al., 2020; Nikken, 2019; Tang et al., 2018), which may put children at risk for excessive screen time and mental health problems in the future (Hartshorne et al., 2020; Li & Zhou, 2021). For example, heightened parent anxiety during the initial COVID-19 outbreak was a predictor of children's internalizing and externalizing behaviours (Li & Zhou, 2021). In addition, over-reactive, inconsistent, and authoritarian parenting practices contributed to more screen time in children (Eyimaya & Irmak, 2021; Oliveira et al., 2021).

While cross-sectional studies point to potential risks of screen time and parent stress on children's mental health outcomes, few studies have addressed these concerns longitudinally. The influence of parental stress and parenting strategies has been identified as critical mediating factors. It is essential to identify the factors that promote or impede childhood development and develop early intervention strategies to support parents and children during phases of economic hardship.

1.5 The present study

In the current longitudinal study, we examined the association between screen time, parenting styles, and parent stress on the incidence of externalizing and internalizing behaviours in a cohort of Canadian parents and children from November 2020 to November 2021. Parents completed online questionnaires concerning children's media screen time use, children's behaviours, parent stress and parenting styles. Two research questions were examined: 1) Is screen time associated with internalizing and externalizing behaviours in children over time? 2) Will changes in parent stress and parenting styles contribute to children's mental health outcomes? We hypothesized that protracted screen time exposure would contribute to an increased presence of externalizing and internalizing behaviours and that parent stress and parenting styles would moderate the strengths of these association.

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Chapter 2

2 Screen time use and children's mental health during the COVID-19 pandemic

2.1 Introduction

The COVID-19 pandemic generated unprecedented increases in children and adolescents' time spent on devices, with some children spending over 6 hours per day on screens (Eyimaya & Irmak, 2021; Nagata et al., 2022; Seguin et al., 2021; Xiang et al., 2020). A parallel issue for parents with school aged children, who reported stress levels in the moderate to high range (Calvano et al., 2021; Li & Zhou, 2021; Seguin et al., 2021). While screen time and parent stress are known to have separate adverse implications on childhood development, little is known about the accumulated risks of prolonged screen time exposure on incidences of internalizing and externalizing behaviours in children, and the moderating influence of parent stress and parenting strategies on these relationships.

2.1.1 Screen time

Screen time is the amount of time spent using a technology, such as computers, television, video games, and smartphones (Tang et al., 2018; Twenge & Campbell, 2018). Health care professionals caution that excessive screen time may adversely impact childhood development, health, and mental health outcomes with screen time guideline recommending a maximum of 2 hours of screen time per day for children over the age of five (Canadian Paediatric Society, Digital Health Task Force, 2019; World Health Organization, 2020).

The unparalleled impact of COVID-19 engendered nationwide increases in children's time spent on devices (Eyimaya & Irmak, 2021; Orgilés et al., 2020; Velde et al., 2021; Xiang et al., 2020). Based on early cross-sectional data in Ontario, children's average screen time increased

from 2.6 hours before the pandemic, to 5.9 hours a day during the initial school closures of the pandemic (Seguin et al., 2021). This daily average is more than double the recommended guidelines for Canadian children. Similar increases occurred in the United States, Turkey, China, Italy, and Spain (Eyimaya & Irmak, 2021; Nagata et al., 2022; Xiang et al., 2020), with concurrent decreases in physical activity also found in some of these samples (Orgilés et al., 2020; Xiang et al., 2020). Factors such as socioeconomic status, race/ethnicity, school satisfaction (for both children and parents), and having a child with special needs, contributed to unregulated screen time in children (Assari, 2020; Lee et al., 2022; Nagata et al., 2022; Seguin et al., 2021).

2.1.2 Child internalizing and externalizing behaviours

The most prevalent mental health concerns affecting school-aged children prior to the pandemic were anxiety, depression, and conduct problems (Ghandour et al., 2019). Since March 2020, internalizing (i.e., anxiety and depression) and externalizing problems (i.e., aggression) have increased dramatically in school aged children (Khoury et al., 2021), with an estimated 20-25% of children experiencing symptoms of depression and anxiety (Racine et al., 2021). Lockdowns were associated with the most pervasive emotional problems, including anxiety, restlessness, worry, and depression (Orgilés et al., 2020; Racine et al., 2021).

Early evidence indicates that internalizing and externalizing problems may be an enduring issue for children and youth during the pandemic. Increases in internalizing and externalizing symptoms from pre-pandemic to the initial lockdown period were found in Canada and the United Kingdom (Bignardi et al., 2021; Khoury et al., 2021). In a cohort of Norwegian children, an overall increase in mental health issues were reported during the early stages of the pandemic to 9 months after the initial outbreak, with internalizing symptoms accounting for the most increases (Lehmann et al., 2022). Factors such as parent stress, dysregulated family dynamics, and screen time

contributed to increases in children's mental health problems (Khoury et al., 2021; Li & Zhou, 2021; Oliveira et al., 2021).

2.1.3 Impact of screen time on child mental health

Excessive screen time use appears to have an adverse influence on children's mental health outcomes (McArthur et al., 2022; Tamana et al., 2019; Tandon et al., 2021). In a large longitudinal study of brain development and child wellbeing in the United States (ABCD study; https://abcdstudy.org) increased screen time was associated with impaired social skills (Jericho & Elliott, 2020; Paulus et al., 2019), depression and anxiety (Fors & Barch, 2019), behavioural and social issues (Guerrero et al., 2019), and reduced sleep duration, fatigue, and insomnia in children (Hisler et al., 2020). Screen time was associated with a dose-dependent increase in depression risk in children (Liu et al., 2016). Youth reporting over 4 hours of passive screen time per day were significantly more likely to meet the criteria for major depressive episode, social phobia, and generalized anxiety disorder (Kim et al., 2020). By contrast, a systematic review (n= 159, 425) on children's screen time behaviours found that screen time was weakly associated with externalizing and internalizing problems (Eirich et al., 2022). Age-related factors appear to influence the strength and direction of the association (Neville et al., 2021).

Adverse mental health outcomes associated with unregulated screen time is an emergent concern amid the ongoing pandemic. Cross sectional evidence from early stages of the pandemic demonstrates associations between excessive screen time and increased incidence of total mental health difficulties in children and youth, with sleep duration, physical activity and sedentary behaviour mediating these relationships (Olive et al., 2022; Tandon et al., 2021). In a cohort of 2026 Ontario children, more digital media and TV consumption was associated with conduct and

hyperactivity/inattention problems in children under the age of 4 and internalizing problems in older children (Li et al., 2021).

2.1.4 The mediating influence of parent mental health

Parent mental health, parenting strategies, and involvement with children's academic and recreational activities may mediate mental health problems and excessive screen time use in children (Arundell et al., 2020; Barroso et al., 2018; Kochanova et al., 2022; Seguin et al., 2021; Tang et al., 2018). For example, under-resourced parents tend to perceive screen time as an effective tool to modify problem behaviour (Nikken, 2019). Greater maternal stress is associated with less screen-time monitoring/limit setting in children, while greater paternal stress is positively associated with limit setting (Tang et al., 2018).

The pandemic has contributed to heightened perceived stress among parents with school aged children (Adams et al., 2020; Calvano et al., 2021; Orgilés et al., 2020; Seguin et al., 2021), which may put children at risk for greater screen time use and mental health problems in the future (Hartshorne et al., 2020; Li & Zhou, 2021). For example, greater parent anxiety during the initial COVID-19 outbreak was a significant predictor of children's internalizing and externalizing behaviours (Li & Zhou, 2021). In addition, over-reactive, inconsistent, and authoritarian parenting practices contributed to higher screen time use in children (Eyimaya & Irmak, 2021; Oliveira et al., 2021).

While studies point to the separate negative influences of screen time and parent stress on children's mental health outcomes, few studies have addressed these concerns longitudinally. The influence of parental stress and parenting strategies has been identified as important mediating factors. It is essential to identify the factors that promote or impede childhood development, and

to devise early intervention strategies to support parents and children during periods of school closures.

2.1.5 The present study

In the current longitudinal study, we examined the association between screen time, parenting styles, and parent stress on the incidences of externalizing, and internalizing behaviours in a cohort of Canadian children. Parents were recruited between November 2020 to January 2021 and completed follow up surveys exactly one year from baseline measures (i.e., November 2021 to January 2022). Two research questions were examined: 1) Is screen time associated with internalizing and externalizing behaviours in children over time? 2) Will changes in parent stress and parenting styles contribute to children's mental health outcomes? We hypothesize that protracted screen time exposure will contribute to increased externalizing and internalizing behaviours, and that parent stress and parenting styles will moderate the strength of this association.

2.2 Methods

2.2.1 Participants

Parents (aged 18 years and over) and child (aged 6-12 years) residing in Canada with children receiving education through the public-school systems were considered for this study. Participants were recruited online through Prolific and social media (i.e., Facebook, Twitter, and Instagram); those who provided informed consent/assent completed survey measures through

Qualtrics. The study received approval from Western's Non-Medical Research Ethics Board (See Appendix A).

2.2.2 Procedures

We gleaned data from an ongoing longitudinal community-based cohort project on children's mental health and learning outcomes during the pandemic (COVID-19: Managing Parent Attitudes and School Stress). Data from two time points across the 2020-21 academic school year were considered for the present study. Baseline data were collected from parents between November 2020 and January 2021 on a rolling recruitment basis. Parents completed follow up surveys approximately 12 months from their baseline measures. Parents completed demographic measures and answered questions about their parenting styles, stress levels, and their child's mental health and screen time behaviours. We condensed the demographics questionnaire at time two and incorporated supplementary items to capture pandemic-related alterations to school and home routines. All other procedures remained the same. Participants received 10 Canadian dollars for participation at each time point.

2.2.3 Demographic Measures

Parents provided information regarding their household income, employment status, age, gender, geographical location, and the number of children living at home. Children's information, including age, special needs and mental health diagnoses, and mode of education, was provided by the participating parent.

2.2.4 Parent measures

Parental involvement was assessed using a subscale from the abbreviated Alabama Parenting Questionnaire (APQ; Frick, 1991; See Appendix B). The parental involvement subscale provides an estimate of how engaged the parent is in their child's daily activities. Example items

include “you play games or do other fun things with your child” and “you help your child with his or her homework.” The APQ has been shown to have good psychometric properties, including internal consistency (i.e., Cronbach's alpha .80; Shelton et al., 1996) and factorial validity (Essau et al., 2006). The Parent Stress Index -Fourth Edition Short Form (PSI-4; Cohen et al., 1983) was used to assess the magnitude of stress experienced by parent-child dyads. The PSI-4 contains three 12-item subscales, including Parental Distress (e.g., “I often have the feeling that I cannot handle things very well”), Parent-Child Dysfunctional Interaction (e.g., “Sometimes I feel my child doesn't like me and doesn't want to be close to me”), and Difficult Child (e.g., I feel that my child is very moody and easily upset”). These subscales were summed to create a Total Stress Index. The PSI-4 has been shown to have adequate internal reliability and convergent validity (Rivas et al., 2020).

2.2.5 Child measures

Our primary interest was to examine recreational screen time, which was captured through parent estimates of time spent on social media, video gaming, and watching television. Parents provided estimates for sleep duration, time spent engaged in physical activity, and time spent on homework. Time-based estimates were measured in minutes per day. Parents indicated whether their child was enrolled in online or in-person schooling, as well as the parent’s satisfaction with their child's education and whether their child was engaged in their schoolwork.

We examined children's internalizing and externalizing behaviours through the Strengths and Difficulties Questionnaire (SDQ; Goodman, 1997; See Appendix D). The SDQ is a validated behavioural questionnaire for caregivers of children (3-16 years old). The SDQ utilizes five subscales to assess emotional and behavioural development (i.e., emotional symptoms, peer relationship problems, conduct problems, hyperactivity–inattention, and prosocial behaviour). The

sum of the conduct problems and hyperactivity-inattention scales yielded a total score for externalizing behaviours; the sum of peer relationship problems and emotional difficulties yielded a total score for internalizing behaviours. A Total Difficulties score was created by adding the composite scores for internalizing and externalizing behaviours. The SDQ was completed by the parent.

2.2.6 Statistical analyses

All statistical analyses were performed using IBM SPSS Statistics software (Version 28, Statistical Package for the Social Sciences, IBM, Armonk, NY). A multiple imputation procedure addressed missing values in the dependent variables. We performed an analysis of missing values and Little's MCAR test to determine whether missing data were missing completely at random (MCAR). Missing values were imputed using predictive mean matching. Our first aim was to examine whether screen time was associated with children's mental health difficulties. Internalizing and externalizing behaviours were entered as dependent variables in separate generalized estimating equations models (GEE) with screen time entered as the independent variable. Time was included as a within-subjects factor to account for repeated measures. Our second aim was to determine whether parent stress and parenting styles modified the relationship between screen time and mental health outcomes. This was addressed by introducing parent stress and parental involvement into the models as covariates. All models were adjusted for family income, parent gender, child age, number of children living at home, sleep, physical activity, and special needs.

2.3 Results

2.3.1 Participant characteristics

The median age was 38.00 (*IQR*= 8) years for parents and 8.00 (I*QR*= 3) years for children. Participant demographics are presented in Table 1.

A total of 210 parents completed the questionnaire at T1. After excluding ineligible participants and those missing data, a total of 193 participants were retained for the study and 108 participants completed measures at the one year follow up (n=113 prior to data cleaning). Participants who completed measures at both time points (51%, n= 108) were included in the final analysis. The original data source will cease in July 2022, which means that some participants may not have completed follow-up measures in time to be included for the present analysis. Therefore, attrition rates cannot be accurately estimated in our sample.

2.3.2 Measures

2.3.2.1 Screen time and child mental health

The average time children spent on screens was 252.20 minutes (4.40 hours; *SE* = 18.45) at baseline and 233.99 at follow up (3.89 hours; *SE* = 16.70). No significant differences in daily screen time were evident between the two time points (*t*(103) = 1.01, 95% C.I. [-17.63 – 54.05], *p*= .316). No significant differences were found for internalizing (*t*(104) = .652, 95% C.I. [-.408 – .808], *p* = .516), or externalizing behaviours (*t*(104) = .096, 95% C.I. [-.561 – .619], *p* = .924) behaviours between the two time points.

2.3.2.2 Parental factors

Parent stress levels increased significantly from baseline (*M*= 78.45, *SE*= 1.89) to the second time point ([*M*= 86.23, *SE*= 2.59], (*t*(104) = -4.59, 95% C.I. [-11.13 – -4.41], *p* <.001)).

No significant differences were found in parental involvement scores between time points ($t(104)$= .758, 95% C.I. [-.508 –1.14], p = .450).

2.3.3 Internalizing behaviours and screen time

To address our first aim, we examined the relationship between screen time and internalizing behaviours across the two time points. Internalizing behaviours were entered as the dependent variables and screen time was entered as a continuous predictor in the first step of the GEE. A significant positive main effect was found for screen time and internalizing behaviours (p= .030, 95% C.I. .000 - .006, B = .003, Table 2: model 1). Physical activity (p = .001, 95% C.I. -.012 – -.003, B = -.008) and child age (p = .027, 95% C.I. -.48 – -.29, B= -.255) were negatively correlated with internalizing behaviours.

2.3.4 Internalizing behaviours, screen time, and parental factors

Parent stress and parental involvement were entered as covariates to the second step of the GEE for internalizing behaviours. Screen time and parent stress were positive predictors of internalizing behaviours (both, p <.05, Table 2: model 2). Parental involvement, and number of children at home were also positively associated with internalizing behaviours (both, p<0.05). Decreased levels of physical activity was negatively associated with internalizing behaviours.

An additional GEE was performed to examine the interaction effects between parent stress and screen time with internalizing behaviours (Table 2: model 3). Children who spent more time on screens had a parent who reported higher stress levels (p < .001, Fig. 1). Physical activity, number of children at home, and child age were also significant predictors in the model (all, p <.05).

2.3.5 Externalizing behaviours and screen time and parental factors

Our second aim was to address whether screen time was associated with externalizing behaviours over time. No association was found between screen time and externalizing behaviours after adjusting for covariates in the GEE model ($p>0.05$). Parent stress and parental involvement were introduced to the model as moderator variables. Parent stress was a positive predictor of externalizing behaviours ($B = 0.43$, 95% C.I. .021-.066, $p <.001$). No other significant results were found.

2.4 Discussion

The current study explored whether children with higher screen time use would exhibit more externalizing and internalizing behaviours than children with lower screen time use. We also considered the moderating influence of parental stress and involvement on behavioural outcomes and univariate changes to screen time, parenting factors and child mental health.

Children's screen time soared during the initial wave of the pandemic, with several North American and European countries reporting estimates of over 6.00 hours per day (Eyimaya & Irmak, 2021; Nagata et al., 2022; Seguin et al., 2021; Xiang et al., 2020). While we found no significant changes in screen duration over the study period, children were spending an average of 4.00 hours per day on screens, which remains higher than pre-pandemic levels and exceeds the recommended guidelines for Canadian children. This finding illustrates that continuous screen exposure over protracted periods may still pose health risks to children and adolescents.

Parent stress levels were within normal limits at both time points; however, there was a significant 7-point increase at the 1-year follow-up from baseline. This finding corresponds with, and extends upon, previous observations of parents' perceived stress amidst the pandemic. Previously, parents reported experiencing high-stress levels at the outset of the pandemic (Adams

et al., 2020; Calvano et al., 2021; Seguin et al., 2021), with stress levels waning toward the end of 2020 (Adams et al., 2020). We found an increase in perceived stress toward the end of 2020 and into 2021, suggesting that parents continue to struggle with competing demands presented at home and in the workplace.

2.4.1 Internalizing behaviours and screen time

Children's internalizing behaviours were outcomes of interest in the current study. We found a moderate positive association between screen time and internalizing behaviours after controlling for demographic covariates, sleep duration, and physical activity. This observation corresponds with Eirich and colleagues' (2022) meta-analysis demonstrating weak associations among screen time and children's internalizing and externalizing behaviours. Outcome heterogeneity was moderated by between-study variation.

Age-related factors could moderate the correlational strength of screen time and internalizing behaviours. For example, Neville and colleagues (2021) found that greater screen time among preschoolers significantly predicted internalizing behaviours at ages 5 and 7, but greater screen time at age 7 was significantly associated with less internalizing behaviors at 9 years of age. Screen time may disproportionately influence internalizing symptoms in children depending on their age (Li et al., 2021). Therefore, the modest association found in the current work may reflect the association between media use and internalizing symptoms in school-aged children. Nevertheless, screen time overexposure (≥4 hours per day) puts children at a threefold risk for developing major depressive disorder, social phobia, and generalized anxiety disorder (Kim et al., 2020), which underscores the necessity of limiting children's screen time activity, irrespective of age.

2.4.2 Internalizing behaviours, screen time, and parental factors

Parent stress and parental involvement modified the influence of screen time on internalizing behaviours. We also found evidence of a strong relationship between screen time and parent stress on the incidence of anxiety and depressive symptoms in children. Previous research demonstrates a strong positive association between parent mental health and screen time behaviours, which is mediated by dysfunctional parent-child interactions, inconsistent screen time monitoring (Tang et al., 2018), limited access to childcare resources (Hartshorne et al., 2020), lower household income (Lee et al., 2022; Seguin et al., 2021), extended school closures (Lee et al., 2022), and negative parenting strategies (Oliveira et al., 2021). Altogether, our findings indicate that children with greater screen time engagement and who dwell in high-stress environments are at significant risk of developing internalizing behaviours.

2.4.3 Externalizing behaviours and screen time

Our second outcome of interest was externalizing behaviours, which were comprised of hyperactivity/inattention symptoms and conduct problems. We found no association between screen duration and externalizing behaviours in school-aged children. Previous studies indicate that externalizing issues emerge more frequently in younger children. For example, Neville and colleagues (2021) found a directional association between externalizing behaviours and screen time activity in preschoolers, suggesting that parents may use technology to regulate challenging behaviour exhibited by young children. Spending over 2 hours per day on screens was found to increase preschoolers' risk for developing inattention issues by the age of 5; however, the association with aggressive behaviours was not apparent (Tamana et al., 2019). Overall, screen time and externalizing difficulties appear weakly correlated (Eirich et al., 2022), suggesting that other latent factors may underpin children's behavioural functioning.

2.4.4 Externalizing behaviours, screen time, and parenting factors

Parent stress emerged as a strong predictor for children's externalizing behaviours over the pandemic. The association between child behavioural difficulties, parent-child dysfunctional interactions, and parent stress is well established in the literature (Barroso et al., 2018; Kochanova et al., 2022; Oliveira et al., 2021). Parent stress is associated with externalizing behaviours in adolescents, which underscores the need to address parenting strategies and parent mental health when treating children with externalizing difficulties (Eirich et al., 2022; Kochanova et al., 2022).

2.4.5 Limitations

A limitation of the current study was the use of online survey questionnaires to collect information. Albeit virtual collection methods attenuate pandemic-related bottlenecks presented in research, the lack of in-person observation exacerbates the risk of systemic and random error. In addition, parents may over or underestimate their parenting abilities to appear more socially desirable. A strength of our study was the compatibility with multiple technologies (i.e., tablets, smartphones, and laptops) and accessible to English and French speaking families. Another theoretical limitation of the current work is that children’s outcome data were exclusively derived from parent-report estimates. Children often have disparate perceptions of their school and home relationships, which may differ from parental reports.

2.4.6 Conclusion

The current study provides insight to the factors that promote or impede children’s emotional and behavioural outcomes over the 2020-2021 academic school year; and to what extent parent stress and parenting strategies influence these relationships. The findings underscore the need to develop inclusive intervention strategies, as preventing parent stress may be key to preventing problem behaviours and emotional dysregulation in children. Future studies should

consider the separate and combined influences of social media, video gaming, and television on child mental health. Moreover, future work should approach the measurement of screen time within the context of parent-child relationships.

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Table 1 Parent demographics in the full cohort

Characteristic	Full sample	
	n	%
Parent Gender		
Women	56	52.8
Men	50	47.2
Parent age groups		
19–29	11	10.5
30–39	56	53.3
40–49	35	33.3
50–59	3	2.9
Primary parent [a]	102	96.2
Cohabitate [a]	99	94.3
Number of children at home		
1–2	82	78.1
3–4	21	20
5+	2	1.9
Income		
Low < 40K	7	7.1
Moderate 40- 80K	29	29.6
High > 80K	62	63.3
Educational level		
Highschool	6	5.7
College/some college	22	21.0
University/some university	54	51.4
Masters/postgraduate	18	17.1
Doctorate	5	4.8
Employment [a]	93	12.3
Spouse Employment [a]	80	85.1
Child age groups		

Characteristic	Full sample	
	n	%
6 – 7	39	39.4
8 – 9	27	27.3
10 – 12	33	33.3
School delivery		
Online	40	37.7
In-person	66	62.3
School enrollment		
Full-time	103	98.1
Part-time	2	1.9
Child with special need [a]	11	10.2

[a] Reflects the number and percentage of participants answering “yes” to this question.

Table 2 Multivariable GEE regression model for children's Internalizing behaviours

	Model 1					**Model 2**					**Model 3**				
	B	*SE*	95% CI		*p*	*B*	*SE*	95% CI		*p*	*B*	*SE*	95% CI		*p*
			LL	*UL*				*LL*	*UL*				*LL*	*UL*	
Parent gender [a]	-.590	.55	-1.67	.487	.283	-.577	.468	-1.49	.340	.218	-.548	5.30	-1.59	.490	.301
Special needs[b]	-1.94	1.00	-3.89	.015	.052	-2.24	.810	-3.82	-.648	.006*****	-2.06	.931	-3.89	-.237	.027*****
Income	.002	.007	-.011	.015	.738	.000	.006	-.011	.012	.959	.002	.006	-.011	.014	.768
Children at home	.450	.265	-.069	.970	.089	.479	.202	.084	.875	.017*****	.508	.245	.028	.988	.038*****
Child age	-.255	.115	-.481	-.029	.027*****	-.172	.100	-.361	.017	.075	-.265	1.06	-.472	-.059	.012*****
Physical activity	-.008	.002	-.012	-.003	.001**	-.006	.002	-.010	-.002	.007*	-.007	.002	-.012	-.003	.001******
Sleep	.001	.004	-.007	.009	.806	.002	.003	-.005	.009	.570	.003	.004	-.005	.010	.482
Screen time	.003	.001	.000	.006	.030*****	.002	.001	.000	.005	.036*					
PSI[c]						.068	.010	.048	.088	.001******					
Parental Involvement						.086	.041	.006	.116	.034*****	.007	.035	-.062	.076	.840
PSI*Screen time											<0.001	1.45E-5	3.01E-5	8.71E-5	.001******

[a] 0 = Female; 0 [b] = No developmental disorder; [c] Parent stress index.
***** p< .05; ****** p< .001.

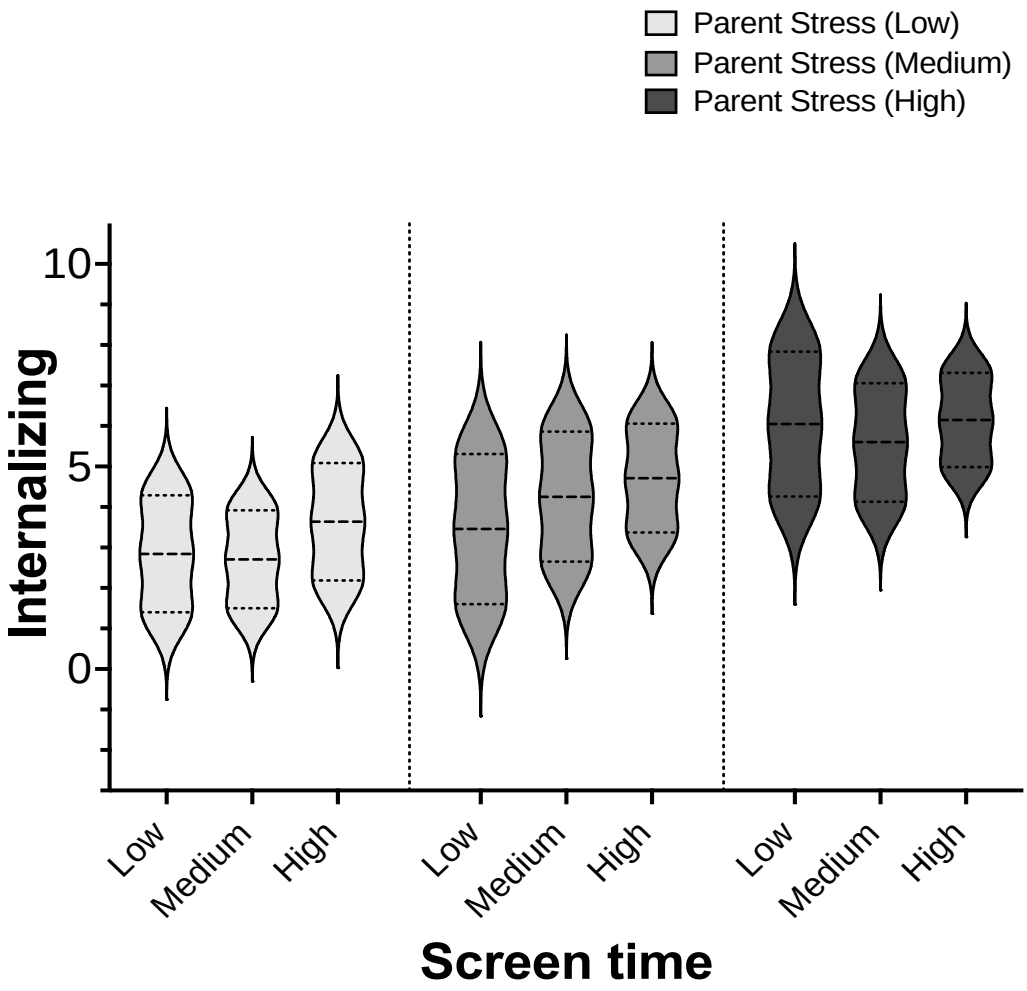

Figure 1 The interaction effects of screen time behaviour and parent stress on internalizing behaviours. Parent stress and screen time were transformed into grouping variables based on quartile ranges (Low, <25th; Medium; <50th, High, >75th percentile). Scores for internalizing behaviours remained continuous. A significant interaction was found for parent stress and screen time activity (β = <0.001, p < .001). Scores represent estimated marginal means with 95% Wald Confidence Intervals.

Chapter 3

3 Discussion

The current study explored whether children with higher screen time engagement would exhibit more externalizing and internalizing behaviours than children with lower screen time activity. We also considered the moderating influence of parental stress on behavioural outcomes, univariate changes to screen time, parenting styles and child mental health.

Children's screen time soared during the initial wave of the pandemic, with several North American and European countries reporting estimates of over 6.00 hours per day (Eyimaya & Irmak, 2021; Nagata et al., 2022; Olive et al., 2022; Seguin et al., 2021; Xiang et al., 2020). While we found no significant changes in screen duration over the study period, children were spending an average of 4.00 hours per day on screens, which remains higher than pre-pandemic levels (Seguin et al., 2021) and exceeds the recommended guidelines for Canadian children. This finding illustrates that continuous exposure over protracted periods may still pose health risks to children and adolescents.

There was a significant 7-point increase in parent stress from baseline to 1-year follow-up. This finding is commensurate with, and extends upon, previous observations of parents' perceived stress amidst the pandemic. Previously, parents reported experiencing high-stress levels at the outset of the pandemic (Adams et al., 2020; Calvano et al., 2021; Seguin et al., 2021); with stress levels waning toward the end of 2020 (Adams et al., 2020). We found an uptick in perceived stress toward the end of 2020 and into 2021, suggesting that parents continue to struggle with competing demands presented at home and in the workplace.

3.1 Internalizing behaviours and screen time

Children's internalizing behaviours (i.e., depression and anxiety) were outcomes of interest in the current study. We found a moderate positive association between screen time and incidence of internalizing behaviours after controlling for demographic covariates, sleep duration, and physical activity. This observation corresponds with Eirich and colleagues (2022) meta-analysis demonstrating weak associations among screen time and children's internalizing and externalizing behaviours. Outcome heterogeneity was moderated by between-study variation.

Age-related factors could moderate the correlational strength of screen time and internalizing behaviours. For example, Neville and colleagues (2021) found that greater screen time among preschoolers significantly predicted internalizing behaviours at ages 5 and 7, while greater screen time at age 7 significantly reduced symptoms by 9 years of age. Screen time may disproportionately influence internalizing symptoms in older, but not younger, children (Li et al., 2021). Therefore, the modest association found in the current work may reflect the global association between media use and internalizing symptoms in school-aged children. Nevertheless, screen time overexposure (≥4 hours per day) puts children at a threefold risk for developing major depressive disorder, social phobia, and generalized anxiety disorder (Kim et al., 2020), which underscores the necessity of monitoring and identifying resilience factors that can modify children's screen time activity.

3.2 Internalizing behaviours, screen time, and parental factors

Parent stress and parental involvement modified the influence of screen time on internalizing behaviours. We also found evidence of a strong synergistic relationship between screen time and parent stress on the incidence of anxiety and depressive symptoms in children. Previous research demonstrates a strong directional link between parent mental health and screen time behaviours,

which is mediated by dysfunctional parent-child interactions (Khoury et al., 2021), inconsistent screen time monitoring (Tang et al., 2018), access to childcare resources (Hartshorne et al., 2020), lower household income (Lee et al., 2022; Seguin et al., 2021), extended school closures (Lee et al., 2022), and negative parenting strategies (Oliveira et al., 2021). Altogether, our findings indicate that children with greater screen time engagement and who dwell in high-stress environments are at significant risk of developing internalizing behaviours.

3.3 Externalizing behaviours and screen time

Our second outcome of interest was externalizing behaviours (i.e., hyperactivity/inattention symptoms and conduct problems). We found no association between screen duration and externalizing behaviours in school-aged children. Previous studies indicate that externalizing issues emerge more frequently in younger children. For example, Neville and colleagues (2021) found a directional association between externalizing behaviours and screen time activity in preschoolers, but not vice versa, suggesting that parents may use technology to regulate challenging behaviour exhibited by young children. Likewise, spending over 2 hours per day on screens puts preschoolers at risk for developing inattention issues by the age of 5; however, the association with aggressive behaviours is scant (Tamana et al., 2019). Overall, screen time and externalizing difficulties appear weakly correlated (Eirich et al., 2022), suggesting that other latent factors may underpin children's behavioural functioning.

3.4 Externalizing behaviours, screen time, and parenting factors

Parent stress emerged as a strong predictor for children's externalizing behaviours over the pandemic. The association between child behavioural difficulties, parent-child dysfunctional interactions, and parent stress is well established in the literature (Barroso et al., 2018; Kochanova et al., 2022; Tamana et al., 2019). Greater parental hostility is a longitudinal predictor of greater

externalizing problems in children (Khoury et al., 2021) and adolescents (Kochanova et al., 2022) which underscores the need to address parenting strategies and parent mental health when treating children with externalizing difficulties.

3.5 Implications

The current work explored the factors that influence mental health and behavioural outcomes in school aged children over the pandemic. We found that parent stress progressively increased over the 2020-2021 school year and was the strongest predictor of children's internalizing and externalizing behaviours. Greater attention must be paid to parents with school-aged children to attenuate the risk for family violence and child mental health morbidity (Khoury et al., 2021; Kochanova et al., 2022; Oliveira et al., 2021). Moreover, interventions targeted toward modifying problematic behaviour must prioritize the parent-child relationship.

Few studies have evaluated the interaction effects underpinning emotional and behavioural dysregulation in school-aged children. The synergistic interplay of screen time and parent stress emerged as a key risk factor for children developing later anxious and depressive symptoms. We posit that children who live with stressed and overwhelmed parents may gravitate toward screen-based activities to fulfill unmet social needs and cope with family tension. These coping strategies may lead to isolation, emotional distress, and low self-confidence in children, further exacerbating future behavioural difficulties.

Screen time and parent stress have been conceptualized as a family systems issue. However, the pandemic has generated mass existential, social, and financial uncertainties that continue to overwhelm families. Low income families and parents from diverse racial and ethnic milieus are significantly more likely to experience class-based discrimination in education and health care settings (Chen et al., 2022), and therefore may not have the necessary resources to

monitor their child's time spent on devices (Assari, 2020; Hartshorne et al., 2020; Seguin et al., 2021). Children from marginalized groups are at a heightened risk of exceeding screen time recommendations and developing internalizing and externalizing problems (Assari, 2020; Chen et al., 2022; Kochanova et al., 2022; Lee et al., 2022; Nagata et al., 2022). Therefore, family stress, screen time, and child mental health represent broader systemic issues which require extensive top-down intervention. It is essential for policy makers, service providers, and decision heads to implement reforms to support families and children during the pandemic. In addition, mental health workers, educators, and healthcare providers should develop competencies for using culturally relevant and responsive pedagogies when working with diverse families (Assari, 2020).

3.6 Limitations

A limitation of the current study was the use of online survey questionnaires to measure parent stress and behavioural difficulties in children. Albeit virtual collection methods attenuate pandemic-related bottlenecks presented in research, the lack of in-person observation exacerbates the risk of systemic and random error. A positive aspect is that our study was compatible with multiple technologies (i.e., tablets, smartphones, and laptops) and accessible to English and French speaking families. Another theoretical limitation of the current work is that children’s outcome data were exclusively derived from parent-report estimates. Children often have disparate perceptions of their school and home relationships, which theoretically cannot be captured through parental estimates alone. Finally, our study had modest attrition rates, which is typical for longitudinal research. To address these gaps, we extended our cohort and included additional time points beyond 2022.

3.7 Conclusion

The current study provides insight to the factors that promote or impede children's emotional and behavioural outcomes over the 2020-2021 academic school year; and to what extent parent stress and parenting strategies influence these relationships. The findings underscore the need to develop inclusive intervention strategies, as preventing parent stress may be key to preventing problem behaviours and emotional dysregulation in children. Future studies should consider the separate and combined influences of social media, video gaming, and television on child mental health. Moreover, future work should approach the measurement of screen time within the context of parent-child relationships.

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Appendices

Appendix A: Western University Non-Medical Research Ethics Board Approval

Western Research

Date: 16 November 2020

To: Dr Emma Duerden

Project ID: 116741

Study Title: COVID-19:Managing Parent Attitudes and School Stress

Short Title: COMPASS

Application Type: NMREB Initial Application

Review Type: Delegated

Full Board Reporting Date: December 4 2020

Date Approval Issued: 16/Nov/2020

REB Approval Expiry Date: 16/Nov/2021

Dear Dr Emma Duerden

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

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

Documents Approved:

Document Name	Document Type	Document Date	Document Version
COMPASS survey 05-10-2020	Online Survey	05/Oct/2020	1
GamesInstructionsExamples_Centivizer2020	Other Data Collection Instruments	05/Oct/2020	1
COMPASS Study ad Oct 5	Recruitment Materials	05/Oct/2020	1
COMPASS Assent Letter_Oct 5 2020	Implied Consent/Assent	05/Oct/2020	1
COMPASS Prolific Ad	Recruitment Materials	05/Oct/2020	1
COMPASS Protocol 09-11-2020	Protocol	09/Nov/2020	2
COMPASS LOI_09_11_2020	Implied Consent/Assent	09/Nov/2020	2
COMPASS French documents_09_11_2020	Translated Documents	09/Nov/2020	2

Documents Acknowledged:

Document Name	Document Type	Document Date	Document Version
COMPASS Screening Nov 9 2020	Screening Form/Questionnaire	09/Nov/2020	1

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

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

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

Sincerely,

Western Research

Date: 4 November 2021

To: Dr Emma Duerden

Project ID: 116741

Study Title: COVID-19:Managing Parent Attitudes and School Stress

Application Type: Continuing Ethics Review (CER) Form

Review Type: Delegated

Date Approval Issued: 04/Nov/2021

REB Approval Expiry Date: 16/Nov/2022

Dear Dr Emma Duerden,

The Western University Non-Medical Research Ethics Board has reviewed this application. This study, including all currently approved documents, has been re-approved until the expiry date noted above.

REB members involved in the research project do not participate in the review, discussion or decision.

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

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

Sincerely,

The Office of Human Research Ethics

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

Appendix B: Alabama Parenting Questionnaire (APQ) Parent-Report

1=Never, 2=Almost Never, 3=Sometimes, 4=Often, 5=Always

1. You have a friendly talk with your child
2. Your let your child know when he/she is doing a good job with something
3. You threaten to punish your child and then do not actually punish him/her
4. You volunteer to help with special activities that your child is involved with (such as sports, boy/girl scouts, church youth groups)
5. You reward or give something extra to your child for obeying you or behaving well
6. You child fails to leave a note to let you know where he/she is going
7. You play games or do other fun things with your child
8. Your child talks you out of being punished after he/she has done something wrong
9. You ask your child about his/her day in school
10. Your child stays out in the evening past the time that he/she is supposed to be home
11. You help your child with his/her homework
12. You give up trying to get your child to obey you because it's too much trouble
13. You compliment your child when he/she has done something well
14. You ask your child what his/her plans are for the coming day
15. You drive your child to a special activity
16. You praise your child for behaving well
17. You do not know the friends your child is with
18. You hug or kiss your child when he/she has done something well
19. Your child good out with a set time to be home
20. You talks to your child about his/her friends
21. Your child goes out after dark without an adult
22. You let your child out of a punishment early (like lift restrictions earlier than you originally said)
23. Your child helps plan family activities
24. You get so busy that you forget where your child is and what he/she is doing
25. Your child is not punished when he/she has done something wrong
26. you attend PTA meetings, parent/teacher conferences, or other meetings at your child's school

27. You tell your child that you like it when he/she helps around the house
28. You don't check that your child comes home at the time he/she was supposed to
29. You don't tell your child where you are going
30. Your child comes home from school more than an hour past the time you expect him/her to be home
31. The punishment you give your child depends on your mood
32. Your child is at home without adult supervision
33. You spank your child with your hand when he/she has done something wrong
34. You ignore your child when he/she is misbehaving
35. You slap your child when he/she has done something wrong
36. You take away privileges or money from your child as punishment
37. You send your child to his/her room as punishment
38. You hit your child with a belt, switch, or other object when he/she has done something wrong
39. You yell or scream at your child when he/she has done something wrong
40. You calmly explain to your child why his/her behavior was wrong when he/she misbehaves
41. You use time out him/her sit or stand in a corner) as punishment
42. You give your child extra chores as punishment

Appendix C: Strengths and Difficulties Questionnaire (SDQ)

*0=Not True, 1= Somewhat true, 3= Certainly true; *items 7, 11, 14, 21, & 25 are reverse coded*

Emotional problems scale

ITEM 3: Often complains of headaches... (I get a lot of headaches...)

ITEM 8: Many worries...(I worry a lot)

ITEM 13: Often unhappy, downhearted... (I am often unhappy....)

ITEM 16: Nervous or clingy in new situations... (I am nervous in new situations...)

ITEM 24: Many fears, easily scared (I have many fears...)

Conduct problems Scale

ITEM 5: Often has temper tantrums or hot tempers (I get very angry)

ITEM 7: Generally obedient... (I usually do as I am told)

ITEM 12: Often fights with other children... (I fight a lot)

ITEM 18: Often lies or cheats (I am often accused of lying or cheating)

ITEM 22: Steals from home, school or elsewhere (I take things that are not mine)

Hyperactivity scale

ITEM 2: Restless, overactive... (I am restless...)

ITEM 10: Constantly fidgeting or squirming (I am constantly fidgeting....)

ITEM 15: Easily distracted, concentration wanders (I am easily distracted)

ITEM 21: Thinks things out before acting (I think before I do things)

ITEM 25: Sees tasks through to the end... (I finish the work I am doing)

Peer problems scale

ITEM 6: Rather solitary, tends to play alone (I am usually on my own)

ITEM 11: Has at least one good friend (I have one goof friend or more)

ITEM 14: Generally liked by other children (Other people my age generally like me)

ITEM 19: Picked on or bullied by other children... (Other children or young people pick on me)

ITEM 23: Gets on better with adults than with other children (I get on better with adults than with people my age)

Prosocial scale

ITEM 1: Considerate of other people's feelings (I try to be nice to other people)

ITEM 4: Shares readily with other children... (I usually share with others)

ITEM 9: Helpful if someone is hurt... (I am helpful is someone is hurt...)

ITEM 17: Kind to younger children (I am kind to younger children)

ITEM 20: Often volunteers to help others... (I often volunteer to help others)

Curriculum Vitae

Amira Hmidan

Education

2020-22	Master of Arts (Candidate) in Counselling Psychology
2018	Bachelor of Arts in Psychology

Honours and Awards

2021	Tri-Agency (NSERC) Canada Graduate Scholarship, *Western University*
2021	Ontario Graduate Scholarship, *Western University*
2018	Deans Honours List for Outstanding Academic Achievement, *St.FX*

Publications

1. Mckee, K., **Hmidan, A.,** Crocker, C., Lam, R., Meyer, J., Crockford, D., Trépanier, A., Aitchison, K., & Tibbo, P. (2021). Potential therapeutic benefits of cannabinoid products in psychiatric disorders: a systematic review and meta-analysis of randomised controlled trials. *Journal of Psychiatric Research, 140,* 267-281.
2. **Hmidan, A.,** & Weaver, A. (2019). Sex dreams: Gender, erotophilia, and sociosexuality as predictors of dream content, valence, and frequency. *The Canadian Journal of Human Sexuality 28*(2), 177-189.

Research experience

2020-22	Graduate Student Assistant, *Western University*
2021	Research Assistant, London Health Sciences Centre
2018-20	Research Assistant, *Nova Scotia Health Authority*
2018-19	Research assistant, *Dalhousie University and Pride Health*

Practicum Placements and Professional Training

2021-22	Counselling Internship, *Thames Valley District School Board*
2018	Mental health summer studentship (full-time), *Stone Hearth Bakery*
2017	Forensic Practicum I, *Nova Institution for Women*
2017	Forensic Practicum II, *Dartmouth Parole Office*

Selected Conference presentations

1. **Hmidan, A**., Seguin, D., Morton, B., & Duerden, E. (2021). The role of parent stress on children's screen time use and behavioural outcomes during the second wave of the pandemic. Canadian Stress Research Summit, Toronto, ON, Canada

2. **Hmidan, A**., Seguin, D., Morton, J. B., & Duerden, G. E. (2021). Parent stress is associated with children's screen time use and behavioural outcomes during the second

wave of the pandemic. Robert Macmillan Symposium in Education, London, ON, Canada

3. Mckee, K., **Hmidan, A.,** Crocker, C., Lam, R., Meyer, J., Crockford, D., Trépanier, A., Aitchison, K., & Tibbo, P. (2020). Potential Therapeutic Benefits of Cannabinoid Products in Mental Illness: A Systematic Review. Canadian Psychiatric Association, Virtual Platform

4. Patterson, V.C., Pencer, A., **Hmidan, A.,** Tibbo, P.G. (2020). The overlap between psychotic symptoms, substance use, and adversity history: A systematic review. Poster presentation at Dalhousie University's Psychiatry Research Day, Halifax, N.S.

5. McKee, K., **Hmidan, A**., & Tibbo, P. (2019). Effectiveness of cannabinoid-based products for the treatment of mental health disorders in adulthood: A systematic review. Poster presented at Dalhousie Psychiatry Research Day, Halifax, N.S.

6. **Hmidan, A.,** & Weaver, A. (2018). Sex dreams: Gender, erotophilia, and sociosexuality as predictors of dream content, valence, and frequency. Poster presented at the Canadian Sex Research Forum, Toronto, ON

Memberships, Organizations and Societies

2022	Canadian Counselling and Psychotherapy Association, Student Member
2020-22	Councillor for the Society of Graduate Students (SOGS) at Western
2020-21	Communications Chair for the Education Graduate Student Association
2020-21	Member of the Social Committee for the Education Graduate Student Association