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Education-Related COVID-19 Difficulties and Stressors during the COVID-19 Pandemic among a Community Sample of Older Adolescents and Young Adults in Canada

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Abstract: The COVID-19 pandemic created significant disruptions to the provision of education, including restrictions to in-person and remote learning. Little is known about how older adolescents and young adults experienced these disruptions. To address this gap, data were drawn from the Well-Being and Experiences study (the WE Study), a longitudinal community-based sample collected in Manitoba, Canada, from 2017–2021 (n = 494). Prevalent difficulties or stressors during in-person learning were less interaction with friends or classmates, worrying about grades, less interaction with teachers, and too much screen time (range: 47.3% to 61.25%). Prevalent difficulties or stressors for remote learning were less interaction with friends or classmates and teachers, less physical activity, worrying about grades, and too much screen time (range: 62.8% to 79.6%). Differences related to sex, education level, financial burden, and mental health prior to the pandemic were noted. From a public health perspective, efforts to re-establish social connections with friends, classmates, and teachers; strategies to manage stress related to worrying about grades or resources to improve grades that have declined; and approaches to reduce screen time in school and at home may be important for recovery and for any ongoing or future pandemics or endemics that impact the delivery of education.

Keywords: COVID-19; pandemic; education; remote learning; school; university; college; adverse childhood experiences (ACEs); child maltreatment; peer victimization; household challenges

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1. Introduction

The COVID-19 pandemic has created significant disruption at a global level. Public health orders have been put into place to reduce the spread of infection, illness, and mortality. Research has determined that public health measures, including travel restrictions, isolation and quarantine, lockdowns, contact tracing and testing, social distancing, mask wearing, and school closures, have been effective in reducing infections [1]. Since the beginning of the global pandemic in 2020, public health orders have had an impact on education, including in schools, colleges, and universities. These restrictions have required significant changes to operations to accommodate the new and evolving public health measures with the aim of keeping students, staff, and faculty safe. In Winnipeg, Manitoba, Canada, schools were initially closed and moved to remote learning in March 2020 and remained in remote learning until the new academic school year in September 2020, which corresponded to Wave 1 of the pandemic. From September 2020 until January 2022, many schools, colleges, and universities transitioned between in-person learning with restrictions to remote learning as Waves 2, 3, and 4 crested and subsided.

Although most public health restrictions have since been lifted, the pandemic and COVID-19 infections remain a global concern. Importantly, it remains unknown whether restrictions can be fully and permanently removed in schools both locally and across the globe. Therefore, it is critical to better understand difficulties and stressors among students, specifically during in-person and remote learning, and whether some students are more likely to identify challenges compared to others. Such knowledge can inform the current pandemic and possible future endemics or pandemics, provide insight into efforts to improve the delivery of education when public health orders are needed, help to guide public health policy within schools, ease student stress, and identify students who may be more likely have difficulties and would perhaps benefit from additional supports to better support their recovery from the COVID-19 pandemic.

To date, a large body of literature has quickly emerged on the impacts of COVID-19 on education for school-aged children and adolescents. What is known is that academic performance was negatively impacted during the pandemic for many children, but not all [2]. Research has also examined the impacts of remote learning on parents and caregivers during the COVID-19 pandemic. As an example, for parents and caregivers, having children in remote learning at home was related to increased caregiving distress for parents and caregivers [3]. Parents have also reported both positive impacts, such as learning in a quiet and safe environment and managing workloads, and negative impacts of remote learning, including social isolation [4]. Research has also been conducted among school-aged children (11 years and younger) to better understand their perceptions and experiences related to the COVID-19 pandemic, and has found themes of knowledge of COVID-19 and understanding public health guidelines, sadness and fears, and social responsibilities. Other overall themes noted in the education literature since the COVID-19 pandemic include mental health, intervention, e-learning or collaborative learning, and a focus on higher education or medical education [5].

Although research on the impacts of COVID-19 is needed across the lifespan, more work is warranted specifically on experiences among adolescents and young adults. Adolescence and young adulthood are distinctly different from earlier periods of child development. The adolescent developmental period is unique, as it is a time when young people individuate and become more independent from parents, along with the progression from concrete thinking to abstract and complex abstract thinking as youth move from early, mid-, and late adolescence [6]. Early adulthood continues to be a time of transition, which may include graduating from high school and entering college or university. These are important milestones across the life course. Stressors and difficulties related to in-school learning with restrictions and remote learning during the COVID-19 pandemic may be different for those in late adolescence and early adulthood compared to children in earlier stages of development. Taken together, research focused specifically on older adolescents' and young adults' experiences and perspectives is warranted.

What is currently known is that data from a qualitative study of high school students conducted during the pandemic from the United States indicated academics and work habits to be the most reported challenge, followed by mental and physical health [7]. Another study examining barriers for university students in Mexico found that a large proportion of students reported having difficulty with time management and following instructions from teachers, problems communicating with school authorities, perceiving less attention from teachers, and finding online learning strenuous and hard. Differences were found for some barriers for students enrolled in private compared to public universities [8]. When asking American university students about the impacts of the COVID-19 lockdowns generally speaking, students reported stress, depression, loneliness, lack of motivation, difficulty focusing on schoolwork, restless sleep, appetite changes, job loss concerns, and difficulties coping [9]. Importantly, however, far less is known about what adolescents and young adults have found stressful or difficult specifically at school during in-person learning with restrictions and at home during periods of remote learning due to the COVID-19 pandemic. Additionally, understanding these stressors and difficulties among those who

were in high school only, university or college only, or transitioning from high school into university or college over the duration of the pandemic would be an important extension of knowledge from a developmental perspective.

Importantly, what is identified as stressful or difficult may vary based on several factors, including age or developmental period (i.e., older adolescents compared to young adults); sex (i.e., males compared to females); household financial burden experienced during the pandemic; having a history of adverse childhood experiences (ACEs), including child maltreatment, peer victimization, and household challenges; and experiencing fair or poor mental health prior to the COVID-19 pandemic. Research from our group indicated that females compared to males reported greater financial burden, mental health problems, and conflict with parents during the COVID-19 pandemic [10]. From a developmental perspective, our research also found important differences for pandemic-related experiences among older adolescents compared with young adults, with young adults being more likely to report financial burden and mental health problems [10]. Our group has also found that having an ACE history (i.e., child maltreatment history, peer victimization history, and/or household challenges) was associated with pandemic-related challenges, including financial difficulties, lack of emotional support, higher levels of feeling stressed/anxious and down/depressed, increased alcohol and cannabis use, and increased relationship conflict [11]. Furthering our understanding of education-related difficulties and stressors among young people and whether differences exist based on age, sex, pandemic-related financial burden, having an ACE history, and mental health problems prior to the pandemic would be useful for informing any ongoing or future public health restrictions in schools and to help identify those that may need additional supports to recover from the COVID-19 pandemic.

Therefore, the aims of the current research were to (1) understand what older adolescents and young adults identify as being difficult or stressful about (a) in-person learning and (b) remote learning during the COVID-19 pandemic, and (2) determine whether differences in identified difficulties or stressors exist for (a) those in high school only, university or college only, and both high school and university or college; (b) males compared to females; (c) those experiencing financial burden during the pandemic compared to those not experiencing financial burden; (d) those with a child maltreatment history compared to no child maltreatment history; (e) those with a peer victimization history compared to no peer victimization history; (f) those with a household challenges history compared to no household challenges history; and (g) those with fair or poor mental health prior to the pandemic compared to those with good or excellent self-reported mental health.

2. Materials and Methods

2.1. Study Design and Participants

The sample was drawn from the Well-Being and Experiences (WE) Study, a longitudinal community survey conducted in Winnipeg and surrounding rural areas in Manitoba, Canada. To date, data were collected in 2017–2018, 2019, 2020, and 2021 for Wave 1 (baseline n = 1002), Wave 2 (n = 748), Wave 3 (n = 664), and Wave 4 (n = 582), respectively. Data for the present study were primarily drawn from Wave 4 when respondents were 17 to 22 years old, with mental health assessed prior to the COVID-19 pandemic from Wave 1 in 2017–2018 and ACEs including child maltreatment experiences collected during various waves depending on the age of the respondent (e.g., less than 18 years of age). The overall retention rate at Wave 4 was 58.2% (75% at Wave 2, 88.8% retained from Waves 2 to 3, and 87.7% retained from Waves 3 to 4). Three recruitment methods were used for the original baseline sampling design, including random digit dialing (21%), referrals (40.6%), and community advertisements (38.4%). Few differences were found based on sampling methods and with no differences noted for age, grade, ethnicity, and several ACEs [12]. Baseline data (Wave 1) closely resembled the population from which it was drawn based on tracking the forward sortation area from postal codes, sex, income, and ethnicity [13]. Data were collected using computer-based questionnaires. Wave 4 data were collected

between November 2021 and January 2022. Respondents were asked whether they had been enrolled in high school, college, or university during the COVID-19 pandemic since March 2020. Only respondents that responded "yes" were included in the current study (n = 494). All respondents provided informed consent. The Health Research Ethics Board at the University of Manitoba approved this study.

2.2. Measures

2.2.1. High School, College, and University

Respondents were asked to reflect on their education experiences from the beginning of the pandemic in March 2020 until the current data collection from November 2021 to January 2022. The age range of the respondents was 17 to 22 years old, meaning that some respondents were in high school during the defined study period, some were completing high school and then beginning university or college, and others were in university or college only during this time.

2.2.2. In-Person and Remote Learning

Respondents were asked what had been difficult or stressful about school, college, or university during the COVID-19 pandemic during the times they were at school in person since March 2020 and during the data collection period. Respondents were provided with the following list of options and asked to mark all that applied: (a) nothing, I did not spent time at school in person, (b) wearing a mask, (c) physical or social distancing, (d) limited movement in classrooms or schools, (e) less interaction with friends or classmates, (f) less interaction with teachers, (g) worrying about grades, (h) too much screen time, and (i) other (open-ended response). Respondents were also asked what had been difficult or stressful about school, college, or university during the COVID-19 pandemic when they were remote learning since March 2020. Respondents were provided with the following options and asked to mark all that applied: (a) nothing, I did not experience remote learning, (b) less interaction with friends or classmates, (c) less interaction with teachers, (d) worrying about grades, (e) too much screen time, (f) less physical activity, (g) lack of or insufficient access to technology (e.g., computers) or internet, and (h) other (open-ended response).

2.2.3. Financial Burden during the COVID-19 Pandemic

Financial burden during the pandemic was assessed with the question, "In the past 12 months, have you or your family experienced financial difficulties because of the COVID-19 pandemic?" Those responding "some", "quite a bit", or "a lot" were coded has having financial burden, whereas those responding "not at all" or "a little" were coded as having no financial burden.

2.2.4. Mental Health Prior to the Pandemic

Self-rated mental health was assessed at Wave 1 in 2017–2018 prior to the COVID-19 pandemic with the question, "In general, how would you rate your mental health?" Response options were dichotomized as "fair" or "poor" versus "good", "very good", or "excellent".

2.2.5. Child Maltreatment History

ACEs were assessed from Waves 1 to 4 and included child maltreatment, household challenges, and peer victimization [14]. The Childhood Trauma Questionnaire (CTQ) was used to assess physical abuse, sexual abuse, emotional abuse, physical neglect, and emotional neglect before the age of 16 years once the respondent turned 18 years old due to reporting laws for minors, which corresponded with Waves 3 or 4 based on age and were not assessed at Wave 4 among respondents aged 17 years [15]. Each ACE was coded with binary (yes/no) classifications using the CTQ guidelines. Exposure to physical intimate partner violence (IPV) was defined as seeing or hearing parents, step-parents, or guardians hit each other or another adult in the home 3–5 times or more, and was also assessed once the respondent turned 18 years old. For respondents aged 17 years, only emotional neglect

was assessed with the CTQ. Emotional abuse was defined as having a parent or guardian say hurtful or mean things once a month or more. Exposure to verbal IPV was defined as having seen or heard adults say hurtful or mean things to another adult in the home monthly or more. Due to mandatory child abuse reporting requirements for minors (i.e., those under 18 years of age), physical abuse, sexual abuse, and physical neglect were not measured among 17-year-olds. Spanking was assessed at Wave 1 among all respondents and was defined as responding "2–3 times a year" or more often to the question "In a typical year, when you were 10 years or younger, about how often do you remember an adult spanking you with their hand on your bottom (bum)"?

2.2.6. Peer Victimization History

Past 12-month peer victimization (assessed at Waves 1 and 2) was examined using seven items and was coded as present if a response of "once a month" or more often was indicated for at least one item at either wave. The seven types of peer victimization included physical, verbal, social, cyber, and three discriminatory forms of peer victimization (e.g., "said something bad about your race, culture, or religion"). At Wave 1 these experiences referred to "a friend, peer, kid at school, or other young person (not an adult or sibling)" and at Wave 2 referred to "a friend, peer or current or former classmate (not sibling)".

2.2.7. Household Challenges

Eight household challenge ACEs were assessed as experiences before the age of 16 years and included the following: (1) Household substance abuse was present if the respondent indicated "yes" to either one or both of the questions, "Did a parent or other adult living in your home ever have problems with alcohol or spend a lot of time drinking or being hung over?" and "Did a parent or other adult living in your home ever have problems with drugs?" (2) Household mental illness was assessed as present if the respondent responded "yes" to the question, "Did a parent or other adults living in your home ever have mental health problems like depression or anxiety?" (3) Parental separation or divorce was considered present if the respondent indicated "yes" to the question, "Were your biological parents ever separated or divorced?" (4) Parental trouble with the police was present if respondents indicated "yes" to the question, "Did a parent or other adult living in your home ever have problems with the police?" (5) Parental gambling was assessed using the following question: "Did a parent or other adult living in your home ever have problems with gambling?" and considered present with a "yes" response. (6) Foster care or child protective organization (CPO) contact was present if the respondent responded "yes" to, "Did you ever see or talk to anyone from a child protective organization (like social services, child welfare, children's aid, or the Ministry) due to difficulties at home?" and/or "Have you ever been placed in a foster home or group home by Child and Family Services?" At Wave 1, the household running out of money and unsafe neighbourhood ACEs were assessed. (7) The household running out of money was considered present with a response of "sometimes" or more often to either or both of the questions, "How often does your family run out of money or find it hard to pay for . . . rent or mortgage on your house?" and " . . . basic necessities like food or clothing?" (8) An unsafe neighbourhood was considered present with a response of either "disagree" or "strongly disagree" to the statement "I feel safe in my community".

2.2.8. Sociodemographic Characteristics

Respondent age was measured in years from 17 to 22 years old. Sex (male, female) was collected at Wave 1 from the adolescent respondent.

2.3. Statistical Analysis

First descriptive statistics were conducted to summarize the overall sample. Second, the prevalence of difficulties or stressors identified during in-person learning and remote learning during the specified COVID-19 pandemic time period were computed and strat-

ified by sex, education, financial burden, child maltreatment history, peer victimization history, household challenge ACEs, and mental health assessed prior to the COVID-19 pandemic. Finally, logistic regression models were run to determine whether differences in identified difficulties or stressors existed depending on respondents' sex, education level, perceived financial burden, history of child maltreatment history, peer victimization history, household challenges, and fair/poor mental health prior to the COVID-19 pandemic.

3. Results

Table 1 displays the descriptive statistics for the current sample. Among the whole sample, very few respondents (5.6%) indicated nothing as being difficult or stressful specific to in-person learning during the COVID-19 pandemic period. Wearing a masking (26.5%), physical or social distancing (30.8%), and limited movement in the classroom (32%) were the least prevalent difficulties or stressors reported. Difficulties or stressors of in-person learning that were most prevalent included less interaction with friends or classmates (61.2%), worrying about grades (54.8%), less interaction with teachers (49.4%), and too much screen time (47.3%). A summary of the open-ended responses (n = 20) describing other difficulties or stressors related to in-person learning included worrying about getting COVID-19, having both online and in person classes, lack of or fewer extracurricular activities or clubs, lack of structure, lack of motivation, and no graduation or postponed graduation. Similar to in-person learning, only 3.9% reported no difficulties or stressors related to remote learning experiences during the pandemic period assessed. A lack of, or insufficient access to, technology or internet was the least reported difficulty or stressor in this sample (16.5%), whereas all other difficulties and stressors noted above were highly prevalent (ranging from 62.8% to 79.6%). A summary of the open-ended responses (n = 21) for other difficulties or stressors regarding remote learning included difficulties learning online, lack of structure, time management, lack of motivation, more distractions/harder to concentrate, fatigue, less self-care, fewer extracurricular activities, and teacher inexperience with online learning.

Table 1. Descriptive sample statistics.

	%
Sex	
Male	44.3
Female	55.7
Education During the COVID-19 Pandemic	
High school only during pandemic	28.3
High school then moved to university/college	39.6
University/college only during pandemic	32.1
Financial Burden Due to COVID-19 in Past 12 Months	
No	80.6
Yes	19.4
Child Maltreatment History	
No	47.6
Yes	52.4
Peer Victimization History	
No	62.9
Yes	37.1

Table 1. *Cont.*

	%
Household Challenges	
No	36.3
Yes	63.7
Mental Health Prior to the COVID-19 Pandemic	
Good/very good/excellent	68.5
Fair/poor	31.5
Age	Mean (SD; Range)
	18.9 (1.24; 17 to 22 years)
Stressors or Difficulties of In-Person Learning	%
Other	3.9
Nothing	5.6
Wearing a mask	26.5
Physical or social distancing	30.8
Limited movement in classrooms or schools	32.0
I did not spend time at school in person	47.3
Too much screen time	47.3
Less interaction with teachers	49.4
Worrying about grades	54.8
Less interaction with friends or classmates	61.2
Stressors or Difficulties of Remote Learning	%
I did not experience remote learning	3.3
Nothing	3.9
Other	4.3
Lack of or insufficient access to technology/internet	16.5
Too much screen time	62.8
Worrying about grades	67.2
Less physical activity	67.2
Less interaction with teachers	73.1
Less interaction with friends or classmates	79.6

Table 2 presents the prevalence of difficulties or stressors related to in-person learning during the COVID-19 pandemic by sex, education level, financial burden, child maltreatment history, peer victimization history, household challenges history, and mental health prior to the pandemic. Table 3 provides the odds ratios for sex, education, financial burden, child maltreatment history, peer victimization history, household challenges history, and mental health prior to the pandemic, and the likelihood of difficulty or stressors related to in-person learning during the COVID-19 pandemic. Findings indicate that females compared to males were more likely to report experiencing too much screen time (odds ratio (OR) = 1.54, 95% confidence interval (CI) = 1.07 to 2.21) and worrying about grades (OR = 1.60, 95% CI = 1.11 to 2.29). Those in high school and university/college and those in university/college only compared to those in high school only were less likely to report (1) nothing was difficult, (2) wearing masks, (3) physical or social distancing, and (4) limited movement in classrooms (ORs ranging from 0.14 to 0.55) and more likely to report too much screen time (ORs ranging from 1.76 to 1.91) as difficulties or stressors. Those in

university/college only compared to high school only were less likely to report less contact with friends or classmates and worrying about grades as difficulties or stressors (OR ranging from 0.49 to 0.59) and more likely to report not spending time at school (OR = 2.23, 95% CI = 1.39 to 3.58). Finally, those reporting experiencing financial burden compared to those not reporting financial burden were more likely to report worrying about grades during the COVID-19 pandemic (OR = 2.26; 95% CI = 1.37 to 3.73). No statistically significant differences were found for those who experienced child maltreatment, peer victimization, household challenges, or poor mental health prior to the COVID-19 pandemic.

Table 4 displays the prevalence of difficulties or stressors of remote learning during the COVID-19 pandemic by sex, education level, financial burden, child maltreatment history, peer victimization history, household challenges history, and mental health prior to the pandemic. Table 5 provides the odds ratios for sex, education, financial burden, child maltreatment history, peer victimization history, household challenges history, and mental health prior to the pandemic and likelihood of difficulty or stressors regarding remote learning during the COVID-19 pandemic. Findings indicate that females compared to males were more likely to report less contact with friends or classmates, worrying about grades, engaging in too much screen time, and lack of or insufficient access to technology or internet as difficulties or stressors during remote learning (OR ranging from 1.56 to 1.94). Those in high school and university/college and those in university/college only compared to those in high school only were less likely to report that they did not experience remote learning (OR ranging from 0.08 to 0.33) and more likely to experience too much screen time (OR ranging from 2.34 to 3.70). Those in high school and university/college compared to high school only were more likely to report less contact with teachers (OR = 1.72, 95% CI = 1.05 to 2.82). Respondents reporting financial burden compared to those not reporting financial burden were more likely to worry about grades and have a lack of or insufficient access to technology or internet (OR ranging from 1.71 to 1.80). Respondents reporting fair/poor mental health compared to good/excellent were less likely to report less physical activity as a difficulty or stressor during remote learning (OR = 0.53, 95% CI = 0.35 to 0.79). Statistically significant differences were not found for those who experienced child maltreatment, peer victimization, or household challenges.

Table 2. Prevalence of difficulties or stressors of in-person learning during the COVID-19 pandemic.

Difficulty or Stressor	Nothing	I Did Not Spend Time at School	Wearing a Mask	Physical or Social Distancing	Limited Movement in Classrooms or School	Less Contact with Friends or Classmates	Less Contact with Teachers	Worrying about Grades	Too Much Screen Time
	%	%	%	%	%	%	%	%	%
Sex									
Male	59.3	40.4	50.0	50.3	44.8	42.2	43.5	39.2	38.9
Female	40.7	59.7	50.0	49.7	55.2	57.8	56.5	60.8	61.1
Education									
High school only	63.0	21.8	41.4	38.9	42.6	31.4	25.9	30.9	21.8
High school and university/college	25.9	40.2	36.7	37.6	41.3	41.9	42.7	41.5	42.8
University/college only	11.1	38.0	21.9	23.5	16.1	26.7	31.4	27.6	35.4
Financial Burden									
No	100	82.8	77.1	78.0	75.8	79.0	78.1	75.6	78.9
Yes	0	17.2	23.0	22.0	24.2	21.0	21.9	24.4	21.1
Child Maltreatment History									
No	42.3	51.1	43.7	44.9	46.7	45.5	45.1	43.4	45.5
Yes	57.7	48.9	56.4	55.1	53.3	54.5	54.9	56.6	54.5
Peer Victimization History									
No	62.5	64.5	58.4	58.3	61.7	61.2	61.4	60.5	64.0
Yes	37.5	35.5	41.6	41.7	38.4	38.8	38.6	39.5	36.0
Household Challenges									
No	31.8	35.8	36.4	36.4	36.3	36.8	38.9	32.6	33.9
Yes	68.2	64.3	63.6	63.6	63.7	63.2	61.1	67.4	66.2
Mental Health									
Good/very good/excellent	66.7	68.0	72.0	73.3	67.6	71.4	72.7	66.2	68.4
Fair/poor	33.3	32.0	28.0	26.7	32.5	28.6	27.4	33.9	31.6

Table 3. Odds ratios for difficulties or stressors of in-person learning during the COVID-19 pandemic.

Difficulty or Stressor	Nothing	I Did Not Spend Time at School	Wearing a Mask	Physical or Social Distancing	Limited Movement in Classrooms or School	Less Contact with Friends or Classmates	Less Contact with Teachers	Worrying about Grades	Too Much Screen Time
	OR (95% CI)	OR (95% CI)	OR (95% CI)	OR (95% CI)	OR (95% CI)	OR (95% CI)	OR (95% CI)	OR (95% CI)	OR (95% CI)
Sex									
Male	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Female	0.53 (0.24–1.17)	1.37 (0.95–1.96)	0.74 (0.49–1.10)	0.71 (0.48–1.04)	0.98 (0.66–1.43)	1.26 (0.87–1.82)	1.08 (0.75–1.54)	**1.60 (1.11–2.29)**	**1.54 (1.07–2.21)**
Education									
High school only	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
High school and university/college	**0.26 (0.11–0.65)**	1.55 (0.99–2.43)	**0.50 (0.31–0.81)**	**0.55 (0.34–0.86)**	**0.52 (0.33–0.82)**	0.82 (0.51–1.30)	1.32 (0.85–2.05)	0.86 (0.55–1.35)	**1.76 (1.12–2.75)**
University/college only	**0.14 (0.04–0.49)**	**2.23 (1.39–3.58)**	**0.35 (0.20–0.59)**	**0.40 (0.24–0.66)**	**0.21 (0.12–0.35)**	**0.49 (0.30–0.79)**	1.13 (0.71–1.80)	**0.59 (0.37–0.95)**	**1.91 (1.19–3.06)**
Financial Burden									
No	–	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Yes	–	0.79 (0.50–1.27)	1.39 (0.84–2.31)	1.31 (0.80–2.13)	1.60 (0.99–2.58)	1.42 (0.87–2.33)	1.45 (0.91–2.31)	**2.26 (1.37–3.73)**	1.29 (0.81–2.05)
Child Maltreatment History									
No	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Yes	1.25 (0.56–2.77)	0.75 (0.52–1.09)	1.23 (0.82–1.86)	1.16 (0.78–1.72)	1.04 (0.71–1.54)	1.22 (0.84–1.78)	1.21 (0.84–1.74)	1.44 (1.00–2.07)	1.16 (0.81–1.67)
Peer Victimization History									
No	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Yes	1.05 (0.45–2.46)	0.92 (0.62–1.38)	1.35 (0.87–2.10)	1.39 (0.91–2.11)	1.13 (0.74–1.73)	1.30 (0.87–1.96)	1.20 (0.81–1.78)	1.33 (0.89–1.99)	0.97 (0.65–1.44)
Household Challenges									
No	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Yes	1.25 (0.50–3.15)	1.08 (0.72–1.61)	1.02 (0.64–1.60)	1.01 (0.66–1.56)	1.02 (0.67–1.57)	0.98 (0.64–1.49)	0.82 (0.55–1.23)	1.47 (0.98–2.21)	1.26 (0.84–1.89)
Mental Health									
Good/very good/excellent	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Fair/poor	1.12 (0.49–2.56)	1.10 (0.75–1.63)	0.83 (0.53–1.30)	0.75 (0.48–1.15)	1.11 (0.73–1.68)	0.76 (0.51–1.13)	0.72 (0.48–1.06)	1.35 (0.91–2.00)	1.06 (0.72–1.56)

Note. Bold font denotes $p \leq 0.05$.

Table 4. Prevalence of difficulties or stressors of remote learning during the COVID-19 pandemic.

Difficulty or Stressor	Nothing	I Did Not Experience Remote Learning	Less Contact with Friends or Classmates	Less Contact with Teachers	Worrying about Grades	Too Much Screen Time	Less Physical Activity	Lack of or Insufficient Access to Technology or Internet
	%	%	%	%	%	%	%	%
Sex								
Male	57.9	50.0	41.5	41.8	39.3	37.8	42.9	30.8
Female	42.1	50.0	58.5	58.2	60.7	62.2	57.1	69.2
Education								
High school only	47.4	62.5	26.8	25.1	26.5	19.7	24.9	21.3
High school and university/college	26.3	31.3	42.3	42.4	43.1	41.8	40.9	38.8
University/college only	26.3	6.3	30.9	32.5	30.5	38.5	34.2	40.0
Financial Burden								
No	88.2	73.3	81.5	80.7	78.1	80.3	81.0	72.0
Yes	11.8	26.7	18.6	19.4	21.9	19.7	19.0	28.0
Child Maltreatment History								
No	50.0	43.8	48.0	49.0	45.4	48.7	50.2	39.0
Yes	50.0	56.2	52.0	51.0	54.6	51.4	49.8	61.0
Peer Victimization History								
No	56.3	69.2	62.9	62.0	62.7	65.9	63.4	61.8
Yes	43.7	30.8	37.1	38.0	37.3	34.1	36.6	38.2
Household Challenges								
No	28.6	38.5	38.4	38.3	35.2	35.6	39.5	30.4
Yes	71.4	61.5	61.6	61.7	64.8	64.4	60.5	69.6
Mental Health								
Good/very good/excellent	68.4	68.8	69.7	70.7	66.9	69.4	73.2	61.5
Fair/poor	31.6	31.3	30.3	29.3	33.1	30.6	26.8	38.5

Table 5. Odds ratios for difficulties or stressors of remote learning during the COVID-19 pandemic.

Difficulty or Stressor	Nothing	I Did Not Experience Remote Learning	Less Contact with Friends or Classmates	Less Contact with Teachers	Worrying about Grades	Too Much Screen Time	Less Physical Activity	Lack of or Insufficient Access to Technology or Internet
	OR (95% CI)	OR (95% CI)	OR (95% CI)	OR (95% CI)	OR (95% CI)	OR (95% CI)	OR (95% CI)	OR (95% CI)
Sex								
Male	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Female	0.55 (0.22–1.40)	0.77 (0.28–2.09)	**1.56 (1.00–2.43)**	1.35 (0.90–2.03)	**1.73 (1.18–2.54)**	**1.92 (1.32–2.80)**	1.11 (0.76–1.63)	**1.94 (1.15–3.26)**
Education								
High school only	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
High school and university/college	0.37 (0.12–1.12)	**0.33 (0.11–0.98)**	1.58 (0.91–2.76)	**1.72 (1.05–2.82)**	1.45 (0.90–2.32)	**2.34 (1.49–3.67)**	1.43 (0.90–2.26)	1.31 (0.69–2.48)
University/college only	0.46 (0.15–1.41)	**0.08 (0.01–0.63)**	0.97 (0.56–1.67)	1.42 (0.86–2.35)	0.97 (0.60–1.57)	**3.70 (2.25–6.08)**	1.61 (0.99–2.63)	1.78 (0.94–3.37)
Financial Burden								
No	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Yes	0.54 (0.12–2.42)	1.53 (0.48–4.94)	0.77 (0.44–1.34)	0.99 (0.59–1.67)	**1.71 (1.00–2.91)**	1.05 (0.65–1.68)	0.92 (0.57–1.50)	**1.80 (1.02–3.18)**
Child Maltreatment History								
No	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Yes	0.91 (0.35–2.33)	1.18 (0.43–3.22)	0.94 (0.60–1.47)	0.82 (0.55–1.24)	1.32 (0.90–1.94)	0.90 (0.62–1.31)	0.74 (0.50–1.09)	1.53 (0.93–2.52)
Peer Victimization History								
No	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Yes	1.37 (0.50–3.76)	0.77 (0.23–2.53)	1.14 (0.70–1.87)	1.27 (0.81–2.01)	1.11 (0.73–1.68)	0.76 (0.50–1.14)	1.01 (0.66–1.53)	1.09 (0.64–1.87)
Household Challenges								
No	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Yes	1.45 (0.45–4.70)	0.91 (0.29–2.84)	0.64 (0.37–1.08)	0.73 (0.46–1.17)	1.18 (0.76–1.81)	1.10 (0.73–1.68)	0.67 (0.43–1.04)	1.38 (0.79–2.41)
Mental Health								
Good/very good/excellent	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Fair/Poor	1.01 (0.38–2.71)	0.99 (0.34–2.91)	0.79 (0.50–1.27)	0.71 (0.46–1.08)	1.28 (0.84–1.95)	0.90 (0.61–1.35)	**0.53 (0.35–0.79)**	1.46 (0.88–2.42)

Note. Bold font denotes $p \leq 0.05$.

4. Discussion

The current findings have advanced knowledge with the identification of several adolescent and young adult reported stressors or difficulties related to in-person learning and remote learning during the COVID-19 pandemic. Importantly, novel findings also include identifying differences according to sex, education level, financial burden, and self-reported mental health prior to the pandemic. Novel findings from this work are as follows.

In the current study, only 5.6% and 3.9% of the older adolescent and young adult respondents reported that nothing was difficult or stressful during in-person and remote learning, respectively. This is consistent with previous and recent research indicating that the pandemic has been difficult and stressful for students [16]. A novel finding from this study is that the prevalence of wearing a mask, physical or social distancing, and limited movement in the classroom were among the lowest reported difficulties or stressors of in-person learning assessed in this study, ranging from 26.5–32.0%. The proportion is still approximately one third but is not the majority. From a public health perspective, it is important to know that these measures that have been shown to be effective in preventing infection and keeping individuals safe from illness [1] are not among the most difficult or stressful experiences related to in-person learning. Therefore, during a significant outbreak resulting in potential widespread infections, implementing such public health measures to mitigate risk is warranted. However, strategies to address potential distress and stress related to these measures for some should be developed to reduce individual burden while promoting public health. Importantly, the types of difficulties or stressors related to in-person learning with restrictions and remote learning that were most prevalent among this sample were specific to social connections with friends, classmates, and teachers, as well as worrying about grades and experiencing too much screen time. These findings identify important targets as the pandemic begins to retreat and end, which include ensuring that students (1) are re-establishing these social connections; (2) have access to resources to manage worrying about grades, to improve grades, or to catch up on any missed or delayed curriculum; (3) have effective strategies to reduce or manage screen time; and (4) are given opportunities to increase physical activity.

Some differences in identified difficulties or stressors were noted and could be important targets for public health intervention and possible future planning should a return to in-person learning with restrictions or remote learning be needed now or in the future. Several differences were noted for high school students only compared to high school and university/college students, and university/college students only. As previously noted, late adolescence and early adulthood are distinct developmental periods [6,17]. For example, compared to students who were only in high school for in-person and remote COVID-19 pandemic learning, both those experiencing the end of high school and beginning of university/college students and students enrolled in university/college only reported experiencing too much screen time related to in-person and remote learning. It may be important for university/college faculty to be aware of this and to find creative ways to reduce screen time in courses and programs when remote learning is necessary. This could include other experiential remote learning activities that involve live instructor engagement and peer interaction in the virtual learning experience. University/college students were also less likely to report wearing masks or physical or social distancing for in-person learning as being difficult or stressful, which may highlight the need for relief for providing safe breaks from wearing masks or distancing to be a greater priority within high schools.

Other notable differences were also found for male compared to female students. Female students were more likely to report experiencing too much screen time and worrying about grades (in-person and remote learning), and less contact with friends or classmates and lack of or insufficient technology (remote learning) as difficulties or stressors compared to males. This may highlight the need for different resources and approaches for supports to assist post-pandemic recovery efforts for female students. Students who reported having

financial burden compared to those who did not during the COVID-19 pandemic had an increased likelihood of worrying about grades (in-person and remote learning) and lack of or insufficient technology or internet. This is consistent with other research indicating that low-income families have issues associated with poor connectivity or no connectivity online [18]. As well, education disparities may widen because of a lack of remote learning resources for lower-income families [16]. Our research may extend the current knowledge to identify that such technology challenges may exist in families experiencing financial burden, which may not be the same experiences as families in low-income brackets or living in poverty. Monitoring online attendance and completion of work and checking in on these students to better understand barriers may be one strategy to identify whether lack of or insufficient access to technology is a problem and finding solutions for technology deficits will be needed.

The findings from the current study should be interpreted while considering important limitations. First, although the sample for this work was a community sample of adolescents and young adults that at baseline was similar to the population from which it was drawn, it may not be representative. These findings may not be generalizable for all adolescents and young adults. It may be important for future studies to replicate this work among adolescents and young adults in other locations. Second, financial burden was self-reported, and the degree of burden is not known. Third, the assessment of mental health prior to the COVID-19 was self-reported as "poor", "fair", "good", and "excellent" and did not reflect clinical diagnoses of mental illness. Finally, we only had adequate power to assess possible sex differences. Gender differences could not be examined but would be important for future work in this area.

The current work extends knowledge of education-related difficulties and stressors and has highlighted some important differences related to sex, education level, and pandemic-related experiences of financial burden. From a public health perspective, the findings indicate that public health orders of wearing masks, distancing, and limited movement in the classroom or school to mitigate infection risk were not as difficult or stressful for adolescents and young adults compared to other difficulties and stressors, including limited social connections with friends, classmates, and teachers; worrying about grades; and experiencing too much screen time. Late adolescence and early adulthood mark important development stages for individuation, socialization, and the emergence of social and romantic relationships. The pandemic has significantly interfered with these normative and important social experiences both in and outside of schools for young people. For many, these connections will naturally be rebuilt as restrictions decrease and more social opportunities are permitted. Interventions may not be necessary. However, it might be useful for educators to be aware that less contact with friends, classmates, and teachers was a highly prevalent stressor both for in-person and remote learning during the COVID-19 pandemic and to initiate pedagogical activities that may foster social connections among students. For example, activities or assignments to encourage social interactions and relationship building may help to facilitate connections. Being aware of this may also help identify some individuals who may need more intervention to become reconnected with social groups. These difficulties or stressors need to be considered and addressed during any ongoing or future public health restrictions in schools and during remote learning. In addition, these findings highlight that these difficulties and stressors may vary according to sex, education level, and financial burden, which may indicate that resources and intervention strategies may need to be tailored to address any specific educational support needs or to foster resilience or recovery if needed during the COVID-19 recovery phase.

In summary, from a public health perspective, efforts to re-establish social connections with friends, classmates, and teachers; strategies to manage stress related to worrying about grades or resources to improve grades that have declined; and approaches to reducing screen time in school and at home may be important for recovery and for any ongoing or future pandemics or endemics that impact the delivery of education. Future studies may

want to focus of effective ways to re-establish social connections and to reduce stress and screen time among students.

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