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ACTA PÆDIATRICA NURTURING THE CHILD WILEY

BRIEF REPORT

Recreational screen time before and during COVID-19 in school-aged children

Strategies used to restrict the spread of COVID-19, such as school closures and limited extracurricular activities, have resulted in shifts in children's sedentary behaviours[1] and increases in screen time have largely been assumed. One limitation of the existing research is that it is either cross-sectional[1] or uses national norms as a comparison.[2] Longitudinal cohorts with pre-COVID-19 estimates are needed to examine within-person changes in recreational screen time, to inform policy and practice efforts.

The objectives of the current study were to determine (1) if COVID-19 increases in recreational screen time were greater than pre-COVID-19 within-person time trends and (2) what COVID-19-specific, media-related and demographic factors predicted the magnitude of increases in children's screen time. Given past research showing that screen time is higher when family resources are limited,[3] we hypothesised that COVID-19-specific stressors would result in greater increases in screen time in these families. We also hypothesised that children in families placing limits on screens would have lower increases in screen use, and that child age and sex would predict changes in screen time during COVID-19.

Participants (n = 1333) were from All Our Families, a cohort of mothers and children from Calgary, Canada.[4] Data, herein, include maternal surveys collected when the child was age 5 (2014–2016) and 8 years (2017–2019), and maternal (May-July 2020) and child (9.5 years; July-August 2020) COVID-19 surveys. The institutional ethics board approved this study.

As detailed in Table 1, continuous variables included maternal-reported (and during COVID-19, child) recreational screen time (hours/week; ie smartphone, tablet, gaming, TV device use 'for fun [*outside of schoolwork*]'), maternal awareness of child media activities, maternal stress (Perceived Stress Scale[5]) and child age. Categorical variables included mothers' use of screen rules, COVID-19 impacts on family resources, job/income loss, difficulties balancing homeschooling with work/household activities, or obtaining childcare, and child sex.

Hierarchical linear modelling (HLM) was performed in Mplus 8.1 using robust maximum likelihood estimation. Piecewise slopes were used to differentiate change in screen time from 5 to 8 years and from 8 years to 9.5 years (during COVID-19). We examined univariate between-person predictors (eg COVID-19-specific, media-related factors, demographics) of change in screen time from 8 years to COVID-19.

Mean (SD) maternal-reported screen time at ages 5 years, 8 years and during COVID-19 at 9.5 years were as follows: 10.63 (5.27), 11.73 (9.25) and 23.57 (12.13) hours/week; and child-reported screen time during COVID-19 was 23.65 (11.95) h/week. The increase in screen time during COVID-19 based on both child (B = 12.42; 95% CI: 11.62, 13.23) and maternal report (B = 11.82; 95% CI: 11.15, 12.50), was significantly greater than increases from age 5 to 8 years pre-pandemic (Figure 1). Experiencing the financial impact of COVID-19 and having higher maternal stress, as well as child age, were associated with greater increases in screen time. Use of screen rules and maternal awareness of screen activities were associated with less of an increase in screen time (Table 1).

Findings support that COVID-19 has resulted in significant increases in children's recreational screen time compared to within-person time trends pre-pandemic. Specifically, when surveyed at 5 and again 8 years of age , children had an average increase of 1-hour/week of screen time pre-pandemic. Approximately 1.5 years later at age 9.5 during COVID-19, these same children had an average 11-hour/week increase, a finding consistent across maternal and child reports. These results warrant attention given the research showing that screen time habits tend to be consistent over time and that high durations of screen time have been linked to poor behavioural and developmental outcomes.[3]

In families where screen-use rules were used, children received 3.5 fewer hours of recreational screen time per week than children where no rules were used. Alternatively, in families where financial and psychological stress were high during COVID-19, children's recreational screen time was most elevated. Consistent with developmental expectations, older children had higher increases in recreational screen time, equating to approximately one additional hour for each chronological age in years.

While this study highlights the increase in children's recreational screen time during COVID-19, it does not address whether increases in screen time pose a risk to children. There is a need for more nuanced data regarding the content (ie types of media use) and context (eg co-viewing) of children's screen time during COVID-19, as well as the impact of use on child health outcomes. This study is

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TABLE 1 Univariate between-person predictors of change in screen time from 8 years to 9.5 years (during COVID-19)

	Δ 8–9.5 years (during COVID−19) Screen time hours/week[a] B (95% CI)	
Variable[b]	Child report[c]	Maternal report
Awareness of media use	−0.43 (−1.47, 0.61)	−3.37 (−4.20, −2.54)*
Screen time rules	−3.20 (−5.30, −1.10)*	−3.81 (−5.43, −2.19)*
Pandemic impact on resources	2.06 (0.57, 3.54)*	0.26 (−0.95, 1.47)
Maternal stress	0.07 (−0.04, 0.18)	0.21 (0.12, 0.30)*
Difficulty balancing homelife	−0.89 (−2.61, 0.84)	1.13 (−0.26, 2.52)
Job/income loss	0.43 (−1.06, 1.92)	−1.10 (−2.29, 0.10)
Difficulty obtaining childcare	−1.22 (−2.87, 0.44)	0.27 (−1.08, 1.62)
Age	1.16 (0.24, 2.09)*	1.33 (0.43, 2.23)*
Male child	−0.62 (−2.08, 0.83)	0.37 (−0.83, 1.57)

Note: Adjusted models were run controlling for child age (M = 9.85, SD = 0.78, range 9 –11 years), sex (47.6% female), ethnicity (83.1% White), and household income at COVID-19 (84.6% ≥$80,000 Canadian). The pattern of results remained the same with and without covariates.

Abbreviation: Δ, change.

[a]At the 5year, 8year, and COVID-19 waves mothers reported the range of time their child spent using electronic devices (ie watching television programmes; movies, videos, or stories on a VCR or DVD player; using a computer, gaming system, or other screen-based devices) on a typical weekday and weekend day outside of schoolwork (ie recreational use). At the COVID-19 wave children also self-reported. A weighted average across week and weekend days and electronic devices was calculated to yield screen use in hours/week. Outliers greater than 4 SDs from the mean were winsorised (n = 6 at 5 years, and n = 11 at 8 years).

[b]At the COVID-19 impact survey, mothers reported on their awareness of their child's screen use activities (1, never; 5, always; M = 4.10; SD = 0.71), whether they were enforcing screen time rules (eg limiting content, limiting duration, using parental controls; 9.5% no; 90.5% yes), the impact of COVID-19 on family resources (43.6% reported difficulty meeting financial and/or essential needs; 56.4% reported no impact or too soon to tell), their overall stress levels using the Perceived Stress Scale[4] (M = 16.08, SD = 6.73, range = 0–39), whether they had difficulties balancing home-school with other work/household activities during COVID-19 (78.2% somewhat/very difficult; 21.8% not difficult), the impact of COVID-19 on employment status (59.6% maternal or partner job/income loss; 40.4% no job/income loss), whether they or their partner had difficulties obtaining childcare during COVID-19 (25.3% yes; 74.7% no), their child's age, and their child's sex (male/female).

[c]Change from 8yr maternal-reported screen time to COVID-19 (9.5 year) child self-reported screen time.

*significant estimates (95% CIs do not include 0).

sociodemographically homogeneous, and self-report measurement was used to assess screen time.

Overall, the results of this multi-informant study show that children had a significant increase in recreational screen time during COVID-19, compared to their previous use patterns. Future research is needed to determine if screen use patterns developed during COVID-19 are maintained post-pandemic. These data support the need for targeted resources and strategies to help families manage children's screen time to enable healthy device habits, during and following COVID-19.

CONFLICT OF INTEREST

No conflicts of interest.

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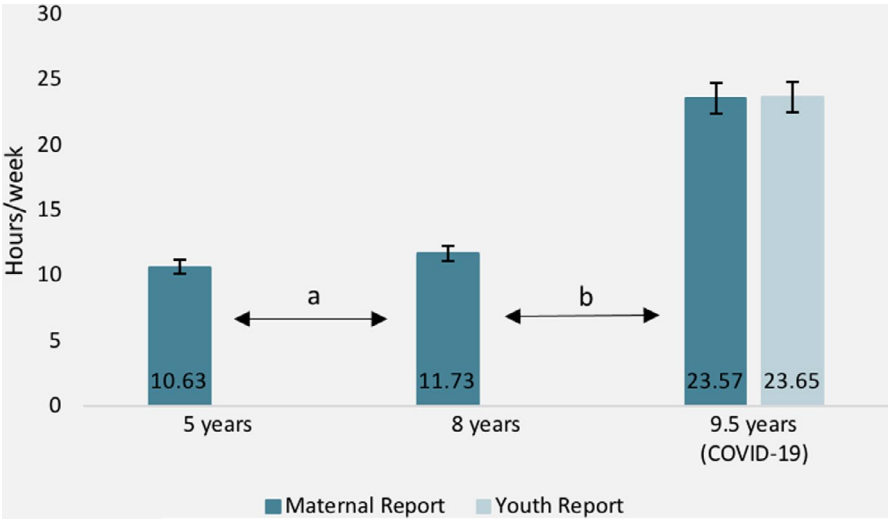

FIGURE 1 Average reported screen time across study waves. Dark blue bars are based on the maternal report (at ages 5, 8, and during COVID-19 at age 9.5); the light blue bar is based on child report (at age 9.5 during COVID-19 only). Error bars represent the standard error of the mean. Data analysis included 1274 mothers who completed the COVID-19 impact survey and at least one other time point. Of these mothers, 839 children agreed to participate and had valid data. The observed within-person increase between 5 and 8 years (a;B = 1.08; 95% CI: 0.60, 1.55) significantly differed from the observed within-person increase from 8 years to COVID-19 (b; [maternal report:B = 11.83; 95% CI: 11.23, 12.25; *t* (2546) =10.74, 95% CI: 9.77, 11.71]; [child report:B = 12.43; 95% CI: 11.63, 13.24; *t* (1676) =11.593; 95% CI: 10.43, 12.76])

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