Mothers’ Perceptions of Children’s Screen Use During the COVID-19 Lockdown in Israel

**Abstract**

The contemporary parenting challenge of regulating children’s screen time became even more difficult in the context of the recent coronavirus (COVID-19) pandemic. By means of two consecutive cross-sectional studies, this paper investigates the characteristics of this challenge and explores mothers’ perceptions regarding their children’s screen use. The first study addressed 299 mothers of elementary school children, who were asked to complete questionnaires regarding their children’s screen use habits. Mothers were also asked about their own attitudes as parents concerning screen use and their personal feelings of frustration and guilt. The second study replicated this procedure among a further 283 mothers but, in this case, the mothers were also asked to complete validated scales regarding their sense of parental competence and authority style. The retrospective reports of the mothers indicated that, during the lockdown, entertainment use of screens increased by 73% among 4th–6th graders and by 108% among 1st–3rd graders. Educational use increased by 86% in both age groups. Mothers’ guilt increased too, and was predicted by children’s entertainment use (but not educational use), above and beyond demographic variables and the mothers’ attitudes. Other factors, such as parenting style and existing diagnosis of attention-deficit/hyperactivity disorder (ADHD), were associated with entertainment use, notwithstanding the lockdown. Interestingly, children with ADHD were not affected more than their peers by the lockdown. Factors that did moderate the lockdown effect were mothers’ attitudes towards screens and mothers’ confidence in their parenting ability. The findings are discussed in the context of parents’ efforts to regulate their children’s screen use.

**Highlights**

* Children’s screen time is a major parenting challenge today.
* Children’s screen use for entertainment and educational purposes increased during the COVID-19 pandemic.
* Mothers’ guilt also increased, but was associated only with entertainment use of screens.
* The increase in entertainment use was moderated by the mothers’ attitudes and parental confidence.
* Parents may derive insights from this study regarding their own parental approach.

**Keywords:** Screen use; COVID-19; Parenting style; Parental competence; ADHD

A major concern of parents in our modern society is the amount of time children spend engaging with screen-based content. Twenty-first century children are the first generation to grow up with smartphone devices from very young ages, and many parents are worried that this unprecedented exposure to screen technologies could impair their children’s psychological development (Author et al., 2020a). Naturally, this parental concern is not unfounded. An increasing number of studies have documented links between children’s screen use and a range of unwanted developmental outcomes, including, for example, cognitive delays (Hutton et al., 2020; Madigan et al., 2020), addictive behaviors (King et al., 2010; Van Deursen et al., 2015) and emotional dysregulation (Elhai et al., 2017). Considering these potential adverse outcomes, parents are typically advised by health officials to limit their children’s screen time, especially at young ages (WHO, 2019).

However, limiting children’s screen time is, of course, not an easy task for parents. There are multiple factors that are known to facilitate (or to moderate) children’s screen time, some of which are very difficult to control. Previous studies have shown that children’s screen time is associated with the socio-demographic and educational background of parents and with specific characteristics of children (Bittman et al., 2011; Rideout et al., 2011). For example, multiple studies investigated screen use in children with attention-deficit/hyperactivity disorder (ADHD), with the assumption that the restlessness that characterizes the disorder would lead children with ADHD to favor the stimulating and highly rewarding activities associated with screen use (Beyens et al., 2018). Additional, perhaps less rigid, factors that can influence children’s screen use are their parent’s general competence, confidence, and parenting styles (Bjelland et al., 2015; Livingstone et al., 2015; Valcke et al., 2010). Finally, parental attitudes towards children’s screen use seem to play a significant role in children’s actual screen use (Cingel & Krcmar, 2013; Lauricella et al., 2015). These attitudes include parents’ beliefs regarding the benefits and risks of screen use, alongside their perceptions regarding their own parental role in limiting their children’s screen time.

Notably, parental attitudes towards children’s screen use predict children’s actual screen time, even in cases where the parents’ own patterns of screen use are not consistent with their attitudes (e.g., parents that spend excessive time on screen technologies despite negative attitudes towards their children’s use) (Lauricella et al., 2015). In addition, mundane “functional parental motives” may also prove to be useful in predicting children’s screen time (Cingel & Krcmar, 2013). Parents who work long hours, for example, may allow their children more screen time than they would like (according to their personal attitudes towards screens). Correspondingly, many parents struggle to meet the strict screen time guidelines of medical officials, and allow their children more screen time than is recommended (Götz et al., 2020; Trinh et al., 2020). Inevitably, modern lifestyles and working habits, along with the glut of scientific warnings regarding the effects of screens on children’s development, lead many parents to experience considerable guilt and frustration (Carson et al., 2014).

 Unfortunately, this complex parental struggle became even more difficult with the COVID-19 pandemic. The pandemic led many countries to shut schools and enforce partial or complete lockdowns, which left millions of children at home, relatively isolated, without productive programs or activities. In order to cope with this challenging and unfamiliar situation, many parents turned to screen technologies as a fast and immediate solution, and the overall screen time of children soared dramatically (Götz et al., 2020; Schmidt et al., 2020). This rise in children’s screen use became a further source of anxiety in these already difficult pandemic times (Nagata et al., 2020; Sultana et al., 2021). The present research aimed to investigate the characteristics of this parental concern and explore mothers’ perspectives regarding their children’s screen use.

Specifically, this research consists of two consecutive studies which were conducted in Israel, a world leader in the use of smartphones and other screen technologies (Ministry & of Education, 2018; Pew Research Center, 2019). In fact, most children in Israel receive their first smartphone as soon as they reach the 4th grade (National Council for the Child, 2020). Study one explored the following research questions: 1) To what extent did children’s screen time increase during the COVID-19 lockdown? 2) Did mothers experience negative emotions regarding their own parenting in terms of children’s use of screens, and, if so, did they differentiate between educational use and entertainment use of screens? Study two furthered this investigation and targeted the following questions: 1) What were the factors that augmented or moderated children’s screen use during the COVID-19 lockdown? 2) Did certain parenting capabilities and certain traits in children predict children’s screen use during the lockdown? A detailed description of the hypotheses, methodologies, and results of both studies is provided below.

**Study one**

The goal of the first study was to investigate the extent to which children’s screen time increased during the COVID-19 lockdown and to evaluate mothers’ consequent negative emotional reactions (e.g., frustration and guilt). Based on recent evidence that children’s screen time did in fact increase during the COVID-19 pandemic (Götz et al., 2020; Schmidt et al., 2020) and prior work that documented increased parental guilt when official guidelines on screen time were not met (Carson et al., 2014), we hypothesized that a significant increase would be observed in both variables. In this investigation, we also examined whether the expected relationship between these two variables was significant, beyond other potential variables that are known to affect screen use, such as the demographic background of the mothers and their individual attitudes towards children’s screen use (Cingel & Krcmar, 2013; Lauricella et al., 2015; Rideout et al., 2011).

Additionally, this study aimed to examine a unique aspect of screen use that is less discussed in the literature – the distinction between general use of screens, mainly for entertainment, and a more targeted use of screens for educational purposes (e.g., Skvarc et al., 2021). In this study, we predicted that not all types of screen use would be associated with parental guilt and frustration. We hypothesized that mothers would experience negative feelings regarding their children’s use of screens for entertainment and would not necessarily experience these feelings with regard to their children’s educational use of screens (e.g., distance learning).

**Method**

**Participants and procedure.**

The procedures of study one and study two were approved by the Institutional Review Board (IRB) of Beit Berl College. The recruitment of participants was conducted on April 16, 2020, using an established survey service in Israel, approximately three weeks after the beginning of the first COVID-related lockdown. On account of the lockdown, all data-collection procedures were conducted online using the popular application Qualtrics. After signing a consent form, participants were asked to answer a set of close-ended questions, which were developed for the purpose of this study (all questions were presented to the participants in Hebrew). To minimize poor-quality responses, we applied a strict data-quality protocol (Author et al., 2020b). First, we measured the response time for each participant. Participants who provided answers within an improbable response time (i.e., over ten words in one second) were omitted from the final sample. Second, we administered an “honesty item” at the end of the study in which participants could declare if they had been “attentive,” “not so attentive,” or “completely inattentive” during the study. In this item, we shared our concern with the participants that poor-quality responses might impair the scientific process, and we assured them that honest responses would not harm them in any way. Participants who admitted they had been not so attentive or completely inattentive were excluded from the final sample.

Altogether, the initial sample consisted of 326 mothers. Twenty-seven (8.2%) mothers however, failed the attention checks. The final sample included 299 mothers aged 27 to 67 (*M* = 40.88, *SD* = 5.45), of which 100 mothers had children in the 1st to 3rd grades, 82 had children in 4th to 6th grades, and 117 had children in both age groups. The demographic characteristics of the sample (*age of the mothers*, *number of children, education years,* and *economic status*) are described in Table 1. What follows is a detailed description of the study’s material.

**Attitudes towards screen use.**

We formulated six items to measure parent attitudes towards children’s screen use. Participants’ levels of agreement with each item were rated on a 5-point scale (1 = completely disagree, 5 = fully agree). The items were: (1) screen use can lead to cognitive problems, such as delays in brain development or impairments in attention capabilities; (2) screen use can lead to emotional and social problems, such as impairments in emotion regulation and poor interpersonal capabilities; (3) screen use may contribute to children’s cognitive functioning, for example, through online education; (4) screen use may contribute to emotional and social functioning, for example through online communications with friends; (5) it is important to limit screen time among children in the 1st to 3rd grades; (6) it is important to limit screen time among children in the 4th to 6th grades.

All six attitude items significantly correlated with each other (*0.2* ≤ *r* ≤ 0.5, *p <0.05*). A factor analysis revealed two principal factors with *eigenvalue* > 1, which together explained 69.67% of the original variance. The loadings of the items on each factor suggested that one factor represents the mother’s negative attitudes towards screens, whereas the other represents her positive attitudes. Based on this analysis, two average scores were computed, one for *negative attitudes* and one for *positive attitudes* (Table 2).

**Screen time.**

Upon completion of the attitudes questionnaire, participants were asked to report their children’s daily screen time separately for both entertainment and educational use, and for their young (1st to 3rd grades) and older children (4th to 6th grades). Mothers were asked to address these four items twice – once in relation to their children’s use of screens before the COVID-19 lockdown and once during the lockdown. Under each item, mothers could choose from the following time options per day: “several minutes or even less”; “half an hour”; “one hour”; “two hours”; “three hours”; “four hours”; “five hours,” and “six hours and more.” Prior to the statistical analyses, these categorical options were transformed into a continuous “screen time” variable, such that the verbal answers (e.g., three hours) were replaced by their corresponding numerical value (e.g., 3). The first option of “several minutes or even less” was coded 0.1 and the last option of “6 hours and more” was coded 6.1.

**Parental guilt and frustration.**

Finally, mothers were asked to rate on a 5-point scale (1 = not at all, 5 = very much) the extent to which they experienced negative feelings concerning their parenting, such as guilt or frustration, in relation to their children’s screen use. Mothers completed this item twice, once in the section that addressed their children’s screen use before the COVID-19 lockdown, and once in the section that addressed their children’s screen use during the lockdown.

**Results**

The descriptive statistics of all the variables in the study, including the average screen time of the children before and during the COVID-19 lockdown are presented in Table 1. To examine our first hypothesis regarding the expected increase in screen time, we conducted paired-samples t-tests. The first main finding was that children’s screen time increased significantly during the COVID-19 lockdown across all ages and usages [entertainment use in the 1st to 3rd grades: *Mdiff* = 1.87, *t(199) = 17.01*, *p < 0.01*; entertainment use in the 4th to 6th grades: *Mdiff* = 1.80, *t(182) = 16.20*, *p < 0.01*; educational use in the 1st to 3rd grades: *Mdiff* = 0.65, *t(198) = 7.15*, *p < 0.01*; educational use in the 4th to 6th grades: *Mdiff* = 0.72, *t(180) = 6.75*, *p<0.01*)]. The results indicated that during the COVID-19 lockdown, entertainment use of screens increased by 73% among 4th–6th graders and by 108% among 1st–3rd graders. Educational use increased by 86% in both age groups. The second main finding was that mothers’ guilt and frustration regarding their children’s screen use had also increased significantly during the COVID-19 lockdown (*Mdiff* = 0.49, *t(291) = 7.70*, *p < 0.01*), although the scale of this increase was smaller than the rise in children’s screen use. Here, the levels of frustration and guilt increased by 17% only.

To examine the specific relationships between the mothers’ guilt and frustration and their children’s screen use during the lockdown, and to explore what other factors may have contributed to mothers’ increased sense of guilt and frustration, we conducted a two-step hierarchical regression. Step 1 included the following predictors: demographic variables (*age*, *number of children, education years, economic status*); mothers’ attitudes towards screen use (*average* *positive attitudes and average negative attitudes*), and baseline-levels of mothers’ guilt and frustration before COVID-19. Step 2 included the actual increase in screen time before and during the COVID-19 lockdown (calculated as the duration during the lockdown minus the duration before the lockdown). This increase included two predictors: *increase in entertainment use* and *increase in educational use*. The regression analysis was conducted twice, once for mothers of children in the 1st to 3rd grades (Table 3) and once for mothers of children in the 4th to 6th grades (Table 4).

For mothers of children in the 1st to 3rd grades, the first analysis revealed two significant predictors: the mothers’ negative attitudes (*B = 0.349, SE = 0.104, t(180) = 3.367, p<0.005*) and the baseline level of guilt and frustration (*B = -0.446, SE = 0.073, t(180) = -6.143, p<0.001*). The second analysis revealed an additional significant predictor: an increase in entertainment use (*B = 0.212, SE = 0.05, t(180) = 4.51, p < 0.001*). Importantly, the second step, which included the increase in entertainment use, contributed to the prediction of increased guilt and frustration among the mothers, above and beyond the first step that included the demographic predictors and the mothers’ attitudes towards screens and baseline levels of frustration and guilt, *R2*change = 0.081, *Fchange(2,178) =10.248, p < 0.001*.

For mothers of children in the 4th to 6th grades, the first step revealed five significant predictors: years of education (*B = 0.07, SE = 0.03, t(168) = 2.79, p < 0.01*), economic status (*B = 0.238, SE=0.083, t(168) = 2.854, p < 0.05*), positive attitudes (*B = -0.284, SE = 0.09, t(168) =-3.081, p <0.05*), negative attitudes (*B = 0.257, SE = 0.105, t(168) = 2.448, p <0.05*), and the baseline-level of guilt and frustration (*B = -0.459, SE = 0.078, t(168) = -5.879, p<0.001*). The second step revealed the same additional significant predictor from the previous analysis, that is, an increase in entertainment use (*B = 0.167, SE = 0.05, t(168) =3.638, p <0.005*). Like the previous analysis, this regression showed that the second step, which included an increase in entertainment use contributed to the prediction of increased guilt and frustration among the mothers, above and beyond the first step that included the demographic predictors and the mothers’ attitudes towards screens and base-line levels of frustration and guilt, *R2*change = 0.057, *Fchange(2,168) =6.680, p < 0.00*5. Altogether, these findings suggest that a significant factor that contributes to the prediction of mothers’ guilt and frustration regarding screen use is the actual increase in their children use of screens for entertainment. A further discussion of this study’s findings is provided below, after the presentation of the results of study two.

**Study two**

The goal of study two was to further our understanding of the increase in children’s use of screens for entertainment (which, as seen in study one, correlated with mothers’ guilt and frustration). In this study, we explored what could be contributing to this increase in entertainment use, besides the straightforward explanation that children were seeking recreational activities while schools were closed during the COVID-19 lockdown. Following previous studies on this topic, we extracted three clusters of potential predictors of children’s screen use: (1) the socio-demographic background of the mothers (Rideout et al., 2011); (2) their negative/positive attitudes towards children’s screen use (Cingel & Krcmar, 2013; Lauricella et al., 2015), and (3) their general approach to parenting (Bjelland et al., 2015; Livingstone et al., 2015; Valcke et al., 2010). Although this study was mostly explorative, we speculated that mothers who hold positive attitudes towards screens and/or have a permissive parenting style, would allow their children more screen time than mothers with different attitudes towards screens and/or a different parenting style.

Following studies that emphasized the characteristics of the child as a central predictor of actual screen use (e.g., Beyens et al., 2018), we also asked the mothers whether one (or more) of their children had ADHD. We hypothesized that these children, who often feel “uncomfortable being still for extended time” and who are “often unable to play or engage in leisure activities quietly” (American Psychiatric Association, 2013), would be granted more screen time by their parents, during the COVID-19 lockdown.

**Method**

**Participants and procedure.**

The recruitment of participants for this study was conducted by research assistants from a large Israeli college. The recruitment process started about a week after the first study, a full month into the first COVID-19 lockdown. As in study one, the data-collection procedure was conducted online using Qualtrics. To minimize poor quality responses, we applied the same data quality protocol that was used in study one, including time measurements and an “honesty item.” The initial sample consisted of 308 mothers, of whom 25 (8.1%) failed the attention checks. The final sample included 283 mothers aged from 26 to 54 (*M* = 36.91, *SD* = 6.26), of whom 106 had children in the 1st to 3rd grades; 28 had children in the 4th to 6th grades, and 149 had children in both age groups. The demographic characteristics of the sample are described in Table 5.

After signing a consent form, participants were asked to answer the same set of questions that were used in study one. Factor analysis of the screen attitudes questionnaire revealed the same pattern that was found in study one, explaining 65.21% of the questionnaire variance (Table 6). Based on this analysis, two average scores were calculated, one for *negative attitudes* and one for *positive attitudes*. In addition, this study included a single item regarding children with ADHD and two well-established questionnaires that addressed the mothers’ parenting authority style and sense of competence. What follows is a detailed description of the additional measurements of study two.

**Children with ADHD.**

Mothers were presented with a single multiple-choice item in which they were asked whether they had any children with ADHD. In this item, mothers could choose one of the following responses: “I do not have children with ADHD”; “one/two/three/four or more of my children of elementary school age has received a diagnosis of ADHD”; “I have at least one child with a diagnosis of ADHD but not of elementary school age,” and “I have children with ADHD but none of them has been formally diagnosed by an authorized clinician.”

**Parenting Sense of Competence.**

Mothers were then asked to complete the Hebrew version (Goldstein-Farber, 1988) of the Parenting Sense of Competence Scale (PSOC; Gibaud-Wallston & Wandersman, 1978). The PSOC is a 6-point Likert scale (1 = strongly disagree, 6 = strongly agree) that addresses two sub-factors of parenting competence: a sense of efficacy and a sense of confidence. The sense of efficacy is measured by eight items (e.g., “I honestly believe I have all the skills necessary to be a good parent to my child”), and the sense of confidence is measured by nine items (e.g., “Being a parent makes me tense and anxious”). The reliability of the Hebrew version of the PSOC is well-documented (e.g., Efrati & Gola, 2019; Waldman-Levi et al., 2015) and this study evidenced good internal consistency of the items in terms of both sub-factors (Cronbach’s α = 0.7 and 0.74, for efficacy and confidence, respectively).

**Parental Authority Questionnaire.**

Finally, the mothers’ parenting style was rated using the Hebrew version (Sholet, 1997) of the Parental Authority Questionnaire (PAQ; Buri, 1991). This questionnaire, which is well-established in the scholarly literature (e.g., Efrati & Boniel-Nissim, 2020; Gong et al., 2015), consists of 30 items that are rated on a 5-point scale (1 = strongly disagree, 5 = strongly agree). The PAQ addresses three types of parenting style: permissive (e.g., “children need to be free to make up their own mind”), authoritarian (e.g., “children should be forced to conform to what the parent thinks is right”), and authoritative (e.g., “the parent discusses the reasoning behind rules”). The psychometric validity of the PAQ is well-documented in the literature (e.g., Buri, 1991; Yaffe, 2018), and the current study evidenced good internal consistency in all sub-factors (Cronbach’s α = 0.7, 0.74, and 0.614, for permissive, authoritarian, and authoritative, respectively).

**Results**

The descriptive statistics of this study’s variables are provided in Table 5. To examine the relative effect of each variable on entertainment screen use, two repeated measure ANCOVAs were conducted, one for children in the 1st to 3rd grades and one for children in the 4th to 6th grades. The categorical predictors in each analysis were the COVID-19 lockdown and ADHD. The COVID-19 lockdown was defined as being a within-subjects binary predictor that includes two levels (before and during the lockdown). The ADHD variable was defined as a between-subjects predictor with two levels (with and without ADHD). Since some mothers reported having more than one child with ADHD, we recoded this variable into a binary variable (0/1), which indicated whether the mother had at least one child with ADHD. The continuous predictors were the two types of attitudes towards screens (positive attitudes and negative attitudes); the two sub-factors of the Parenting Sense Of Competence Scale (PSOC-efficacy and PSOC-confidence); the three parenting styles according to the PAQ (PAQ-permissive, PAQ-authoritarian, and PAQ-authoritative), and the demographic variables of the study (age, religious affiliation, number of children, and economics status).

**Entertainment use among children in the 1st to 3rd grades.**

Table 7 presents the results from the repeated measure ANCOVA for children in the 1st to 3rd grades. The following predictors were found to be significant in this analysis: the COVID-19 lockdown [the estimated means of screen time before and during the lockdown were 1.27 and 2.75, respectively, *F(1,210)=6.45, p<0.05, partial* $η^{2}$*=0.03*]; ADHD [estimated means among children without and with ADHD were 1.68 and 2.34 respectively, *F(1,210)=12.41, p<0.005, partial* $η^{2}$*=0.06*]; the mothers’ positive attitudes towards screens [*F(1,210)=13.86, p<0.001, partial* $η^{2}$*=0.06*]; the mothers’ negative attitudes towards screens [*F(1,210)=6.91, p<0.01, partial* $η^{2}$*=0.03*]; the PAQ-authoritarian sub-factor [*F(1,210)=4.84, p<0.05*, *partial* $η^{2}$*=0.02*]; the age of the mother [*F(1,210)=10.32, p<0.001, partial* $η^{2}$*=0.047*], and the number of children [*F(1,210)=5.06, p<0.01, partial* $η^{2}$*=0.024*].

In addition, the following interactions were found to be significant: the COVID-19 lockdown with negative attitudes towards screens [*F*(1,210)=6.08, p<0.05, partial $η^{2}$=0.029] and the COVID-19 lockdown with the PSOC-confidence sub-factor [*F*(1,210)=6.75, p<0.05, partial $η^{2}$=0.03]. To interpret these interactions, we calculated the correlations between each of these covariates and the increase in screen-use that occurred during the COVID-19 lockdown. The two covariates were negatively correlated with the change in screen-use duration (*r* = -0.185, and -0.138, for negative attitudes towards screens and PSOC-confidence respectively). These negative correlations suggest that the greater the score of one of these three continuous variables, the less pronounced the effect of the COVID-19 lockdown on the entertainment use of screens (see the discussion section for below explanation of these interactions).

**Entertainment use among children in 4th to 6th grades**

Table 8 presents the results from the repeated-measure ANCOVA for children in the 4th to 6th grades. The following predictors were found to be significant in this analysis: the COVID-19 lockdown [estimated means before and during the lockdown were 1.59 and 3.26, respectively, *F(1,136)=4.37, p<0.05, partial* $η^{2}$*=0.03*)]; the presence of ADHD [estimated means among children without and with ADHD were 2.17 and 2.68 respectively, *F(1,136)=4.38, p<0.05, partial* $η^{2}$*=0.03*]; positive attitudes towards screens [*F(1,136)=8.57, p<0.05, partial* $η^{2}$*=0.059*]; negative attitudes towards screens [*F(1,136)=5.33, p<0.05*, *partial* $η^{2}$*=0.038*]; the PAQ-authoritarian sub-factor [*F(1,136)=4.19, p<0.05, partial* $η^{2}$*=0.03*]; the age of the mother [*F(1,136)=5.19, p<0.05, partial* $η^{2}$*=0.037*], and the number of her children [*F(1,136)=4.41, p<0.05*, *partial* $η^{2}$*=0.031*].

In this analysis, two continuous variables interacted with the COVID-19 lockdown variable: positive attitudes towards screens [*F*(1,136) = 5.05, p < 0.05, *partial* $η^{2}$ = 0.036], and negative attitudes towards screens [*F*(1,136) = 8.82, p < 0.005, *partial* $η^{2}$ = 0.06]. The positive attitudes scores were positively correlated with the increase in entertainment use of screens (*r* = 0.256), and the negative attitudes were negatively correlated with this increase (*r* = -0.202). These results suggest that the mothers’ relative attitudes towards screen use either moderated or augmented the effect of the COVID-19 lockdown on children’s use of screens for entertainment.

**Discussion**

The two studies presented above aimed to investigate the increase in children’s screen use during the COVID-19 lockdown, from the point of view of mothers. Unsurprisingly, mothers in both studies reported a significant increase in their children’s screen use during the COVID-19 lockdown. During the lockdown, children used screen technologies for approximately twice the time they used them before the onset of the pandemic. According to the mothers, the highest increase (108%) was in the use of screens for entertainment among young children (the 1st to 3rd grades). This finding corroborates recent studies that were conducted on this topic (Götz et al., 2020; Schmidt et al., 2020).

Importantly, study one revealed that the reported increase in screen time was accompanied by an increase in guilt and frustration among the mothers. These disturbing parental feelings are understandable, and to be expected, considering the multiple studies (and their subsequent, often sensationalist, divulgation in the press) that found associations between screen use and adverse developmental outcomes (e.g., Elhai et al., 2017; Hutton et al., 2020; King et al., 2010; Madigan et al., 2020; Van Deursen et al., 2015). Indeed, in many cases, there is a gap between the alarming headlines in popular media and the actual scientific evidence regarding the developmental risk of screen use (Author et al., 2019a; Author et al., 2019b; Author et al., 2020c); however, there seems to be consensus among scholars that excessive and problematic use of screens is dangerous to children’s healthy psychological development. From this point of view, the parental fear from secondary negative outcomes of the COVID-19 lockdown (i.e., the increase in screen use), is highly reasonable (Nagata et al., 2020; Sultana et al., 2021).

Parental guilt and frustration, however, are not always a direct product of the child’s screen use. Study one showed that mothers make a clear distinction between the use of screens for educational purposes and for entertainment purposes. It seems that mothers believe that the risk to their children’s development does not lie in the duration of use *per se*, as implied, for example, in the WHO guidelines for sedentary behaviors (WHO, 2019), but in the specific type of use, that is, the use of screens for entertainment rather than for educational purposes. In other words, they are less worried about the physical health consequences of sedentary behavior (e.g., gaining weight, decreased physical activity) and more about its psychological consequences. Study one also showed that this factor of children’s use of screens for entertainment contributes to the prediction of the mothers’ guilt and frustration, above and beyond other significant factors, such as the mothers’ age, educational background, economic status, and even the mothers’ personal attitudes towards screen use.

A further exploration of this specific type of screen use conducted in study two revealed that the COVID-19 lockdown was not the only factor that contributed to children’s entertainment use of screens. Other factors, such as the mothers’ characteristics (attitudes towards screens, parenting style, age, and number of children) and the child’s traits (ADHD), played a role in the child’s entertainment use of screens. These findings corroborate with pre-COVID literature that singled out socio-demographic variables (Rideout et al., 2011) and ADHD diagnosis (Beyens et al., 2018) as potential predictors of children’s screen use. The diagnosis of ADHD, however, did not interact with the COVID-19 lockdown factor. Although children with ADHD used screens more often than their non-ADHD peers (as one might expect, in the light of their inherent need for stimulating activities), the increase in their screen use during the lockdown was not significantly different from their non-ADHD peers. In other words, despite the lack of school constraints and despite their presumed inherent restlessness, children with ADHD were not affected more by the COVID-19 lockdown as compared to their peers.

Other factors that relate to the mothers’ parenting capabilities did interact with the COVID-19 factor. In the younger group of children (1st to 3rd grades), the effect of the COVID-19 lockdown on entertainment use of screens was moderated by two features in the mothers: their negative attitudes towards screens and their confidence in their parenting capabilities. These moderating effects may suggest that mothers who have strong beliefs that screen use can impair their children’s development and/or mothers that are confident in their parenting, managed (to a certain extent) to regulate their children’s excessive use of screens during the COVID-19 lockdown. Somewhat different results were documented in the older group of children (those in the 4th to 6th grades). In this age group, both types of the mothers’ attitudes towards screens (positive and negative) interacted with the COVID-19 lockdown factor, suggesting that the increase in screen use during COVID-19 was dependent on the mothers’ attitudes. Children of mothers with strong negative attitudes towards screens demonstrated a large increase in screen use, whereas children of mothers with strong positive attitudes towards screens demonstrated a small increase in screen use, during COVID-19. These findings correspond with the existing pre-COVID studies that demonstrated significant links between parental attitudes and actual screen use of their children (Cingel & Krcmar, 2013; Lauricella et al., 2015).

This research has limitations. Firstly, all the results are based on self-report. For this reason, despite the strict data-quality protocol, they may not reflect the actual rise in screen use during the pandemic. Secondly, the research did not address fathers, and, more importantly, it did not address the children themselves. The focus on mothers only may have yielded a somewhat biased and incomplete picture of children’s screen use. Further studies are recommended to deepen our understanding of the factors associated with this major contemporary parenting challenge. It is our hope that the pandemic will be over soon but, in case additional lockdowns are enforced, we encourage researchers to continue investigating children’s screen use, preferably using more objective and more comprehensive methods (e.g., digital tracking, questionnaires for both parents, and designated scales for children).

Our final recommendation for future research is to implement an experimental design that consists of an intervention group and a control group. Parents in the intervention group could participate in a psychoeducational session, in which they would receive information regarding the various effects of screen use. They would then be encouraged to actively search for stimulating educational content online and to instruct their children to increase their educational screen time in favor of entertainment-based content. Parents in the control group could receive general psychoeducational information about balanced parenting (without a specific focus on screen use). Outcome measures in this proposed experiment could range from academic performance to social and emotional functioning. Indeed, the children of parents participating in the intervention group might object to the new regulations at first; however, we hypothesize that, by the end of this experiment, both parents and children would exhibit beneficial outcomes.

**Declarations**

The funding of both studies was provided by the Israeli education institution of MOFET.

The authors declare no conflict of interests.

**Ethics statement**

The procedures of the current studies were approved by the institutional ethics review board (IRB) of Beit Berl College.

Informed consent was obtained from all the participants of this research.

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**Tables**

Table 1

*Descriptive statistics of all variables (study one)*

|  |  |  |
| --- | --- | --- |
| Mean (*SD*) [Min/Max] | N | Variable |
| 40.88 (5.45) [27/67] | 292 | Age |
| 3.02 (1.15) [1/7] | 291 | No. of children |
| 15.27 (2.76) [4/25] | 292 | Education years |
|  |  | **Religion status** |
|  | 176 (24%) |  Not religious |
|  | 68 (9.3%) |  Traditional |
|  | 45 (6.1%) |  Orthodox |
|  | 6 (0.8%) |  Ultra-orthodox |
| 2.91 (0.82) [1/5] | 292 |  Economic status |
|  |  | **Screen-time (in hours) before the COVID** |
| 1.74 (1.01) [0/6] | 206 |  Entertainment use (1st to 3rd grade) |
| 2.48 (1.21) [0/6] | 188 |  Entertainment use (4th to 6th grade) |
| 0.71 (1.13) [0/6]  | 202 |  Education use (1st to 3rd grade) |
| 0.82 (1.03) [0/6] | 186 |  Education use (4th to 6th grade) |
|   |  | **Screen-time (in hours) during the COVID** |
| 3.62 (1.68) [0/6] | 200 |  Entertainment use (1st to 3rd grade) |
| 4.29 (1.69) [0/6] | 185 |  Entertainment use (4th to 6th grade) |
| 1.33 (1.25) [0/6] | 199 |  Education use (1st to 3rd grade) |
| 1.53 (1.43) [0/6] | 181 |  Education use (4th to 6th grade) |
|  |  | **Attitudes towards screens**  |
| 3.04 (0.83) [1/5] | 299 |  Positive attitudes |
| 3.61 (0.80) [1/5] | 299 |  Negative attitudes |
| 2.86 (1.07) [1/5] | 273 | Frustration and guilt – before the COVID |
| 3.35 (1.25) [1/5] | 273 | Frustration and guilt – during the COVID |

Note. Mean scores, Standard Deviations, and Min-max scores are presented for continuous variables. Percentage of participants in each class is presented for categorical variables (i.e., nominal scales).

Table 2

*Factor loadings of screen-use attitudes questionnaire (study one).*

|  |  |
| --- | --- |
| **Item** | **Principal components** |
| *Negative attitudes* | *Positive attitudes* |
| Cognitive problems | **0.760** | 0.141 |
| Emotional and social problems | **0.704** | 0.241 |
| Screen-time limits are needed (1st to 3rd grades) | **0.850** | 0.194 |
| Screen-time limits are needed (4th to 6th grades) | **0.828** | 0.246 |
| Cognitive benefits | -0.354 | **0.813** |
| Emotional and social benefits | -0.485 | **0.712** |

Table 3

*Negative feelings among mothers of children in the 1st to 3rd grades – a regression analysis (study one)*

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Model  | *B* | *S* | *β* | *t* | *p* | *R2* | *R2 changed*  | *F* | *p* |
| 1 | Age | -.023 | .016 | -.099 | -1.404 | .162 | 0.218 | 0.218 | 5.550 | 0.000 |
|  | Number of Children | .002 | .071 | .002 | .029 | .977 |  |  |  |  |
|  | Education years | -.002 | .028 | -.004 | -.063 | .950 |  |  |  |  |
|  | Economic status | .105 | .098 | .075 | 1.073 | .285 |  |  |  |  |
|  | Religious |  |  |  |  |  |  |  |  |  |
|  |  Orthodox | .014 | .198 | .005 | .070 | .944 |  |  |  |  |
|  |  Ultra-orthodox | -1.21 | .237 | -0.41 | -.509 | .611 |  |  |  |  |
|  | Positive attitudes | -.061 | .093 | -.049 | -.657 | .512 |  |  |  |  |
|  | Negative attitudes | .349 | .104 | .247 | 3.367 | .001 |  |  |  |  |
|  | Pre-COVID negative feelings  | -.446 | .073 | -.449 | -6.143 | .000 |  |  |  |  |
| 2 | Age | -.025 | .015 | -.112 | -1.662 | .098 | 0.299 | 0.081 | 10.25 | 0.000 |
|  | Number of Children | .036 | .068 | .038 | .523 | .601 |  |  |  |  |
|  | Education years | -.006 | .027 | =.015 | -.219 | .827 |  |  |  |  |
|  | Economic status | .098 | .093 | .070 | 1.054 | .293 |  |  |  |  |
|  | Religious |  |  |  |  |  |  |  |  |  |
|  |  Orthodox | .106 | .189 | .039 | .559 | .577 |  |  |  |  |
|  |  Ultra-orthodox | -.119 | .225 | -.041 | -.528 | .598 |  |  |  |  |
|  | Positive attitudes | -.087 | .089 | -.069 | -.947 | .331 |  |  |  |  |
|  | Negative attitudes | .297 | .099 | .210 | 2.986 | .003 |  |  |  |  |
|  | Pre-COVID negative feelings | -.424 | .069 | -.427 | -6.113 | .000 |  |  |  |  |
|  | Change in screen-time (Entertainment) | .212 | .047 | .291 | 4.51 | .000 |  |  |  |  |
|  | Change in screen-time (Educational) | .012 | .056 | .013 | .211 | .833 |  |  |  |  |

Table 4

*Negative feelings among mothers of children in the 4th to 6th grades – a regression analysis (study one)*

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Model  | *B* | *S* | *β* | *t* | *p* | *R2* | *R2 changed*  | *F* | *p* |
| 1 | Age | .012 | .014 | .059 | .837 | .404 | 0.240 | 0.240 | 5.582 | 0.000 |
|  | Number of Children | .049 | .059 | .060 | .834 | .406 |  |  |  |  |
|  | Education years | .074 | .027 | .201 | 2.790 | .006 |  |  |  |  |
|  | Economic status | .238 | .083 | .208 | 2.854 | .005 |  |  |  |  |
|  | Religious |  |  |  |  |  |  |  |  |  |
|  |  orthodox | -.001 | .164 | .000 | -.005 | .996 |  |  |  |  |
|  |  Ultra-orthodox | -.185 | .218 | -.066 | -.847 | .398 |  |  |  |  |
|  | Positive attitudes | -.284 | .092 | -.230 | -3.081 | .002 |  |  |  |  |
|  | Negative attitudes | .257 | .105 | .203 | 2.448 | .015 |  |  |  |  |
|  | Pre-COVID negative feelings | -.459 | .078 | -.463 | -5.879 | .000 |  |  |  |  |
| 2 | Age | .005 | .014 | .027 | .387 | .699 | 0.297 | 0.057 | 6.680 | 0.002 |
|  | Number of Children | .057 | .058 | .069 | .991 | .323 |  |  |  |  |
|  | Education years | .068 | .026 | .185 | 2.634 | .009 |  |  |  |  |
|  | Economic status | .240 | .081 | .209 | 2.972 | .003 |  |  |  |  |
|  | Religious |  |  |  |  |  |  |  |  |  |
|  |  Orthodox | .085 | .161 | .037 | .526 | .600 |  |  |  |  |
|  |  Ultra-orthodox | -.192 | .211 | -.069 | -.909 | .364 |  |  |  |  |
|  | Positive attitudes | -.278 | .089 | -.225 | -3.113 | .002 |  |  |  |  |
|  | Negative attitudes | .283 | .102 | .223 | 2.776 | .006 |  |  |  |  |
|  | Pre-COVID negative feelings | -.475 | .076 | -.479 | -6.276 | .000 |  |  |  |  |
|  | Change in screen-time (Entertainment) | .167 | .046 | .246 | 3.638 | .000 |  |  |  |  |
|  | Change in screen-time (Educational) | .005 | .047 | .007 | .103 | .918 |  |  |  |  |

Table 5

*Descriptive statistics (study two)*

|  |  |  |
| --- | --- | --- |
| Mean (*SD*) [Min/Max] | N |  |
| 36.97 (6.26) [26/54] | 258 | Age |
| 4.51 (1.96) [1/13] | 261 | No. of children |
| 16.97 (1.99) [11/25] | 259 | Education years |
|  | 55 (17.1%) | At least one child with ADHD |
|  |  | **Religion status** |
|  | 23 (7.2%) | Not religious |
|  | 13 (4%) | Traditional |
|  | 150 (46.7%) | Orthodox |
|  | 78 (24.3%) | Ultra-orthodox |
|  | 57 (17.8%) | *missing* |
| 2.93 (0.60) [1/5] | 263 | Economic status |
|  |  | **Screen-time (in hours) before the COVID** |
| 1.11 (1.01) [0/6] | 245 | Entertainment use (1st to 3rd grade) |
| 1.48 (1.17) [0/6] | 164 | Entertainment use (4th to 6th grade) |
| 0.27 (0.41) [0/6] | 242 | Education use (1st to 3rd grade) |
| 0.44 (0.64) [0/6] | 160 | Education use (4th to 6th grade) |
|  |  | **Screen-time (in hours) during the COVID** |
| 2.55 (1.60) [0/6] | 243 | Entertainment use (1st to 3rd grade) |
| 3.00 (1.81) [0/6] | 161 | Entertainment use (4th to 6th grade) |
| 1.01 (0.94) [0/6] | 242 | Education use (1st to 3rd grade) |
| 1.36 (1.15) [0/6] | 160 | Education use (4th to 6th grade) |
|  |  | Attitudes towards screens |
| 2.68 (0.77) [1/5] | 283 | Positive attitudes |
| 4.10 (0.63) [1/5] | 283 | Negative attitudes |
|  |  | **Parental competence** |
| 4.42 (0.72) [1/6] | 267 | Confidence  |
| 4.56 (0.55) [1/6] | 267 | Efficacy |
|  |  | **Parental authority style** |
| 3.65 (0.74) [1/6] | 260 | Authoritarian |
| 4.76 (0.49) [1/6] | 260 | Authoritative |
| 2.82 (0.70) [1/6] | 260 | Permissive |

Note. Mean scores, Standard Deviations, and Min-max scores are presented for continuous variables. Percentage of participants in each class is presented for categorical variables (i.e., nominal scales).

Table 6

*Factor loadings of screen-use attitudes questionnaire (study two).*

|  |  |
| --- | --- |
| **Item** | **Principal components** |
| *Negative attitudes* | *Positive attitudes* |
| Cognitive problems | **0.686** | 0.150 |
| Emotional and social problems | **0.708** | 0.106 |
| Screen-time limits are needed (1st to 3rd grades) | **0.811** | 0.329 |
| Screen-time limits are needed (4th to 6th grades) | **0.766** | 0.310 |
| Cognitive benefits  | -0.505 | **0.695** |
| Emotional and social benefits | -0.493 | **0.687** |

Table 7

*Repeated Measures ANCOVA for entertainment screen use among children in the 1st to 3rd grades*

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Source | *df* | *MSE* | *F* | p | $$η^{2}$$ |
| **Between subjects** |  |  |  |  |  |
| ADHD | 1 | 26.650 | 12.413 | .001 | .056 |
| Religious | 3 | 6.220 | 2.897 | .036 | .040 |
| Age | 1 | 22.157 | 10.320 | .002 | .047 |
| No. of children | 1 | 10.872 | 5.064 | .025 | .024 |
| Economic status | 1 | .804 | .375 | .541 | .002 |
| PSOC – Confidence | 1 | 6.649 | 3.097 | .080 | .015 |
| PSOC - Efficacy | 1 | 1.145 | .533 | .466 | .003 |
| PAQ - Authoritarian | 1 | 10.386 | 4.838 | .029 | .023 |
| PAQ - Permissive | 1 | .003 | .002 | .968 | .000 |
| PAQ - Authoritative | 1 | 2.600 | 1.211 | .272 | .006 |
| Positive attitudes | 1 | 29.762 | 13.862 | .000 | .062 |
| Negative attitudes | 1 | 14.833 | 6.909 | .009 | .032 |
| Error | 210 | 2.147 |  |  |  |
| **Within subjects** |  |  |  |  |  |
| COVID -19 | 1 | 3.812 | 6.455 | .012 | .030 |
| Interactions with COVID-19 |  |  |  |  |  |
|  COVID \* ADHD | 1 | .313 | .530 | .467 | .003 |
|  COVID \* Religious | 3 | .998 | 1.690 | .170 | .024 |
|  COVID \* Age | 1 | 1.650 | 2.794 | .096 | .013 |
|  COVID \* No. of children | 1 | .074 | .125 | .724 | .001 |
|  COVID \* Economic status | 1 | 1.156 | 1.957 | .163 | .009 |
|  COVID \* PSOC Confidence | 1 | 3.987 | 6.753 | .010 | .031 |
|  COVID \* PSOC Efficacy | 1 | .189 | .320 | .572 | .002 |
|  COVID \* PAQ Authoritarian | 1 | .787 | 1.332 | .250 | .006 |
|  COVID \* PAQ Permissive | 1 | 2.287 | 3.872 | .050 | .018 |
|  COVID \* PAQ Authoritative | 1 | .611 | 1.035 | .310 | .005 |
|  COVID \* Positive attitudes | 1 | 1.310 | 2.219 | .138 | .010 |
|  COVID \* Negative attitudes | 1 | 3.595 | 6.088 | .014 | .028 |
| Error | 210 | .591 |  |  |  |

Table 8

*Repeated Measures ANCOVA for entertainment screen use among children in the 4th to 6th grades*

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Source | *df* | *MSE* | *F* | p | $$η^{2}$$ |
| **Between subjects** |  |  |  |  |  |
| ADHD | 1 | 13.321 | 4.378 | .038 | .031 |
| Religious | 3 | 6.802 | 2.236 | .087 | .047 |
| Age | 1 | 15.787 | 5.189 | .024 | .037 |
| No. of children | 1 | 13.406 | 4.406 | .038 | .031 |
| Economic status | 1 | 2.495 | .820 | .367 | .006 |
| PSOC – Confidence | 1 | .372 | .122 | .727 | .001 |
| PSOC - Efficacy | 1 | 6.995 | 2.299 | .132 | .017 |
| PAQ - Authoritarian | 1 | 12.740 | 4.187 | .043 | .030 |
| PAQ - Permissive | 1 | .278 | .091 | .763 | .001 |
| PAQ - Authoritative | 1 | .526 | .173 | .678 | .001 |
| Positive attitudes | 1 | 26.088 | 8.575 | .004 | .059 |
| Negative attitudes | 1 | 16.224 | 5.333 | .022 | .038 |
| Error | 136 | 3.043 |  |  |  |
| **Within subjects** |  |  |  |  |  |
| COVID -19 | 1 | 2.427 | 4.370 | .038 | .031 |
| Interactions with COVID-19 |  |  |  |  |  |
|  COVID \* ADHD | 1 | 1.901 | 3.423 | .066 | .025 |
|  COVID \* Religious | 3 | .467 | .840 | .474 | .018 |
|  COVID \* Age | 1 | .430 | .774 | .381 | .006 |
|  COVID \* No. of children | 1 | .049 | .089 | .766 | .001 |
|  COVID \* Economic status | 1 | .132 | .237 | .627 | .002 |
|  COVID \* PSOC Confidence | 1 | .010 | .018 | .895 | .000 |
|  COVID \* PSOC Efficacy | 1 | 1.163 | 2.093 | .150 | .015 |
|  COVID \* PAQ Authoritarian | 1 | .647 | 1.166 | .282 | .008 |
|  COVID \* PAQ Permissive | 1 | 1.622 | 2.919 | .090 | .021 |
|  COVID \* PAQ Authoritative | 1 | .041 | .074 | .786 | .001 |
|  COVID \* Positive attitudes | 1 | 2.810 | 5.059 | .026 | .036 |
|  COVID \* Negative attitudes | 1 | 4.900 | 8.821 | .004 | .061 |
| Error | 136 | .555 |  |  |  |