Parental mediation in pandemic: Predictors and relationship with children's digital skills and time spent online in Ireland

Beatrice Sciacca [*], Derek A. Laffan, James O'Higgins Norman, Tijana Milosevic

DCU National Anti-Bullying Centre, Dublin City University, Ireland

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ABSTRACT

During the COVID-19 pandemic, an increasing reliance on digital technology to carry out social, entertainment, work and school activities increased, which may have affected the ways in which parents mediated their children's digital technology use. Given the prominent role that digital technology will have in the future, it is important to investigate parent and child characteristics which impacted parental mediation of children's digital technology use. Therefore, the present study aimed at analysing the frequency of parental mediation strategies (i.e. active and restrictive) during lockdown, their determinants, and how the two strategies affected children's digital skills and time spent online. Data were collected from 461 parent and 461 child participants. Results showed that almost half of parents (46%) practiced parental mediation with the same frequency, while the 42.6% applied it more often. Active mediation was predicted by parental worries about online risks, while restrictive mediation was predicted by time spent online by children, parental worries about online risks, parental negative attitudes towards digital technology and parents' digital skills. Children developed more digital skills when their parents applied higher levels of both active and restrictive mediation, and they spent the lowest amount of time online when their parents employed higher levels of restrictive and lower levels of active mediation. Practical implications for families and children's wellbeing are discussed.

1. Introduction

Families' increased reliance on digital technology during COVID-19 pandemic has had a mixed effect on parents and children according to emerging research (e.g. Bonal & González, 2020; O'Sullivan et al., 2021). On the one hand, digital technology use has enabled remote schooling and work, and has thus proved to be a useful resource in the global effort to execute physical distancing. On the other hand, many children and parents have reported that changes in their daily activities (e.g. attending school) have not been optimal even with the accessibility and benefits of digital technology available to them (O'Sullivan et al., 2021). This migration of a large number of normally offline activities into the online realm during the lockdown may have impacted parental mediation strategies of children's digital technology use, which has not been studied thus far and which is the subject of this paper. Did parents and caregivers resort to more restrictions under such extenuating circumstances or did they engage in more active mediation strategies, and why? Which factors, such as parental attitudes towards technology and level of digital skill, led to more restrictions vs. more active mediation?

And what implications did these changes in parental mediation during lockdown have for the amount of time children spent online and their digital skills? These issues are important to study as they have implications for children's overall wellbeing in conditions of increased technology use.

1.1. Parental mediation

Parental mediation is defined as the strategies adopted by parents to regulate, discuss, and monitor children's media use (Livingstone & Helsper, 2008; Warren, 2001). Being a socialization practice, parental mediation aims to teach children the appropriate ways to use media, so as to foster learning opportunities and prevent the risks that might be encountered when engaging in media (Mesch, 2009; Shin, 2015). While early research on parental mediation focused exclusively on television viewing (Clark, 2011; Livingstone & Helsper, 2008), nowadays the focus is on parental mediation of digital technology, intended as the strategies that parents adopt to regulate children's use of digital technology, which includes devices with and without an Internet connection (e.g.

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smartphones, tablets, computers, videogames, etc.; Clark, 2011).

Early research on parental mediation of television viewing identified three basic strategies, that can be applied to digital technology use as well: active mediation, restrictive mediation, and co-using (Valkenburg et al., 1999). *Active mediation* consists of actively discussing media content with the child, by answering the child's questions, explaining media content, clarifying why it is appropriate or not, and encouraging the child to use media in a constructive way. For instance, in the context of digital technology, informing the child of ways to use social media safely would be an active mediation practice. *Restrictive mediation*, on the other hand, consists of setting rules to the child's use of media by limiting the time, place, or situation of the media use, without necessarily providing explanations for the restrictions. Restrictive mediation of digital technology use could consist of prohibiting the child from using their smartphone during meals, or limiting their online interactions with strangers. Finally, the *co-using* strategy refers to sharing the media experience with the child, that is using media together, without necessarily having an active discussion about it. When it comes to digital technology, co-using could consist of playing a game on the tablet together with the child, although it is more difficult to co-use digital devices as they often come in a small size and are used in a private room (Livingstone & Helsper, 2008). Besides these three basic strategies, Livingstone and Helsper (2008) identified two more parental mediation practices that are specific to digital technology use: *technical restrictions*, that refers to installing software to limit the child's access to certain websites or to monitor their activity, and *monitoring*, which consists of checking the child's online activity through Internet history or private messages. A further parental mediation strategy called *enabling mediation* emerged in a later study by Livingstone et al. (2017), and it consists of practices typical of active mediation along with more controlling behaviours (namely technical restrictions and monitoring), that aim at providing the child with a safe online environment where online opportunities can be maximized.

1.2. Factors that influence parental mediation

Such parental mediation strategies, as every socialization practice, are guided by parental beliefs, values, and experiences based on which parents choose which strategy to adopt. They are not applied rigidly to every situation, but they are negotiated daily in parent-child interactions based on both personal and environmental factors (Symons, Ponnet, Walrave, & Heirman, 2017). Examining these factors under conditions of increased digital technology use, as in the case of the COVID-19 lockdown, is important as it allows us to understand which mediation strategies become more salient under such circumstances, and why they become more salient; and most importantly, the implications this has for the amount of time that children spend online, their digital skills, and their overall wellbeing. It also allows us to foster the most constructive parental mediation practices in those parents who, based on their or their child's habits and characteristics, are more likely to need guidance to constructively set rules and communicate with children about digital technology use. In particular, child's and parental factors related to digital technology use (e.g. time spent on the Internet, digital skills level, attitudes towards technology) have proved to be significant predictors of parental mediation of digital technology (e.g. Livingstone et al., 2017; Nikken & Jansz, 2014; Sonck et al., 2013). Therefore, the present study will investigate some of these factors and their relationship with parental mediation.

1.2.1. Child-related factors

Parental mediation can be affected by children's demographic characteristics, such as age (Beyens & Valkenburg, 2019) and gender (Wright, 2017). More specifically, parental mediation of digital technology can be related to the ways such technology is used by children, namely to how much time they spend online, how they regulate their own technology use, and how digitally skilled they are.

1.2.1.1. Time spent online. Time spent online (TSO) is meant as the daily hours children spend on the Internet or using digital technology, and it can be a predictor of parental mediation. Parents tend to apply less restrictive mediation and less supervision with children who engage in a higher variety of online activities and spend more hours online (Nikken & Jansz, 2014; Sonck et al., 2013). The lack of restrictions could be due to the fact that such a frequent digital technology use is more difficult to regulate (Padilla-Walker & Coyne, 2011).

1.2.1.2. Self-regulation. Another predictor of parental mediation is children's self-regulation, which refers to choosing to initiate, plan and monitor one's own behaviour, in order to reach a specific goal (Grolnick & Farkas, 2002). Self-regulated behaviours are self-initiated, which means that they are intentionally caused and intrinsically motivated (Grolnick & Farkas, 2002). For instance, children who are self-regulated in learning will study independently and will complete their homework because they find enjoyment in doing so, and not because they feel coerced by an adult figure (Greene et al., 2015; Grolnick & Farkas, 2002). The development of self-regulation is the ultimate goal of parental mediation as a socialization practice, as it implies that the child has successfully internalized societal values and socially accepted behaviours (Grusec & Davidov, 2007). Therefore, parents who perceive that their children are self-regulated and that they do not get easily distracted when completing an important task, may consider that it is not necessary to regulate their online behaviours, and thus tend to restrict less their Internet, TV and video-game use (Padilla-Walker & Coyne, 2011; Padilla-Walker et al., 2012).

1.2.1.3. Digital skills. Children's digital skills have been established as a predictive factor of parental mediation too (Livingstone et al., 2017). Digital skills are defined as "the ability to use ICTs in ways that help individuals to achieve beneficial, high-quality outcomes in everyday life for themselves and others" (International Telecommunication Union, 2018). Digital skills allow the child to limit the risks associated with the use of digital technologies and to maximize the opportunities they offer. Therefore, when parents perceive that their children have low digital skills, they tend to restrict children's Internet use, to prevent them from facing online risks that they think are not manageable for them. On the other hand, when parents see their children as digitally skilled, they prefer to use active mediation to encourage children in the exploration of online opportunities (Livingstone et al., 2017).

1.2.2. Parent-related factors

Parent-related factors that can influence parental mediation of child's digital technology use include parental demographics such as age (Connell et al., 2015; Sonck et al., 2013), gender (Nikken & Jansz, 2014), socio-economic status (SES) and education level (Livingstone et al., 2015, pp. 3–25; Nikken & Jansz, 2006). Besides demographics, there are technology-specific parental variables that can affect how parents regulate children's digital technology use, and they refer to parents' own attitudes and worries towards technology, parents' digital skills, and parents' self-efficacy in supporting children's online learning.

1.2.2.1. Attitudes and worries. Some parents hold negative attitudes towards digital technology, as they believe that its use could be detrimental to their children's education and health (Mascheroni et al., 2013; Symons et al., 2017b), and they worry that children could come across online risks such as cyberbullying and hate speech when using digital technology. Such attitudes and worries contribute to influencing parental mediation practices: parents who hold more negative attitudes towards digital technology and are worried about the risks that their children could face online, tend to apply more frequently every type of mediation strategy, especially restrictive (Lee, 2013; Nikken & Jansz, 2014; Sonck et al., 2013). This could be the case because they perceive their child as unable to manage Internet risks on their own (Lee, 2013).

1.2.2.2. Digital skills. Parental mediation practices can be affected by parents' digital skills as well, as being digitally skilled possibly makes parents more aware of online opportunities: it was found that parents who report higher digital skills employ less restrictive mediation and more active mediation towards their children's Internet use (Livingstone et al., 2017). Moreover, digitally skilled parents also engage in two mediation practices specific to Internet use: technical mediation and monitoring (Nikken & Jansz, 2014; Sonck et al., 2013).

1.2.2.3. Self-efficacy. Self-efficacy is defined as the degree to which an individual believes to be capable of successfully completing a specific task, despite the obstacles and difficulties (Bandura, 1982). This concept can be applied to parenting and parental mediation as well (Shin, 2018). Indeed, parents who feel more confident in their ability to protect their children online apply both active and restrictive mediation more frequently (Hwang et al., 2017). Moreover, parents with a strong sense of parenting self-efficacy (i.e. who feel confident in their ability to parent successfully) engage in more active mediation of children's smartphone use, even when they do not report high digital skills, thus overcoming their technical limitations (Shin, 2018).

1.3. The COVID-19 context

Investigating how child's and parental behaviours and attitudes around digital technology can affect parental mediation is of particular interest in the context of the COVID-19 lockdown, when the use of the Internet and technology became predominant among children and adolescents: it was indeed found that young people during the pandemic spent more time online completing school activities, playing videogames, interacting on social media and watching TV series and movies on streaming platforms compared to before (DAK-Gesundheit, 2020; Fernandes et al., 2020). However, children and adolescents might sometimes lack the self-regulation to control their Internet use, which could lead to adverse health outcomes: spending an excessive amount of time online during lockdown has been found to be associated with reduced physical and emotional wellbeing, decreased self-esteem, and increased depression, loneliness and anxiety (Adıbelli & Sümen, 2020; Fernandes et al., 2020). Furthermore, some children and adolescents also lacked the appropriate digital skills to manage online risks such as hate speech and cyberbullying, and to study and to use digital devices independently for completing online school activities (Koskela et al., 2020; Lau & Lee, 2021).

Such increased use of digital technology and higher exposition to adverse health outcomes among children might have called for greater parental support: specifically, parental mediation practices of children's digital technology use could have changed compared to before lockdown, in order to limit risks and to promote children's wellbeing in a context with increased digital technology use. For instance, prior to lockdown parents used to restrict children's Internet use to limit distractions while doing homework (Mascheroni, 2013; Symons et al., 2017b). However, with online schooling, parents had to allow children to use the Internet more frequently to complete schoolwork. At the same time, some parents might refrain from doing so because of their worry about online risks and their negative attitudes towards online schooling, which some consider harmful to children's health, critical thinking, and academic success (Dong et al., 2020; Koskela et al., 2020), and which could impact parent's mediation practices. In particular, parents with low self-efficacy who do not have confidence in their abilities to support children's online learning reported increased parental stress, which in turn could have resulted in higher active and restrictive mediation (Lau & Lee, 2021; Warren & Aloia, 2019). Therefore, it is important to investigate if parental mediation practices changed during lockdown compared to before, to understand how parents regulate their mediation strategies in emergency situations, and specifically in situations that require an increased digital technology use by children. Investigating

the changes in parental mediation is also relevant considering the impact that these practices can have on children's digital technology use and development of digital skills.

1.4. Parental mediation's impact on children's digital technology use and digital skills

Parental mediation can also influence the amount of time that children spend online, particularly during COVID-19. Past research on the relationship between parental mediation practices and children's TSO has shown mixed results. Strategies such as recommending appropriate websites and co-using the Internet led to higher Internet usage in children for educational and communication purposes (Lee & Chae, 2007); while autonomy-supportive restrictive mediation (i.e. setting rules while providing rationale and listening to the child's feedback) was linked to lower TSO (Padilla-Walker et al., 2019). Conversely, other studies found that parental monitoring, technical mediation and restrictions had no effect on children's TSO (Lee & Chae, 2007; Vaala & Bleakley, 2015). This could be due to age differences, as parental mediation strategies may not be as effective and frequent with adolescents.

Parental mediation can also affect children's digital skills. Lack of digital skills can hinder children's success in online schooling, which was particularly challenging during a period such as the COVID-19 lockdown (Ferri et al., 2020; OECD, 2020). Previous studies showed that restricting children's Internet use, thus limiting their online social interactions and other opportunities, is associated with a lower level of children's digital skills (Festl, 2020; Haddon et al., 2020; Mascheroni et al., 2020). On the other hand, actively mediating children's Internet use by giving advice and discussing content seems to be indirectly associated with children's development of digital skills, through the facilitation of online opportunities (Chang et al., 2015; Festl, 2020; Haddon et al., 2020; Mascheroni et al., 2020).

1.5. The present study

Parental mediation practices of children's digital technology use might have undergone a change during the COVID-19 lockdown. However, research to date has not focused on the factors affecting parental mediation during lockdown, nor on the relationship between parental mediation and children's development of digital skills and TSO during this period. Investigating these variables gives us the chance to examine how parental mediation is affected during emergency times, and specifically during times where socializing, entertainment, educational, and work activities are carried out through digital technology, which could become more pervasive in the future. In this context, optimizing parental mediation strategies could facilitate children's regulation of TSO and help them develop new digital skills, which is fundamental to young people's adjustment and to their involvement in the digital world.

The present study examined which parental mediation strategies were employed by parents during lockdown and how they were predicted by various child-related and parent-related factors discussed above. Furthermore, we considered whether parental mediation practices affected children's digital skills and daily hours spent online during lockdown. Therefore, the research questions were as follows:

RQ1. How did parents perceive the frequency of their mediation practices during lockdown as compared to the previous period?

RQ2. What child and parent factors predicted parental mediation strategies during lockdown?

RQ3. Did parental mediation strategies predict differences in children's digital skills and time spent online during lockdown?

In order to answer these research questions, the present study analysed part of the data collected in the Kids Digital Lives During COVID-19 Times (KiDiCoTi). KiDiCoTi is a project of the European Commission

Joint Research Centre (JRC, 2020) that involves fifteen countries in Europe and aims to explore children's and parents' digital practices during lockdown, with particular attention to online activities, online safety, and wellbeing during COVID-19. Ad hoc measures were created for KiDiCoTi despite the existence of already validated ones, in order to be specific to the pandemic context and to detect families' perceived changes in their daily practices during lockdown as compared to the previous period. This led to validation of such newly created measures in the present study. Specifically, the present study analysed the Ireland dataset. The other countries involved in the KiDiCoTi project were Austria, Belgium, Croatia, Denmark, France, Germany, Italy, Lithuania, Norway, Portugal, Romania, Slovenia, Spain and Switzerland.

2. Method

2.1. Participants

The survey was completed by a total of 504 parent participants and 504 children participants. Data exclusion criteria were applied, in order to remove from the analyses parent participants who were aged under 25 and whose responding child was under 10 years of age (N = 5), parent participants whose responding child did not live in the same household (N = 4), children participants who were older than 17 (N = 28), children participants who had finished school (N = 13), children participants who spent less than one hour a day using digital technology (N = 0). Moreover, participants were removed from the analyses if their corresponding parent or child had been excluded based on the above-mentioned criteria. The resulting sample comprised of 461 parent participants and 461 children participants.

The parents' sample included slightly more mothers (51.6%) than fathers (48.4%). Their age range was 25–68 years (M = 43.11, SD = 8.14). The majority of the parents' sample indicated their household income as average (43.6%), followed by somewhat above average (24.5%), somewhat below average (15.4%), far above average (8%) and far below average (7.4%).

In the children's sample there were slightly more boys (54.8%) than girls (45.2%). Their age ranged from 10 to 17 years of age (M = 13.84, SD = 1.99). Children attended 5th class of primary school (15%), 6th class of primary school (13.7%), 1st year of post-primary (12.8%), 2nd year (15%), 3rd year (13.9%), 4th year or transition year (10.2%), 5th year (13.7%), or 6th year (5.9%).

2.2. Procedure

Data were collected in Ireland between July and August 2020 by a professional research agency employed by the Ireland partners of the KiDiCoTi project. The survey was administered online and in English. All participants received information about the study through a plain language statement before filling out the survey. Informed consent was obtained from all participants. Both parent and child participants were informed that their participation was voluntary and that they could interrupt it at any time. Ethical approval for the present study was obtained from the researchers' university ethics committee.

2.3. Instruments

The measures analysed in the present study were developed specifically for the KiDiCoTi project, unless otherwise stated. Additionally, demographics were assessed at the beginning of the questionnaire, and asked participants about age, gender, and socio-economic status (measured as perception of the total household income compared to the average) among others. When asked about their child, parent participants had to answer regarding the child who would be completing the questionnaire.

2.3.1. Parental mediation

The KiDiCoTi survey adapted a similar parental mediation conception that was applied in the EU Kids Online research (Zlamal et al., 2020). Parents were asked to report how often they engaged in sixteen parental mediation practices during lockdown compared to the period before. Answers were provided on a 6-point Likert scale ranging from 1 = I didn't do it at all and 6 = I did it much more than before lockdown. The additional response option was "I don't know". Sample items were "I forbid certain digital activities altogether" and "I explain why some websites are appropriate or inappropriate" (see Table 2).

2.3.2. Factors related to parental mediation

There were multiple questions asked to parents and children that related to the factors of parental mediation in the KiDiCoTi dataset. Children reported their time spent online and their digital skills. Parents reported their perception of their child's self-regulation, their child's digital skills, their negative attitudes towards digital technology, worries about their child being exposed to online risks, worry about their child's education, their estimations of their own digital skills, and their sense of parenting self-efficacy. More item details about parental mediation factors and their Cronbach's alpha scores are displayed in Table 1.

2.4. Data analysis approach

Prior to the results section, it is important to detail the data analyses procedures which were carried out on the dataset. The research design adopted in the present study was cross-sectional. Data were analysed using SPSS 27 version. Descriptive statistics and bivariate correlations were run for all the considered variables. Participants who answered "don't know" were coded as missing values.

To answer RQ1, an exploratory factor analysis (EFA) was conducted on a random half of the sample to identify the parental mediation strategies investigated by our measurements. The emerging model was tested though confirmatory factor analysis (CFA) on the other half of the sample, using SPSS AMOS. Such procedure was adopted following Anderson and Gerbing's (1988) recommendations, who advise against performing EFA and CFA on the same sample, as factor structures derived from EFA will likely be confirmed by CFA. Instead, the authors suggest to evaluate the accuracy of the factor structure on a different subset of data from the one that was used to generate the initial factor structure. Therefore, they suggest to split the sample into two random halves, so to develop the model on one half (through EFA), and then test the same model on the other half (through CFA). This approach allows to test whether the model generated by EFA is a good fit for other samples as well, avoiding capitalization on chance. After conducting factor analysis, frequencies of the single items of the parental mediation measure were run.

Following on from this, a new variable was computed averaging the active mediation items, and another variable was computed averaging the restrictive mediation items. Based on these averaged variables, two new nominal variables were created respectively for active and restrictive mediation. The nominal variables had three categories: the first included participants who on average did not apply restrictive/active mediation during lockdown or applied it less often than before (N = 109 for restrictive mediation; N = 64 for active mediation); the second category included participants who engaged in restrictive/active mediation during lockdown as much as before on average (N = 232 for restrictive; N = 269 for active); the third included participants who applied more restrictive/active mediation during lockdown than before on average (N = 118 for restrictive; N = 127 for active). Subsequently, two multinomial logistic regressions were conducted in answer to RQ2, to test whether children's TSO, children's self-regulation, children's digital skills as reported by parents, negative parental attitudes towards digital technology, parental worry about online risks and child's education, parents' digital skills, and parents' self-efficacy (predictor variables) predicted employing less or more restrictive/active parental

Table 1
Descriptive information for the measures of the parental mediation factors.

Parental Mediation Factor	Items	Measurement	Cronbach's Alpha	M (SD)
Child-Related Factors				
Time spent online	One item: "On a typical weekday during the lockdown, how many hours did you spend on the internet or using digital technology?"	Number of hours	N/A	6.82 (3.38)
Children's self-regulation	Three items: "My child engaged more with school activities", "My child has become better at organising their school activities", and "My child has more self-determination and self-regulation with their school activities".	5-point Likert scale from 1 = not true at all to 5 = very true.	.89	3.23 (1.01)
Children's digital skills reported by parents	Three items: "My child has gained more autonomy, such as using digital technology by him/herself for their school activities", "Overall, my child has become better at using all digital technology for their school activities", and "My child has become better helping others with digital technology for their school activities".	5-point Likert scale from 1 = not true at all to 5 = very true.	.85	3.57 (.86)
Children's digital skills reported by children	Six items. Samples: "I know how to join a video conference" and "I know how to use on-line public services".	5-point Likert scale from 1 = not at all true of me to 5 = very true of me.	.84	3.58 (.75)
Parent-Related Factors				
Negative attitudes towards digital technology	Three items: "Digital technology use has created new conflicts between family members", "Digital technology use has increased stress and anxiety levels in my family", and "My family is experiencing fatigue from overuse of digital technology".	5-point scale from 1 = strongly disagree to 5 = strongly agree.	.85	3.11 (1.07)
Worry about online risks	"Compared to the period before the lockdown, please evaluate how much did you worry – if at all – about these issues during the lockdown?" Six worries: "excessive use", "dis- and mis-information", "information disclosure", "cyberbullying", "sexting", "harmful content", "hate speech online".	6-point scale from 1 = I didn't worry at all to 6 = I worried much more than before lockdown.	.93	4.45 (1.00)
Worry about education	One item: "How worried are you that the coronavirus situation will have a negative impact on your child's education (e.g. falling behind with schoolwork, failing in exams)?"	5-point scale from 1 = not worried at all to 5 = very worried.	N/A	3.66 (1.11)
Parent's digital skills	Six items. Samples: "I know which information I should and shouldn't share online" and "I find it easy to check if the information I find online is true".	5-point scale from 1 = not true at all to 5 = very true.	.84	4.21 (.63)
Parent's self-efficacy	Six items. Samples: "I find it hard to follow and keep track of my child's schoolwork" and "I am able to motivate my child when she/he loses interest or gets frustrated with their schoolwork".	5-point scale from 1 = not true at all to 5 = very true	.71	3.35 (.73)

Note. Children's digital skills reported by children and parents' digital skills were assessed using the same instrument that was adapted by Helsper et al., 2015.

mediation than before lockdown (outcome variables). The participants who reported employing as much mediation as before during lockdown were considered the reference category in the multinomial regression. Such approach was adopted to highlight the characteristics of the families whose parents reported a perceived increase or decrease in their parental mediation practices during lockdown, and how they differed from families who did not report any perceived increase nor decrease.

With regards to RQ3, two regressions with interaction terms were run using the PROCESS macro for SPSS to test the association between active mediation, restrictive mediation, and their interaction (predictor variables) with children's self-reported digital skills and children's TSO (outcome variables).

3. Results

The present study aimed at investigating the frequencies of parental mediation practices during the COVID-19 lockdown, and their association with several parent- and child-related variables. Specifically, we were interested in examining how parents perceived the frequency of their mediation practices during lockdown; which parent-related and child-related variables predicted such practices; and how parental mediation predicted children's digital skills and time spent online. In order to answer these questions, data were analysed as outlined in paragraph 2.4. Results of the analyses are shown in the present section.

3.1. Parental mediation items validation and frequencies

The sample was randomly split into two halves. An exploratory factor analysis (EFA) was conducted on one half (N = 231) to identify the factors of the 16 parental mediation items, using oblique rotation (promax). The inter-item correlation matrix showed values higher than 0.30 and lower than 0.90, indicating that the items correlated with each other without overlapping (Field, 2009). The Bartlett's test of sphericity score resulted significant, with $p < .001$. The Kaiser-Meyer-Olkin

statistics (KMO) showed an overall value of 0.91 and individual values higher than 0.93, which indicate that our sample size was adequate for the factor analysis (Hutcheson & Sofroniou, 1999). Two factors had eigenvalues higher than Kaiser's criterion of 1, explaining the 55.21% of the variance. The goodness-of-fit test resulted significant, with $\chi^2 (89) = 243.49, p < .001$, which is not optimal but can be due to the sample size being greater than 200 (Hair et al., 1995). Table 2 shows the pattern matrix and the structure matrix with the rotated factor loadings for the 16 items, which were all above 0.40.

The clustering of the items suggested that the first factor represents active parental mediation, as it contains items that indicate supportive strategies (e.g. encouraging the child to explore digital technologies, discussing technology use and media content, using technologies together) ($\alpha = 0.87$). The second factor refers to restrictive mediation, as the included items refer to rules that limit children's digital technology use to specific times, situations and types of content, besides strategies such us checking the child's Internet history and using specific software to filter apps and websites ($\alpha = 0.89$).

A confirmatory factor analysis (CFA) was run on the other random half of the sample (N = 230) to test the two-factor model emerged from the EFA (Table 2). The chi-squared test resulted significant, with $\chi^2 (103) = 269.69, p < .001$. Nevertheless, the model resulted in an acceptable fit, with TLI = 0.89, CFI = 0.92, and RMSEA = 0.07 (Whittaker, 2016, pp. 639–746), although these results should be interpreted with caution. Following this, the two factors were retained in the final analysis. A restrictive mediation score and an active mediation score were calculated for each participant by averaging across the items with primary loadings on the first and the second factor respectively.

Frequencies of parental mediation showed that about half of the parents (46%) reported applying parental mediation strategies as much as before lockdown, while the 42.6% reported employing parental mediation strategies more often than before lockdown. Only the 3.7% applied it less than before lockdown. Total average frequencies of the specific parental mediation strategies are shown in Table 3.

Table 2

Pattern and structure matrices of EFA item-factor loadings for the parental mediation measure and CFA standardised regression weights.

Items	Pattern matrix		Structure matrix		Standardised Regression Weights	
	Factor 1 (active mediation)	Factor 2 (restrictive mediation)	Factor 1 (active mediation)	Factor 2 (restrictive mediation)	Factor 1 (active mediation)	Factor 2 (restrictive mediation)
1. I explain why some websites are appropriate or inappropriate	**.80**	-.08	**.74**	.52	.67	
2. I show an interest in what my child does online	**.74**	-.05	**.70**	.51	.63	
3. I suggest ways to use the internet safely to my child	**.71**	-.02	**.69**	.51	.75	
4. I talk with my child about what he/she does with digital technologies	**.70**	.12	**.79**	.65	.64	
5. I use digital technology together with my child, doing shared activities (playing, learning together)	**.67**	.00	**.67**	.50	.68	
6. I help my child when something is difficult to do on the internet or on the device.	**.60**	.11	**.69**	.57	.71	
7. I encourage my child to explore and to learn new things by using digital technologies on his/her own	**.53**	.17	**.66**	.57	.62	
8. I propose alternative, non-digital activities to limit the child's use of digital technology	**.37**	.16	**.50**	.44	.69	
9. I limit or forbid access to certain types of content (e.g. extreme violence, gory content, sexually explicit content	-.17	**.83**	.45	**.70**		.69
10. I use parental controls or other technical means of blocking, filtering, keeping track of the websites or apps that my child uses.	-.00	**.80**	.60	**.80**		.68
11. I forbid certain digital activities altogether (e.g. playing multiplayer games or buying stuff online)	-.03	**.73**	.52	**.71**		.75
12. I limit the spaces for digital technology use (e.g. "no smartphone in your bedroom")	.13	**.63**	.60	**.73**		.79
13. I establish rules together with my child (based on negotiation, discussion)	.19	**.55**	60	**.69**		.68
14. I limit the time for digital technology use (screen time in general or for some activities)	.23	**.49**	.59	**.66**		.77
15. I limit digital technology use under certain circumstances (e.g. during meals, during distant classes)	.20	**.49**	.57	**.64**		.58
16. I check from time to time the digital activities of my child (e.g. history navigation, apps that they use etc.)	.32	**.45**	.66	**.69**		.56
Eigenvalue	7.61	1.22				
% of Variance	47.58	7.63				
A	.87	.89				

Table 3

Average percentage of parental mediation items by strategy.

Parental Mediation Strategies	Parents' agreement with the statement			
	Did not do it at all	Did it less than before lockdown	Did it as much as before lockdown	Did it more than before lockdown
Active Mediation	4.9%	2.3%	44.2%	46.9%
Restrictive Mediation	6.8%	5.1%	47.8%	38.4%
Total	5.8%	3.7%	46%	42.6%

3.2. Descriptive analyses and bivariate correlations

Table 4 shows the descriptive statistics for all study variables. The average scores for all the study variables were above the midpoint, except for TSO. With regards to the bivariate correlations, both active and restrictive mediation correlated negatively with parents' and children's age, indicating that the older the parents and the children, the less active and restrictive mediation was applied. Moreover, there was a positive correlation between both active and restrictive mediation and child's self-regulation, child's digital skills (reported by both parents and child), parental negative attitudes towards digital technology, and parental worries about online risks and child's education, meaning that higher levels of active and restrictive mediation were correlated with higher scores of the abovementioned variables. Finally, active mediation was positively correlated with parental digital skills, whereas restrictive

mediation was negatively related to parental self-efficacy.

3.3. Predictors of parental mediation

Two multinomial logistic regressions were conducted: one with restrictive parental mediation and one with active parental mediation as the outcome variable. In both cases the "more mediation than before lockdown" and "less mediation than before lockdown" groups were compared to the "as much mediation as before lockdown" group, which was used as reference. The predictors included demographics (parent's age, parent's gender, child's age, child's gender, and socio-economic status), child-related variables, (children's time spent online, children's self-regulation, and parent-reported children's digital skills), and parent-related variables (parental attitudes towards digital technologies, parental worries about online risks, parental worry about child's education, parents' digital skills, and parents' self-efficacy).

3.3.1. Predictors of restrictive mediation

The multinomial regression for restrictive mediation showed that higher TSO, OR = 1.15, $p < .001$, 95% CI [1.07, 1.25] (see Table 5), was related to parents applying less restrictive mediation during lockdown than before, rather than applying it as much as before.

On the other hand, having a younger child, OR = 0.78, $p = .003$, 95% CI [0.67, 0.92], a son, OR = 0.53, $p = .038$, 95% CI [0.29, 0.97], more worries about online risks, OR = 3.36, $p < .001$, 95% CI [2.12, 5.32,], more negative attitudes towards digital technology, OR = 1.45, $p = .044$, 95% CI [1.01, 2.09], and lower parental digital skills, OR = 0.50, $p = .012$, 95% CI [0.29, 0.86], was more common among those parents

Table 4

Descriptive statistics and bivariate correlations for all study variables.

	M (SD)	1.	2.	3.	4.	5.	6.	7.	8.	9.	10.	11.	12.	13.
1. Parent's age	43.11 (8.14)	–												
2. Child's age	13.84 (1.99)	.31**	–											
3. Time spent online by child	6.82 (3.38)	-.10*	.11*	–										
4. Child's self-regulation	3.23 (1.01)	-.20**	-.05	.07	–									
5. Child's digital skills perceived by parents	3.57 (.86)	-.16**	-.08	.13**	.75**	–								
6. Child's self-reported digital skills	3.58 (.75)	-.12*	.13**	.17**	.34**	.39**	–							
7. Parental negative attitudes towards ICT	3.11 (1.07)	-.31**	-.15**	.11*	.16**	.14**	.15**	–						
8. Parental worries about online risks	4.45 (1.00)	-.19**	-.03	-.03	.26**	.19**	.19**	.44**	–					
9. Parental worry about child's education	3.66 (1.11)	-.12**	.02	.05	-.04	-.01	.11*	.28**	.35**	–				
10. Parental digital skills	4.21 (.63)	-.05	-.11*	.09*	.23**	.34**	.26**	-.01	-.00	.01	–			
11. Parental self-efficacy	3.35 (.73)	.18**	-.03	-.03	.11*	.13**	-.02	-.46**	-.22**	-.33**	.26**	–		
12. Restrictive mediation	4.30 (.92)	-.28**	-.18**	-.09	.39**	.30**	.17**	.42**	.49**	.16**	.05	-.21**	–	
13. Active mediation	4.48 (.81)	-.25**	-.15**	.01	.38**	.34**	.16**	.32**	.49**	.14**	.11*	-.07	.73**	–

*$p < .05$; **$p < .01$.

Table 5

Multinomial logistic regression analysis for restrictive and active parental mediation.

	Restrictive parental mediation		Active parental mediation	
Predictors	Less than before lockdown vs. as much as before lockdown	More than before lockdown vs. as much as before lockdown	Less than before lockdown vs. as much as before lockdown	More than before lockdown vs. as much as before lockdown
	OR (95%CI)	OR (95%CI)	OR (95%CI)	OR (95%CI)
Demographic characteristics				
Parent's age	1.04 (1.00–1.07)	0.96 (0.93–1.00)	1.01 (0.97–1.06)	0.97 (0.94–1.00)
Parent's gender (mother vs. father)	1.45 (0.87–2.42)	1.19 (0.65–2.17)	1.92 (1.01–3.66*)	1.21 (0.70–2.10)
Child's age	0.93 (0.81–1.06)	0.78 (0.67–0.92**)	1.36 (1.14–1.63**)	0.97 (0.84–1.12)
Child's gender (girl vs. boy)	0.92 (0.56–1.52)	0.53 (0.29–0.97*)	0.57 (0.30–1.06)	0.55 (0.32–0.95*)
SES (low vs. average)	1.05 (0.56–1.99)	1.03 (0.49–2.18)	0.73 (0.34–1.58)	0.88 (0.44–1.74)
SES (high vs. average)	1.11 (0.62–1.98)	1.28 (0.66–2.50)	0.59 (0.28–1.24)	1.15 (0.63–2.10)
Child-related variables				
Time spent online	1.15 (1.07–1.25***)	1.05 (0.96–1.16)	1.00 (0.92–1.09)	1.00 (0.92–1.08)
Child's self-regulation	0.75 (0.52–1.08)	1.59 (0.99–2.56)	0.69 (0.45–1.07)	1.36 (0.90–1.05)
Child's digital skills reported by parents	1.03 (0.68–1.55)	1.68 (0.93–3.03)	1.42 (0.85–2.37)	1.54 (0.92–2.58)
Parent-related variables				
Parental negative attitudes towards digital technology	0.87 (0.65–1.15)	1.45 (1.01–2.09*)	1.20 (0.86–1.69)	1.21 (0.88–1.67)
Parental worry about online risks	0.90 (0.68–1.18)	3.36 (2.12–5.32***)	0.61 (0.45–0.83**)	2.56 (1.71–3.83***)
Parental worry about the lockdown's impact on child's education	0.96 (0.75–1.22)	0.81 (0.60–1.09)	1.24 (0.91–1.68)	1.22 (0.93–1.62)
Parent's digital skills	0.78 (0.51–1.20)	0.50 (0.29–0.86*)	1.53 (0.88–2.65)	1.03 (0.63–1.68)
Parent's self-efficacy	1.29 (0.86–1.93)	0.73 (0.44–1.21)	0.96 (0.60–1.53)	0.72 (0.47–1.13)
Cox & Snell R²	.39		.35	
Nagelkerke R²	.44		.42	
χ² (df)	217.71 (28)***		194.18 (28)***	

Note. OR = Odds Ratios; CI = Confidence Interval. *$p < .05$; **$p < .01$; ***$p < .001$.

who applied more restrictive mediation than before, compared to those who applied it as much as before.

3.3.2. Predictors of active mediation

Findings from the multinomial regression for active mediation showed that being a mother, OR = 1.92, $p = .045$, 95% CI [1.01, 3.65] (see Table 5), having older children, OR = 1.36, $p = .001$, 95% CI [1.14, 1.63], and less worries about online risks, OR = 0.61, $p = .002$, 95% CI [0.45, 0.83], was more common in the "less active mediation" group compared to the group that during lockdown applied as much active mediation as before.

On the other hand, having a son, OR = .55, $p = .033$, 95% CI [0.32, 0.95], and being less worried about online risks, OR = 2.56, $p < .001$,

95% CI [1.71–3.83], were related to applying more active mediation during lockdown than before, rather than applying it as much as before.

3.4. Children's digital skills and technology use

Two regressions with interaction terms were performed after mean centering the variables. In one case the dependent variable was children's self-reported digital skills, while in the other case it was child's TSO. In both regressions, active mediation was entered as the independent variable, while restrictive mediation was entered as the moderating variable.

Results for child self-reported digital skills showed that the interaction effect of active and restrictive mediation was significant, B = 0.07, t

= 2.12, *p* = .034 (see Table 6). Analysis of the simple slopes displayed that at one standard deviation above the restrictive mediation mean, the linear relationship between active mediation and child's digital skills was significant and positive, B = .15, t = 2.16, *p* = .031 (see Fig. 1). This indicates that digital skills increased as active mediation increased only when parents applied high restrictive mediation. No significant results were found at one standard deviation below the restrictive mediation mean, B = 0.04, t = 0.54, *p* = .589.

With regards to TSO, the regression showed that this variable was independently predicted by higher active mediation, B = 0.73, t = 2.62, *p* = .009 (see Table 6), and lower restrictive mediation, B = −0.69, t = −2.78, *p* = .006. The interaction effect was significant as well, B = 0.30, t = 2.23, *p* = .026. Further analyses showed that at one standard deviation above the restrictive mediation mean there was a significant positive relationship between active mediation and TSO, B = 1.02, t = 3.19, *p* = .002 (see Fig. 2), indicating that active mediation had a stronger impact on TSO when parents applied higher restrictive mediation. No significant results were found at one standard deviation below the restrictive mediation mean, B = 0.46, t = 1.55, *p* = .122.

4. Discussion

The present study aimed at investigating how the lockdown conditions contributed to the frequency with which parents adopted different mediation strategies of children's digital technology use in relation to the period before lockdown; and how such mediation strategies reflected on children's time spent online and their digital skills. It is important to understand whether and how an increasing reliance on digital technology use in lockdown conditions, including for school and leisure purposes, may have influenced parental mediation as well as the consequences for children's wellbeing.

4.1. Two parental mediation strategies in lockdown

The EFA findings showed that our parental mediation measure could be investigating two strategies: restrictive and active. The restrictive mediation measure included items referring to setting rules to child's digital technology use, for example limiting the content that children could access, the length of the sessions, and the situations where it was acceptable to use digital technology. Such rules were not necessarily implemented without considering the child's opinion, since the factor also included an item referring to establishing rules after negotiating with the child. The active mediation factor included items regarding parents' interest in children's online activities, and an active discussion with the child about their online practices, risks encountered online, and appropriateness of websites. Parents who preferred active mediation tended to encourage their child to explore digital technology on their own, while also providing support to the child's issues and online safety, and suggesting alternative activities to digital technology.

In contrast with previous research that identified technical mediation and monitoring as separate strategies, in the present study the items that seemed to refer to these practices were factorised as restrictive mediation (Livingstone & Helsper, 2008; Symons et al., 2017a). Additionally, typical co-use items (i.e. using digital technology together with the child) were factorised as active mediation, in line with a previous
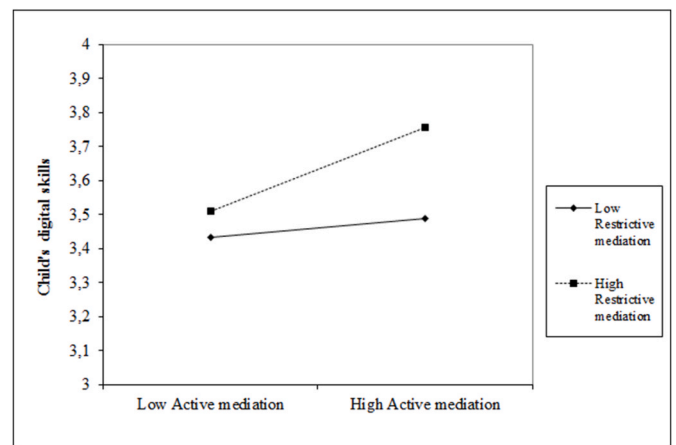

Fig. 1. Moderating effect of restrictive mediation on the relationship between active mediation and child self-reported digital skills.
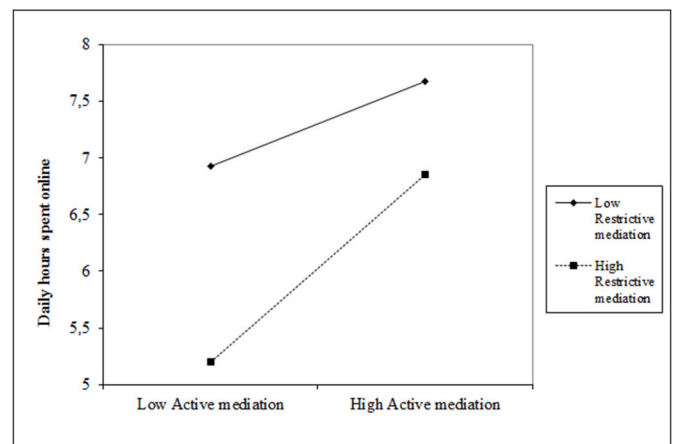

Fig. 2. Moderating effect of restrictive mediation on the relationship between active mediation and time spent online by child.

classification made by Livingstone and Helsper (2008).

Almost half of the parents (46%) reported applying mediation strategies with the same frequency they used before lockdown. This is coherent with studies conducted that found that most parents did not report any changes in their parental mediation habits during lockdown (Ambrožová et al., 2021; Kotrla Topić et al., 2021). Keeping the same habits, including rules to digital technology use, was suggested by the World Health Organization (2020) in order to help children cope with the stress during the COVID-19 lockdown. With regards to the specific types of parental mediation, the 46.9% of parents reported applying active mediation more often compared to before lockdown, while only the 38.4% of parents reported adopting restrictive mediation more often compared to the previous period. Again, these findings reflect a previous study that was limited to younger children (Kotrla Topić et al., 2021) and extend the results to adolescents as well, showing that parents could

Table 6
Regression analyses with interaction terms for child self-reported digital skills and time spent online by child.

Predictors	Digital skills					Time spent online				
	R^2	B	SE	$t_{(455)}$	95% CI	R^2	B	SE	$t_{(455)}$	95% CI
Intercept	.04***	3.55***	.04	93.56	[3.47, 3.62]	.03**	6.67***	.17	38.64	[6.33, 7.00]
Active mediation		.09	.06	1.52	[-.03, .22]		.74**	.28	2.63	[.19, 1.29]
Restrictive mediation		.10	.06	1.72	[-.01, .20]		-.69**	.25	−2.78	[-1.18, −.20]
Active*Restrictive mediation		.07*	.03	2.12	[.00, .13]		.30*	.14	2.23	[.04, .57]

Note. Variables were mean centered.

have found it easier to adopt active strategies rather than restrictive ones during lockdown. When children engage frequently in digital technology use (such as during lockdown), giving them trust, talking to them about their use, and giving support if needed could be more attainable strategies rather than controlling and limiting their tech use at all times, which could be not realistic (Page Jeffrey, 2020). Another possibility could be that parents spent more time with children during lockdown thanks to remote working, and thus were more available to discuss media content with them.

4.2. Predictors of restrictive mediation

Results from the present study showed that parents who reported applying less restrictive mediation during lockdown were more likely to have a child who spent more time online. On the other hand, parents who reported applying more restrictions during lockdown than before were more likely to have a younger son, to have more negative attitudes and worries about digital technology, and lower digital skills.

Parents usually mediate more the digital technology use of younger children rather than older adolescents, as they are considered too young and vulnerable to manage media content on their own (Beyens & Valkenburg, 2019). However, our findings for child's gender are in contrast with previous research, which found that parents use more mediation with girls rather than boys, as they are believed to be more vulnerable to online risks (Wright, 2017).

The findings for TSO reinforce past research that suggests how frequent technology use is more difficult to monitor for parents, who therefore give up on rules and become more permissive instead (Page Jeffrey, 2020; Padilla-Walker & Coyne, 2011; Sonck et al., 2013). This might have been especially challenging during the COVID-19 lockdown, since there was a considerable increase in children's digital technology use for entertaining, socializing, and academic purposes (Adıbelli & Sümen, 2020).

Our findings for parents' attitudes, worry and digital skills are in support of previous research (Lee, 2013; Livingstone et al., 2017). Parents who consider that digital technology is having a negative impact on their family may be more prone to limit their children's digital technology use out of fear that digital technologies could harm their children's development (Lee, 2013). Particularly parents who have limited digital skills might rely on restrictions as they may not be aware of online opportunities (Livingstone et al., 2017). This might have been particularly true during the COVID-19 lockdown, when stress and anxiety levels were high in general, and the increased use of digital technology might have enhanced some parents' worries and anxieties about online risks and harms, thus leading them to apply more restrictions.

4.3. Predictors of active mediation

The study results indicated that parents who reported engaging in less active mediation during lockdown than before were more likely to be mothers, to have an older child, and to report less worry about online risks. On the other hand, parents who reported adopting more active mediation during lockdown compared to the previous period were more likely to have a son and to worry less about online risks.

Our findings about parents' gender are in contrast with previous research (Nikken & Jansz, 2014). It could be that mothers experienced more pressure than fathers during lockdown, having to juggle between family, house chores, and work (Shockley et al., 2021), which did not leave them much time to actively discuss media content with children. Findings for child's age and gender reflect the ones discussed above for restrictive mediation.

Finally, results for parent-related variables showed that worries about online risks were more common among parents who applied more active mediation, and they were less common in those that applied less active mediation. This finding is likely unsurprising considering that the aim of parental mediation is to minimize online risks (Mesch, 2009;

Sonck et al., 2013). Parents' worries about online risks might have enhanced during the COVID-19 lockdown, due to the increased use of digital technology among children. Therefore, some parents might have recurred to more active strategies, such as openly discussing with the child about ways to use the internet safely, about potential online risks and media appropriateness, and supporting the child when they encounter an issue online. Such practices aim at making children autonomous in their understanding and managing of online risks, which could be particularly useful during lockdown, as parents could not always be physically present to limit and restrict digital technology use since they often had to work while children used technology.

4.4. Children's digital skills and time spent online

Findings showed that children whose parents applied higher levels of active mediation reported higher digital skills if their parents also applied high restrictive mediation, compared to children whose parents applied high active but low restrictive mediation, or low levels of mediation in general. As found in previous studies, active mediation usually fosters children's digital skills, while restrictive mediation is connected to lower children's digital skills (Haddon et al., 2020; Mascheroni et al., 2020). Therefore, our findings partially contrast with previous literature. A possible explanation to this could be that children's digital skills can also be fostered by a combination of restrictive and active mediation. This resonates with the concept of Zone of Proximal Development theorised by Vygotsky (1986), a zone that marks the distance between what the child is able to do on their own and what the child is potentially able to do thanks to others' support. In the case of parental mediation, receiving guidance, limitations, rules and support from parents in the field of digital technology might help the child to develop new digital skills. Another possible explanation within parenting theory is that parents who engage more in both restrictive and active mediation usually have an authoritative parenting style, which consists of high levels of demandingness and responsiveness (Eastin, 2006; Padilla-Walker & Coyne, 2011; Warren & Aloia, 2019). Children of authoritative parents are interested in mastering new competences, are more intrinsically motivated in learning tasks and have a higher self-efficacy (Gonzalez et al., 2002; Llorca et al., 2017; Masud et al., 2016). Thanks to these qualities, it could be that children with authoritative parents who apply both active and restrictive mediation would also be more motivated and successful in developing their digital skills. At the same time, children's development of digital skills might have encouraged parents to further enable and regulate their digital technology use. The lockdown might have facilitated parents to further comprehend their children's abilities, capabilities, and preferences when using digital technology, given the increased time that they spent together with their children. Observing children skillfully use digital technology for emergency online schooling and spending time with their friends while in lockdown as measures to curb the spread of COVID-19 might have led parents to recognise their children's skills and to be more involved and invested in the child-technology relationship, thus applying more active and restrictive mediation.

Children's time online was independently predicted by higher active and lower restrictive mediation. Children who received less restrictions spent more time online compared to those who received more restrictions, regardless of how enabling their parents were. Conversely, the more active mediation parents employed, the more time children spent online. This effect was enhanced by high restrictive mediation: when restrictions were more frequent, children spent considerably less time online if their parents employed low active mediation compared to when their parents employed high active mediation (see Fig. 2). Children who did not come across any limitations in their digital technology use might have engaged in online activities as much as they liked to stay in touch with their peers, watch movies, or study, as the COVID-19 lockdown required them to carry out activities solely online. However, when parents applied more restrictions, children's time spent online

decreased, but only if parents applied low active mediation. It could be that, given the challenges with constantly restricting such frequent digital technology use that takes place on private devices during lockdown, parents resorted to a combination of active and restrictive strategies, having conversations with their child about online safety and what is appropriate to post online (Page Jeffrey, 2020); and setting rules in an autonomy-supportive way, giving rationale and listening to the child's opinion. In turn, these strategies might have promoted further digital technology use by the child instead of limiting it, in a sort of bidirectional relationship. In short, child's digital technology use might be promoted by parents' negotiations and encouragement to explore online opportunities and to learn new skills, which might require the child to spend more time online. At the same time, a more frequent use of digital technology might prompt parents to combine active and restrictive mediation, to encourage the child to explore more online opportunities while still setting rules to prevent excessive use.

4.5. Limitations and strengths

The correlational nature of the research does not allow for drawing causal relationships between the variables. For instance, it cannot be stated that parental worries caused higher restrictive and active mediation in parents during lockdown, nor the opposite. However, a significant association between the variables does exist, and its direction should be further investigated in longitudinal studies. Another limitation is given by the measurements' lack of validation. Most measures were created ad hoc for the KiDiCoTi project, and some of them were partially inspired by previous studies: therefore, their validity has not been tested. This means that they might not have detected the constructs that we expected. However, the creation of new measures was necessary for the KiDiCoTi project, given that they were intended for detecting new developments in a specific situation such as the COVID-19 pandemic. Furthermore, an exploratory and a confirmatory factor analysis for the parental mediation items were carried out to ensure a more rigorous understanding of the structure of this measure. Finally, given the self-report nature of the measurements, participants' responses could be less accurate and might be influenced by the social desirability bias.

Despite the limitations, the present study contributes to the existing literature on parental mediation in general and in the context of COVID-19. The study findings showed which child-related and parent-related variables were connected to parental mediation strategies in an emergency situation such as the COVID-19 pandemic, adding to recent research that investigated to what extent parental mediation practices changed during lockdown (Ambrožová et al., 2021; Kotrla Topić et al., 2021). The present study went further, analysing the child and parental variables related to such perceived changes, along with the relationship between parental mediation and children's TSO and digital skills. Our findings regarding the context-specific predictors of parental mediation are also relevant to parents, educators, and practitioners, considering that, after COVID-19, children's technology use and online schooling might become more and more frequent in the future, thus calling for parental mediation. The stakeholders could work on regulating parental mediation by managing parental worries and attitudes towards technology. Our results also showed how the use of both restrictive and active parental mediation might be the right combination to promote children's digital skills. This finding might be of use to practitioners and policymakers that work with parents, who could train parents to find the right balance between the two strategies in order to foster children's digital skills.

Future research could investigate the possible bidirectional relationship existing between parental mediation strategies and other variables, such as time spent online by children and their digital skills, which could be both predictors and outcomes of parental mediation. Finally, we suggest that future research adopts psychological theoretical frameworks when collecting data about parental mediation during lockdown, such as the Self-Determination Theory framework. For instance, future studies could examine parents' basic psychological needs of autonomy, relatedness, and competence that underlie parental mediation. Another idea would be to investigate how the different parental mediation strategies and styles can fulfil children's basic psychological needs, thus contributing to their wellbeing. Finally, future studies could assess other demographics such as participants' ethnicity, to investigate whether parental mediation practices vary among different cultural groups.

5. Conclusion

The present study found that during lockdown almost half of parents mediated their children's digital technology use with the same frequency as before lockdown, while the other half reported applying parental mediation (especially active) more frequently compared to before lockdown. In general, parents who adopted more mediation during lockdown were more likely to have more negative attitudes towards digital technology and lower digital skills, and to be more worried about online risks. Furthermore, parents who adopted less mediation during lockdown were more likely to be less worried about online risks and to have children who spent more time online. Finally, we showed that a combination of active and restrictive mediation brought children to develop more digital skills and to spend more time online during lockdown.

Such findings shed a light on the technology-related habits of parents and children during the COVID-19 lockdown. It is evident that in such a period where in-person interactions were limited and digital technology use was fundamental in everyday life, parents did not simply enhance their restrictions, but they preferred to rely on active mediation or on a combination of active and restrictive instead, pushed by their worry about online risks among other things. It is interesting to note that despite the advantages of digital technologies observed during lockdown (e.g. being in touch with the loved ones, developing new digital skills, entertainment), parents still reported to be worried about the harmful side of the Internet. However, this worry did not lead parents to just restrict their children's digital technology use, but also to discuss it openly, and providing support and explanations. This combination of strategies helped children to develop new digital skills and to spend more time online, possibly in a more mindful and productive way.

The COVID-19 pandemic is still ongoing and it is arguably difficult to foresee what ordinary life will look like in a post COVID-19 world. Digital technology use is likely to become more frequent, with various activities being facilitated online, including social and educational activities that involve children. With this in mind, parents and children are likely to be significantly implicated by embracing these digital technology changes while lockdown conditions persist. In the meantime, parents are likely to be substantially advantaged by considering a negotiated active and restrictive parental mediation strategy involving their children, which in turn is will likely protect children from exposure to online risks and also foster their digital skills.

Credit author statement

Beatrice Sciacca: Conceptualization, Methodology, Formal analysis, Writing – original draft preparation, Writing - Reviewing & Editing. **Derek A. Laffan:** Conceptualization, Methodology, Writing – original draft preparation, Writing - Reviewing & Editing. **James O'Higgins Norman:** Writing - Reviewing & Editing, Supervision, Funding acquisition. **Tijana Milosevic:** Conceptualization, Investigation, Writing – review & editing, Supervision, Project administration, Funding acquisition.

Declarations of competing interest

None.

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