SAPIENZA
UNIVERSITÀ EDITRICE

E-ISSN 2724-2943
ISSN 2723-973X

Psychology Hub (2024)
XLI, 3, 15-22

Children's recreational activities during lockdown, use of digital devices and psychological difficulties. Individual and contextual factors

Chiara Mascaro[1*], Eleonora Cannoni[1], Giordana Szpunar[1], Madalina Grigore[1], Anna Di Norcia[1]

[1]*Department of Social and Developmental Psychology, Sapienza University of Rome, Rome, Italy*

Article info

Submitted: 07 December 2023
Accepted: 10 July 2024
DOI: 10.13133/2724-2943/18334

Abstract

The present study aims to investigate how children spent their free time during the lockdown, analyzing the relationship between the time spent on activities involving the use of Digital Devices (DD) and those that do not, taking into account individual factors (gender and age of the child) and contextual factors (parent's educational qualification); it also investigates the relationship between the increase in psychological difficulties during the lockdown and the way children spent their free time. 3602 parents of Italian girls and boys (52% male) aged between 3 and 10 years responded to the questionnaire (M=6.46; SD=2.23).

From the data analysis, it emerged that during the lockdown period, there was a significant increase in screen time compared to other leisure activities (t (3601) =18.427; p<.001; Cohen's D= 3.68), consistently with findings from other studies conducted during the same period (Orgilés et al., 2020). Gender effects (β=-0.08; p<.001) and age effects (β=0.46; p<.001) were identified regarding screen time, indicating higher usage among males compared to females and among older children compared to younger ones. Regression results indicate a significant effect of screen time on psychological difficulties (β=0.10; p<.001) and an effect of other leisure activities that appear to act as protective factors against such difficulties (β=-0.13; p<.001). Lastly, an important role seems to be played by the parent's level of education, which appears to act as a protective factor against screen time. These results confirm existing literature regarding the increase in screen time during the lockdown and highlight the role of contextual and individual factors that can act as protective or risk factors.

Keywords: children, digital devices, free time, psychological difficulties; COVID-19

*Corresponding author.
Chiara Mascaro
Department of Social and Developmental Psychology, Sapienza University of Rome, Rome,
E-mail: chiara.mascaro@uniroma1.it
(C. Mascaro)

Introduction

The global pandemic of coronavirus disease, known as COVID-19, was first detected in the Chinese city of Wuhan in December 2019, and since the beginning of 2020, has begun a public health emergency of international concern, forcing the world population into quarantine for several months.

Italy was one of the first European nations to be affected by the virus, and from March to May 2020, it was in lockdown, imposing significant restrictions on citizens in almost all daily activities.

Specifically, among the measures adopted to contain COVID-19 was the immediate interruption of the educational, sports, and social activities of children, youths, and adults who suddenly found themselves in a condition of home isolation.

This situation has led to increasing psychological distress (Jiao et al., 2020; Orgilés et al., 2020), whose impact on the population differed according to different factors such as age, gender, and socioeconomic status (Singh et al., 2020).

Restrictions have caused a rise in the use of Digital Devices (DDs), whether used for educational or recreational purposes, resulting in a generalized increase in hours spent in front of screens by children, teens, and adults (Di Norcia et al.,2023).

For children, digital technologies can have a double nature: On one side they can be tools for their growth and self-expression, rich sources of information and social resources, but on the other side they can expose them to multiple risks (Holloway et al., 2013; Livingstone et al., 2015) of which the incidence depends on several factors, such as age of the child, mode of use of the device, time to use, and type of applications or content (Balbinot et al., 2016) with which they are interacting.

Several studies have demonstrated that excessive and uncontrolled use of DDs can bring sleeping problems, social-emotional and behavioral disorders, such as anxiety, irritability, poor empathy, aggression (Kaloeti et al., 2021) language and cognitive difficulties (Balbinot et al., 2016), altered attentional, concentration and executive function abilities (Nathanson et al., 2014; Reid-Chassiakos et al., 2016; Veraksa et al., 2021), changes in self-regulation skills and socio-emotional development (Bozzola et al., 2018; Halapa et al., 2021).

However, other studies have shown that the support of DDs can bring many benefits to children. In the early years of life, they also can promote literacy by taking advantage of the educational potential of specific programs or applications (Kılıç et al., 2019), improve language development and visuomotor coordination (Ernest et al., 2014), encourage new forms of knowledge, facilitating occasions for contact and interaction with peers (Reid-Chassiakos et al., 2016), which is particularly relevant in the lockdown period. However, these benefits depend first on all on the age of the children: they are typically observed in older children, whose mature and more consolidated skills can be implemented using DD. In younger children, meanwhile, the influence of DD use is mainly dependent on the involvement of the parent: sharing the activity done in front of the screens can be a factor in mediating the impact of the media content and a regulating factor in the time of use. The parent, more specifically, can be a role model for the child in the use of DDs (Wu et al., 2014; Sadeghi et al., 2019; Buijzen & Valkenburg, 2005), a controller of access to devices and contents (Dias et al., 2016), promoting appropriate and safe use of DDs (Karaagac et al., 2015; Wu et al., 2014).

Recreational activities, with or without the mediation of the screen, during free time, are a significant factor in the healthy emotional, social, and cognitive development of children (Kourti et al., 2020), supporting them in the processes of managing emotions, activating resilience and encouraging well-being conditions during highly stressful situations (Capurso & Ragni, 2016).

During the pandemic, recreational activities and other everyday life activities experienced several changes, leading children and their families to reorganize these activities during free time. Studies (Andrew et al., 2020) reported that children during lockdown engaged in various activities such as playing, reading, motor activity in private spaces, and activities on screens, which were much more prevalent as the age of the children increased; all these activities according to the study of Martínez Muñoz et al., (2020) were essential for children's well-being and happiness.

As mentioned earlier, various studies have already demonstrated that the time spent using Digital Devices (DD) has increased significantly during the lockdown period. Therefore, it is appropriate to investigate this aspect more deeply.

Hypotheses

In this study, our primary objective (H1) is to assess whether the time dedicated to Digital Devices (DD) is indeed higher than that allocated to other leisure activities, as indicated by other studies published during the same period (Orgilés et al., 2020). Secondly (H2), we aim to verify if there is a relationship between time spent on DDs and individual variables (gender and age). We expect no effect of gender because, in a previous study, Cho and Lee (2017) reported equal usage time between boys and girls. Similarly, we aim to examine the relationship between time spent on DDs and contextual variables (parents' educational background), as reported in the study by Balbinot et al. (2018). We expect a negative correlation between time spent on DD by children and the cultural level of parents.). Finally (H3), we seek to explore the relationship between the increase in psychological difficulties during the lockdown and how children spent their free time (Arace et al., 2021).

Method

The data of this study are part of a larger research project about the changes in life habits of children and adolescents during the national lockdown imposed in Italy to limit the spread of the COVID-19 contagion (*blind for peer review*).

Data collection was conducted in April and May 2020, when the Italian population was confined to quarantine. The questionnaire, created *ad hoc,* was completed by parents who reported on the life habits of their children before and during lockdown. The parents were contacted online, sharing the

online survey link on social networks; a preliminary informed consent ensured the complete voluntariness and anonymity of their participation. The completion of the questionnaire was 10 minutes long on average.

The research project involved 5022 parents of children and adolescents (aged 3 to 18 years). More specifically, responses to the questionnaire were provided by parents for 2830 girls and 2992 boys aged from 3 to 18 years (*Mage* = 9.3; *SDage* = 4).

For the present study, we have focused only on the responses of 3602 parents of children between the ages of 3 and 10 years old (*Mage* = 6.56; *SDage* = 2.23); the boys were 1881 (52.2%), and the girls 1721 (47.8%), results regarding adolescents have been already published (*blind for peer review*). Most of the responding parents (42.2%) had a bachelor's degree, 28.8% a high school diploma, 26.5% a postgraduate degree, 2.3% a junior high school diploma, and the remaining 0.2% an elementary school diploma (Tab.1). On the other hand, the majority of non-responding parents (42.6%) had a high school diploma, 34.7% a bachelor's degree, 11.9% a postgraduate degree, 8.4% a junior high school diploma, and the remainder (0.4%) an elementary school diploma (Tab.2).

The research and its procedure were approved by the ethics committee of *Department of Psychology of Developmental Processes and Socialization*.

Tab. 1. Parent's cultural level of respondent parents

Parent's cultural level	Frequencies	Percentage
Bachelor's degree	1520	42.2%
High school diploma	1038	28.8%
Postgraduate degree	955	26.5%
Junior high school diploma	83	2.3%
Elementary school diploma	6	0.2%
Total	3602	100%

Tab. 2. Parent's cultural level of non-respondent parents

Parent's cultural level	Frequencies	Percentage
High school diploma	1533	42.6%
Bachelor's degree	1251	34.7%
Postgraduate degree	430	11.9%
Junior high school diploma	303	8.4%
Elementary school diploma	15	0.4%
Missing	70	1.9%
Total	3602	100%

Measures

Individual information: Parents reported the gender (1 = boy; 2= girl) and age of the son/daughter about whom they were completing the questionnaire.

Parent's educational qualification: Two items collected the educational qualification owned by both the responding parent and the other parent, if any. This paper focuses on the educational qualification owned by the responding parent.

Psychological difficulties before and after the lockdown: Psychological difficulties during lockdown were investigated by nine items, attempting to understand the frequency with which specific behavioral aspects occurred. Specifically, the items analyzed behavioral difficulties (e.g., eating, sleep, motor behavior, etc.) and emotional difficulties (e.g., crying, irritability, concentration difficulties, etc.). Answers were rated on the Likert-type scale: 0= never, 1= sometimes, 2 = often. The psychological difficulties were investigated regarding the period of lockdown and the period before; the two scores of difficulties (before and during) were compared by ANOVA for repeated measures by gender. The difference between the two scores defines a score noted as "increased psychological difficulties."

Total time spent on Digital Devices: Five items assessed the amount of daily time the children spent on each digital device for recreational purposes, as perceived by the responding parent, focusing attention on the following devices: Television, PC, Smartphone, Tablet, and PlayStation. Answers were rated on the following Likert-type scale: 0 = never; 1 = less than 1 hour; 2 = 1 hour; 3 = 2 hours; 4 = 3 hours; 5 = 4 hours or more. All items were framed in two versions to investigate the usage of DDs for recreational purposes before the lockdown and during the lockdown period. This study focuses on the average total score for daily free time spent on DDs.

Time spent doing recreational activities without DDs: Three items evaluated the amount of daily time children spend doing recreational activities that do not involve DDs, focusing attention on reading, playing, and motor activity, as observed by their parents. Answers were rated on the Likert-type scale: 0 = never; 1 = less than 1 hour; 2 = 1 hour; 3 = 2 hours or more per day. All items were framed in two versions to investigate the recreational purposes during free time and their frequencies before and during the lockdown period. This study focuses on the average total score for daily free time spent in recreational activities during lockdown.

Data analysis

Data analysis was performed using the statistical program SPSS, version 25.0. Firstly, a paired sample t-test was run to compare the average time spent using DDs and time spent on other recreational activities. Variables of individual, contextual, and recreational activities were correlated; then, each variable was used as a predictor in four separate linear regressions, which had as dependent variables (VDs): total hours of DDs, other recreational activities, and increased psychological difficulties.

Results

Use the time of Digital Devices during lockdown (H1)

The averages of time spent on DDs (Tab.3) and performing other recreational activities were compared using a paired-sample t-test, and it was found that during lockdown, time spent on Digital Devices was significantly higher than time spent on recreational activities ($t(3601) = 18.43$; $p < .001$; Cohen $d = 3.68$). Indeed, parents state that their children spend an average of 1 hour a day in front of screens and less than an hour engaged in other activities. This result appears to align with other studies conducted during the same period (Orgilès et al., 2020).

Tab. 3. Average recreational time activities

Free time	Average	N	SD
Time of DDs use	2.13	3602	.987
Time in other activities (reading-playing-motor activity)	1.75	3602	.543

Gender and age about the use of Digital Devices (H2)

The first regression analysis (Tab. 4) showed significant effects of individual variables: Gender and child's age on the total time of DD use; indeed, there were significant effects of gender (β = .08; $p < .001$) and age (β = .46; $p < .001$) on the total time of DDs use. Older boys appear to use them more than girl peers and compared to younger boys and girls, in contrast to the evidence presented in the literature, which indicates equality by gender and age.

Tab. 4. Linear regression to show the effect of gender and age on screen time use

	Unstandardized B	SE	Standardized B	t	p
Age	0.62	0.20	0.46	31.71	< .001
Gender	-0.45	0.08	-0.08	-5.20	< .001

Note: $R^2 = .22$; F (2, 3599) = 518.4, p < .01; DV: Average Time of DD's use

Education qualification about the use of Digital Devices (H2)

Preliminary correlations revealed a significant relationship between the cultural level of the parent and the use of digital devices ($r = -.055$; $p < .001$), and from linear regression (Table 5), a significant relationship emerged between the cultural level of the parent and other leisure activities (β = .17; p < .001). Therefore, it seems that the higher the cultural level of the parents, the more they spend their children's time on leisure activities without using digital devices, a finding consistent with other evidence already present in the literature (Balbinot et al., 2018).

Use of Digital Devices and Psychological Difficulties (H3)

The second regression analysis (Table 5) showed a significant effect of hours spent using DDs on the increase in psychological difficulties (β = .10; $p < .001$), and the last regression (Table 5) showed a negative relationship between the increase in psychological difficulties and hour spent doing other recreational activities (β = -.13; $p < .001$), to which was added a significant effect of age (β = -.18; $p < .001$).

Discussion

Nearly all studies conducted during the lockdown have found increased use of digital devices (DDs) for recreational and educational use among children. It has been found that children spent more time using DDs and less time engaging in other activities (Orgilés et al., 2020; Wong et al.,2020; Di Norcia et al., 2023). Thus, it can be said that the lockdown period has resulted in increased exposure to screens for learning purposes, especially recreational activities. Our results align with previous studies; indeed, the use of DDs was preferred over other recreational activities (reading, playing, motor activity). Considering parents' cultural level, as measured by educational qualification, it was found that children whose parents had lower educational qualifications spent most of their free time using DDs. In comparison, children of parents with higher educational qualifications were more engaged in recreational activities that did not include DDs.

This finding is by other studies (Balbinot et al., 2016; Cho & Lee, 2017), which highlight that the parent's educational qualification is correlated with how they stay about their children's use of DDs; in fact, it seems that parents with lower cultural level are more likely to allow their children more freedom in using DDs at different times of the day and for different purposes (Wartella et al., 2014), while parents with a higher cultural level adopt a more cautious and conscious attitude toward their children's use of technologies (Balbinot et al., 2016).

Probably because the latter are more aware of the risks associated with intense and early use; however, this data, in addition to confirming what is already present in the literature, does not add further information since specific information on parenting style has not been collected for the present study.

Our study furthermore confirmed this trend during the pandemic period. Not only do contextual factors seem to have significantly impacted children's activities during lockdown, but also individual factors, such as the age and gender of the child, seem to have had a role; in fact, our findings showed that the time of using DDs seems to be longer in older boys. Thus, the more people grow, the more their use of DDs for recreational activities increases, and this finding is also in accordance with literature. Several studies have shown that younger children have more time limitation of DDs, while as they get older, they gain more and more freedom; so, the time they use digital technologies increases with age (Sivrikova et al., 2020); moreover, it appears that during lockdown, older children and youth spent more time on screens than the younger ones even to maintain social relationships with peers (Andrew et al., 2020).

Tab. 5. Linear regression to show the effect of parental cultural level on other leisure activities

Dependent Variable	Predictor	Unstandardized B	SE	Standardized B	t	p
Time in other activities						
	Parent's educational level	0.35	0.03	0.17	10.56	<0.001
Average time of DD's use						
	Psychological Difficulties	.11	.02	.10	6.04	< .001
Time in other activities						
	Psychological Difficulties	-.07	.009	-.13	-8.11	< .001
	Age	-.13	.01	-.18	-10.8	< .001

Note: Time in other activities: $R^2 = .22$; F (1, 3600) = 111.5, p < .01; Average time of DD's use: $R^2 = .01$; F (1, 3598) = 36.53, p < .01; Time in other activities: $R^2 = .01$; F (2, 3597) = 88.42, p < .01.

Only a few studies report the influence of gender on DD use among the age group we are considering; for example, Cho and Lee's (2017) study shows that the percentage of DD use among boys and girls in this age group appears to be almost equal. During the pandemic, digital technologies have been an essential resource for teaching, recreational time, and social relationships, relieving the difficulties caused by the restrictions. However, the excessive and sometimes uncontrolled use of DDs in recreational time has had adverse effects on psychological well-being, especially in younger children, for those who would be more valuable activities that do not create cognitive overload and fatigue by fostering the onset of emotional and behavioral difficulties (Rothbart & Posner, 2015; Courage et al., 2015). Our findings showed that long-term use of DDs is a predictor for increased psychological difficulties, both regarding emotional issues and behavioral problems, with a stronger among younger children that seems to diminish with increasing age. This evidence seems to be in accordance with the literature (Rideout et al., 2003; Liu et al., 2021), which highlights that at preschool age, children's brain systems are still developing and highly plastic. This feature is a risk condition, especially at preschool age, for the development of emotional and behavioral problems because of excessive media use. This result may suggest the opportunity to include DDs gradually in children's lives, as in the early years of their lives, they are at risk of not receiving the beneficial effects that have been found later in life.

It would also appear to be especially important to lead children, particularly younger ones, to the conscious use of devices and never leave them alone but act as filters or mediators in all their activities (Karaagac et al.,2015; Özyurt et al., 2018).

Regarding this last point, our data show a negative correlation between age and the increase in psychological difficulties, i.e., the older children get, the fewer psychological difficulties there are, and this may again be in accordance with what was stated before. Finally, analyzing the results of our study, it was found that the time children engaging in different recreational activities (reading, playing, motor activity) that did not involve the use of DDs was a protective factor against increased psychological difficulties during lockdown. These findings are by several studies in the literature that define recreational activities as critical to the overall well-being of individuals (Coyl-Shepherd & Hanlon, 2013), especially in the presence of highly stressful and adverse events (Capurso & Ragni, 2016).

Conclusions, limitations, and future developments

The present study, as well as confirming the increase in the amount of time spent using DDs during lockdown and the impact this had on children's psychological well-being, also showed that the cultural level of parents was a protective factor against such overuse.

According to Hendry and Kloep (2001), the pandemic can be considered a non-normative historical change. It affected everyone by producing significant changes in the microsystem and forcing people to suddenly reorganize their lives to better cope with the stressful event. Digital Devices have been an indispensable resource for teaching and social relations during the pandemic, especially for older children. Indeed, it was easier with them to cope with a new, demanding, high-stress challenge such as the lockdown. However, our study found that the excessive and sometimes uncontrolled use of DDs for recreational activities had adverse effects on psychological well-being, especially in younger children, for whom, on the other hand, the performance of different recreational activities that did not involve the use of technology was a protective factor. In addition, the highest control in the use of DDs occurred mainly by parents with higher cultural levels; this leads to focus on the importance of disseminating knowledge about the risks of excessive use of DDs among parents. The study also revealed a new finding compared to previous literature that sees higher use of DDs among boys than girls. This finding needs to be further explored to understand whether this is simply a specificity related to this group of participants or to figure out possible explanations for the phenomenon.

This study has some limitations: First, the exclusive use of *parent-report* questionnaires did not consider the children's views either about the use of DDs or about psychological difficulties experienced during quarantine. Second, our survey did not include standardized measures of psychological difficulties because it was a short and easy instrument created *ad hoc* for the lockdown condition to avoid undue overload for participants and prevent drop-out during completion. Third, since no information was collected on participants before the lockdown, a longitudinal comparison could not be made between different periods (before, during, and after the lockdown). Lastly, the limitations of studies conducted with observational methods also apply to our results, as it is impossible to infer any causal relationship between the variables considered. This is because behaviors or events are observed and recorded without direct intervention. Therefore, while this approach is helpful for examining relationships between variables, more is needed to determine cause and effect with certainty.

Further developments in the present study could relate to whether the pandemic-related change in habits has remained stable over these months or whether there has been a slow return to pre-pandemic habits and verify if the gender effect emerged from our results also emerges in a more extensive and more diverse sample.

Another potential applicative outcome could be in helping parents acquire knowledge to achieve a mindful use of Digital Devices with their children, emphasizing the benefits and risks associated with children's DD use. This includes raising awareness about the importance of guiding their young children in their interactions with DDs, discouraging using DDs to fill their idle time and promoting diverse recreational activities instead.

According to our findings, this study is certainly not conclusive. However, it could shed light on the landscape of new technology use and raise awareness among parents, especially those with lower educational backgrounds, whose children show more significant psychological difficulties. It underscores the importance of understanding the benefits and risks of technology, helping parents guide their children to use them correctly and consciously as tools that promote growth and development.

Ethical approval
Research approved by *Department of Psychology of Developmental Processes and Socialization*, Sapienza University of Rome.

Data availability statement
The data that support the findings of this study are available from the corresponding author upon request.

Funding/Financial Support
No founding supported the present research.

Author Contributions
The first author (CM) primarily wrote the manuscript and conducted analyses.
The second author (EC) developed hypotheses and assisted with writing.
The third author (GS) assisted with writing.
The fourth author (MG) translated the manuscript and carried out a proofreading revision.
The fifth author (AND) contributed to data analysis and performed manuscript editing.

Declaration of Conflicting Interests
The authors declared no potential conflicts of interest with respect to the research, authorship, and/or publication of this article.

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