Screen use among young children in a city of Argentina

Ingrid Waisman, M.D.[a], *Elisa Hidalgo, M.D.*[a] *and María L. Rossi, M.D.*[a]

ABSTRACT

The use of mobile devices has become ubiquitous in the family, across all social strata, and from an early age.

Objectives: To assess the use of mobile and fixed screens among young children, the time spent doing traditional childhood activities, and the relationship to the maternal level of education.

Material and methods: Descriptive, cross-sectional design.

Population: Children aged 6 months to 5 years seen in Río Cuarto, Córdoba, between July and September 2016.

Outcome measures: Demographics, family income, age at initiation, frequency of use, daily minutes, other activities.

Results: 160 surveys were included; 99% of households had a TV and 98.75%, a smartphone. Average number of electronic devices: 5.68; among lower income households: 5.1 (standard deviation [SD]: 1.57); and among higher income households: 6.32 (SD: 1.18) ($p = 0.0000$).

By the age of 2, 80.3% of children watched TV and 37.4% used touchscreen devices with help. Between 2 and 4 years old, 38.7% used screens without help.

Also, 93% of children watched TV and 56% used mobile screens very frequently. Children watched TV for an average of 75.6 daily minutes and used other screens for 31.3 minutes, whereas reading only accounted for 20.4 minutes.

Mothers who had completed tertiary education spent more time reading books than those who had completed primary or secondary education (analysis of variance: $p = 0.00007$).

Conclusions: Household technological equipment is practically universal; children's exposure to screens starts at an early age. TV is the most commonly used screen although mobile screens take up a significant time. Mothers who had completed higher education spent more time reading.

Key words: *touchscreen, TV, exposure duration, early childhood.*

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a. Neoclínica, Río Cuarto, Province of Córdoba.

E-mail address:
Ingrid Waisman, M.D.: ingridwaisman@arnet.com.ar

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"So much solitude,
everyone's connected,
screen children,
welcome to the market."
(Popular song,
lyrics by Andrés Ciro Martínez)

INTRODUCTION

The impact of technology in the life of men is continuously increasing and children are no strangers to this reality. For more than 40 years, traditional media such as TV and radio have occupied a predominant place in everyday family activities; however, in recent years, with the emergence of tablets and smartphones, the ways in which we communicate, exchange information, and look for entertainment have changed. Using mobile and touchscreen devices has become ubiquitous, in general regardless of the family financial or social status. The screen culture has extended across and pervaded all social classes, and children start using these devices at an increasingly younger age.[1,2]

Mobile devices are unquestionably attractive: they are portable, helpful for parents to keep their children entertained whenever they need to complete their tasks, they grant access to countless sources of entertainment and information, and represent a relative cost reduction.[3] For better or worse, children have access to all types of screens at an increasingly younger age and, although this tendency seems inevitable, the advantages and disadvantages of such early contact are still unclear.

Young children could play or get entertained with adequately-designed TV shows or interactive media, but they require guidance and interaction

with adults in order to learn from screen use.[4]

Screen exposure has disadvantages for children. The most relevant ones are its association with sedentary habits and obesity, decreased sleep hours, potentially diminished social interaction skills, a negative impact on certain behavioral traits, and exposure to inappropriate content.[5]

It is also worth considering that children spend less time doing other activities, such as reading books with their parents, doing outdoor activities, and having interpersonal relationships.

It is interesting to focus on early childhood, before children start using social media, because during this stage they develop habits related to media use for future life; also at this age, parents play an important role in children's relationship with the media. This is a period of considerable brain plasticity, during which experiences have dramatic impacts on social, cognitive, and emotional development, and health-related routines, such as eating, sleeping, and doing physical activity, become established.[4]

There are several epidemiological studies and regulations in relation to screen use among young children in developed countries,[3-8] but no similar approach in this age group has been found in Latin America or Argentina.

The objective of this study was to assess the use of mobile and fixed screens among young children in a city of Argentina, the time spent doing traditional childhood activities, and the relationship to the maternal level of education.

MATERIAL AND METHODS

Design. Observational, descriptive, prospective, and cross-sectional study.

Population. Patients aged 6 months to 4 years, 11 months and 29 days, and their mothers, seen at the outpatient offices of Neoclínica, Río Cuarto, Córdoba, between July and September 2016.

The study site is a clinic for patients who have health care coverage through a social insurance program or a managed care organization, specially focused on mother and child health. It has a pediatric hospitalization unit, a neonatology hospitalization unit, a Department of Obstetrics and Gynecology, and other specialties. The outpatient facilities of the Department of Pediatrics are located in an exclusive building and include general pediatrics offices, pediatric specialties offices, and an Emergency Department.

Sample size. For an estimated prevalence of touchscreen use of 50%, the statistical test indicated that the sample should include 159 surveys.

Inclusion criteria: Patients aged 6 months to 4 years, 11 months and 29 days seen at the outpatient facilities of the Department of Pediatrics or the Emergency Department.

Exclusion criteria: Children with neurological problems or any other kind of disability.

Methods

A survey with close-ended questions was designed and adapted from the Common Sense Media survey.[6] Mothers were invited to participate and their consent was obtained with their signature on the form (*Annex 1*).

During May 2016, a pilot survey was administered to 15 mothers and some questions were corrected because they were unclear.

Outcome measures

Children's age, mother's age, and maternal level of education. Incomplete secondary education was defined as less than 12 years of education; complete secondary education, as 12-16 years of education; and complete university education, as 17 or more years of education.

Family income: less than ARS 20 000 per month, ARS 20 000 or more per month.

Electronic devices at home: TV, computer, tablet, smartphone, video game console (none, one, two or more).

Age at which the child started using screens with and without help: < 1 year old, 1-2 years old, 2-3 years old, 3-4 years old, > 4 years old.

Frequency of weekly use: never, once a week, several times a week, every day. Frequency was established for each screen and for all screens together, and also for other activities: reading, outdoors, other types of games. This outcome measure was dichotomized into infrequent (never or once a week) and frequent (several times a week, every day).

Weekly use score. The following was considered for this score: 1) TV, tablet, and smartphone use; 2) outdoors, reading, and other role-playing games.

Never (0 points), once a week (2 points), several times a week (4 points), every day (6 points), to establish mean and median values.

Daily minutes: TV, touchscreen (tablet and smartphone), story reading.

Analysis: an Excel database was designed and data were analyzed using the Epi Info 7.1.4.0 software, provided by the Centers for Disease

Control and Prevention (CDC).

Numerical outcome measures were analyzed by comparison of averages and ratios using a Z-test and an analysis of variance (ANOVA); a value < 0.05 was considered significant.

Odds ratios were estimated to demonstrate the association among qualitative outcome measures, considering a 95% confidence level.

RESULTS

Surveys completed by the mothers were included in consecutive order. No mother refused to take part. A total of 160 surveys were completed. The male: female ratio of children was 1:1.

General data

Table 1 shows the demographic characteristics of mothers and their children.

The family income was below $20 000 for 93 survey respondents (58.1%) and $20 000 or more for 67 (41.8%).

Most households (99%) had a TV; among these, 76.8% had 2 or more. Also, 75.6% of households had one or two computers, 98.75% had a smartphone, and most families had 2 or more devices.

The average number of electronic devices per household was 5.68. The mean number was 5.1 (standard deviation [SD]: 1.57) among lower income households and 6.32 (SD: 1.18) among higher income ones. The difference was significant (p= 0.0000).

Frequency and duration of use. Comparison to other activities

The percentage of time that children devoted to each of the following three activities (TV, tablet/smartphone, and reading) per week is shown in *Table 2*.

For *Table 3*, scores were added and mean and median values of weekly screen use (TV, tablet, and smartphone) were estimated and compared to the scores of all other leisure activities (reading, outdoor activities, and other games).

The correlation between screen use and other activities are shown in *Table 4*.

Table 5 compares the weekly time spent watching TV, reading, and using other screens.

As regards screen exposure, 93% of children watched TV very frequently and 56% used mobile screens also very frequently. "Very frequent" was defined as use every day or several times a week.

Table 1. *Demographic data* (N= 160)

				Frequency	Percentage
Children	Age groups	A	6-11 m.	16	10
		B	12-23 m.	38	23.7
		C	24-35 m.	39	24.4
		D	36-47 m.	36	22.5
		E	48-59 m.	31	19.4
	Age in months	Mean	SD	Mean	Range
		31.3	14.29	30.5	6-59
Mothers	Age in years	30.16	5.54	31	18-45
		13.43	4.06	13	6-22

SD: standard deviation; m.: months old.

Table 2. *Percentage of time spent doing different activities per week*

	Frequency				
	Every day	Several times a week	Once a week	Never	Total percentage
TV	77	17	3	3	100
Screens	34	22	12	32	100
Books	25	38	16	21	100

Table 3. *Weekly screen use score compared to other activities*

	Observations	Total	Mean	SD	Min.	25%	Mean	75%	Max.
TV, tablet, smartphone	160	1644	10.275	3.79	0	8	10	12	18
Outdoors, games, and books	160	1936	12.1	4.0859	0	10	12	16	18

SD: standard deviation.

When measured in minutes, children watched TV for an average of 75.6 daily minutes and used other screens for 31.3 minutes, whereas reading only accounted for 20.4 minutes.

Screen use in relation to age

Before 2 years old, 80.3% of children watched TV with the help of their parents and 37.4% used touchscreen devices (tablet or smartphone) also with help.

Between 2 and 4 years old, 28.7% were able to watch TV without help and 38.7% used touchscreen devices also without help.

The weekly distribution of time was analyzed based on the age of children included in the sample. The frequency of weekly use of TV, mobile screens, and books by age is shown in *Figure 1*.

Table 6 shows the minutes spent the previous day watching TV, using other screens, and reading books by age group (<2 years old or ≥2 years old).

Reading and maternal level of education

The median and SD of the weekly scores for book reading were 2.16 ± 2.1, respectively, among children whose mothers had completed primary education or had not completed secondary education; 3.51 ± 2.1, respectively, among those whose mothers had completed secondary education; and 4.12 ± 1.5, respectively, among those whose mothers had completed university education. The ANOVA showed a *p* value of 0.00007.

DISCUSSION

According to the demographic data, the study population belonged to a middle-class socioeconomic status, mothers had a middle to middle-high level of education, and practically all households had a TV and other screens. Although the difference between high- and low-income households in relation to electronic devices was significant, almost all households had a TV and a smartphone.

TV exposure was always higher than exposure to other activities, followed by mobile screen exposure. Once the scores of all leisure activities not related to screen use were added, they were slightly above screen use; however, it should be noted that participants were in a very young age group who did not attend school and for whom games, outdoor activities, and reading/listening to stories took up a great part of their daily routine.

The greater time spent using screens did not correlate to the time spent doing other activities, so it is believed that there is no direct relationship between these outcome measures.

Consistent with what other authors have reported,[3,7,8] we observed that screen exposure was almost universal and that children acquired skills for using screens at a very early age.

In a study carried out by the Subcommittee of Information and Communication Technologies of the Argentine Society of Pediatrics (Sociedad Argentina de Pediatría, SAP) between 2007 and 2008, children older than 4 years and adolescents were assessed. It was observed that half of

TABLE 4. *Correlation coefficient*

Outcome measure 1	Outcome measure 2	Correlation coefficient
All screens (*)	All other activities (**)	0.00016246
TV	Reading	0.00274
TV	Outdoor activities	0.0373

(*) TV, tablets and smartphones.
(**) Outdoors, reading, and other role-playing games.

TABLE 5. *Weekly TV use compared to reading and other screen use*

	Very frequent	Infrequent	OR	*P*
TV	150	10	8.76 (4.2-17.9)	0.0000
Books	101	59		
Other screens	90	70	11.66 (5.7-23.7)	0.0000

OR: odds ratio.

children accessed the Internet every day and less than half of them were supervised by a responsible adult who could monitor the content or the contacts to which they were exposed. At that time, the Group recommended that parents should become involved in their children's access to the web, encourage a fluid dialog, and foster the establishment of consensual rules, leading by example.[9] The subsequent introduction of tablets and smartphones into the market has refreshed and confirmed such recommendation and extended it to include younger children.

In 2011, the American Academy of Pediatrics (AAP) made a recommendation not to allow the use of mobile screens before the age of 2, which was generally adopted by pediatricians but does not look realistic today.[10] In November 2016, the AAP recommended, for this age group, that good judgment be used to decide on exposure duration and, basically, that parents or caregivers should supervise and monitor use.[11]

Considering the weekly frequency observed in our study, TV use remained constant across all age groups, whereas mobile screen use increased with age. However, once the daily minutes of TV exposure were analyzed, it was observed that as children grew older, TV exposure was higher. Such contradictory information may be explained by the fact that younger children have a shorter attention span: although they frequently watch TV, the duration of such activity is shorter.

Very young children go through a sensorimotor development stage and their understanding of screens' two-dimensional content is limited. It is believed that, in children younger than 2 years, attention control and symbolic thinking are not mature enough for them to transfer knowledge from a screen to three-dimensional real life.[4,11]

Before two years old, children develop sensory, cognitive, and language skills; this calls for them to explore the world around them and to interact adequately with their parents or caregivers to reach maturity successfully.[5] It is not clear how the generalized use of touchscreen devices affects such maturation processes but different authors agree on the need for adults to monitor the process, select content, and limit exposure duration.[3,4,11,12]

According to the AAP, the industry has targeted the 0-2-year-old group (and their parents) as key consumers of electronic media. TV shows, videos, and music have been specifically developed for this age group. At present, most parents indicate that their children younger than 2 years use some sort of electronic device.[7,11]

Fixed and mobile screens are neither good nor bad. In the age group analyzed in this study, the

FIGURE 1. *Frequency of weekly use by age (score)*

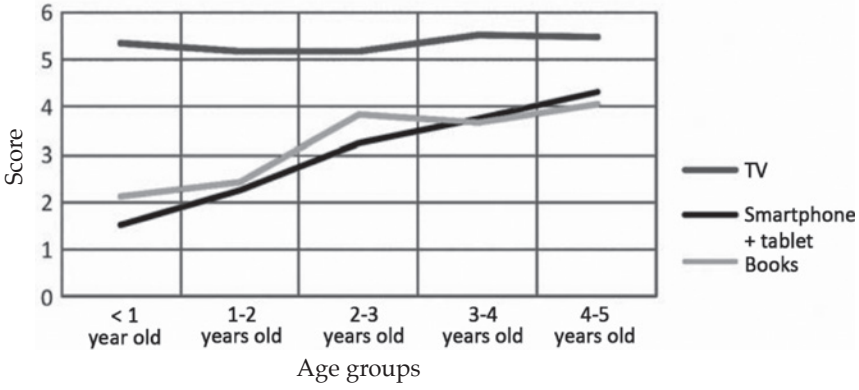

TABLE 6. *Daily minutes spent watching TV, using other screen and reading books by age group*

	< 2 years old		≥ 2 years old or older	
	Mean (SD)	**Median (range)**	**Mean (SD)**	**Median (range)**
TV	46.66 (45.5)	30 (0-180)	90.28 (60.6)	60 (0-180)
Other screens	16.34 (34.4)	0 (0-150)	39.1 (47)	20 (0-150)
Books	13.14 (31)	0 (0-150)	24.05 (35)	20 (0-150)

SD: standard deviation.

difference lies in how parents use screens, how they introduce technology to their children, and how they protect them from potential risks.[1]

In turn, an excessive use of mobile devices by parents has been associated with a lower level of verbal and non-verbal family interaction, which may lead to parent-child conflicts.[4,5,13]

For this reason, the SAP's Subcommittee of Information and Communication Technologies has recently proposed that the pediatric community should promote the "no screens at the dinner table"[2] campaign to increase direct, personal interaction during a sensitive time for the family.

Other authors[3] have referred to children owning different electronic devices. In our setting, it has been observed that families share TV and tablets and, very especially, smartphones. Although these are not owned by young children, they are widely available.

Asking parents to read a book or listening to a story are activities that are undoubtedly set aside by technological innovations. However, it was observed that mothers who had a higher level of education spent more time telling stories or reading books to their young children.

The limitations of this study are, on the one side, that participants belonged to a rather homogeneous middle-class socioeconomic status whose mothers had a high level of education, so it is difficult to extrapolate these outcomes to the general population.[3] On the other side, several answers may include a recall bias, especially those related to the history of electronic device use according to children's age. In addition, and consistent with the concern expressed by other authors,[14] answers were based on maternal perception, not on objective measurements.

This study does not aim at elucidating the effect of TV or mobile screens on the growth of children younger than 5 years; it merely proposes to describe the situation in Argentina, which, despite having its own characteristics, is rather similar to the worldwide reality, and to attract pediatricians' attention because it is at this age that children's behavior patterns are shaped for the future, not only in relation to digital media use but also to many aspects of their life and health.

Pediatricians may become an adequate source of information for parents by discussing the results of studies, offering recommendations to accompany children during screen use, and advising how to regulate exposure duration. ■

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ANNEX 1
Survey

Survey no.
Child's first name and initial of last name:

1) Demographic data

	Years old	Months old
Age		
Sex	F	M
Birth order		Singleton

	Mother	Father	
Age			
Years of education			
Working outside the home?			
Number of children			
Do you have Internet access at home?	YES	NO	
Family income	< 20 000	20 000-40 000	> 40 000

2) Screens at home

Which of the following devices (if any) do you have at home?

	None	1	2 or more
TV			
Mobile phone			
Computer			
Mobile devices (tablet, iPod)			
Video game console			
Other			

3) Which of the following devices does the child have in his/her own bedroom?

Device	YES	NO
TV		
Computer or netbook		
Video game console		
Other		

4) Which of the following devices (if any) does the child own? Even if it is not his/her property, he/she may use it whenever he/she wants to.

Device	YES	NO
TV		
Computer or netbook		
Video game console		
Tablet		
Mobile phone		
Other		

5) How old was the child when he/she started...?

Activity	With help					Alone				
	< 1 y.o.	1 y.o.	2 y.o.	3 y.o.	4 y.o.	< 1 y.o.	1 y.o.	2 y.o.	3 y.o.	4 y.o.
Watching TV										
Using touchscreens										
Calling someone on the phone or making a videocall										
Playing video games										
Surfing the Internet										
Using apps										

y.o.: years old.

6) How many and which apps does the child use (with or without help)?

Number:
App names (that you recall):

7) How often does the child do the following activities?

Activity	Never	Once a week	Several times a week	Every day
Watching TV				
Using a computer				
Playing video games				
Using tablet or smartphone apps				
Reading books or having someone read to him/her				
Sports or outdoor activities				
Playing educational games or drawing				
Using educational apps				

8) How long did the child do the following activities YESTERDAY?

Activity	< 30 minutes	30 minutes	1 hour	2 hours	More than 2 hours
Watching TV					
Using a computer					
Playing video games					
Using tablet or smartphone apps					
Reading books or having someone read to him/her					
Sports or outdoor activities					
Playing educational games or drawing					
Using educational apps					

9) While the child is doing other activities, how often is the TV on in the background?

TV on	Frequency			
	Never	Rarely	Often	Always

10) What is the purpose of using these devices?

- For the child's entertainment only
- So that parents or caregivers can complete household or work-related activities
- For the child's entertainment in public places or while traveling
- Before going to bed
- Other

11) Have you ever talked to your pediatrician about using these devices and his/her recommendations regarding children?

- YES
- NO