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Early Screen Use and Psychomotor Development: The Role of Family Practices in Early Intervention Contexts

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Abstract

Screen use has become increasingly embedded in early childhood, raising concerns about its implications for developmental processes, particularly in applied early intervention contexts. This study analyses the associations between screen use and the psychomotor development of children aged 16 to 48 months in five Child Development and Early Care Centres (CDECC) in Catalonia, Spain. The sample includes 164 children (M = 30.82 months; 68.3% boys). Families completed a questionnaire on children's and parents' screen use, including reasons and daily contexts of exposure, and children's development and behaviour were assessed using the CBCL and BDI. The results confirmed that more hours of screen exposure were associated with increased developmental risk in personal-social functioning, expressive language, fine motor skills and the total scale score, as well as increased aggressiveness. Parental screens use significantly predicted children's screen exposure, highlighting the role of family modelling and contextual practices. In addition, parental reasons and specific situational contexts of screen use showed stronger predictive value for developmental and behavioural difficulties than screen time alone. These findings suggest that early developmental outcomes are shaped not only by the amount of screen exposure, but also by the relational and contextual conditions in which screens are used. Implications are discussed for applied developmental research and for early intervention professionals supporting families in the development of age-appropriate and interaction-focused media practices dur-

ing early childhood.

Keywords

Early Childhood, Early Intervention, Screen Use, Parental Mediation, Psychomotor Development, Behaviour

1. Introduction

Child Development and Early Care Centres (CDECCs) in Catalonia (northeastern Spain), locally referred to as *Centros de Desarrollo Infantil y Atención Precoz* (CDIAPs), provide specialised support to children aged 0 to 6 who have, or are at risk of developing, delays in any area of psychomotor development, as well as emotional or behavioural problems. Based on clinical practice, the professionals who authored this study have observed, over the past ten years, an increase in the number of consultations for communication and relationship disorders, as well as delays in language acquisition among the child population treated at the centres.

During 2023, CDECC in Catalonia observed a 153% increase in relationship and communication disorders, a 4% increase in language disorders, and a 27% increase in motor development disorders compared to 2015 (Department of Social Rights and Inclusion of the Government of Catalonia, 2023). In 2023, the main diagnoses were: language disorders (18.5%), relationship and communication disorders (18.5%), motor development disorders (11.1%) and regulation and behaviour disorders (7.2%). Worldwide, approximately 1 in 14 preschool children has a language disorder (National Institute on Deafness and Other Communication Disorders, 2023), with a prevalence of over 15% in preschool age (García & González, 2018). With regard to the diagnosis of autism spectrum disorder (ASD), the prevalence has increased in all countries in recent years and stands at 1:100, but varies considerably depending on age (WHO, 2023). In four-year-olds, the prevalence ranges from 1.17% to 1.55%, according to a study conducted in Catalonia (Hervás & Maraver, 2020).

The observed increase in these disorders motivated the authoring team to investigate which familial or contextual factors might influence their occurrence. On the one hand, diagnostic criteria and early detection were considered influential variables, alongside social and family aspects. On the other hand, an increase in the use of mobile phones and tablets was observed in waiting rooms to distract children, with parents reporting frequent use at home during meals or sleep times. The lack of scientific evidence regarding the impact of screen exposure in early childhood within this clinical context prompted the development of the present study. This study contributes to the applied developmental literature by examining the association between screen use and psychomotor development in a clinical early intervention context, a population that remains underrepresented in screen-related research, which has largely relied on community-based samples.

1.1. Screen Use in Early Childhood

Screens (mobile phones, consoles, tablets, etc.) are now part of everyday life for most people, regardless of age. Technologies open up a wide range of possibilities for developing personal and academic skills, and some studies indicate that they can promote social bonding and visuospatial skills (Manago et al., 2012; Sanders et al., 2019). However, most studies suggest that excessive use can expose people to risks, especially those who are still developing, in this case, children and adolescents (Holloway et al., 2013; Martín-Perpiñá et al., 2019). In this regard, Ponti et al. (2017) state that screen use is not appropriate in early childhood because children do not acquire content comprehension until the age of two and have difficulty transferring learning from 2D to 3D (real life). They add that children learn best through interaction with caregivers, as well as through aspects related to meaningful emotion (Bueno, 2022; Ponti et al., 2017; Siegel et al., 2016).

According to UNICEF (2020), it is necessary to bear in mind that each age has specific limitations and needs, and that while children are using screens, they are missing out on enriching experiences for their growth, such as play, contact with nature, interaction with other children, exploration and boredom; therefore screen exposure should be avoided (UNICEF, 2020). There is no clear consensus on the recommended age and time for screen use, especially for children over 5 years of age, although in general, it is recommended to avoid screen use for children under 3 years (Cartanyà-Hueso et al., 2021; Ramis, 2020). The American Academy of Pediatrics (2024) recommends no television viewing until the age of 2 - 3 and limiting screen time to 1 hour per day for children aged 2 to 5, using high-quality programmes (Stiglic & Viner, 2019). The preventive protocol for children—developed in Catalonia by the regional government (Soler & Prats, 2025)—proposes avoiding screen use in children under 3 years and promoting communication and play, as well as limiting screen use in breastfeeding parents. From the age of 3 onwards, there is no single recommendation (McArthur et al., 2022b; Stiglic & Viner, 2019), although the trend is less than one hour for 3 - 5-year-olds and 1 hour from the age of 6 onwards (Panjeti-Madan & Ranganathan, 2023).

Active Healthy Kids Canada (2024) reports that children aged 3 to 5 spend an average of 2 hours per day using screens, and in the US, children aged 8 months to 8 years spend 4 hours per day, despite the recommendation being 1 hour. Only 15% of Canadian children aged 3 to 4 years meet screen time guidelines of <1 hour/day (Ponti, 2023). Another study notes that 24.7% of children under the age of 2 had contact with screens, and 35.6% of 3 - 5-year-olds had an average of 1 hour per day (McArthur et al., 2022b). Twenge & Campbell (2018) note that average screen time among 2- to 14-year-olds was 3.2 hours per day, increasing to an average of 4.5 hours per day among 14- to 17-year-olds. When consumption reaches 7 hours per day, the likelihood of anxiety and depression doubles. The authors also observed an impact on social relationships, reduced emotional stability, reduced curiosity and greater difficulty in completing activities. Taken together, existing evidence indicates that early exposure to screens -both in terms of

age of first contact and patterns of use, frequently exceeds global recommendations. Yet, important questions remain regarding how these early exposure patterns relate to children's developmental functioning and which domains are more sensitive in early childhood. The present study addressed these questions by offering developmentally grounded evidence with direct relevance for early intervention contexts, supporting family-centred strategies that promote developmentally appropriate media practices during the first years of life.

1.2. Screen Use, Psychomotor Development and Behaviour

Recent studies have found that screen time is significantly related to child development and, in particular, can increase ADHD, difficulty falling asleep and behavioural problems (Lissak, 2018; Twenge & Campbell, 2018), as well as aggressive and antisocial behaviour and disruptions in emotional development (Madigan et al., 2019). Heffler et al. (2024) and Ponti (2023) associate screen use with atypical sensory processing in multiple domains: low registration, sensation seeking, sensory sensitivity and sensation avoiding. However, there are no studies on the relationship between screen time, sensory processing and behavioural outcomes.

Social difficulties increase when screen use occurs during daily routines, especially when it occurs in more than five routines (Domoff et al., 2017). Some studies have linked screen use with habits in early childhood. With regard to sleep, the possible impact of stimulating content and blue light is noteworthy, as it can affect melatonin suppression, leading to an increase in night-time awakenings (Hill et al., 2016).

Excessive screen time in early childhood (more than 2 to 3 hours per day on any device) reduces opportunities for interaction and observation, limits learning related to emotional regulation, and promotes greater emotional lability related to the desire to use devices. A recent Irish study clearly associated screen time exposure with internalising behaviours in preschoolers (Ponti, 2023).

Studies with children aged 4 to 6 years have linked screen use with greater difficulty in social skills (Skaug et al., 2018) and, in later stages of development, with difficulties in cognitive ability, obesity, sleep difficulties and increased anxiety (Domingues-Montanari, 2017). Other studies highlight the impact that technology use can have on the physical health of adolescents, such as obesity, heart problems and vision problems (Domingues-Montanari, 2017; Domoff et al., 2019; Pearson et al., 2018; Stiglic & Viner, 2019) as well as on executive functions (Baumgartner et al., 2014).

We are finding more specific studies on preschoolers that point to the same difficulties. Madigan et al. (2019) link high levels of screen exposure at 24 - 36 months with lower performance on the ASQ-3 developmental test (Squires & Bicker, 2009). Infants with the highest scores tend to be girls, with low levels of maternal depression, positive maternal affect, positive activity, greater exposure to stories, better sleep and higher income levels (Madigan et al., 2019). A higher

risk of language acquisition delay has also been observed in children who begin to have contact with screens before 12 months of age and with 1 hour of exposure per day, both factors increasing the risk of language delay (Guellai et al., 2022; Massaroni et al., 2023). The same authors highlight that watching television before 12 months of age increases the risk of language development delay sixfold, for reasons such as reduced interaction with adults, fewer stories being told to them and the developmental difficulty of learning from 2D images. They also emphasise the importance of the quality of audiovisual content over the amount of time spent watching it, pointing out the risk of early exposure to adult content that is not developmentally appropriate, reduced verbal interaction and increased loneliness during screen use. These aspects can have an impact on play, language, executive functions and emotional regulation, findings that are consistent with broader evidence linking screen time to developmental and behavioral outcomes in preschool children (Cerneglia et al., 2021; McArthur et al., 2022a). Takahashi et al. (2023) also identify a relationship between screen contact in the first year of life, screen time and certain children's programmes with images that involve rapid inputs (Ali, 2024), which is associated with greater language delay and problem-solving difficulties between the ages of 2 and 4.

On the other hand, other studies point to the relationship between autism spectrum disorders and screen time, showing that there is a possible relationship between excessive screen time and an increase in autistic symptoms, particularly social withdrawal and communication difficulties (Lin et al., 2025). These results are not conclusive, as children with autism spectrum disorder often prefer screens due to their communication difficulties, which necessitates further study of this bidirectional relationship (Dilshad et al., 2025).

However, some studies indicate that the impact of screens may not only be psychological but may also involve changes in brain development, such as myelination and microstructural organisation, and alterations in cortical EEG, especially when screen use begins in early childhood (Hutton et al., 2019; Law et al., 2023).

1.3. Family Context: Parents' Screen Use, Parental Mediation and Its Impact on Children

Family characteristics such as mental health and parents' screen use are other factors that contribute to the amount of time children spend in front of screens and the effects of this on their physical and mental health (Ishii et al., 2022; Lauricella et al., 2015; Tang et al., 2018). Barragan-Jason & Hopfensitz (2021) found that, in children aged 4 to 6, screen time was influenced by parent-related variables such as maternal education and family income.

Although these structural characteristics provide an important framework, parental screen use can reduce the quantity and quality of early parent-child interactions (Mupalla et al, 2023), which are critical for the development of cognitive skills such as language and executive functions (Anderson & Subrahmanyam, 2017), as well as social reciprocity (Munzer et al., 2019; Raman et al., 2017). Ex-

posure to family TV viewing is associated with lower language scores at age 2 as assessed by the McArthur Communicative Development Inventory (CDI) (Fenson et al., 1993), and when the TV is constantly on at age 2, it is associated with lower verbal IQ (Guellai et al., 2022; Martinot et al., 2021). Relatedly, children's screen use has also been linked to socioeconomic variables, maternal depression, mothers' screen time and cognitive stimulation at home (Duch et al., 2013).

Interruptions in parent-child interaction related to parents' use of technology have been conceptualized as *technoreference* (McDaniel & Radesky, 2018). The authors link this form of technological interference, particularly mothers' mobile phone use- to the prediction of both externalising and internalising problems in children.

Beyond parental screen use, early childhood research highlights parental mediation as a key family-level process shaping children's media experiences. During the first three years of life (0 - 36 months), mediation strategies include active, restrictive, and utilitarian approaches, ranging from guided co-use and content discussion to limit setting and the use of screens for emotional management (Coyne et al., 2017; Plowman, 2015). Longitudinal evidence indicates that higher parental media efficacy is associated with lower levels of problematic media use (PMU) through consistent monitoring and rule enforcement (Coyne et al., 2023). From a developmental perspective, active and dialogic co-use supports early language and socioemotional development, whereas passive co-presence and reliance on screens for emotional regulation are linked to poorer self-regulation and steeper screen-time trajectories during early childhood (Coyne et al., 2017; Coyne et al., 2023; Goodall et al., 2025).

Screen exposure in early childhood has also been linked to broader lifestyle patterns. Screens tend to promote sedentary lifestyles, which in the early years of life interfere with development and play. Screen use in pregnant women has been identified as a predictor of increased screen use in children aged 2 - 5, as well as reduced physical activity (Xu et al., 2016), with additional evidence suggesting that mothers' screen time predicts children's subsequent screen exposure (Xu et al., 2014). Consistent with this evidence, Guellai et al. (2022) conclude that screen consumption has increased and that, on the one hand, if the content is not age-appropriate, it can hinder learning and the generalisation of information, highlighting its impact on development. They consider screen use to be beneficial only when it is used as support during interaction, as it allows content to be communicated to parents. They also highlight that there are family environmental variables that can explain and clarify the understanding of the increase in consumption habits in households, such as parents' and children's daily hours of sleep, daily routines and the duration of a child's crying. Other studies also point in this direction, emphasising the importance of the relationship between the reasons for screen use, parental characteristics, the functions attributed to screens and nurseries in understanding the relationship with daily care (Siddiqui et al., 2025).

In line with these findings, international organizations emphasise the importance

of adult involvement in young children's screen experiences. Both Zero to Three (2024) and the American Academy of Pediatrics (2024) recommend that, when there is contact with screens, it should occur alongside an adult, using viewing as an aid to stimulate language through questions, creating stories or using the content viewed to enhance learning. They also recommend avoiding screen use during sleep and mealtimes, as well as reducing adults' screen time due to the model they may represent for the child and the potential effects on behaviour. They further warn that background television use increases distractions during parent-child interaction and play.

By incorporating parental screen consumption and reported motivations for children's screen use, the present study advances understanding of family-level processes that shape early media exposure beyond screen time alone.

1.4. Purpose of the Present Study

Based on the literature reviewed, this study aimed to analyse the associations between family screen use, children's screen exposure, and developmental and behavioural outcomes in children attending early intervention centres. Specifically, the study pursued the following objectives:

1) To describe family screen consumption and children's screen exposure according to child age and gender;

2) To analyse the reasons and daily contexts in which parents allow children to use screens;

3) To explore whether parents' screen exposure predicts their children's screen exposure;

4) To analyse whether greater children's screen exposure is associated with developmental risk, particularly in social, language, motor, and cognitive domains;

5) To analyse whether greater children's screen exposure is associated with behavioural difficulties;

6) To examine whether the number of parental reasons and screen-use contexts is associated with children's developmental and behavioural outcomes.

We expected that increased screen use by parents would be associated with increased screen use by their children (Hypothesis 1), and that greater screen exposure in children would be associated with poorer development and behavioral outcomes (Hypothesis 2).

2. Method

2.1. Sample

The final sample comprised 164 children and their families recruited across five participating early intervention centres in Catalonia. Table 1 shows the characteristics of the sample of children and families participating in this study. The child sample consisted of 164 infants, most of whom were born in either 2018 (47.6%) or 2019 (43.3%), with 68.3% being boys and a mean age of 30.8 months (SD = 6.19). The main diagnosis was relationship and communication disorder

(31.4%), followed by regulation and behaviour disorder (22.9%) and simple language delay (18.6%).

Regarding the parent sample, the survey on family habits and screen use was answered mainly by mothers (57.2%), followed by both parents together (34.2%) and, to a lesser extent, fathers (8.6%). Most of the families who responded reported having a steady job (61.8%), and nearly a third had completed secondary education (30.6%).

Table 1. Sociodemographic characteristics of the sample of children and parents.

Characteristics	Total
Child gender	
Boy	112 (68.3%)
Girl	52 (31.7%)
Total	164
Year of birth	
2017	1.2
2018	47.6
2019	43.3
2020	7.3
2021	.6%
Age (in months)	
Minimum 16 months	M = 30.8
Maximum 48 months	SD = 6.19
Initial diagnosis	
Relationship and communication disorder	31.4
Regulation and behavioural disorder	22.9
Simple language delay	18.6
Normal variation	12.9
Parent's occupation (Parent 1[a])	
Unemployed, domestic work, temporary work	29.9
Permanent job	61.8
Self-employed	6.4
Other	1.9
Level of education	
Primary education (EGB)	22.3
Secondary education (ESO, BUP, FP)	30.6%
Baccalaureate/Intermediate level (COU)	16.6
University degree (bachelor's degree)	13.4
Master's or postgraduate degree	12.7
Doctorate	4.5

[a]Parent 1 refers to the person who responded to the survey, who may be the father, the mother or both.

2.2. Procedure

A cross-sectional, descriptive study was designed with a clinical sample of children aged between 16 and 48 months whose families were starting care at five ECDCCs located in different towns in the northeast of Catalonia (Spain). Families in which the infant had a specific organic pathology at the time of referral or first visit were excluded.

The study began in 2019 and consisted first of the *ad hoc* construction of a questionnaire on screen-consumption habits and family dynamics, and the selection of the two tests that would be used to assess the children's development and behaviour. In 2020, the intention was to begin administering the instruments, but due to the health crisis caused by COVID-19, administration did not begin until 2021.

For sample planning purposes, each participating centre used as a reference the number of children attended during the previous year. Across the five centres, this reference population comprised 549 families. Based on this figure, an approximate recruitment target of 30% was established for each centre. Families were consecutively invited to participate upon starting care at the participating centres, provided they met the inclusion criteria. The final sample comprised 164 children and their families, who provided informed consent to participate in the study.

Once approval had been obtained from the Ethics and Biosafety Committee of the University of Girona (Spain) (CEBRUdG18-2021), informed consent was requested from those families who wished to participate in the study and who met the inclusion criteria. They were given the screen habits questionnaire along with the CBCL behaviour inventory for parents (Achenbach & Rescorla, 2000). At the same time, a clinical professional administered the Battelle Developmental Inventory screening test (Newborg et al., 2011) to the child. The tests were administered within a maximum period of 15 days.

2.3. Measures

Three instruments were applied to all children and families in the sample:

Questionnaire on screen consumption habits (created ad hoc by the authors). Parents completed a self-reported questionnaire about their children's screen exposure, as well as their own screen use. At the beginning, information was requested about the person completing the questionnaire (mother, father, or both parents/caregivers), the child's date of birth, current age (years and months), the reason for consultation and the diagnosis. To explore data on the child's screen consumption and exposure habits, questions covered: 1) The number of devices available in the home (mobile phone, TV, tablet, computer and video game consoles) with response options ranging from "none" to "more than 6"; 2) The number of hours of TV consumption and number of hours of tablet/mobile phone consumption, exploring weekday and weekend use separately, coded on a 6-point ordinal scales (0 = 0 h, 1 = 1 h, 2 = 2 h, 3 = 3 h, 4 = 4 h, 5 = 5 or more h); 3) The reasons why parents allowed their children to use screens: to learn, to calm down,

to be able to do tasks, to eat, to sleep, because they asked, to have fun and not to disturb. Multiple options could be selected; 4) The screen-use contexts, explored in the same way as above (eating, sleeping, at home to play, in the car, waiting at the doctor's, in the park). Child screen exposure was assessed using parent-reported ordinal categories for daily screen use across two domains (television/video games and mobile/tablet use), separately for weekdays and weekends (0 hours, 1 hour, 2 hours, 3 hours, 4 hours, and 5 hours or more). To derive an overall indicator of screen exposure, response categories were converted into numeric values (0 - 5), with the highest category ("5 hours or more") coded as 5. A composite child screen score was then calculated by combining weekday and weekend reports into a single continuous indicator of total exposure. This operationalisation was intended to provide a parsimonious proxy measure of cumulative screen exposure suitable for regression analyses.

The second part of the questionnaire included questions for parents and/or legal guardians. Data on occupation and educational level were collected. Parental screen time was explored with the question "What is your average daily use of mobile phones or other screens when you are at home?", coded on a 5-point ordinal scale (1 = 1 h, 2 = 2 - 4 h, 3 = 5 - 7 h, 4 = 8 - 12 h, 5 = more than 12 h). The questionnaire was available for families to complete in the two official languages of Catalonia (Catalan and Spanish).

Child Behaviour Checklist for ages 1.5 - 5, parents' version (CBCL (Achenbach & Rescorla, 2000)). The CBCL is a screening tool for the early stages of diagnosis, created for the clinical assessment of behaviour in children aged 1.5 to 5 years. Parents completed the 100 items that comprise the instrument, which are grouped into six dimensions: emotional reactivity, anxiety/depression, somatic complaints, withdrawal, attention problems and aggressive behaviour. Responses are rated on a three-point scale (*Not True, Sometimes*/*Somewhat True*; *Very Often True*). These dimensions can be grouped into externalising and internalising domains. The CBCL produces an Internalising Problems score—formed by combining Anxious/Depressed, Withdrawn/Depressed and Somatic Complaints—and an Externalising Problems score, formed by combining Rule-Breaking Behaviour and Aggressive Behaviour. Scores above 70 are considered a criterion for clinical severity. Internal consistency (Cronbach's alpha) for all dimensions in this study was very high, with all values above .94.

Battelle Development Inventory (BDI) (Newborg et al., 2011). The BDI is a battery of tests used to assess fundamental developmental skills in children from birth to eight years of age. It was administered individually by professionals at early intervention centres. One of the main functions of the Battelle is to identify children with delays in any area of development. The screening test is used to determine which areas require a more comprehensive assessment. It provides information on the personal/social area (including interaction with adults and expression of emotions), the adaptive area (eating, dressing, toileting, responsibility), the motor area (body coordination and fine motor skills), the communi-

cation area (expressive and receptive language), the cognitive area (memory, conceptual development and perceptual discrimination) and the total score for each child. For the screening interpretation, BDI results were dichotomised into absence of developmental risk and presence of developmental risk according to the instrument's screening criteria. In the analyses, "presence" indicates that the child showed developmental risk in the corresponding area, whereas "absence" indicates no developmental risk. The internal consistency (Cronbach's alpha) for all areas in this study was high, ranging from .82 for the total score to .85 for expressive language.

2.4. Statistical Method

Descriptive analyses were conducted to address Objectives 1 and 2. Specifically, these analyses were used to describe family screen availability, parental screen use, children's screen exposure according to child age and gender, and the reasons and daily contexts in which parents allowed children to use screens. Pearson correlations were used to examine the association between children's weekday and weekend screen exposure. Group differences according to child gender and age group (1.5 - 2 years and 2 - 4 years) were examined using Student's t-tests and chi-square tests, as appropriate.

To analyse the relationship between parental and child screen exposure, a simple linear regression was conducted using parental average daily screen use as the predictor and child screen exposure as the outcome, addressing Objective 3 and Hypothesis 1.

To examine the association between child screen exposure and developmental outcomes (Objective 4, Hypothesis 2), Student's t-tests were conducted to compare screen-exposure scores between children with and without developmental risk in each BDI area. In addition, binary logistic regression analyses were performed to examine whether child screen exposure predicted developmental risk across BDI domains.

To examine the association between child screen exposure and behavioural outcomes (Objective 5, Hypothesis 2), simple linear regression analyses were conducted using CBCL dimensions as dependent variables and child screen exposure as the predictor.

Two additional variables were computed to examine family screen-use practices: the total number of parental reasons for allowing children to use screens and the total number of daily screen-use contexts. In both cases, the variables were calculated by summing the number of endorsed response options. These variables were used to address Objective 6. To analyse their association with developmental outcomes, binary logistic regression analyses were conducted using the BDI domains as dependent variables. To examine their association with behavioural outcomes, simple linear regression analyses were performed using CBCL dimensions as dependent variables.

Given the exploratory aims of the study, the modest sample size, and the large number of outcome-specific analyses, the regression models were estimated without adjustment for additional covariates. These analyses were intended to identify broad patterns of association rather than to estimate independent causal effects.

Because some variables contained missing values, analyses were conducted using available cases, and sample size varied slightly across models. All analyses were performed using SPSS v.29, and statistical significance was set at $p < .05$.

2.5. Data Availability Statement

The data that support the findings of this study are not publicly available due to ethical and confidentiality considerations related to research involving minors and data collected in clinical settings. However, de-identified data and study materials may be made available by the corresponding author upon reasonable request, subject to approval by the relevant ethics committee and institutional regulations.

3. Results

3.1. Parent and Child Exposure to Screens

Descriptive analysis of the family media context shows that the devices most commonly found in homes are mobile phones and televisions, followed by tablets, while video game consoles are less common. In terms of parental use, the average number of hours of screen exposure when parents are at home is 1 hour per day (SD = .64). For children, television is the most widely used medium, followed by mobile phones and tablets, with similar proportions by gender. No statistically significant differences were observed between boys and girls for any of the media explored (Table 2).

Table 2. Distribution of devices at home and media used by children.

Devices at home	Percentage	
2 - 3 mobile phones	87.7	
1 tablet	49.4	
No video game consoles	58.5	
1 television	47.6	
2 - 3 televisions	45.1	
Media used by children	Boy (%)	Girl (%)
Television	89.2	88.2
Mobile phone	55.4	58.8
Tablet	35.7	31.4

Descriptive analysis of screen exposure time shows consistent patterns across different devices. For television, there is a moderate and significant positive correlation between weekday and weekend viewing hours ($r = .622$; $p < .001$), indi-

cating continuity in consumption habits. For tablet or mobile phone use, the relationship is even stronger ($r = .832$; $p < .001$), with greater weekday use associated with increased weekend use. Average exposure time is higher on weekends for both types of screens.

Although there are small differences by gender—higher weekday television use among boys and higher tablet/mobile phone use among girls—these differences are not statistically significant. In contrast, age differences are significant in tablet or mobile phone use, with longer exposure time in the 2- to 4-year-old group both during the week ($t_{(86,084)} = -2.351$; $p = .010$) and at weekends ($t((_{91,138})) = -4.349$; $p < .001$) (Table 3).

Table 3. Mean and standard deviation of daily hours of exposure to television, tablets and/or mobile phones by gender and age.

Group	Weekday TV M (SD)	Weekend TV M (SD)	Tablet/mobile weekdays M (SD)	Weekend tablet/mobile M (SD)
Total	1.67 (1.29)	2.05 (1.39)	.80 (.88)	1.23 (1.19)
Gender				
Boy	2.06 (1.47)	2.06 (1.41)	.78 (1.03)	.84 (1.08)
Girl	1.80 (1.29)	2.13 (1.42)	.92 (1.21)	1.06 (1.07)
Age				
1.5 - 2 years	1.65 (1.25)	1.81 (1.64)	.42 (.62)	.40 (.64)
2 - 4 years	2.06 (1.45)	2.13 (1.36)	.92 (1.15)	1.02 (1.14)

3.2. Reasons and Screen-Use Contexts of Children's Screen Use

The most prominent reasons parents report allowing their children to use screens are to do their own work (adults), to calm the child down and when the child requests it. No statistically significant differences by gender are observed for any of the reasons recorded (Figure 1).

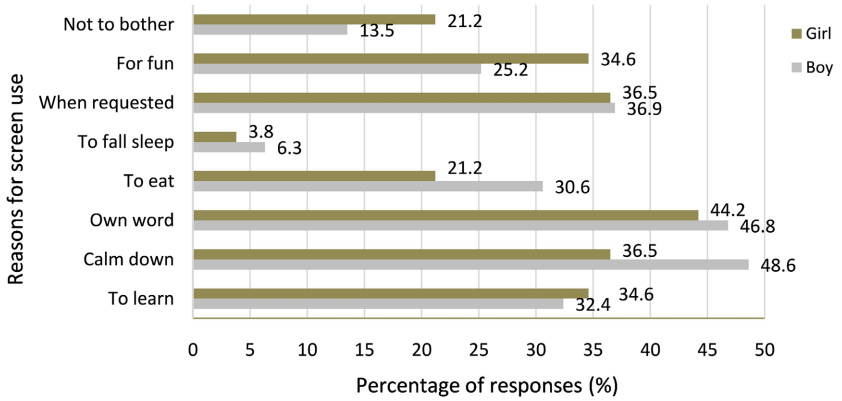

Figure 1. Reasons for allowing screen use by gender (%).

Different behaviours by parents are also observed based on the child's age. Chil-

dren between 1.5 and 2 years are more often offered screen time to calm them down, to eat, to fall asleep and to keep them from bothering others, whereas older children (2 - 4 years) are allowed to use screens to learn, to do their own work, when they ask for it and for fun.

Statistically significant differences are observed in two of the reasons explored: when children ask for it ($\chi^2(1, n = 163) = 12.115$, $p = .001$, Phi = .273) and for entertainment ($\chi^2(1, n = 163) = 11.806$, $p = .001$, Phi = .269). In both cases, the percentage of children in the 2 - 4-year-old group is significantly higher than in the 1.5 - 2-year-old group (Figure 2).

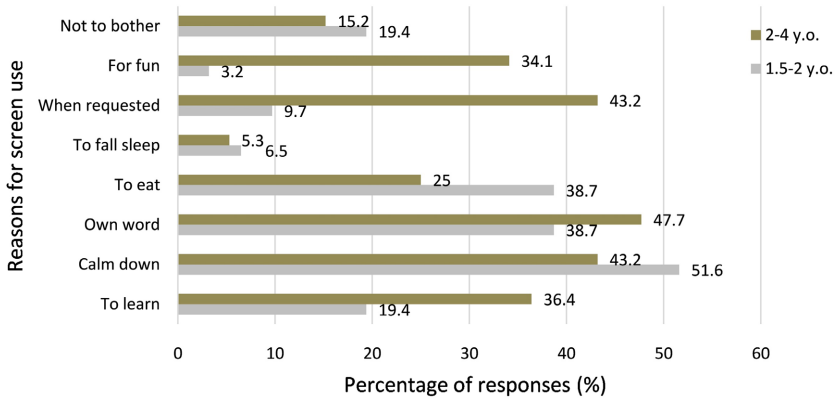

Figure 2. Reasons for allowing screen use by age (%).

Parents most frequently reported children's screen use at home for play (46.8% and 56%, sons and daughters, respectively) and during mealtimes (46.8% and 36% for sons and daughters, respectively). Around 20% (18% and 16% for sons and daughters, respectively) use them to fall asleep, and similar proportions use them in the car (18.9% and 20% for sons and daughters, respectively). No statistically significant differences are observed according to gender across the situational context explored.

According to the ages of the children, statistically significant differences are observed for screen use at home for playing [$\chi^2(1, n = 161) = 3.84$, $p = .05$, phi = .170], with children aged 2 - 4 years using screens at this context more frequently.

3.3. The Effect of Parental Screen Exposure on Children

We investigated the predictive relationship between children's weekly television, mobile phone and tablet use and their parents' average daily screen time. The regression analysis revealed a significant association with children's television consumption hours ($F(1, 150) = 4.663$, $p = .032$), with an R^2 value of .030, accounting for 3% of the variance. The regression coefficient for parental screen time is .696, with a standard error of .32, indicating a statistically significant positive relationship ($t(150) = 2.159$, $p = .032$). The 95% confidence interval ranged from .059 to 1.334. These results suggest that for each additional hour of parental screen time, children's weekly television consumption increases by an average of .7 hours.

3.4. Screen Exposure in Children and Its Effect on Development

A Student's t-test was performed to compare child screen exposure between children with and without developmental risk according to the Battelle Developmental Inventory (BDI). As shown in Table 4, the results reveal significant differences between the two groups in the personal-social area, fine motor skills, total motor skills, expressive language, the cognitive area and the total test score. In all these domains, children classified in the developmental-risk group showed higher mean screen-exposure scores than children without developmental risk.

Table 4. Mean child screen exposure score by BDI areas.

BDI Area	Child screen exposure					
	No developmental risk	Developmental risk	*df*	*t value*	*p*	Cohen's *d*
Personal social	4.90 (2.74)	6.45 (3.91)	137.509	−2.762	.007	3.52
Adaptive	5.65 (3.55)	6.12 (3.63)			*n.s.*	
Fine motor	5.47 (3.20)	7.02 (4.37)	48.429	−1.964	.05	3.53
Gross motor	5.75 (3.55)	6.24 (3.73)			*n.s.*	
Total motor	5.16 (2.64)	6.34 (4.05)	139.910	−2.109	.037	3.55
Total language area	5.45 (3.19)	6.79 (4.23)			*n.s.*	
Receptive language	5.33 (3.00)	6.46 (4.08)			*n.s.*	
Expressive language	4.96 (2.56)	6.40 (3.40)	139.231	−2.621	.010	3.53
Cognitive	5.19 (3.23)	6.56 (3.82)	140	−2.297	.023	3.53
Total scale score	4.72 (2.70)	6.55 (3.88)	136.534	−3.312	.001	3.48

Binary logistic regression analyses were conducted to examine whether child screen exposure predicted developmental risk across BDI areas (Table 5). For the personal and social area, the model is statistically significant ($\chi^2(1) = 6.738$, $p = .009$) and correctly classifies 58.5% of participants, explaining 6.3% of the variability (Nagelkerke R^2). For the fine motor area, the model is statistically significant ($\chi^2(1) = 4.868$, $p = .027$) and correctly classifies 75.4% of participants, explaining 5% of the variability (Nagelkerke R^2). The model shows good fit according to the Hosmer-Lemeshow test ($\chi^2(8) = 4.487$, $p = .811$). For Total Language, the model is significant ($\chi^2(1) = 4.198$, $p = .040$), classifies 69.7% of cases correctly, explaining 4.1% of the variability (Nagelkerke R^2) and shows good fit (Hosmer-Lemeshow: $\chi^2(8) = 4.685$, $p = .791$). For Expressive Language, the model is significant ($\chi^2(1) = 5.782$, $p = .016$), classifies 62% correctly, explains 5.4% of the variability (Nagelkerke R^2) and fits well (Hosmer-Lemeshow: $\chi^2(8) = 11.279$, $p = .186$).

For Cognition, the model is significant ($\chi^2(1) = 5.295$, $p = .021$), classifies 57.7% correctly, explains 4.9% of the variability (Nagelkerke R^2) and shows good fit (Hosmer-Lemeshow: $\chi^2(8) = 10.907$, $p = .207$). For the Total Scale Score, the model is significant ($\chi^2(1) = 9.621$, $p = .002$), classifies 62% correctly, explains 8.9% of the variability (Nagelkerke R^2) and also shows good fit (Hosmer-Lemeshow: $\chi^2(8) = 4.246$, $p = .834$). The full set of tested models, including non-significant results, is reported in Table S1.

Table 5. Binary logistic regression of Behavioural Development Inventory (BDI) and child screen exposure.

BDI Area	*B*	*SE*	*Wald*	*df*	*p*	OR	95% CI
Personal Social	.137	.056	5.939	1	.015	1147	[1.027, 1.281]
Fine motor	.116	.053	4.783	1	.029	1123	[1.012, 1.245]
Total language	.103	.051	4.098	1	.043	1108	[1.003, 1.224]
Expressive language	.127	.056	5.157	1	.023	1135	[1.017, 1.266]
Cognitive	.112	.051	4.899	1	.027	1119	[1.013, 1.236]
Total scale score	.170	.059	8.149	1	.004	1185	[1.055, 1.331]

Note. Only significant dimensions are included. a. Variable entered on step 1: Dependent variable: BDI (0 = No developmental risk and 1 = Developmental risk). b. Independent variable: child screen-exposure score.

The results indicate that higher child screen exposure scores significantly predicted developmental risk in six of the BDI areas explored. In the personal and social area, each one-point increase in the screen-exposure score increased the probability of belonging to the at-risk group by a factor of 1.14. A similar pattern was observed for fine motor (OR = 1.12) (total language (OR = 1.11), expressive language (OR = 1.13), cognitive area (OR = 1.12), and the total scale score (OR = 1.18).

3.5. Screen Exposure in Children and Its Effect on Behaviour

A linear regression analysis was conducted to explore the association between child screen exposure and the dimensions of the Child Behaviour Checklist (CBCL) (Table 6). For emotional reactivity ($F(1, 150) = 5.110$, $p = .025$), anxiety/depression ($F(1, 150) = 4.448$, $p = .036$), internalising problems ($F(1, 150) = 4.684$, $p = .032$), externalising problems ($F(1, 150) = 7.305$, $p = .008$), defiant opposition problems ($F(1, 150) = 3.910$, $p = .05$) and the total scale score ($F(1, 150) = 3.871$, $p = .05$), the models are statistically significant, indicating associations with child screen exposure.

Each one-point increase in the child screen exposure score was associated with small but statistically significant increases in scores for emotional reactivity (.45), anxiety/depression (.33), internalising problems (.53), externalising problems (.58) and defiant oppositional problems (.31). Despite the statistical significance, the proportion of explained variability was modest across dimensions, ranging

from 2.5% (defiant-oppositional problems and total score scale) to 4.6% (externalising problems). Although the proportion of explained variance was modest, these results suggest a consistent positive association between children's overall screen exposure and several behavioural difficulties. The full set of tested models, including non-significant results, is reported in Table S2.

Table 6. Simple linear regression predicting the relationship between child screen exposure score and the Child Behaviour Checklist (CBCL).

CBCL dimension	*B*	*SE*	*t*	*p*	95% CI
Emotional reactivity	.453	.200	2.260	.025	[.057, .848]
Anxiety/Depression	.328	.155	2.118	.036	[.022, .634]
Internalising problems	.529	.244	2.164	.032	[.046, 1.012]
Externalising problems	.581	.215	2.703	.008	[.156, 1.005]
Defiant-oppositional problem	.310	.157	1.977	.05	[.000, .619]
Total scale score	.523	.266	1.968	.05	[−.002, 1.049]

Note. Only significant dimensions are included. a. Dependent variable: CBCL dimensions. b. Predictor: child screen exposure score.

3.6. Total Reasons for Screen Use Per Day and Effects on Development (BDI) and Behaviour (CBCL)

A binary logistic regression analysis was conducted to investigate whether the total reasons for screen use predict various aspects of behavioural development (BDI) (Table 7). Only two areas show significance: the cognitive area, where the model is statistically significant ($\chi^2(1) = 4.124$, $p = .042$) and correctly classifies 54.7% of participants, explaining 3.6% of the variability (Nagelkerke R^2), with a good model fit (Hosmer-Lemeshow test $\chi^2(4) = 5.298$, $p = .258$); and the total scale score, where the model is also significant ($\chi^2(1) = 5.935$, $p = .015$), correctly classifying 62.7% of participants and explaining 5.3% of the variability (Nagelkerke R^2), again with a good fit (Hosmer-Lemeshow: $\chi^2(4) = 3.587$, $p = .465$). These results suggest that for each additional reason for screen use, the likelihood of being in the at-risk group increases by a factor of 1.26 in the cognitive area and 1.36 for the total scale score. The full set of tested models, including non-significant results, is reported in Table S3.

Table 7. Binary logistic regression of Behavioural Development Inventory (BDI) and total reasons for screen use.

BDI Area	*B*	*SE*	*Wald*	*df*	*p*	OR	95% CI
Cognitive	.234	.118	3.903	1	.048	1.263	[1.002, 1.592]
Total scale score	.305	.132	5.367	1	.021	1.356	[1.048, 1.755]

Note. Only significant dimensions are included. a. dependent variable: BDI (0 = No developmental risk and 1 = Developmental risk) b. independent variable: Total reasons for screen use.

To explore the relationship between the total reasons for screen use and CBCL dimensions, a correlation analysis was conducted. The results indicate a positive and significant relationship between both variables, except for the behaviour dimensions related to somatic symptoms and social withdrawal. The more reasons there are for screen use, the more behavioural problems are observed in relation to externalising (r = .325, $p < .0001$), aggressive behaviour (r = .293, $p < .0001$), total scale score (r = .262, $p < .0001$), attention (r = .255, $p < .0001$), Attention Deficit Hyperactivity Disorder (ADHD) (r = .233, $p = .003$), affective problems (r = .222, $p < .0001$), anxiety/depression (r = .203, $p = .010$), emotional reactivity (r = .194, $p = .014$), sleep problems (r = .193, $p = .015$), defiant opposition (r = .188, $p = .022$), anxiety (r = 180, $p = .022$), pervasive developmental problems (r = .171, $p = .030$) and internalising (r = .159, $p = .044$).

Table 8. Simple linear regression predicting the relationship between total reasons for using screens and the Child Behaviour Checklist (CBCL).

CBCL dimension	*B*	*SE*	*t*	*p*	95% CI
Emotional reactivity	1.23	.49	2.494	.014	[.255, 2.196]
Anxiety/Depression	1.08	.41	2.619	.010	[.267, 1.902]
Sleep problems	1.30	.53	2.453	.015	[.253, 2,349]
Attention problems	1.27	.38	3.321	.01	[.515, 2.026]
Aggressive behaviour	1.75	.45	3.866	<.001	[.856, 2.643]
Internalising problems	1.25	.62	2.030	.044	[.034, 2.473]
Externalising problems	2.29	.53	4.331	<.001	[1.244, 3.329]
Affective problems	1.36	.47	2.868	.005	[.423, 2.293]
Anxiety problems	1.07	.46	2.305	.022	[.153, 1.981]
Pervasive developmental problems	1.17	.53	2.194	.030	[.117, 2.221]
Attention Deficit Hyperactivity Disorder (ADHD)	1.14	.38	3.019	.003	[.394, 1.883]
Defiant-oppositional problem	.93	.38	2.418	.017	[.170, 1.684]
Total scale score	2.23	.65	3.417	<.001	[.944, 3.529]

Note. Only significant dimensions are included. a. Dependent variable: CBCL dimensions. b. Predictor: total reasons for screen use.

In a second step, to analyse the predictive relationship between the total reasons for screen use and CBCL dimensions, a simple linear regression was conducted (Table 8). The analysis shows statistically significant models for all the CBCL dimensions investigated, except for somatic symptoms and social withdrawal. For emotional reactivity ($F(1, 160) = 6.218$, $p = .014$, $R^2 = .032$), anxiety/depression ($F(1, 160) = 6.859$, $p = .010$, $R^2 = .035$), sleep problems ($F(1, 160) = 6.016$, $p = .015$, $R^2 = .031$), attention problems ($F(1, 160) = 11.029$, $p = .001$, $R^2 = .059$), aggressive behaviour ($F(1, 160) = 14.943$, $p < .001$, $R^2 = .080$), internalising problems ($F(1, 160) = 4.122$, $p = .044$, $R^2 = .019$), externalising problems ($F(1, 160) = 18.755$, p

< .001, R^2 = .100), affective problems (F(1, 160) = 8.228, p = .005, R^2 = .043), anxiety problems (F(1, 160) = 5.313, p = .022, R^2 = .026), pervasive developmental problems (F(1, 160) = 4.816, p = .030, R^2 = .023), ADHD (F(1, 160) = 9.112, p = .003, R^2 = .048), defiant opposition (F(1, 160) = 5.848, p = .017, R^2 = .029) and the total scale score (F(1, 160) = 5.848, p = .017, R^2 = .063), the total number of reasons for screen use shows a statistically significant positive relationship, with regression coefficients ranging from .93 to 2.23 and standard errors between .38 and .65. These findings suggest that with each additional reported reason for children's screen use was associated with incremental increases in behavioural difficulty scores. The most pronounced associations appear in externalising problems (2.29) and the total scale score (2.23), whereas defiant opposition (.93) and anxiety problems (1.07) show smaller effects. The full set of tested models, including non-significant results, is reported in Table S4.

3.7. Total Screen-Use Contexts Per Day and Effects on Development (BDI) and Behaviour (CBCL)

A binary logistic regression analysis was conducted to investigate whether the total screen-use contexts of screen time use predict various aspects of behavioural development (BDI), but no significant associations were found.

To analyse the predictive relationship between total screen-use contexts and CBCL dimensions, a simple linear regression was conducted. Only aggressive behaviour shows a significant model (F(1, 158) = 4.704, p = .032) with an R^2 of .023, explaining 2.3% of the variability. The regression coefficient for the total number of screen-use contexts is 1.69, with a standard error of .78, indicating a statistically significant positive relationship (t(158) = 2.169, p = .032), with a 95% confidence interval ranging from .151 to 3.228. This finding suggests that with each additional context of screen use was associated with higher aggressive behaviour scores (1.69). The full set of tested models, including non-significant results, is reported in Table S5.

4. Discussion

The main objective of this study was to answer the initial question: *to what extent can early exposure to screens predict the onset and persistence of developmental problems?* An interesting initial finding is that child screen exposure ranged from 4 to 19 hours per week, with an average of 5.84 hours. Only 2.6% of the children were not exposed to screens (zero hours per week). According to the recommendations of global health and paediatric organisations (American Academy of Pediatrics, 2024; Arnaiz et al., 2022; Soler & Prats, 2025; WHO, 2023), more than 2 hours of daily screen use at these ages is considered excessive. Although 98% of participants in this study did not exceed this daily threshold, we did observe that approximately 2% would be classified as excessive users.

In relation to the first objective, we observed that most families have multiple screens at home, predominantly mobile phones (two or three per household), tab-

lets and televisions. These data are consistent with the availability of technologies in Spanish homes (National Institute of Statistics, 2023). This high presence of media reflects the daily use of technology among families and their members, including very young children. Although reported parental screen use in this study was low to moderate, children's exposure was notable, particularly in relation to television. We also observed that greater use of television during the week is associated with greater use at the weekend, regardless of the child's age or gender. Tablet and mobile phone use was less prominent overall, although significant age-related differences were found, with children between 2 and 4 years being the most exposed on both weekdays and weekends.

Furthermore, this study provides **innovative data on the main reasons and the specific situational contexts where parents offer screens to their children (second objective)**. The most frequent reason is the need for adults to carry out their own tasks. The most common context when children are allowed to use technology is at home for play, and parents also give their children devices when they ask for them, particularly those aged 2 to 4, compared with children aged 1.5 to 2 years, as well as more often for entertainment purposes. However, experts advise against using technological devices primarily as toys, as it is more appropriate at these ages to encourage other forms of play (Lerner & Barr, 2015). The results of this study underscore the importance of promoting free play, role play and quiet games, and avoiding screen-based play, as previous research has shown benefits for psychomotor and emotional development (Hinkley et al., 2018; Xu et al., 2014, 2016). Similarly, Goldstein (2012) highlights the significant developmental value of early play, which supports children's cognitive, physical, social and emotional well-being.

Families also frequently report offering technology to calm children or to facilitate eating or falling asleep at specific times of the day. In line with previous studies, using screens for these purposes may not promote the maturation of children's capacity for emotional regulation and may also contribute to physical health problems, including sleep disturbances (Lissak, 2018; Twenge & Campbell, 2018), visual problems and obesity (Pearson et al., 2018; Stiglic & Viner, 2019).

The analysis of the third objective showed that parents' screen use at home predicts their children's television exposure, in line with previous studies on family media environments and screen use patterns and confirming the first hypothesis (Lauricella et al., 2015; McArthur et al., 2022b). Some authors have already highlighted the social function that media such as television can serve, providing distraction, supporting learning or even acting as a "digital babysitter" (Lull, 1980). However, it is important to emphasise that exposure without adult supervision and to non-educational content can hinder the development of social relationships and language (Guellai et al., 2022; Madigan et al., 2019; Skaug et al., 2018), largely due to the absence, especially prolonged absence of interaction with caregivers and a reduction in opportunities to shift between activities. This aligns with the concept of "technoference" described in previous research (McDaniel & Radesky, 2018).

Among children under 36 months, it has been shown that screens do not support vocabulary learning or verbal expression; however, after this age, and when adults are actively involved, screen use can gradually support expressive language development (Jing et al., 2023).

Regarding the fourth objective, we observed a clear relationship between child screen exposure and their developmental outcomes. Children who do not pass the BDI test spend significantly more hours watching screens each week than those who do pass in the personal and social, motor, expressive language, cognitive and total scale areas (Madigan et al., 2019). In addition, for every extra hour of weekly screen exposure, there is an increase of approximately one point in the scores for fine motor skills, expressive language, cognitive skills and the total scale score, indicating poorer performance in these areas. These findings are consistent with previous research showing that early screen exposure can negatively affect language development (Guellai et al., 2022), social skills (Guerrero, 2021) and aspects of cognitive development (Domingues-Montanari, 2017).

On the other hand, and in **relation to the fifth objective**, the results show that for every additional hour of child screen time, there is a significant increase in externalising and internalising problems, emotional reactivity, anxiety/depression and oppositional defiant problems (Twenge & Campbell, 2018; Lissak, 2018). These findings confirm the second hypothesis, namely that the more children are exposed to screens, the greater the risk of developing developmental and/or behavioural difficulties.

Finally, regarding **the sixth objective**, the findings show that the total number of reasons parents give for allowing screen use has greater predictive value than the total screen-use contexts. In terms of behaviour, the findings indicate that the more reasons families have for allowing screen time, the more cognitive and developmental problems appear. This effect is significant across most of the dimensions explored, showing stronger predictive power for externalising problems, affective problems, sleep problems and attention problems, among others (Lerner & Barr, 2015; Lissak, 2018; Twenge & Campbell, 2018). The specific contexts when screens are turned off predict aggressive behaviour. Overall, the findings suggest that greater screen exposure, and, to a lesser extent, a greater number of daily screen-use contexts are associated with higher levels of developmental and behavioural difficulties in early childhood. According to prior research on parental mediation (Coyne et al., 2017; Coyne et al., 2023; Goodall et al., 2025), these results underscore that relevance of family-level process, not only the quantity of screen time, but also the motivations and situational patterns surrounding its use, in shaping children's early developmental trajectories. From a preventive perspective, it is essential for early childhood professionals to incorporate these dimensions into assessment, family guidance, and intervention efforts aimed at promoting more adaptive developmental outcomes.

4.1. Limitations and Directions for Future Research

It should be noted that this study is not without limitations. As it is a cross-sec-

tional study with a very specific sample, the results cannot be generalised. It is important to consider conducting longitudinal studies to establish causal relationships and observe the long-term impact of screen use on development. Another limiting aspect is that the regression models used, although significant, present low explained variances. However, as Berk & Jennings (2021) and Gigerenzer (2020) point out, R^2 values are often low in psychological research, yet the findings can still be significant and useful for understanding psychological phenomena. A further limitation is that the regression models were unadjusted and should therefore be interpreted as exploratory bivariate associations rather than independent effects. Future studies with larger samples should incorporate adjusted multivariable models to assess the robustness of these findings.

4.2. Applied Implications

From an applied developmental perspective, this study provides relevant evidence for professionals working in early intervention and early childhood care settings. By focusing on a clinical sample of children aged 16 to 48 months and their families treated at the ECDCC, the findings respond directly to concerns raised by practitioners regarding the potential developmental impact of early screen exposure in children diagnosed and treated at these specialized centres. As institutions that aim to provide early care in aspects of early childhood development, the data derived from this study can be of great help in providing families with specific intervention guidelines.

In line with what is stated in various manifestos on screens and by national and international paediatric associations, it should be noted that, first and foremost, families need to be made aware of how their own screen use impacts their children's screen use and how this often takes away unique opportunities for face-to-face interaction that are essential for the proper development of such important areas as language, personal and social relationships, and attention.

Although it is unthinkable today to imagine a home without screens, early childhood professionals can support families through psychoeducational approaches grounded in what Compernolle (2022) describes as *digital freedom,* as opposed to digital addiction. In other words, families are encouraged to reflect carefully on the purposes and contexts in which screens are introduced, prioritising use oriented toward learning and education and emphasising the importance of using them with shared interaction. It is also important to choose content with fewer inputs per second and more repetitive expressions, which allow for better assimilation of content in early childhood (Ali, 2024).

Screen time in children requires controlled observation and monitoring for sustained improvement across developmental domains (Panjeti-Madan & Ranganthan, 2023). It is not advisable to use screens for reasons such as calming children down, giving adults more time, during breastfeeding, or simply when spending time with children, due to the impact that this study has shown they can have on overall infant development. For this reason, and in line with the recommendations

of authors such as Ginsburg (2017), it is important to reactivate quiet, role-playing and free play, as well as the relationship with parents, as protective and preventive factors for later mental health (Izett et al., 2021).

The results obtained in this study, together with those of previous research, allow us to highlight recommendations for professionals and families to avoid the use of screens in the first three years of life and to limit screen use according to age and function in order to improve child development (Panjeti-Madan & Ranganathan, 2023). However, we must not forget the need to introduce this perspective into policies related to health, community and educational institutions.

5. Conclusion

The present study has revealed that parents' screen use directly influences their children's exposure to screens, which can negatively impact their development and behaviour. It has been found that greater screen exposure, together with a higher number of parental reasons and screen-use contexts of the day when parents allow screen use, was associated with increased risk in several areas of psychomotor development and behaviour among children aged 16 to 48 months attending early intervention centres. Although most families do not exceed the recommended exposure limit, it is important to note that excessive screen use contributes to the development of cognitive, emotional and behavioural problems in children. The results also indicate that the reasons parents allow screen use, such as the lack of work-life balance and the need to complete other tasks, can exacerbate these effects. In conclusion, it is crucial to support families in making informed and reflective decisions about when and why screens are introduced may contribute to healthier development trajectories and strengthen early intervention strategies during first years of life. Preventive approaches should prioritise educating families on developmentally appropriate screen practices, fostering alternative play-based activities such as free play and quiet play, and encouraging face-to-face parent-child interaction to mitigate the risks associated with early screen overexposure.

Conflicts of Interest

The authors declare no conflicts of interest regarding the publication of this paper.

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Supplementary

Table S1. Binary logistic regression model including all BDI areas and child screen exposure scores.

BDI Area	*B*	*SE*	*Wald*	*df*	*p*	OR	95% CI
Personal Social	.137	.056	5.939	1	.015	1.147	[1.027, 1.281]
Adaptive	.037	.047	.615	1	.433	1.038	[.946, 1.139]
Fine motor	.116	.053	4.783	1	.029	1.123	[1.012, 1.245]
Gross motor	.037	.054	.474	1	.491	1.038	[.934, 1.154]
Total motricity	.100	.053	3.609	1	.057	1.105	[.997, 1.225]
Receptive language	.091	.049	3.405	1	.065	1.095	[.994, 1.206]
Expressive language	.127	.056	5,157	1	.023	1.135	[1.017, 1.266]
Total language	.103	.051	4.098	1	.043	1.108	[1.003, 1.224]
Cognitive	.112	.051	4.899	1	.027	1.119	[1.013, 1.236]
Total scale score	.170	.059	8.149	1	.004	1.185	[1.055, 1.331]

Note. a. Variable entered on step 1: Dependent variable: BDI (0= No developmental risk and 1= Developmental risk). b. Independent variable: child screen exposure score

Table S2. Simple linear regression model including all CBCL dimensions and child screen exposure scores.

CBCL dimension	*B*	*SE*	*t*	*p*	95% CI
Emotional reactivity	.453	.200	2.260	.025	[.057, .848]
Anxiety/Depression	.328	.155	2.118	.036	[.022, .634]
Somatic symptoms	.277	.159	1.742	.084	[−.037, .592]
Social Inhibition	.436	.259	1.680	.095	[−.077, .948]
Sleep problems	.049	.217	.019	.823	[−.380, .477]
Aggressive behaviour	.325	.188	1.733	.085	[−.046, .697]
Attention problems	.045	.161	.023	.780	[−.274, .364]
Internalising problems	.529	.244	2.164	.032	[.046, 1.012]
Externalising problems	.581	.215	2.703	.008	[.156, 1.005]
Affective problems	.347	.185	1.878	.062	[−.018, .713]
Anxiety problems	.214	.185	1.154	.250	[−.152, .580]
Pervasive developmental problems	.386	.213	1.814	.072	[−.035, 806]
Attention Deficit Hyperactivity Disorder (ADHD)	.118	.159	.745	.457	[−.196, 432]
Defiant-oppositional problem	.310	.157	1.977	.05	[.000, .619]
Total scale score	.523	.266	1.968	.05	[−.002, 1.049]

Note. a. Dependent variable: CBCL dimensions. b. Predictor: child screen-exposure score.

Table S3. Binary logistic regression model including all BDI areas and total reasons for screen use.

BDI Area	*B*	*SE*	*Wald*	*df*	*p*	OR	95% CI
Personal Social	.184	.123	2.262	1	.133	1.202	[.946, 1.529]
Adaptive	−.117	.115	1.035	1	.309	.890	[.711, 1.114]
Fine motor	.111	.129	.739	1	.390	1.117	[.868, 1.437]
Gross motor	.086	.130	.434	1	.510	1.090	[.844, 1.407]
Total motricity	.208	.123	2.880	1	.090	1.232	[.968, 1.567
Receptive language	.098	.113	.760	1	.383	1.103	[.884, 1.376]
Expressive language	.206	.125	2.716	1	.099	1.229	[.962, 1.570]
Total language	.166	.120	1.894	1	.169	1.180	[.932, 1.494]
Cognitive	.234	.118	3.903	1	.048	1.263	[1.002, 1.592]
Total scale score	.305	.132	5.367	1	.021	1.356	[1.048, 1.755]

Note. a. dependent variable: BDI (0 = No developmental risk and 1 = Developmental risk) b. independent variable: Total reasons for screen use.

Table S4. Simple linear regression model including all CBCL dimensions and total reasons for screen use.

CBCL dimension	*B*	*SE*	*t*	*p*	95% CI
Emotional reactivity	1.23	.49	2.494	.014	[.255, 2.196]
Anxiety/Depression	1.08	.41	2.619	.010	[.267, 1.902]
Somatic symptoms	.772	.407	1.898	.060	[−.031, 1.576]
Social Inhibition	.528	.648	.815	.416	[−.751, 1.807]
Sleep problems	1.30	.53	2.453	.015	[.253, 2,349]
Attention problems	1.27	.38	3.321	.01	[.515, 2.026]
Aggressive behaviour	1.75	.45	3.866	<.001	[.856, 2.643]
Internalising problems	1.25	.62	2.030	.044	[.034, 2.473]
Externalising problems	2.29	.53	4.331	<.001	[1,244. 3,329]
Affective problems	1.36	.47	2.868	.005	[.423, 2.293]
Anxiety problems	1.07	.46	2.305	.022	[.153, 1.981]
Pervasive developmental problems	1.17	.53	2.194	.030	[.117, 2.221]
Attention Deficit Hyperactivity Disorder (ADHD)	1.14	.38	3.019	.003	[.394, 1.883]
Defiant-oppositional problem	.93	.38	2.418	.017	[.170, 1.684]
Total scale score	2.23	.65	3.417	<.001	[.944, 3.529]

Note. a. Dependent variable: CBCL dimensions. b. Predictor: total reasons for screen use.

Table S5. Simple linear regression model including all CBCL dimensions and total screen-use contexts.

CBCL dimension	*B*	*SE*	*t*	*p*	95% CI
Emotional reactivity	1.076	.832	1.293	.198	[−.568, 2.719]
Anxiety/Depression	.984	.702	1.402	.163	[−.403, 2.371]
Somatic symptoms	.693	.689	1.006	.316	[−.667, 2.053]
Social Inhibition	.422	1.083	.0389	.697	[−1.717, 2.560]
Sleep problems	1.602	.899	1.781	.077	[−.175, 3.379]
Attention problems	.876	.654	1.338	.183	[−.417, 2.168]
Aggressive behaviour	1.689	.779	2.169	.032	[.151, 3.228]
Internalising problems	.360	1.033	.349	.727	[−1.679, 2.400]
Externalising problems	1.721	.898	1.917	.057	[−,053, 3,495]
Affective problems	.175	.811	.215	.830	[−1.427, 1.776]
Anxiety problems	.371	.786	.472	.637	[−1.181, 1.923]
Pervasive developmental problems	.586	.896	.654	.514	[−1.183, 2.355]
Attention Deficit Hyperactivity Disorder (ADHD)	1.240	.638	1.944	.054	[−.020, 2.501]
Defiant-oppositional problem	.326	.651	.501	.617	[−.960, 1.613]
Total scale score	.598	1.110	.538	.591	[−1.596, 2.791]

Note. a. Dependent variable: CBCL dimensions. b. Predictor: total scree-use contexts.