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Use of mobile devices and psychosocial difficulties in children under 12 years of age: A systematic review and meta-analysis

Leticia Morata Sampaio[1] · **Miriam Lourdes Morales Santana**[1] · **María del Pilar Etopa Bitata**[1]

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Abstract
The growing use of mobile devices among children under the age of 12 underscores the need to investigate potential associated risks and to encourage appropriate usage habits. This meta-analysis aimed to examine the relationship between mobile device use and behavioral problems in children aged 3 to 12 years, as measured by the Strengths and Difficulties Questionnaire (SDQ). The literature search was conducted in three databases (PubMed, PsycINFO, and WOS), in accordance with the PRISMA (Preferred Reporting Items for Systematic Reviews and Meta-Analyses) guidelines. The study protocol was previously registered in the International Prospective Register of Systematic Reviews (PROSPERO). Eligibility criteria were established using the Population, Exposure, Comparator, and Outcomes (PECO) framework. Risk of bias in the included studies was assessed using the Newcastle–Ottawa Scale (NOS) for the quality appraisal of non-randomized studies. A total of seven studies were included in the meta-analysis. The results indicated an incidence of 8.52% for emotional problems (95% CI [4.10, 17.71]); 8.00% for behavioral problems (95% CI [1.87, 34.21]); 10.23% for symptoms of hyperactivity/inattention (95% CI [2.73, 38.40]); 11.64% for peer relationship problems (95% CI [5.20, 26.08]; k = 4); and 0.20% for reduced prosocial behavior (95% CI [0.12, 0.32]) among children with higher mobile device usage. Children's greater use of mobile devices is associated with a higher prevalence of behavioral and emotional problems.

Keywords Mobile devices · Children · Behavioral problems · Internalizing factors · Externalizing factors

Introduction

The increasing use of technologies at younger ages has raised concerns about how they may impact the psychological and social well-being of children. Half of all mental health problems begin before the age of 14, and in most cases, they are not detected or adequately treated (World Health Organization [WHO], 2022). It is essential to gather evidence on factors that may influence mental health from an early age, with mobile electronic devices recently emerging as a particularly relevant factor.

Children are born and raised with electronic devices, which influence their development and behavior (Olson et al., 2022; Urieta et al., 2023). Mobile electronic devices—characterized by their portability, internet connectivity, and multifunctionality—have become ubiquitous in children's daily lives. Among these, smartphones and tablets are the most widely used, and this study will focus specifically on these two formats. Children are increasingly likely to own or use such devices at younger ages (Barr et al., 2019). Radesky et al. (2020) found that at least one-third of 3-year-olds in the United States had access to a mobile device that they used for about 2 h a day, an exposure that increases with age. The use of mobile devices is widespread among children; a study by Rideou and Robb (2022) found that 97% of children between 0 and 8 years old have access to such devices, and the average age at which children acquire their own mobile phone is estimated to be 10.6 years.

Leticia Morata Sampaio and Miriam Lourdes Morales Santana contributed equally.

✉ Leticia Morata Sampaio
leticia.morata@ulpgc.es

Miriam Lourdes Morales Santana
miriam.morales@ulpgc.es

María del Pilar Etopa Bitata
pilar.etopa@ulpgc.es

[1] Departament of Psychology, Sociology and Social Work, University of Las Palmas de Gran Canaria, Canary Island, Las Palmas de Gran Canaria, Spain

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Screen time, including time spent on digital devices, has increased across all age groups, with the greatest increase observed in primary school children (Trott et al., 2022). Recommendations suggest limiting screen use to one hour per day for children aged 2 to 5 years and to no more than two hours per day for those aged 5 to 17, in order to prevent negative effects on health and development. However, these guidelines are often not followed (UNESCO, 2023).

Given this reality, there is concern about the possible effects of children's use of electronic devices (González-Sanmamed et al., 2023), with contradictory evidence and inconclusive results. Studies in this area have analyzed both the negative effects and the potential educational benefits. Among the advantages found, the benefits of learning due to their accessibility, adaptation, and capacity for motivation stand out (Criollo-C et al., 2021). However, other studies find negative effects of their use on school performance (Kates et al., 2018). Excessive screen time and use of electronic devices in populations under 12 years of age have been associated with emotional, behavioral, and cognitive difficulties (Lin et al., 2020; McNeill et al., 2019; Swider-Cios et al., 2023). Although negative effects have been associated with inappropriate use, the empirical evidence remains inconclusive, with contradictory findings and methodological limitations across existing studies (Eirich et al., 2022). This ambiguity may stem from inconsistent definitions of what constitutes inappropriate use.

A common limitation in previous studies is the failure to distinguish between mobile devices and traditional screen-based technologies, which hinders the analysis of their differential effects (Ophir et al., 2021). Due to their portability and individual use, mobile devices can be accessed in a variety of contexts and often without adult supervision, increasing the risk of prolonged exposure beyond recommended limits (McDaniel & Radesky, 2020; Radesky & Christakis, 2016). This risk affects both the family and school contexts, underscoring the need for consistent monitoring of device use and the development of preventive strategies to mitigate potential adverse effects.

Within the family context, parenting styles, caregivers' emotional availability, rule consistency, and supervision have been shown to affect both children's access to mobile devices and the emergence of socioemotional problems (Domoff et al., 2019; Radesky et al., 2020). This perspective reinforces the importance of analyzing the use of technology in childhood from an approach that integrates not only individual factors, but also relational and contextual dimensions.

Inconsistencies in children's use of digital devices are also reflected in school policies on their use. Although UNESCO (2023) supports the continued integration of Information and Communication Technology (ICT) in the classroom, it also indicates that the indiscriminate and unplanned use may have negative consequences. Recent data indicate that only 13% of countries currently have laws regulating the use of mobile phones in schools, and 14% have policies prohibiting their use. Several European countries that were previously advocates for the use of technology in schools, such as Spain, the Netherlands, Sweden, Italy, and France, have now begun to implement regulations limiting or prohibiting students'use of mobile devices (in some cases including smartphones and/or tablets) in educational settings (Gimeno, 2023).

At least 50% of mental health problems emerge before the age of 15 (Kim-Cohen et al., 2003), and one-fifth of the non-fatal burden related to diseases in childhood and adolescence is attributable to mental disorders (Kieling et al., 2024). Mental health prevention is crucial during this stage, as it is strongly shaped by environmental factors and plays a key role in the formation of long-term emotional and behavioral patterns.

Emotional and behavioral problems in children are among the most frequently reported psychosocial concerns in the literature. In Spain, the National Health Survey conducted by the National Institute of Statistics periodically assesses children's mental health using the Strengths and Difficulties Questionnaire (SDQ; Goodman, 1997). The survey evaluates internalizing symptoms (e.g., anxiety and depression) and externalizing symptoms (e.g., conduct problems and hyperactivity) in the general population.

This screening instrument has been validated as a child psychopathology questionnaire and can be applied to children aged 4 to 16. It has been translated into more than 40 languages and is widely used in health services in various countries, where it is considered a standard tool for detecting emotional and behavioral problems in childhood (Armitage et al., 2023).

Despite the availability of multiple instruments for assessing psychosocial difficulties, the present meta-analysis includes only studies that used the Strengths and Difficulties Questionnaire (SDQ) as a common measure. This decision was made to reduce methodological heterogeneity and enhance comparability across studies. It was selected not only for its strong international validation and widespread use in both clinical and population-based research, but also because it assesses both internalizing and externalizing domains within a standardized and widely accepted framework. By limiting the analysis to studies employing the SDQ, this meta-analysis ensures greater consistency in the operationalization of psychosocial difficulties—an especially important consideration given the conceptual variability identified in previous reviews.

According to Spain's most recent National Health Survey (Ministerio de Sanidad, Consumo y Bienestar Social,

2019), SDQ results indicated that approximately 1% of children aged 0 to 14 present signs of mental health problems. The findings also showed that boys exhibited more mental health issues than girls, except in the domains of depression and anxiety.

Early prevention is considered essential in the context of child development, particularly in an increasingly digitized environment where technology plays a growing role in children's lives. Most studies examining the psychosocial effects of mobile devices focus on adolescence, with fewer addressing childhood populations. The association between mental health problems and the use of mobile devices in adolescence has been analyzed in recent systematic reviews with contradictory results, yielding mixed findings, with some studies reporting significant associations while others found no such relationship (Girela-Serrano et al., 2024).

Concerning younger children, a meta-analysis by Mallawaarachchi et al. (2022) examined the relationship between the use of smartphones and tablets, and psychosocial, cognitive, and sleep-related factors. Although some studies reported positive associations, the overall meta-correlations with internalizing and externalizing symptoms were found to be nonsignificant. In the case of children under 12 years of age, a meta-analysis examined the relationship between the effects of screen time and internalizing and externalizing problems, finding weak but significant correlations (Eirich et al., 2022). This inconsistency in results is often attributed to methodological differences, including variations in age groups, measurement instruments, and the types of devices analyzed. Identifying which populations are more strongly affected may help inform the ongoing debate about screen time and support development of targeted interventions for children at greater risk of behavioral problems associated with screen exposure.

Therefore, it is important to analyze and synthesize current evidence, focusing on the association between the use of mobile devices and externalizing and internalizing problems. In order to reduce the influence of certain factors that contribute to methodological variability, we focus on studies using a single validated instrument and a restricted age range (3 to 12 years), selecting the SDQ due to its widespread use in this field across numerous countries (Rivas Arribas et al., 2018). Understanding these associations in depth will support the development of early prevention strategies to protect against emotional and behavioral difficulties, thereby helping to prevent both current and future mental health problems.

This study aims to examine the associations between the general use of smartphones and tablets and the prevalence of behavioral problems in children, focusing on both internalizing and externalizing factors. The systematic review evaluates the existing methodology and findings in this field, identifying key advances, current limitations, and directions for future research and early prevention efforts related to mobile device use. The meta-analysis synthesizes available estimates of the strength of the association between screen time and behavioral problems, based on studies that employed the SDQ, a widely validated instrument used internationally.

Method

Protocol

To ensure a standardized procedure, the present meta-analysis was carried out following the Preferred Reporting Items for Systematic Reviews and Meta-Analysis (PRISMA) recommendations (supplementary material S1) (Page et al., 2021). In addition, it was previously registered in the International Prospective Register Of Systematic Reviews (PROSPERO) (CRD42024542956).

Selection criteria

The inclusion criteria and formulation of research questions were guided by the Population, Exposure, Comparator, Outcome, and Study design (PECOS) framework (Mintzker et al., 2023). Participants were children aged 3 to 12 years, exposed to mobile electronic devices (which may include mobile phones and/or tablets) and/or with access to their own electronic device. Exposure groups were categorized as low/zero use versus medium or high levels of use.

The primary variables referred to total difficulties and externalizing and internalizing behaviors. Secondary variables were hyperactivity and inattention, emotional problems, behavioral problems, problems with peers, and prosocial behavior. These variables were assessed using the validated Strengths and Difficulties Questionnaire (SDQ; Goodman, 1997), completed by family members or caregivers and widely used to establish normal or borderline/high levels of these variables.

Only studies that utilized the Strengths and Difficulties Questionnaire (SDQ) were included to ensure methodological consistency and enhance cross-study comparability. The use of a single, standardized instrument aligns with recommendations for reducing heterogeneity in meta-analytic research (Higgins et al., 2023). The SDQ is one of the most widely used and internationally validated tools for assessing emotional and behavioral difficulties in children, offering strong psychometric properties and cross-cultural applicability (Goodman, 2001; Kersten et al., 2015). Both retrospective and prospective observational cohort studies were considered eligible for inclusion.

The inclusion and exclusion criteria, defined according to the PECOS strategy and their respective justifications, are presented in Table 1.

Search and sources of information

To ensure the eligibility of the articles included, a search was conducted across multiple databases, as recommended by Borenstein et al. (2009). The search focused on peer-reviewed scientific articles indexed in Web of Science (WOS), PubMed, and PsycInfo. These databases provide a broad range of literature across disciplines and are widely recognized for their standards of scientific quality and reliability (Harzing & Alakangas, 2016).

The following search terms were used to identify the study records in the databases: ("pre school*"OR"preschool*"OR "pre-school" OR"early childhood"OR kindergarten* OR toddler* OR"young child*"OR"preschool*"OR child*) AND ("smart phone*" or smartphone* or cell* OR phone* OR mobile OR device* OR tablet* OR phone* OR device*) AND ("internal* factor" OR "external* factor" OR SDQ OR "strengths and difficulties questionnaire*").

No language restrictions were applied. To identify additional studies that may have been omitted in the initial search, we reviewed the reference lists of articles selected during the second screening phase using backward citation tracking.

Selection of studies

The study selection process was structured in three phases and replicated across each database consulted. In the first stage, duplicates were removed. In the second stage, the titles and abstracts of the identified references were reviewed according to the eligibility criteria. In the third phase, the records of the included studies and their supplementary materials were analyzed to determine to determine their eligibility and to review their bibliographic references for additional relevant studies.

Two independent reviewers screened the studies in parallel, blinded to each other's decisions. Subsequently, all possible discrepancies between the two reviewers were resolved through critical discussion or by cross-checking with the protocol criteria. A third reviewer evaluated cases of doubts or disagreement between the reviewers. The search

Table 1 Inclusion and exclusion criteria

Criterion	Inclusion	Exclusion	Rationale
Year of publication	Articles published between January 2007 and May 2024	Articles published before 2007	The year 2007 marks the point at which mobile phone use became widespread and began to increase significantly (Mac Cárthaigh et al., 2020)
Population	Children aged 3 to 12 years and/or family members or caregivers who report the use of devices and minors'symptoms	Children older than 12 or younger than 3 years	Limited research exists on the psychosocial effects of electronic devices in children under 12, as most studies focus on adolescents, a group more susceptible to external stimuli
Exposure factor	Use of mobile electronic devices, differentiated from traditional devices	Data without differentiating the use of mobile and traditional electronic devices	The accessibility of mobile devices results in different patterns and frequencies of use compared to traditional devices. Findings suggest that behavioral difficulties are more strongly associated with new digital media than with television (Poulain et al., 2018)
Outcome variables	SDQ questionnaire measures; externalizing and internalizing factors, emotional problems, behavioral problems, problems with peers, hyperactivity/inattention, prosocial behavior	Outcomes assessed using instruments other than the SDQ	The SDQ is a validated instrument that has been widely used in studies conducted across different countries (Goodman, 2001; Kersten et al., 2015). Using a common scale in research facilitates the standardization and comparability of results (Higgins et al., 2023)
Data analysis	Studies reporting an effect size or providing sufficient data to compute it	Studies lacking effect sizes or data necessary to calculate them	Effect sizes are required to estimate a pooled mean effect and to assess the consistency or heterogeneity across studies
Study design	Cross-sectional or longitudinal observational studies	Literature reviews, experimental, or mobile-based intervention studies	Only original quantitative observational studies address the research question without external manipulation of outcome variables

and selection of studies were conducted in March and April 2024 using Rayyan software (Ouzzani et al., 2016).

Data extraction

The selected articles were reviewed and analyzed in detail by the two authors. Although data extraction was performed independently by three reviewers, the results were discussed and interpreted collaboratively until consensus was reached. The basic characteristics of each article were recorded, and the following information was extracted: authors, year, country, study design, participant characteristics (total sample size, age range, and sex), characteristics of mobile device exposure, outcome measure analyzed, and risk of bias.

The main outcome of interest was behavioral difficulties associated with exposure to mobile electronic devices. The Strengths and Difficulties Questionnaire (SDQ; Goodman, 1997) was used to compare the factors: emotional problems (EP), conduct problems (CP), hyperactivity/inattention (HI), peer problems (PP), and prosocial behavior (PB). The factors underlying the scores obtained in the questionnaire were also extracted, giving rise to another two variables: internalizing and externalizing difficulties, as well as a general factor obtained from the scores achieved in the EP, CP, HI, and PP subscales.

The results based on exposure time were categorized into two groups: Group 1 (less than 1 h) and Group 2 (more than 1 h). This cut-off point was established at 60 min, following prior studies that identified it as an optimal threshold for dichotomizing screen time exposure (Hosokawa & Katsura, 2018). Participants who owned their own mobile phone were also included in Group 2.

Assessment of risk of bias

Two authors independently assessed the methodological quality of the studies using the Newcastle–Ottawa Scale (NOS) for non-randomized studies. The original instrument (Wells et al., 2014, for cohort studies) and the adapted version of the NOS developed by Modesti et al. (2016) for cross-sectional studies were used. This adaptation was specifically designed for studies examining psychological, social, and cultural variables. These constructs are often abstract and not directly observable, requiring tailored evaluation techniques and inferential measurement tools.

We assessed the risk of bias across three domains (supplementary material S2): selection, comparability, and outcome. Following the coding standards established by the authors of both scales, eight items (0–9 points) were evaluated in the cohort studies and seven items (0 to 10 points) in the cross-sectional studies. The studies were classified into three categories based on their total scores: low risk of bias (7–9 points for cohort studies; 7–10 for cross-sectional studies), moderate risk (4–6 points), and high risk (0–3 points).

Initial data analysis

This meta-analysis was conducted using Review Manager 5.4 (The Cochrane Collaboration, 2020). Odds ratios (ORs) were calculated with 95% confidence intervals to compare outcomes between study groups based on mobile device exposure (low vs. high). Unadjusted ORs were used due to substantial variation in covariates across studies.

To interpret the magnitude of the effect, ORs were converted into Cohen's d values following the guidelines proposed by Chen et al. (2010). The thresholds used were as follows: $OR < 1.68$ (negligible effect), $1.68 \leq OR < 3.47$ (small), $3.47 \leq OR < 6.71$ (moderate), and $OR \geq 6.71$ (large).

Heterogeneity across studies was assessed using the Q statistic and I^2 index. A fixed-effect model was applied when $I^2 < 50\%$ and $p > 0.1$, while a random-effects model was used when $I^2 \geq 50\%$ or $p \leq 0.1$. These criteria were also used to interpret the degree of heterogeneity.

A sensitivity analysis was performed to examine the robustness of the results. Publication bias was assessed using funnel plots (supplementary material S3).

Results

Search results

Initially, 719 articles were identified. After uploading the search results into Rayyan and removing duplicates, 113 studies published before 2007 were excluded, as 2007 marked the beginning of the widespread adoption of mobile electronic devices (Mac Cárthaigh et al., 2020). After screening titles and abstracts, 476 records were excluded for being reviews, involving adolescent samples, examining traditional electronic devices, or not including emotional or behavioral outcomes. The full texts of the remaining 22 records were reviewed in detail. Sixteen studies were excluded due to an ineligible age range, lack of clear specification of mobile device exposure, or irrelevant outcomes. One additional study was identified through backward citation tracking, resulting in a total of seven studies included in this meta-analysis. The earliest study meeting all inclusion criteria was published in 2012. Cohen's kappa was used to assess inter-rater reliability between the two independent reviewers. The resulting value ($\kappa = 0.82$) indicated substantial agreement, following the interpretation proposed by Landis and Koch. Figure 1 presents the flowchart of the article selection process.

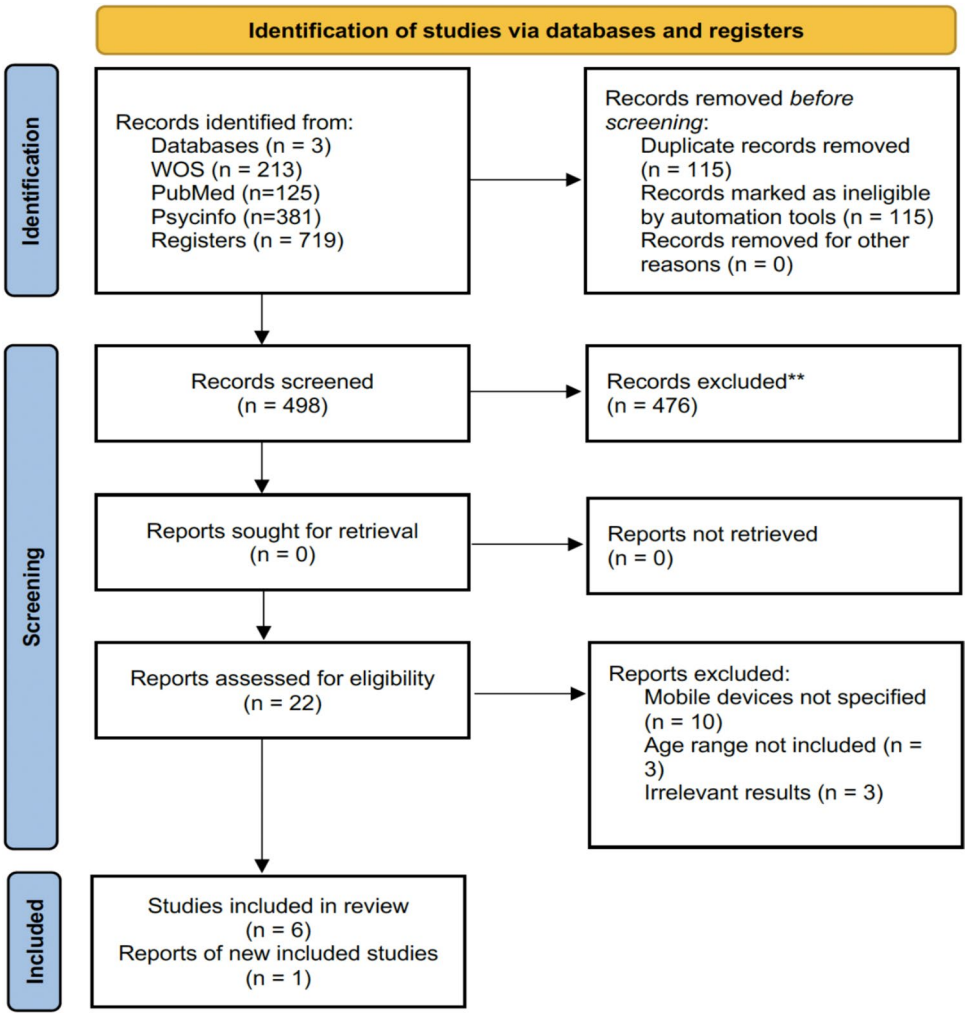

Fig. 1 Flowchart of the selection of studies (Preferred Reporting Items for Systematic Reviews and Meta-Analysis)

Figure 1 presents the flow chart corresponding to the process followed for filtering the scientific articles.

Basic characteristics of the studies

Table 2 presents the basic characteristics of the included studies. Across the seven studies, a total of 88,177 participants aged between 3 and 12 years were included, of whom 49.27% were women. According to the Newcastle–Ottawa Scale, all studies were classified as having a low risk of bias.

Evaluation of the results

Thirteen independent analyses were conducted considering the level of exposure to mobile devices and the results obtained in the various subscales included in the SDQ. We present the results of the seven included studies that reported scores on the SDQ subscales (Fig. 2) and factors (Fig. 3), categorized by exposure level.

According to the scores obtained in the SDQ, the results were classified into levels of normality, borderline, and abnormality. The borderline and abnormal groups were merged into a single category to enhance statistical power in detecting significant associations between the target variables, as suggested by Higgins and Green (2011) in the Cochrane Handbook.

The meta-analysis yielded an incidence estimate of emotional problems of 8.52% associated with high exposure to mobile devices (95% CI [4.10, 17.71]; 5 studies); for behavioral problems, **8.00%** (95% CI [1.87, 34.21]; 4 studies); for symptoms of hyperactivity/inattention, 10.23% (95% CI [2.73, 38.40]; 4 studies); peer relationship problems, 11.64% (95% CI [5.20, 26.08]; 4 studies); and for prosocial behavior, 0.20% (95% CI [0.12, 0.32]; 2 studies). These results are shown in Fig. 2.

For the underlying factors (Fig. 3), the incidence obtained for internalizing problems was 21.83% (95% CI [13.68, 34.85]; 3 studies); for externalizing problems, 36.95% (95% CI [7.06, 193.41]; 2 studies); and for the general factor, total difficulties, 5.30% (95% CI [1.37,1 8.51]; 6 studies).

The results reveal a direct and significant association between exposure to mobile devices and all the variables

Table 2 Basic characteristics of the studies

Author, year: (country)	Design	*N*	Age range	% Female	Type and measure of exposure to mobile devices	Measurement of analyzed outcomes	Risk of bias
Berdot- Talmier et al. (2020): France	Cross-sectional	508	9 to 12 years	51.2%	Use and possession of one's own mobile phone	SDQ: relational problems, emotional problems, internalizing factor	Low
Divan et al. (2012): USA	Cross-sectional	1642	7 years	48.74%	Type and time of use of mobile phones	SDQ: Total Scores Overall Behavioral Problems	Low
Hosokawa and Katsura (2018): Japan	Cross-sectional	1433	6 to 7 years	48.8%	Time spent using mobile phones and tablets	SDQ Behavioral/Emotional/Peer Problems, Hyperactivity Problems	Low
(Miyashita et al., 2023): Japan	Cross-sectional	4105	6 to 12 years	50%	Use and possession of one's own mobile phone	SDQ Emotional/Peer Problems, Hyperactivity Problems, Behavioral Problems Subscale	Low
Okada et al. (2021): Japan	Longitudinal	527	9 to 10 years	49.3	Mobile phone usage time	SDQ Emotional/Peer Problems, Hyperactivity Problems, Behavioral Problems Subscale, Prosocial Scale	Low
(Poulain et al., 2018): Germany	Longitudinal	38,421	3 to 6 years	48	Mobile phone usage time	SDQ: Internalizing Externalizing, SDQ Emotional/Peer Problems, Hyperactivity Problems, Behavioral Problems Subscale	Low
(Sudan et al., 2016): Denmark			7 to 11 years	48.9%	Mobile phone usage time	SDQ: total Behavioural Difficulties	Low

analyzed, except for prosocial behavior, with effect sizes ranging from moderate to high. Although the association was also significant for prosocial behavior, the direction of the relationship was inverse, indicating that longer screen exposure is associated with decreased prosocial behavior.

The meta-analysis of studies that provided scores based on sex (supplementary material S4) showed a significant incidence of 1.34% in boys for emotional problems (95% CI [1.11, 1.61]; 2 studies) and 1.66% for peer relationship problems (95% CI [1.18, 2.32]; 2 studies). No significant associations were found for behavioral problems or symptoms of hyperactivity/inattention in this group.

In girls, a significant incidence of 1.73% was found for behavioral problems (95% CI [1.18, 2.53]; 2 studies) and 1.70% for peer relationship problems (95% CI [1.14, 1.90]; 2 studies). Additionally, general behavioral difficulties were significantly associated with mobile device exposure in girls (incidence: 1.62%, 95% CI [1.27, 2.05]; 4 studies), whereas no significant association was found in boys.

As shown in Fig. 4, a statistically significant sex difference emerged for behavioral problems related to mobile device exposure, $\chi^2(5)=24.92$, $p=0.0002$, with boys scoring significantly lower than girls.

Discussion

The aim of this study was to evaluate the current evidence on the associations between electronic mobile device use and behavioral problems in children aged 3 to 12 years. All included studies used the Strengths and Difficulties Questionnaire (SDQ), a validated instrument that has been successfully applied in over 40 countries (Armitage et al., 2023), facilitating cross-study comparisons. The exclusive use of the SDQ was intended to ensure conceptual clarity and methodological consistency. As recommended by the Cochrane Handbook (Higgins et al., 2023), restricting the analysis to a single, validated tool reduces heterogeneity and enhances the internal validity of meta-analytic findings. Moreover, the SDQ has demonstrated strong psychometric properties and cross-cultural applicability, with validated versions available in over 80 languages (Goodman, 2001). This extensive validation supports its use as a standardized measure across diverse populations and research contexts.

The inclusion of studies published from 2007 onwards was based on evidence identifying that year as a turning point in the popularization of electronic mobile device use among children (Mac Cárthaigh et al., 2020). Although this criterion was methodologically justified, it is noteworthy that the first study meeting all eligibility criteria was not published until 2012. This gap may reflect either a delayed recognition of the potential psychosocial implications of early mobile device use, or a gradual intensification in usage that only began to raise concerns in the following years. The scarcity of research prior to 2012 suggests limited attention to this phenomenon during its initial phase. This pattern highlights the importance of longitudinal monitoring of emerging technologies, particularly as their integration into children's daily lives progresses faster than the scientific evidence available to assess their impact.

First, we found evidence suggesting that higher use of electronic mobile devices is associated with increased

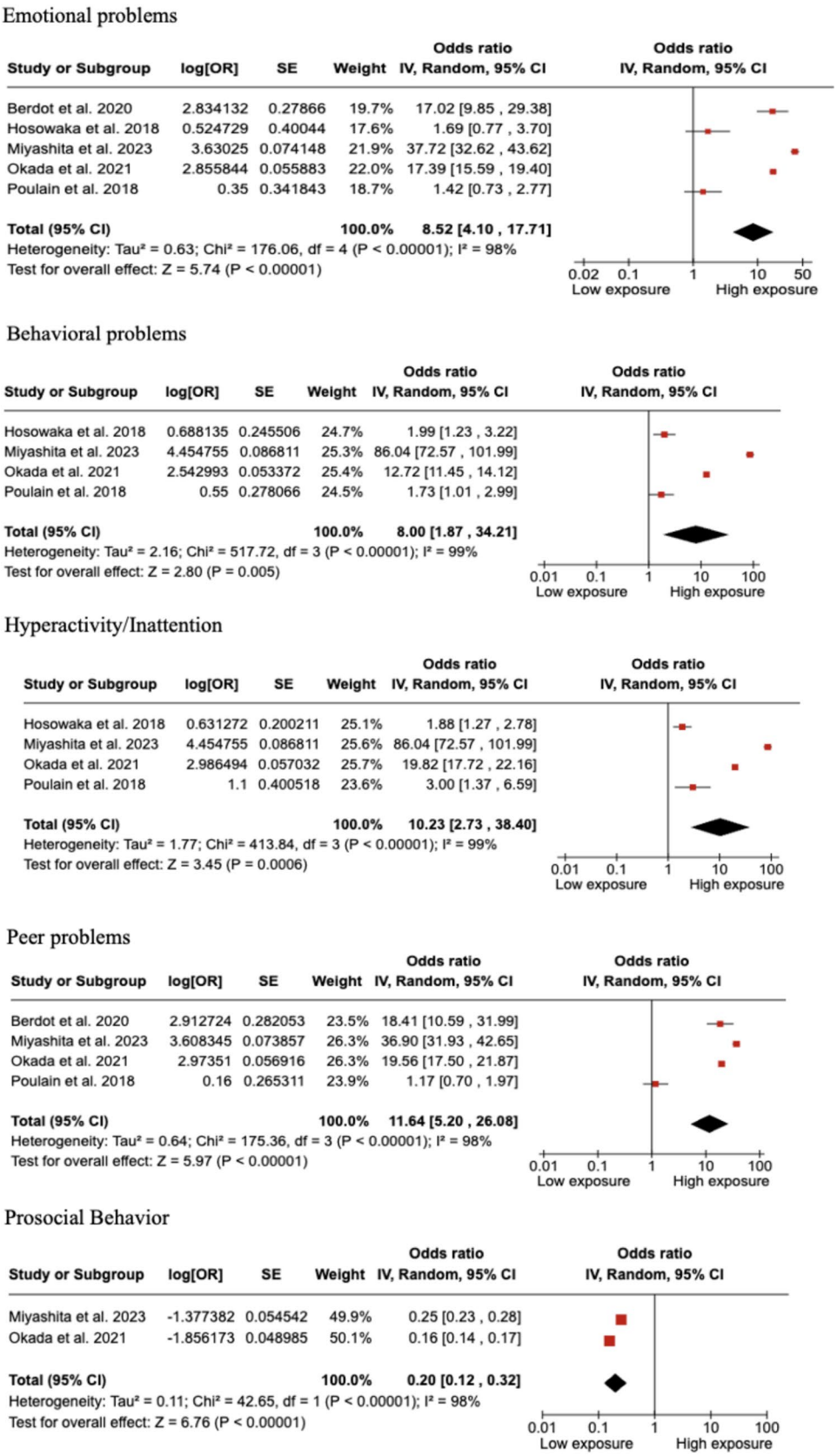

Fig. 2 Forest plot for the SQD subscales: emotional problems (**a**), behavioral problems (**b**), hyperactivity and inattention (**c**), peer problems (**d**), and prosocial behavior (**e**), depending on the level of exposure

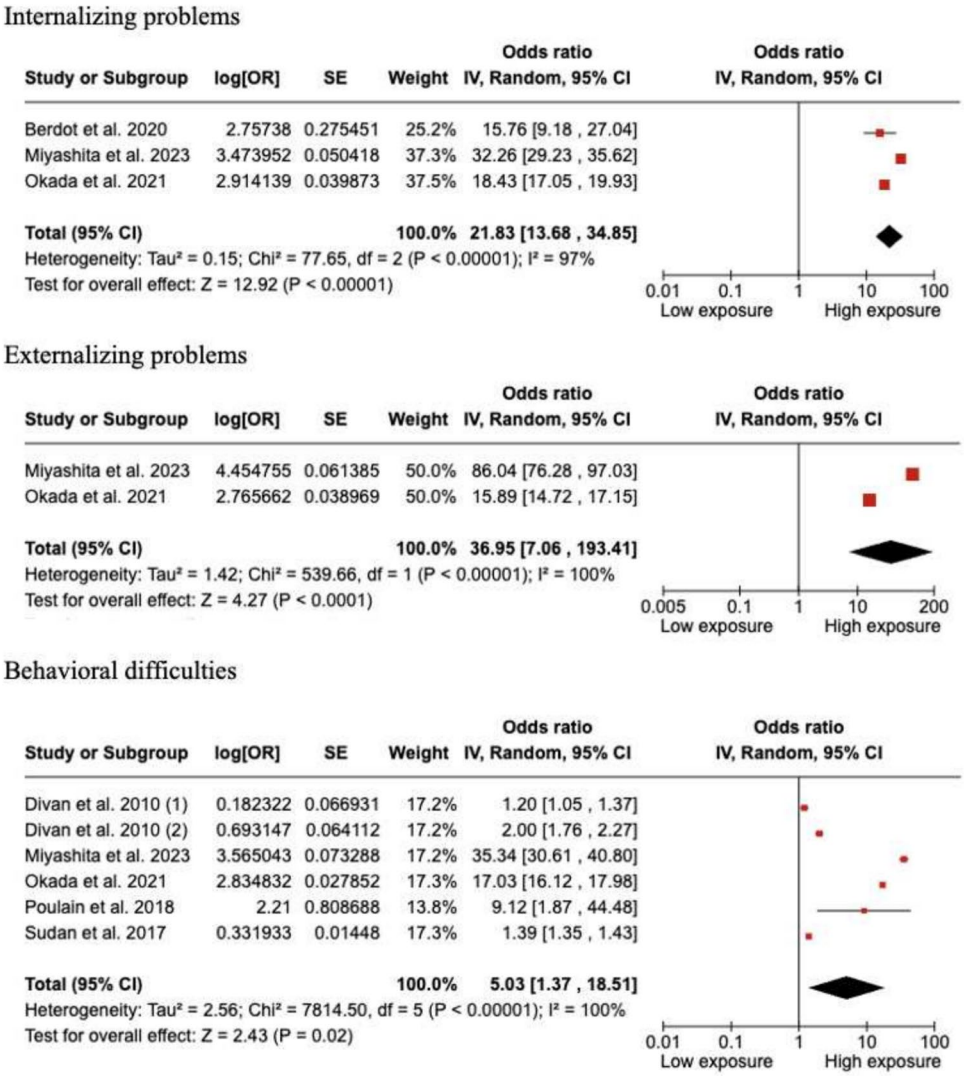

Fig. 3 Forest plot for the underlying factors, internalizing problems (**f**), externalizing problems (**g**), and total difficulties (**h**), depending on the level of exposure

behavioral and emotional problems, with a higher risk observed for both internalizing and externalizing factors, except for prosocial behavior. Although various previous studies have examined this association, their results remain inconsistent, possibly due to methodological differences such as the use of different measurement tools and sample characteristics (Eirich, 2022). Our findings are consistent with prior research showing that excessive use of screens and electronic devices among children under 12 is associated with emotional and behavioral difficulties (Lin et al., 2020; McNeill et al., 2019; Swider-Cios et al., 2023), as well as with higher levels of stress, anxiety, and depression (Twenge, 2019). However, it is important to note that these studies did not distinguish between mobile and traditional electronic devices, which limits the ability to assess their effects independently (Ophir et al., 2021).

The characteristics of mobile devices, such as their portability, individualized use, and reduced adult supervision (McDaniel & Radesky, 2020), may help explain these findings and highlight the importance of analyzing their effects separately in future research. In studies that have examined mobile devices independently from traditional screens, the evidence remains inconsistent. These discrepancies may be due to factors such as differences in study design, participant age, methods for measuring device use, and the psychosocial variables assessed (Girela-Serrano et al., 2024).

The meta-analysis by Mallawaarachchi et al. (2022) found no association between increased use of electronic mobile devices and psychosocial difficulties in children under six years of age. In contrast, the meta-analysis by Girela-Serrano et al. (2024) reported a negative impact of mobile device use on externalizing symptoms in children and early adolescents, although no significant effect was observed for internalizing symptoms. These differences highlight the relevance of age as a moderating factor, potentially explained by variations in use patterns and parental

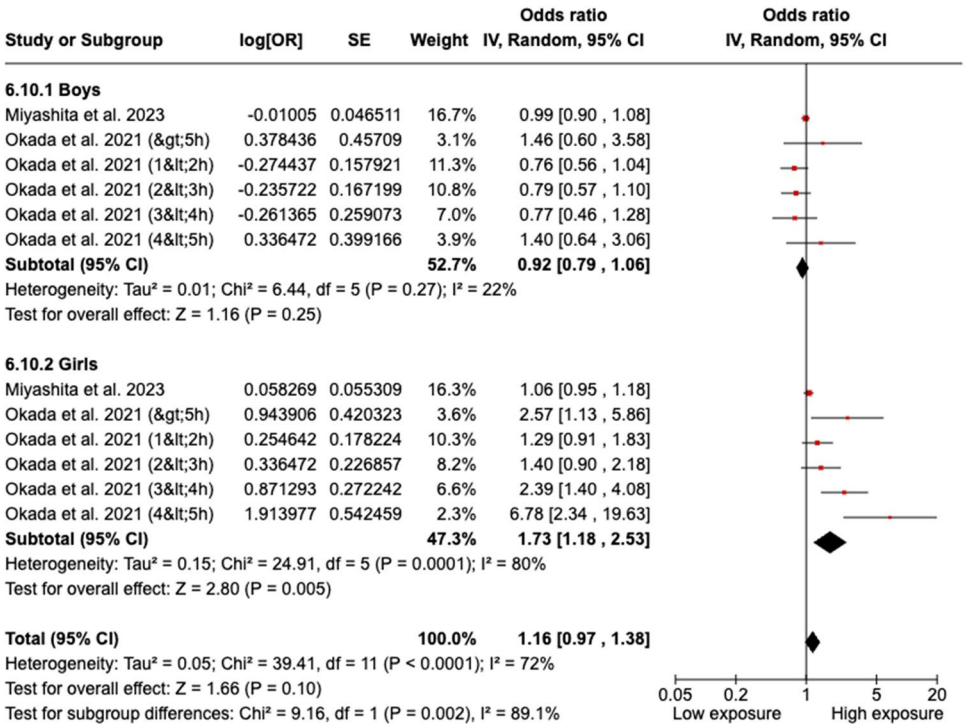

Fig. 4 Behavioral problems by sex. Forest plot for the SQD subscale: behavioral problems depending on the level of exposure

supervision, particularly among younger children. Additionally, it is important to note that the age range in our study coincides with the onset of formal schooling, a period that plays a critical role in children's social development (Miyashita et al., 2023). This may account for the stronger effects of mobile device use on behavioral problems at this stage and supports the regulatory measures adopted in various countries to limit or prohibit mobile phone use in schools (UNESCO, 2023).

Our results show the strongest association between mobile device use and difficulties in peer relationships. Mobile devices may influence the social dynamics and communication skills of school-age children (Uhls et al., 2014), limiting opportunities to develop social skills and resolve conflicts during a critical stage of their development. This finding contrasts with that of Hosokawa and Katsura (2018), who reported associations between the use of general devices and all internalizing and externalizing symptoms, except peer relationships. Although technology can facilitate social interaction, it is essential to promote early relationships that prevent social isolation and support the development of socio-emotional competencies through face-to-face peer engagement.

However, it is important to highlight that younger children are considerably less likely to use digital technologies for social interaction. Evidence suggests that their engagement with social media and online communication is significantly lower than that of older children and adolescents, who are more inclined to use these platforms as tools for socialization (Magis-Weinberg et al., 2021). Replacing face-to-face interactions with digital ones can negatively affect the development of social skills and the ability to form meaningful relationships. Social competence in childhood gradually stabilizes over time and is a strong predictor of social adjustment and the absence of later psychological difficulties (Semrud-Clikeman, 2007). Regarding prosocial behavior, the results point in the opposite direction: children with greater exposure to mobile devices show a lower tendency toward prosocial conduct, suggesting a potential impact on the development of emotional competencies.

In our study, we found no sex differences in overall problems related to exposure to mobile devices in boys and girls, which is consistent with the findings of Berdot-Talmier et al. (2020). However, differences have been found in behavioral problems, with higher scores in girls, highlighting the need for continued examination of the potential influence of sex on early mobile phone exposure. Although, at a general level, data from Spanish National Health Survey 2019 indicate that boys show more behavioral problems and girls tend to present more emotional problems of anxiety and depression without considering exposure to mobile devices, such exposure may affect girls'behavioral problems more, as girls tend to use mobile phones more frequently to maintain social relationships (Lee & Kim, 2018).

Although the results of the present study do not allow for the establishment of a minimum threshold of screen exposure beyond which negative effects consistently emerge, they do provide supporting evidence for the recommendations of

international health organizations. These guidelines recommend limiting screen time to no more than one hour per day for children aged 2 to 5 years, and to a maximum of two hours for those older than 5 years (WHO, 2019; UNESCO, 2023). Our findings align with these recommendations, particularly regarding the importance of reducing overall exposure time. Furthermore, in line with previous research, we underscore the need for future studies to explore screen exposure in relation to the family environment, taking into account factors such as parenting styles and parental supervision (Domoff et al., 2019; Radesky et al., 2020).

Strengths and limitations

This study presents several strengths and limitations that should be pointed out. An important strength of the review is the development of a protocol and the use of a comprehensive and validated search strategy to incorporate as many relevant studies as possible that met the research objectives. The procedures for identification, data extraction, and assessment of publication quality were conducted independently by at least two reviewers, ensuring high inter-rater reliability.

One limitation to be considered when interpreting the results is that, although a thorough search of multiple databases was conducted to minimize the risk of publication bias and efforts were made to identify studies from diverse sources, including different languages and regions, few articles specifically examined the relationship between exclusive exposure to mobile devices and behavioral problems in children aged 3 to 12 years. Publication bias, potentially driven by a greater tendency to publish studies with positive associations, may have influenced the overall findings and led to an overestimation of the effects of exposure. The funnel plots showed asymmetry for all outcomes, indicating the presence of possible publication bias. A quantitative assessment of this bias was not feasible in the present study, as Review Manager does not currently support formal statistical tests commonly used in such analyses, such as Egger et al.'s (1997) and Begg and Mazumdar's (1994) tests.

Furthermore, although the exclusive use of the Strengths and Difficulties Questionnaire (SDQ) as an inclusion criterion allowed for greater methodological homogeneity and comparability of results across studies, it also constitutes a limitation. This decision restricted the number of eligible studies and may have reduced the variability of instruments and perspectives represented in the analysis. Future studies could benefit from incorporating a wider range of validated instruments that assess psychosocial outcomes, provided that appropriate strategies are adopted to manage potential heterogeneity.

Similarly, the categorization of screen time exposure (e.g., less than or more than 1 h) used in the primary studies may not capture the complexity of real device use or offer a clear threshold for what constitutes overexposure. However, this approach was maintained to align with the methods reported by the included studies and to ensure consistency in data extraction and effect size synthesis. We acknowledge that future research should develop more refined and context-sensitive measures that account not only for the quantity but also the quality and context of device use.

Despite these limitations, the review conducted in this study highlights the need for future research that, in addition to the time of exposure, also analyzes other variables, such as the objectives and/or contents of exposure to electronic devices in school-age children. It is necessary to analyze the risks and possible benefits of appropriate use in children. Electronic mobile devices are part of our daily lives; children grow up with them, so we must develop preventive strategies to mitigate their potential negative effects **and** promote healthier usage habits from an early age**.**

Conclusion

Although the number of studies analyzing the behavioral and emotional effects of electronic mobile device use in children has increased, most of them focus on general use in adolescents and, to a lesser extent, in school-age children. Further research is needed to examine the emotional and behavioral outcomes of mobile device exposure specifically in schoolchildren, in order to inform appropriate strategies regarding usage recommendations in families and schools, as well as the promotion of healthier usage habits.

The methodological diversity across studies limits the ability to draw definitive conclusions, but it underscores the importance of investigating the impact of mobile device use from an early age. The present findings indicate associations between greater use and increased emotional and behavioral problems, particularly in internalizing and externalizing symptoms. A higher incidence of peer-related difficulties, inattention, and hyperactivity, along with lower levels of prosocial behavior, was also observed. Although sex differences in this domain are not yet well established, they warrant further exploration as a potential moderating factor.

These results do not support definitive conclusions regarding the magnitude or directionality of the observed associations, nor the underlying factors that may mediate them. Further research should prioritize longitudinal studies to better understand the developmental impact of mobile device use on children, considering variables such as content type, purpose of use, adult supervision, and individual child characteristics.

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Declarations

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References

Armitage, J. M., Kwong, A. S. F., Tseliou, F., Sellers, R., Blakey, R., Anthony, R., Rice, F., Thapar, A., & Collishaw, S. (2023). Cross-cohort change in parent-reported emotional problem trajectories across childhood and adolescence in the UK. *The Lancet Psychiatry, 10*(7), 509–517. https://doi.org/10.1016/S2215-0366(23)00175-X

Barr, R., McClure, E., & Parlakian, R. (2019). Maximizing the potential for learning from screen experiences in early childhood: What the research says. *Zero to Three*, *40*(2), 29–36. Retrieved May 10, 2024, from https://elp.georgetown.edu/wp-content/uploads/2021/06/Barr-40-2-screen-sense-article-2019.pdf

Begg, C. B., & Mazumdar, M. (1994). Operating characteristics of a rank correlation test for publication bias. *Biometrics, 50*(4), 1088–1101. https://doi.org/10.2307/2533446

Berdot-Talmier, L., Koliouli, F., & Zaouche Gaudron, C. (2020). Impact de la téléphonie mobile et de l'adaptation intériorisée sur la satisfaction de vie des enfants âgés de 9 à 12 ans [Impact of the mobile phone and inner adaptation on the life satisfaction in children aged 9 to 12]. *Psychologie Française, 65*(2), 121–139. https://doi.org/10.1016/j.psfr.2019.01.001

Borenstein, M., Hedges, L. V, Higgins, J. P. T., & Rothstein, H. R. (2009). Introduction to meta-analysis. *International Coaching Psychology Review*. Retrieved April 17, 2024, from https://onlinelibrary.wiley.com/doi/book/10.1002/9780470743386

Chen, H., Cohen, P., & Chen, S. (2010). How big is a big odds ratio? Interpreting the magnitudes of odds ratios in epidemiological studies. *Communications in Statistics - Simulation and Computation, 39*(4), 860–864. https://doi.org/10.1080/03610911003650383

Criollo-C, S., Guerrero-Arias, A., Jaramillo-Alcázar, Á., & Luján-Mora, S. (2021). Mobile learning technologies for education: Benefits and pending issues. *Applied Sciences, 11*(9), 4111. https://doi.org/10.3390/app11094111

Divan, H. A., Kheifets, L., Obel, C., & Olsen, J. (2012). Cell phone use and behavioural problems in young children. *Journal of Epidemiology and Community Health, 66*(6), 524–529. https://doi.org/10.1136/jech.2010.115402

Domoff, S. E., Rasmussen, E. E., & Radesky, J. S. (2019). A naturalistic study of child and family screen media and mobile device use. *Journal of Child and Family Studies, 28*(2), 401–410. https://doi.org/10.1007/s10826-018-1275-1

Egger, M., Davey Smith, G., Schneider, M., & Minder, C. (1997). Bias in meta-analysis detected by a simple, graphical test. *BMJ, 315*(7109), 629–634. https://doi.org/10.1136/bmj.315.7109.629

Eirich, R., McArthur, B. A., Anhorn, C., McGuinness, C., Christakis, D. A., & Madigan, S. (2022). Association of screen time with internalizing and externalizing behavior problems in children 12 years or younger. *JAMA Psychiatry, 79*(5), 393. https://doi.org/10.1001/jamapsychiatry.2022.0155

Gimeno, J. A. (2023). El uso de los móviles en el contexto español y europeo. *Cuadernos De Pedagogía, 547*, 15.

Girela-Serrano, B. M., Spiers, A. D. V., Ruotong, L., Gangadia, S., Toledano, M. B., & Di Simplicio, M. (2024). Impact of mobile phones and wireless devices use on children and adolescents' mental health: A systematic review. *European Child & Adolescent Psychiatry, 33*(6), 1621–1651. https://doi.org/10.1007/s00787-022-02012-8

González-Sanmamed, M., Losada-Puente, L., Rebollo-Quintela, N., & Rodríguez-Machado, E. (2023). Uso de los dispositivos móviles en la infancia: Oportunidades y peligros [Use of mobile devices in childhood: Opportunities and risks]. *Psychology, Society & Education, 15*(3), 1–9. https://doi.org/10.21071/pse.v15i3.16103

Goodman R. (2001). Psychometric properties of the strengths and difficulties questionnaire. *Journal of the American Academy of Child and Adolescent Psychiatry, 40*(11), 1337–1345. https://doi.org/10.1097/00004583-200111000-00015

Goodman, R. (1997). The strengths and difficulties questionnaire: A research note. *Journal of Child Psychology and Psychiatry, 38*(5), 581–586. https://doi.org/10.1111/j.1469-7610.1997.tb01545.x

Harzing, A.-W., & Alakangas, S. (2016). Google Scholar, Scopus and the Web of Science: A longitudinal and cross-disciplinary comparison. *Scientometrics, 106*(2), 787–804. https://doi.org/10.1007/s11192-015-1798-9

Higgins, J. P. T., & Green, S. (Eds.). (2011). *Cochrane Handbook for Systematic Reviews of Interventions* (Version 5.1.0). The Cochrane Collaboration. https://www.cochrane.org/authors/handbooks-and-manuals/handbook/archive/v5.1.0

Higgins, J. P. T., Thomas, J., Chandler, J., Cumpston, M., Li, T., Page, M. J., & Welch, V. A. (Eds.). (2023). *Cochrane handbook for systematic reviews of interventions* (Version 6.4, updated August 2023). Cochrane. https://www.cochrane.org/authors/handbooks-and-manuals/handbook/archive/v6.4

Hosokawa, R., & Katsura, T. (2018). Association between mobile technology use and child adjustment in early elementary school age. *PLoS ONE, 13*(7), e0199959. https://doi.org/10.1371/journal.pone.0199959

Kates, A. W., Wu, H., & Coryn, C. L. S. (2018). The effects of mobile phone use on academic performance: A meta-analysis. *Computers & Education, 127*, 107–112. https://doi.org/10.1016/j.compedu.2018.08.012

Kersten, P., Czuba, K., McPherson, K., Dudley, M., Elder, H., Tauroa, R., & Vandal, A. (2015). A systematic review of evidence for the

psychometric properties of the strengths and difficulties questionnaire. *Journal of Child Psychology and Psychiatry, 56*(3), 282–294. https://doi.org/10.1111/jcpp.12306

Kieling, C., Buchweitz, C., Caye, A., Silvani, J., Ameis, S. H., Brunoni, A. R., Cost, K. T., Courtney, D. B., Georgiades, K., Merikangas, K. R., Henderson, J. L., Polanczyk, G. V., Rohde, L. A., Salum, G. A., & Szatmari, P. (2024). Worldwide prevalence and disability from mental disorders across childhood and adolescence. *JAMA Psychiatry, 81*(4), 347. https://doi.org/10.1001/jamapsychiatry.2023.5051

Kim-Cohen, J., Caspi, A., Moffitt, T. E., Harrington, H., Milne, B. J., & Poulton, R. (2003). Prior juvenile diagnoses in adults with mental disorder. *Archives of General Psychiatry, 60*(7), 709. https://doi.org/10.1001/archpsyc.60.7.709

Lee, E. J., & Kim, H. S. (2018). Gender differences in smartphone addiction behaviors associated with parent-child bonding, parent-child communication, and parental mediation among Korean elementary school students. *Journal of Addictions Nursing, 29*(4), 244–254. https://doi.org/10.1097/jan.0000000000000254

Lin, H.-P., Chen, K.-L., Chou, W., Yuan, K.-S., Yen, S.-Y., Chen, Y.-S., & Chow, J. C. (2020). Prolonged touch screen device usage is associated with emotional and behavioral problems, but not language delay, in toddlers. *Infant Behavior and Development, 58*, 101424. https://doi.org/10.1016/j.infbeh.2020.101424

Mac Cárthaigh, S., Griffin, C., & Perry, J. (2020). The relationship between sleep and problematic smartphone use among adolescents: A systematic review. *Developmental Review, 55*, 100897. https://doi.org/10.1016/j.dr.2020.100897

Magis-Weinberg, L., Suleiman, A., & Dahl, R. (2021). Context, development, and digital media: Implications for very young adolescents in LMICs. *Frontiers in Psychology, 12*, 632713. https://doi.org/10.3389/fpsyg.2021.632713

Mallawaarachchi, S. R., Anglim, J., Hooley, M., & Horwood, S. (2022). Associations of smartphone and tablet use in early childhood with psychosocial, cognitive and sleep factors: A systematic review and meta-analysis. *Early Childhood Research Quarterly* (60), 13–33. Elsevier Ltd. https://doi.org/10.1016/j.ecresq.2021.12.008

McDaniel, B. T., & Radesky, J. S. (2020). Longitudinal associations between early childhood externalizing behavior, parenting stress, and child media use. *Cyberpsychology, Behavior, and Social Networking, 23*(6), 384–391. https://doi.org/10.1089/cyber.2019.0478

McNeill, J., Howard, S. J., Vella, S. A., & Cliff, D. P. (2019). Longitudinal associations of electronic application use and media program viewing with cognitive and psychosocial development in preschoolers. *Academic Pediatrics, 19*(5), 520–528. https://doi.org/10.1016/j.acap.2019.02.010

Ministerio de Sanidad, Consumo y Bienestar Social. (2019). Encuesta Nacional de Salud ENSE, España 2017. Serie informes monográficos #1– Salud mental. Ministerio de Sanidad, Consumo y Bienestar Social. Retrieved May 25, 2024, from https://www.sanidad.gob.es/estadEstudios/estadisticas/encuestaNacional/encuesta2017.htm

Mintzker, Y., Blum, D., & Adler, L. (2023). Replacing PICO in non-interventional studies. *BMJ Evidence-Based Medicine, 28*(4), 284–284. https://doi.org/10.1136/bmjebm-2021-111889

Miyashita, C., Yamazaki, K., Tamura, N., Ikeda-Araki, A., Suyama, S., Hikage, T., Omiya, M., Mizuta, M., & Kishi, R. (2023). Cross-sectional associations between early mobile device usage and problematic behaviors among school-aged children in the Hokkaido study on environment and children's health. *Environmental Health and Preventive Medicine, 28*, 22–00245. https://doi.org/10.1265/ehpm.22-00245

Modesti, P. A., Reboldi, G., Cappuccio, F. P., Agyemang, C., Remuzzi, G., Rapi, S., Perruolo, E., & Parati, G. (2016). Panethnic differences in blood pressure in Europe: A systematic review and meta-analysis. *PLoS ONE, 11*(1), e0147601. https://doi.org/10.1371/journal.pone.0147601

Okada, S., Doi, S., Isumi, A., & Fujiwara, T. (2021). The association between mobile devices use and behavior problems among fourth grade children in Japan. *Psychiatry and Clinical Neurosciences, 75*(9), 286–293. https://doi.org/10.1111/pcn.13283

Olson, J. A., Sandra, D. A., Colucci, É. S., Al Bikaii, A., Chmoulevitch, D., Nahas, J., Raz, A., & Veissière, S. P. L. (2022). Smartphone addiction is increasing across the world: A meta-analysis of 24 countries. *Computers in Human Behavior, 129*, 107138. https://doi.org/10.1016/j.chb.2021.107138

Ophir, Y., Rosenberg, H., & Tikochinski, R. (2021). What are the psychological impacts of children's screen use? A critical review and meta-analysis of the literature underlying the World Health Organization guidelines. *Computers in Human Behavior, 124*, 106925. https://doi.org/10.1016/j.chb.2021.106925

Ouzzani, M., Hammady, H., Fedorowicz, Z., & Elmagarmid, A. (2016). Rayyan—a web and mobile app for systematic reviews. *Systematic Reviews, 5*(1), 210. https://doi.org/10.1186/s13643-016-0384-4

Page, M. J., McKenzie, J. E., Bossuyt, P. M., Boutron, I., Hoffmann, T. C., Mulrow, C. D., Shamseer, L., Tetzlaff, J. M., Akl, E. A., Brennan, S. E., Chou, R., Glanville, J., Grimshaw, J. M., Hróbjartsson, A., Lalu, M. M., Li, T., Loder, E. W., Mayo-Wilson, E., McDonald, S.,… Moher, D. (2021). The PRISMA 2020 statement: an updated guideline for reporting systematic reviews. *BMJ*, n71. https://doi.org/10.1136/bmj.n71

Poulain, T., Vogel, M., Neef, M., Abicht, F., Hilbert, A., Genuneit, J., Körner, A., & Kiess, W. (2018). Reciprocal associations between electronic media use and behavioral difficulties in preschoolers. *International Journal of Environmental Research and Public Health, 15*(4), 814. https://doi.org/10.3390/ijerph15040814

Radesky, J. S., & Christakis, D. A. (2016). Increased screen time. *Pediatric Clinics of North America, 63*(5), 827–839. https://doi.org/10.1016/j.pcl.2016.06.006

Radesky, J. S., Weeks, H. M., Ball, R., Schaller, A., Yeo, S., Durnez, J., Tamayo-Rios, M., Epstein, M., Kirkorian, H., Coyne, S., & Barr, R. (2020). Young children's use of smartphones and tablets. *Pediatrics, 146*(1), e20193518. https://doi.org/10.1542/peds.2019-3518

Rideou, V., & Robb, M. B. (2022). *The common sense census: Media use by kids age zero to eight*.

Rivas Arribas, L., García Cortázar, P., Martínez Reglero, C., Blanco Barca, Ó., & Leis Trabazo, R. (2018). El Cuestionario de Capacidades y Dificultades (SDQ) como herramienta de cribado para el trastorno por déficit de atención e hiperactividad [The Strengths and Difficulties Questionnaire (SDQ) as a screening tool for attention deficit hyperactivity disorder]. *Revista De Psiquiatría Infanto-Juvenil, 35*(3), 255–263. https://doi.org/10.31766/revpsij.v35n3a4

Semrud-Clikeman, M. (2007). *Social competence in children*. Springer US. https://doi.org/10.1007/978-0-387-71366-3

Sudan, M., Olsen, J., Arah, O. A., Obel, C., & Kheifets, L. (2016). Prospective cohort analysis of cellphone use and emotional and behavioural difficulties in children. *Journal of Epidemiology and Community Health, 70*(12), 1207–1213. https://doi.org/10.1136/jech-2016-207419

Swider-Cios, E., Vermeij, A., & Sitskoorn, M. M. (2023). Young children and screen-based media: The impact on cognitive and socioemotional development and the importance of parental mediation. *Cognitive Development, 66*, 101319. https://doi.org/10.1016/j.cogdev.2023.101319

The Cochrane Collaboration. (2020). *Review Manager* (RevMan) (Version 5.4) [Computer software]. https://revman.cochrane.org

Trott, M., Driscoll, R., Iraldo, E., & Pardhan, S. (2022). Changes and correlates of screen time in adults and children during the COVID-19 pandemic: A systematic review and meta-analysis. *EClinicalMedicine, 48*, 101452. https://doi.org/10.1016/j.eclinm.2022.101452

Twenge, J. M. (2019). More time on technology, less happiness? Associations between digital-media use and psychological well-being. *Current Directions in Psychological Science, 28*(4), 372–379. https://doi.org/10.1177/0963721419838244

Uhls, Y. T., Michikyan, M., Morris, J., Garcia, D., Small, G. W., Zgourou, E., & Greenfield, P. M. (2014). Five days at outdoor education camp without screens improves preteen skills with nonverbal emotion cues. *Computers in Human Behavior, 39*, 387–392. https://doi.org/10.1016/j.chb.2014.05.036

UNESCO. (2023). *Global Education Monitoring Report 2023: Technology in education: A tool on whose terms?* GEM Report UNESCO. https://doi.org/10.54676/UZQV8501

Urieta, P., Sorrel, M. A., Aluja, A., Balada, F., Lacomba, E., & García, L. F. (2023). Exploring the relationship between personality, decision-making styles, and problematic smartphone use. *Current Psychology, 42*(17), 14250–14267. https://doi.org/10.1007/s12144-022-02731-w

Wells, G. A., Wells, G., Shea, B., Shea, B., O'Connell, D., Peterson, J., Welch, Losos, M., Tugwell, P., Ga, S. W., Zello, G. A., & Petersen, J. A. (2014). The Newcastle-Ottawa Scale (NOS) for assessing the quality of nonrandomised studies in meta-analyses.

World Health Organization. (2019). *Directrices sobre actividad física, comportamiento sedentario y sueño para niños menores de 5 años*. Retrieved June 8, 2024, from https://apps.who.int/iris/handle/10665/311663

World Health Organization (OMS). (2022). Salud del adolescente y el joven adulto [Adolescent and young adult health]. Retrieved June 13, 2024, from https://www.who.int/es/news-room/fact-sheets/detail/adolescents-health-risks-and-solutions