Digital media practices among infants and toddlers based on Filipino mothers' self-reports

Annalyn De Guzman Capulong and
Jose Antonio R. Clemente

Abstract

The dramatic increase in the touchscreen exposure of very young children has raised issues regarding the potentials and perils that digital media practices bring to children's development. This research aimed to examine the touchscreen practices among infants and toddlers based on mothers' self-reports, focusing on amount of screen time and its predictors, type of media content consumed, and maternal motivations and involvement in the regulation of touchscreen use. Questionnaires were administered to 124 mothers, whose children ages six to 42 months used tablets and smartphones. Results revealed an early onset of children's touchscreen use. The children's overall screen time averaged nearly two hours daily, and they frequently used the touchscreen device to watch video shows. Evaluations of the type of content of shows viewed suggested that the mothers seemed to deliberately choose shows that were more educational than non-educational. The child's age, the parent's active and diversionary mediation strategies, and the perceived maternal benefits of children's touchscreen were found to predict screen time. The implications of the results for parenting in the digital age were discussed.

Keywords: screen time, infancy and early childhood, parenting, digital media

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It is not surprising to see infants and toddlers use tablets and smartphones nowadays, with digital technology becoming a more integral part of the daily lives of young children and families compared to a decade ago (Association for Psychological Science, 2015). Newer and "smarter" forms of mobile media devices such as touchscreens[1] have become highly popular and ubiquitous. The advent of touchscreen technology has offered a variety of features that were absent from the traditional forms of media such as television, desktop computers, laptops, and game consoles. Smartphones and tablets provide very young children with a medium that is more easily navigated without the help of an adult (Geist, 2012). The portability of mobile touchscreen devices also allows children the flexibility to bring the device practically anywhere (Wood et al., 2016). Moreover, the interactive and multimedia capabilities of touchscreens offer a variety of visual, auditory, tactile, and kinesthetic stimulations (Bentley et al., 2016; Wood et al., 2016).

Although television remains to be the predominant screen media used by young children in many parts of the world including the Philippines (Capulong, 2017; Philippine Statistics Authority, 2019; Rideout & Robb, 2020), there is a dramatic increase in the time spent on smartphones and tablets because of the increase in family ownership of these devices (Rideout & Robb, 2020), especially during the COVID-19 pandemic when lockdown measures were implemented (Bergmann et al., 2022; Ribner et al., 2021). To illustrate, a nationwide survey in the United States revealed that the ownership of smartphones among families with children under eight years old increased from 41% in 2011 to 97% in 2020 (Rideout & Robb, 2020). An increase in family ownership of touchscreens also comes with the early onset of touchscreen use among young children. Children begin to use digital media devices (i.e., look at tablets or computers) as early as 4 months old (Ribner & McHarg, 2021).

With the controversy over the influence of newer digital media on young children, there is a need to understand children's development in the context of the digital age (Lauricella et al., 2017). The nature of childhood today can be seen as a transformed context that focuses on their physical health, well-being, digital technologies, peers, and families (Burns & Gottschalk, 2019). Thus, digital technologies are indeed viewed as part of modern childhood that both children and caregivers need to navigate. Children nowadays appear to be growing up in a qualitatively different world (i.e., digital age) and as a consequence, they could also grow up qualitatively different physically, cognitively, and socioemotionally in part because of how they are raised.

Much of the extant research on young children and media center on the influence of television, which is perhaps unsurprising because of the

dominance of television viewing until recently. Thus, recommendations on digital media use are still catching up with the relatively fast rate of technological developments. Perhaps the most definitive of these guidelines come from the American Academy of Pediatrics (AAP) published in 2015. AAP recommends avoiding digital media use (except video-chatting) in children younger than 18 to 24 months and limiting screen use to one hour per day of high-quality programming for children two to five years of age (Hill et al., 2016). However, that parents in the Philippines are aware of such guidelines or that they heed them has yet to be established.

In this regard, there seem to be hardly any current local studies investigating young children and digital media (see Abadilla & Tanchuling, 2017; Capulong, 2017), particularly on *how* young children use digital media (Cristia & Seidl, 2015). This highlights a gap in knowledge which puts forward the need to explore the touchscreen use of young children, specifically infants and toddlers. Investigating young children's touchscreen use may serve as baseline information for understanding the impact of new digital media on children. Part of investigating young children's digital media practices also involves examining what strategies parents use to regulate their children's digital media use, which, in turn, has implications on children's screen time. In line with recent studies that assert the utilization of screen time as a parenting tool (Elias & Sulkin, 2019; Findley et al., 2022), we argue that young children's touchscreen use is highly dependent on parental decisions, parents' attitudes toward touchscreen use, and attainment of caregiver goals.

The present study aimed to examine the touchscreen practices among infants and toddlers, including the amount of exposure, type of media content consumed, maternal involvement, and the regulation of touchscreen use based on mothers' self-reports.

The dramatic increase in the touchscreen exposure of very young children has raised issues regarding both the potentials and perils that these new media forms bring to children's development. While some parents may find touchscreens an appealing and promising tool to help them in child rearing (e.g., as an educational partner), others have expressed their concerns over the possible negative effects these devices have on young children's learning and social skills (Lauricella et al., 2017). Lisa Guernsey (2012) suggested the three C's as key components in understanding media effects on children — Child, Content, and Context — where the child is at the center. The next sections discuss each component in turn, highlighting their contributions to how both parents and children navigate touchscreen use.

Some psychological theories related to digital media impact on children

The two main psychological perspectives related to examining the digital media impact on children's touchscreen use are Lev Vygotsky's (1978) sociocultural cognitive theory and Urie Bronfenbrenner's (1979) ecological theory. Vygotsky's (1978) sociocultural cognitive theory emphasizes the important role of culture and social interaction in understanding children's cognitive development. Children's development cannot be separated from their social and cultural activities. In particular, the concept of *scaffolding* can be applied in the context of digital age where parents can guide their children's touchscreen use. Touchscreen devices can also be considered as newer, more advanced cultural tools for knowledge acquisition and meaning-making for children, in the same way that traditional books and toys serve as cultural tools for children (Vygotsky, 1978; Wood et al., 2016).

Meanwhile, Bronfenbrenner's (1979) ecological theory states that development is influenced by the individual's interaction with five nested environmental systems. Bronfenbrenner eventually revised his theory and called it bioecological theory, which shifted its focus from the role of context in development to the role of processes (e.g., parenting) in the child's immediate environment (Plowman, 2016). Particularly applicable in touchscreen use is the concept of *proximal processes*, or the reciprocal interactions of the developing child not only with people with whom he or she has formed mutual and enduring emotional attachment but with appealing objects and symbols present in the microsystem (Bronfenbrenner & Morris, 1998).

As a dimension or subsystem of the microsystem, Genevieve Johnson and Korbla Puplampu (2008) proposed the *ecological techno-subsystem*. This subsystem includes "child interaction with both living (e.g., peers) and nonliving (e.g., hardware) elements of communication, information, and recreation technologies in immediate or direct environments" (p. 10). The ecological techno-subsystem emphasizes the important role that technology plays in child development and the presence of digital media technology within the child's microsystem.

Indeed, both Vygotsky's and Bronfenbrenner's theories address the first C (i.e., the child) suggested by Guernsey (2012). Particularly, they underscore how digital media devices may provide benefits to children in the form of knowledge acquisition, meaning-making, communication, and recreation. At the same time, these theories hint at how screen time is embedded in a child's familial context, where parents not only introduce touchscreen devices to their children but may also contribute to the latter's increased screen time through their caregiving behaviors. The next section focuses on

some digital media experiences among children in specific developmental stages — infants and toddlers.

Trends in touchscreen use among infants and toddlers

In the past decade, as media evolved from traditional to newer digital forms, the patterns of digital media use have also changed (Mantilla & Edwards, 2019; Ofcom, 2020; PSA, 2019; Rideout & Robb, 2020). In terms of the age of touchscreen users, studies revealed an early start, with children less than a year old already using touchscreens (Bergmann et al., 2022; Mantilla & Edwards, 2019). In a 2020 survey in the United States, 30% of 0- to 8-year-olds used mobile devices daily, an uptick from just 8% in 2011 (Rideout & Robb, 2020). Studies reported that at age three, children can use these devices without much help from caregivers (Mantilla & Edwards, 2019; Ofcom, 2020).

Given that young children are now more exposed to touchscreens, what do they exactly do with them? Research suggested that young children use touchscreens for both entertainment and educational purposes, with children below three years of age more likely to use touchscreens for entertainment (Nevski & Siibak, 2016; Ofcom, 2020; Rideout & Robb, 2020). The most common and frequent activities young children do with touchscreens are viewing photos (e.g., of themselves or other family members), watching videos, and using baby or children's apps (e.g., early-learning apps such as alphabet and counting apps) (Cristia & Seidl, 2015). Most children access YouTube or subscription services (e.g., Netflix) primarily to watch cartoons, animations, mini-movies, or songs (Nevski & Siibak, 2016; Ofcom, 2020; Rideout & Robb, 2020). Other activities young children engage in with their touchscreens include listening to music (Cristia & Seidl, 2015), reading/being read e-books (Bentley et al., 2016), and using video chat such as Skype or FaceTime to communicate with relatives (Hill et al., 2016; Nevski & Siibak, 2016).

The role of content in digital media exposure

Screen time has been the main focus of studies on children and media exposure (Carson & Janssen, 2012; Corkin et al., 2021; Duch et al., 2013; Lauricella et al., 2015). However, exploring the features of media content — Guernsey's second C — is also important because the types of content may have a greater impact on child development than the time spent using digital media (AAP, 2015; Waters et al., 2016). Over the decades, child advocates have tried to minimize the issues related to screen media by improving the content, at least as far as television is concerned, e.g., minimizing violence (Lauricella et al., 2017). And since watching shows is one of the most frequent touchscreen activities engaged by children, it would be insightful to look

into the findings regarding the impact of content on children's television exposure to see how they can be applied to understanding the impact of content on touchscreen exposure. Essentially, the quality of media content (both traditional and contemporary) may come in two forms—content that can either facilitate or hinder children's development. The goal, of course, is to expose young children to content that would enhance their development.

Studies show that media content that is developmentally appropriate, child-directed, educational, and socially interactive promotes child developmental outcomes such as learning, language, social skills, and executive functioning (e.g., Alvarez & Booth, 2014; Lauricella et al., 2014; Lauricella et al., 2011; Zosh et al., 2015). First, developmentally appropriate content takes into account children's age and stage of development and is specifically designed for very young children who are more likely to understand and pay active attention to the said content (Guernsey, 2012; Haines & Kluver, 2015). Second, child-directed content is content designed for young children to comprehend and actively pay attention to the material (Anderson & Hanson, 2013). This content should also incorporate ways to reduce transfer deficits to facilitate learning. In transfer deficit, children younger than 30 months of age find it cognitively difficult to transfer information learned from two-dimensional media to corresponding three-dimensional objects (Barr, 2013). Third, educational content is meant to enhance children's school readiness or directly target specific learning areas as well as teach appropriate and prosocial behaviors (Christakis & Zimmerman, 2007; Rideout & Robb, 2020; Scantlin, 2009). Fourth, socially interactive content facilitates scaffolded interactions between the child and caregivers in order to maximize learning (Kirkorian et al., 2016; Roseberry et al., 2013).

Note that the aforementioned studies on the features of child-friendly television content are useful for our purposes to the extent that they can help classify whether digital media contents are, for instance, educational or not. However, few studies have examined whether a specific type of digital media content increases or decreases touchscreen use. The findings of Maria Corkin et al. (2021) may be instructive. Using secondary data analysis of a longitudinal birth cohort study in New Zealand, they found that exposure to "grown-up" or adult-directed content is a strong predictor of children's screen time. Presumably, this is because parents who allow children to watch such content place fewer restrictions on their child's media exposure overall, resulting in higher screen time levels.

The role of context in digital media exposure

The impact of digital media on children cannot be fully understood if the focus is only on media time and content. It is also essential to examine and understand the third C, children's contexts, particularly how media influence family dynamics (Guernsey, 2012). In particular, parental mediation or parental practices in managing and regulating children's media use is also one of the important contextual factors that affects children's screen time (Clark, 2011). Parents exert effort to utilize different mediation strategies in order to minimize potential risks and maximize learning opportunities for their young children. Negative effects of digital media could somehow be compensated by long-term benefits from parental mediation (Pempek & Lauricella, 2017).

Parental mediation theory suggests that parents employ different strategies to mediate and moderate the negative impact of media on their children (Clark, 2011). The theory also assumes that the parent-child interactions that take place during media use play a role in children's socialization. Although parental mediation theory was originally developed in relation to television viewing, there is a need to also apply the theory to digital mobile devices due to the prominence and widespread use of such devices among young children (Blum-Ross & Livingstone, 2016; Clark, 2011).

Parents utilize three known types of mediation strategies (Clark, 2011). First, *active mediation* refers to parents' effort to explain media content to their children. Second, *restrictive mediation* refers to parents' effort to set rules and regulations regarding media use in order to restrict the amount of time their children spend on screen media and to specify media contents that are allowed to be consumed. Third, *co-viewing* or *co-use* refers to parents' effort to use screen media with their children (including non-verbal communications and co-presence) without interacting or discussing anything about the program (Clark, 2011; Takeuchi & Stevens, 2011). The concept of co-viewing needed to be revised to accommodate changes in contemporary media environment to encompass multi-modal engagements with various digital media. The revision attempt resulted in *joint media engagement* (JME), which has been called the "new co-viewing" (Takeuchi & Stevens, 2011, p. 9).

Hee Jiow and colleagues (2016) attempted to refine existing parental mediation strategies in the context of video gaming exposure by suggesting four types of mediation strategies, namely *gatekeeping* (parents regulate their children's media use, which is similar to restrictive mediation strategies), *discursive* (parents discuss with their children about media use, media content and online safety which is similar to active mediation

strategies), *diversionary* (parents actively and intentionally divert their children from media use by encouraging them to engage in alternative, off-screen activities), and *investigative* (parents seek out relevant information to effectively mediate and regulate their children's media use).

In addition, Peter Nikken and Jeroen Jansz (2013) introduced two parental mediation strategies in the context of Internet use, specifically *technical safety guidance* (technology-supported safety measures such as apps designed to protect children's online safety) and *supervision* (parents supervise or regulate their children's media use, not necessarily through joint media use but by merely sitting beside the child to monitor what he or she is doing).

Among the different mediation strategies, restrictive mediation seems to be the most commonly used strategy for very young children. Furthermore, studies on screen media use, parent-child interactions, and parental mediation highlighted the importance of both content and context in understanding and examining child developmental outcomes (Guernsey, 2012; Pempek & Lauricella, 2017). They also emphasized the important role of parents and caregivers in their young children's media exposure—serving as gatekeepers, moderators, and facilitators of children's media use (Fisch, 2017).

Studies have shown that parents of young children are more likely to engage in all forms of parental mediation (Blum-Ross & Livingstone, 2016; Nevski & Siibak, 2016). However, as children grow up, parental mediation strategies change, becoming less restrictive over time as children become more responsible in their own media use (Blum-Ross & Livingstone, 2016).

The present study

While other countries have documented the increase in the touchscreen exposure of very young children, including the potential benefits and perils that digital media practices bring, trends in the Philippine context have yet to be explored. This research aimed to examine the touchscreen practices among infants and toddlers based on mothers' self-reports, focusing on the amount of screen time and its predictors, types of media content consumed, and maternal motivations and involvement in the regulation of touchscreen use. Part of examining young children's digital media practices involved the media mediation strategies that mothers employed to manage their children's digital media use, as well as their reasons for allowing their children to use touchscreens. Specifically, both of these factors related to screen-assisted parenting had important implications on how parents monitor and regulate their children's screen time.

Guernsey's (2012) 3C framework suggests which aspects of touchscreen use can be focused on such as children's demographic characteristics, types of content consumed, and parental involvement in monitoring and regulating digital media practices. Guided by this framework and extant research on television screen time, we explored the digital media practices of infants and toddlers aged 6-42 months. As part of a larger research project, the present study aimed to:

1. identify the touchscreen practices among infants and toddlers based on their mothers' self-reports, such as onset of use, age differences, activities engaged in, types of content consumed, and circumstances of touchscreen use;
2. explore mothers' motivations for allowing their child's touchscreen use, including their parental involvement in the child's touchscreen practices;
3. examine possible predictors of children's screen time, including children's age, maternal reasons for children's touchscreen use, and parental mediation strategies.

Methodology

Participants

Using non-probability sampling, 124 mothers, with ages ranging from 18 to 45 years (mean age of 34.68 years), were recruited to answer a survey about their children's touchscreen use. A small sample size is not uncommon for a study where there are no publicly available databases with contact details of parents of infants and toddlers (Elias & Sulkin, 2019; Krcmar & Cingel, 2014). Thus, purposive and snowballing sampling was employed through personal invites in preschools and a social networking site.

Respondents were limited only to mothers and fathers were not included due to cultural considerations, observations from prior studies, and practical limitations. In a review on parenting in the Philippines, mothers were described as "the primary caretakers of children and are responsible for the tasks pertaining to their everyday care in the realms of schooling, daily routines, and health" (Alampay, 2014, p. 115) and they often "hold sway over most domestic and child matters" (p. 116). Second, we observed that in non-probability studies on screen time where parent-child dyads were recruited, the vast majority of participating parents were mothers, e.g., 85% (Elias & Sulkin, 2019); 91% (Krcmar & Cingel, 2014); 87 % (Lauricella et al., 2014); 90% (Parker et al., 2022); 81.5% (Ribner et al., 2021). Third, the recruitment of parent-child dyads in this study was through invitations sent to private preschools and through the online network of the primary

author. In studies in the United States on recruiting fathers for parenting research, schools were not mentioned as an ideal recruitment venue for fathers (Davison et al., 2017) and that father-oriented Facebook and newspaper ads seem to be effective (Yaremych & Persky, 2022). The latter strategies proved to be too costly. We did recognize the roles of other family members and significant caregivers (e.g., grandmother, aunt, *yaya*/nanny, father) in managing and monitoring the child's touchscreen use, which was why mothers were instructed to consult them as needed in answering the survey.

Inclusion criteria for mothers' participation were the following: resides in Metro Manila; owns touchscreen device(s) such as tablets and/ or smartphones; and has a child aged 6 to 42 months, who uses such touchscreen devices (even for just watching TV shows/cartoons). Infancy covers the developmental period from birth to 18 to 24 months while toddlerhood covers 18 to 36 months (Santrock, 2019). In the present study, the child's maximum age was capped at 42 months instead of only 36 months to provide adequate allowance for children who were developing at a comparatively faster rate (ECCD, 2011). It is important to note that the children should be normatively developing individuals, which meant that they were not diagnosed with or suspected of any developmental delays or disorders. Mothers with atypically developing children were excluded from participation because children's non-normative development may demonstrate different trends in children's digital media practices.

There were originally 190 participants but 66 of them were excluded because they did not meet one of the inclusion criteria—51 had children who were older than 42 months, which was the required maximum age; six did not indicate their children's screen time; four resided outside of Metro Manila; two questionnaires were not answered by the mothers (e.g., uncle, father); and three had children who had been diagnosed with speech delays and were currently undergoing speech therapy.

Research instruments and materials

We present in this section a survey that was developed for the current study. It consisted of four parts: an informed consent form, the Touchscreen Use Questionnaire, the Parental Mediation Strategies Questionnaire, and a demographic information section. The survey had two versions — printed and online (Google Forms). The printed version comprised nearly two-thirds (n = 81) of the accomplished questionnaires while the online version comprised the remaining one-third (n = 43). Both versions of the questionnaire were pretested and revised based on feedback.

As part of the instructions in answering the survey, mothers were told

that they could ask or consult the child's other significant caregivers in case they themselves did not know the information being asked. This is in recognition that other family members and caregivers may play a role in managing the target child's touchscreen use.

Touchscreen use questionnaire (TUQ)

The TUQ comprised 18 questions about the practices of touchscreen use of infants and toddlers including family ownership of touchscreens, amount of time spent using touchscreen, activities engaged in, circumstances and locations of touchscreen use, content of touchscreen use (shows/programs viewed), and reasons why parents allow their children to use such devices. Six items were closed-ended questions with a predefined list of options, four items were open-ended questions, and the remaining eight items on maternal reasons were answerable through a 4-point Likert scale (1 = *not at all*, 4 = *all the time*). All items were constructed based on the results of previous studies (i.e., Davis-Kean & Tang, 2015; Kabali et al., 2015; Kirkorian et al., 2009; Nevski & Siibak, 2016; Radesky & Christakis, 2016; Vandewater & Lee, 2009; Wartella et al., 2014; Ziemer & Snyder, 2016).

Parental mediation strategies questionnaire (PMSQ)

The PMSQ contained 27 items that identified the types of mediation strategies that mothers employed in managing and regulating their young children's touchscreen use. Twenty items were constructed based on the results of previous studies (Blum-Ross & Livingstone, 2016; Clark, 2011; Jiow et al., 2016; Niken & Janz, 2013; Nouwen et al., 2017; Ofcom, 2017; Pempek & Lauricella, 2017; Samaha & Hawi, 2017; Wartella et al., 2014; Zaman et al., 2016) while the remaining seven items were originally developed for this study (Capulong, 2017). The mediation strategies included in the questionnaire were mainly based on the types proposed by Clark (2011), particularly *restrictive mediation*, *active mediation*, and *co-use,* with an addition of *technical safety guidance* and *diversionary* by Jiow and colleagues (2016). Respondents reported their answers on a 4-point Likert scale (1 = *not at all*, 4 = *all the time*). Means of item scores per mediation strategy were computed. Reliability analyses of items per type of mediation strategies obtained acceptable Cronbach's alpha values ranging from 0.72 to 0.86.

Demographic Information

A personal information subsection was also placed at the end of the survey. Note that although socioeconomic status (SES) is not a variable of interest in this study, a question about monthly household income was also included in order to provide a description of the respondents' SES.

Procedure

The questionnaire was administered to qualified mothers either through a printed version or an online survey. Data were collected from August to October 2018, prior to the COVID-19 pandemic. Thus, the results may not represent the observed uptick in screen time use of children, at least in several parts of the world (Bergmann et al., 2022; Ribner et al., 2021). The printed questionnaires were distributed to qualified mothers from 12 private preschools in Metro Manila that were contacted by the first author. Meanwhile, the online survey link was sent through Facebook invitations to qualified mothers or referrals from other people who knew such qualified mothers. The online version was disseminated in order to increase response rates of qualified respondents, especially those who could not be given printed questionnaires due to geographical distance. As a way of increasing interest to respond to the survey, all mothers who participated were included in a raffle draw for a chance to win a Php 500 online gift certificate. Ten winners were drawn and were contacted through text and email along with the attached online gift certificates.

Ethical considerations

Ethical standards were strictly followed in the conduct of this study. We were guided by the code of ethics for Philippine psychologists promulgated by the Professional Regulatory Board of Psychology (2017). Data gathering protocols were similar to previous studies that recruited parents to answer face-to-face or online surveys on their child's screen time use (Elias & Sulkin, 2019; Kabali et al., 2015; Ribner et al., 2021; Ribner & McHarg, 2021). We first sought the approval and cooperation of the school owners or administrators before participant recruitment. As previously mentioned, only mothers were invited to participate to ensure that they were willing to provide information regarding their child's touchscreen practices. Informed consent was given by the mothers prior to the study, through a form that contained relevant details about their participation; participants voluntarily agreed to answer the survey. They were also reminded that they could withdraw from participating at any point in the study. Participants' identifying information were removed before data analysis. Only the researchers had access to the full dataset; research assistants were provided with a section of the dataset that was relevant to their analysis. The physical questionnaires were stored in a secure place while the online responses were password-protected. As a form of debriefing, information related to the study was emailed to the mothers right after the research project concluded. To the best of our knowledge, there were no physical or emotional risks for participating.

Personal declaration

The primary author is a developmental psychologist by training. She is also a licensed psychologist in the Philippines and is allowed to conduct psychological assessments by law. She has prior experience in assessing younger children and was part of the research team that developed the country's Early Childhood Care and Developmental Checklist (2011). As the study's primary researcher, she is considered capable of inquiring about child development and technology use.

Data analysis plan

The study utilized descriptive statistics and correlations to describe the touchscreen practices among infants and toddlers, including the amount of exposure, type of media content, and type of parental mediation strategies. The study also used multiple regression to examine possible predictors of children's screen time, particularly children's age, maternal reasons for children's touchscreen use, and parental mediation strategies. Moreover, factor analysis was used to examine the different maternal reasons for children's touchscreen use.

Coding procedure

Amount of exposure. The time that the child spent on a typical weekday was multiplied by 5 and the time spent on a typical weekend day was multiplied by 2. These numbers were summed and divided by 7 to compute for the average time spent (in minutes) using a touchscreen per day. This computation was adapted from the study of Nicholas Waters and colleagues (2016).

Types of content. The quality of show content that the child consumed during touchscreen use was categorized as either *educational* or *non-educational.* Educational content pertains to a show that has a clear intent to educate, with an explicit cognitive or prosocial component according to the following criteria: 1) the program teaches a lesson with content similar to that found in schools (e.g., math skills, reading skills, other school readiness skills), and 2) the program teaches a lesson about appropriate behavior or interpersonal interactions (e.g., sharing, friendship) (Christakis & Zimmerman, 2007). For the present study, content that met either criterion was sufficient for it to be coded as educational so as not to be too restrictive with the categorization. On the other hand, non-educational content pertains to a show that is more for a child's entertainment, does not have a clear intent to educate, and is merely passively consumed (Zosh et al., 2017).

Prior to evaluating the shows, two coders were instructed to identify all shows listed by the mothers in the survey. Once the list of shows was finalized,

the coders independently searched for information regarding each show in order to provide descriptions of them. The coders also independently watched one episode of each show to have a better understanding of the nature of the said shows. Next, the coders independently evaluated the content of each show. If a show was evaluated as educational, a score of 1 was given, and if a show was evaluated as non-educational, a score of 0 was given. Then, the first author facilitated the discussion of evaluations of the shows and any disagreements were resolved through discussions between the two coders. Cohen's Kappa of 0.602 for interrater reliability and an 81% agreement between the two coders were computed for the evaluation of the show content. The majority of the disagreements between the two coders arose from evaluating whether or not the shows directly taught children concepts (e.g., types of vehicles, animals) and social skills and values (e.g., helping, cooperation, honesty, kindness).

Results and discussion

The first aim of the present study was to find out the touchscreen practices among infants and toddlers based on their mothers' self-report. The results presented below include screen time, activities engaged in, and content consumed by the children.

Demographics of study sample

Profile of participants

The majority of the mothers (91.6%) held undergraduate and graduate degrees (or with some graduate units); have jobs (80.7 %), with the highest percentage of occupation under the professional or technical workers category based on the Philippine Standard Industrial Classification, e.g., doctor, lawyer, teacher (PSA, 2009); and were married. Almost half of them had a monthly household income of above Php 80,000. The participants' demographic information suggested that the majority of the mothers were highly educated, employed, and came from upper middle-income families (Albert et al., 2018).

Profile of participants' children

The mothers had children ranging in age from 6 to 42 months (M = 28.76 months; SD = 8.81); 52.4% of the children were female and 47.6% were male. Almost two-thirds (62.9%) went to preschool or daycare while more than one-third (37.1%) of them do not go to school yet. Although two-thirds of the children already went to preschool, it is important to note that they spent only a few hours in school (about 2 to 3 hours) and still spent considerably more time at home compared to school-aged children.

Children's touchscreen practices

Touchscreen ownership, age of first touchscreen use, and child ability with touchscreen

The majority of the infants and toddlers used both smartphones and tablets, although more children used smartphones (91.9%) than tablets (77.4%). The majority of these children (85.4%) did not have their own touchscreen devices and only used their parents' devices, while five infants and 13 toddlers owned their own devices. The ages of children when they used touchscreens for the first time ranged from 2 to 36 months (M = 14.23; SD = 7.11), with almost half of them (46.8%) not needing frequent assistance in using the touchscreens. Interestingly, more than half of them (56%) were aged 12 months or below when they first used a touchscreen, which suggested an early onset of touchscreen use (Ribner & McHarg, 2021).

It is not surprising that the majority of participating children used both smartphones and tablets. The increase in touchscreen use among children coincided with the drastic double-fold increase in touchscreen family ownership in the United States (Rideout & Robb, 2020). Aside from the increase in touchscreen family ownership, an early onset of touchscreen use may also lead to increased touchscreen use. The results in this study revealed that some children reportedly began to use touchscreens as young as two to four months (e.g., for watching shows), with an average age of a little over one year old, and with nearly half of them requiring less assistance in using these devices. This early onset of use is quite young, an age far below the AAP's recommended age of above 18 months (Hill et al., 2016). These results are similar to previous findings, which suggest that children nowadays have a much earlier access to and use of digital media and that by the end of their second year of life, they could use touchscreen devices with relative ease and expertise (Ofcom, 2020; Rideout & Robb, 2020). In addition, children's ability to navigate touchscreens without much assistance may also imply independent use and exploration.

It is important to highlight that early touchscreen use for the purpose of watching a show, especially for infants younger than 18 months, may lead to harmful effects on their cognitive development (Hill et al., 2016) even though they are watching programs that are supposedly made for young viewers. While infants below 18 months could already understand individual images and action shots in programs, they still have difficulty understanding and integrating the complex connectedness of visual and audio features the way older children and adults do (Anderson & Hanson, 2013; Pempek et al., 2010). Studies have shown that infants and toddlers still learn best through hands-on exploration and social interaction with trusted

caregivers (Hill et al., 2016). This serves as a good reminder for parents and caregivers that although the programs they offer their young children (especially those younger than 18 months) seem educational and child-friendly, they may actually impede rather than enhance young children's learning.

Amount of touchscreen exposure

Mothers of infants and toddlers reported estimates of their children's touchscreen use during weekdays and weekends. The average typical weekday screen time was 1 hour and 44 minutes (SD = 106.95), ranging from 0 minute to 11 hours while the average typical weekend screen time was 1 hour and 53 minutes (SD = 113.84), ranging from 0 minute to 11 hours. Moreover, the overall average screen time on a typical day was 1 hour and 46 minutes (SD = 101.38), ranging from 4 minutes to 11 hours. The results suggest that there seems to be minimal difference in screen time averages regardless of the day of the week. Nelly Elias and Idit Sulkin (2019) found that younger children in their sample had higher screen times during weekdays than on weekends because caregivers would most often be preoccupied with work on weekdays. It is possible that the same level of restrictions are enacted on the children in our sample, regardless of the day of the week and regardless of the caregiver assigned to take care of the child when the mothers are at work.

With the increase in touchscreen family ownership and touchscreen exposure as well as earlier onset of touchscreen use, it appears that children's screen time in this sample is high, at least when compared to current recommended standards (Hill et al., 2016). However, when compared to the average screen time (2 hours and 19 minutes on weekdays) of 18 to 36-month-old participants in a study conducted in Israel (Elias & Sulkin, 2019), the screen time of our participants is relatively lower. At present, there is no baseline nationwide data in the Philippines with which to compare these results.

Correlation was performed between children's age and overall average screen time. The result showed that children's age (in months) and average screen time were positively correlated, $r(124) = .31$, $p < .01$ (2-tailed), $r^2 = .0961$, suggesting that as the child grows older, the more time is spent using the touchscreen.

Since age had a significant positive correlation with screen time, it is possible that age could affect the average and range of screen time depending on the age of the child, that is, whether the child is younger (e.g., an infant) or older (e.g., a toddler). Thus, children could be categorized into two distinct age groups: the infant group (6 to 24 months) and the toddler group (25 to

42 months). The infant group comprised almost one-third (31.5%) of the total number of children in the sample, while the toddler group comprised two-thirds (68.5%). In light of these groupings, we share below the possible differences in screen time between these two age groups.

As seen in Table 1, the infant group's screen times (average weekday and weekend and overall daily averages) were much shorter than the toddler group's, with infants only having a little more than half of the screen time of toddlers; the infants' maximum screen time was only one-third of the toddlers' maximum. It is remarkable that infants spent almost 7 hours per week (58.17 minutes x 7 days = 407.19 minutes or 6.8 hours) using touchscreens while toddlers spend more than double the infants' screen time per week (128.51 minutes x 7 days = 899.57 minutes or 15 hours), which validates the observation that screen time seems to increase with age. The results perhaps are not surprising because compared to infants, toddlers may be able to navigate touchscreen devices on their own or with minimal help from caregivers (Ofcom, 2020). Based on the participants' profile, there were more toddlers who owned devices than infants, which could have also contributed to the higher screen time for these children.

Table 1. Screen Time of Infant and Toddler Groups

	Infant Group (n = 39)		Toddler Group (n = 85)	
	Screen Time in Minutes	Standard Deviation	Screen Time in Minutes	Standard Deviation
Weekday Average	59.21	65.88	124.26	115.92
Weekday Range Minimum Maximum	0 240		0 660	
Weekend Average	55.59	50.33	139.13	124.94
Weekend Range Minimum Maximum	0 210		0 660	
Overall Daily Average	58.17	57.54	128.51	109.44
Overall Range Minimum Maximum	4 210		9 660	

Touchscreen activities

Table 2 presents the various activities that children engage in using touchscreens. The most frequent touchscreen engagement by children was watching various programs and the least frequent activity was reading (or being read) e-books. The top three activities of children were watching programs, viewing photos, and video chatting in apps such as FaceTime, Skype, or Viber, which is similar to findings in previous studies (Cristia & Seidl, 2015; Nevski & Siibak, 2016; Ofcom, 2020). A few mothers also mentioned that their children took selfies and recorded videos using the touchscreens.

Table 2. Frequency Distribution of Activities Children Engage in Using Touchscreens

Activity	No	Yes	Total
Watch programs	5	119	124
	4.0%	96.0%	100
View photos	34	90	124
	27.4%	72.6%	100
Video chat/call	50	74	124
	40.3%	59.7%	100
Listen to music	65	59	124
	52.4%	47.6%	100
Play apps	69	55	124
	55.6%	44.4%	100
Read (being read to) e-books	110	13	123
	89.4%	10.6%	100

Program viewing on touchscreen devices could be an extension of television viewing but in the form of newer digital media such as smartphones and tablets. Touchscreens seem to have displaced (or perhaps augmented) television as a device for children to watch programs such as cartoons and movies (Reid Chassiakos et al., 2016). With the portability, flexibility, and multimodality of touchscreens, watching programs is made easier and more convenient compared to television. It is interesting to note, though, that with the advancement of technology, the features of television have also changed and revolutionized. Certain sets nowadays, such as smart TVs, are more sophisticated than traditional ones because they are internet-based and can offer children a lot of channels or shows to watch. They could also be used offline to watch downloaded movies and shows saved in thumb drives plugged into the USB port. If watching programs on a touchscreen is an extension of television viewing, then parents should be cautious of

the possible harmful effects brought about by television viewing such as language delay (Zimmerman et al., 2007) and poorer socioemotional skills (Kirkorian et al., 2009; Lavigne et al., 2015; Pempek et al., 2011; Radesky & Christakis, 2016).

Another activity frequently engaged in by young children was video calling or chatting. Video chatting is different from merely watching programs on touchscreens because the former is an interactive activity that promotes social connection with family members, relatives, and other significant people who may be physically absent or geographically far from the child. This is probably the reason why even though AAP recommended that children younger than 18 months be discouraged from using digital screen media (Hill et al., 2016), video chatting was made an exception.

Content of programs consumed

Given the aforementioned result that watching programs on digital media devices was the top activity that the children engaged in, we were interested to discover the nature of these programs. Mothers were asked to indicate the top three programs or shows (in any order) that their children watched using the touchscreen devices. These programs were evaluated by two coders for educational and non-educational content as previously described in the data analysis section.

Prior to content evaluation, the coders listed 148 programs, which had been grouped into three categories: *specific programs* (titles were specifically stated), *generic programs* (titles were not specified), and *YouTube channel hosts* (channels served as umbrella hosts where various programs were shown, or what Hilda Kabali and colleagues [2015] called *content delivery site*). Out of the 148 programs, 12 programs were removed because they could not be coded as either educational or non-educational since the labels were inadequately or too broadly reported (e.g., cartoons, bedtime stories, videos of toys). Hence, only a total of 136 programs were evaluated for content. Out of these, 71% comprised of specific shows, 23% generic shows, and 6% YouTube channel hosts. Some examples of selected programs based on the types of content are presented in Table 3.

Among the 136 programs evaluated for content quality, 56.6 % percent were coded as educational while the remaining 43.4 % were coded as non-educational. Looking closely at the first shows indicated or reported by the mothers on the survey, almost two-thirds (65.2%) were evaluated as educational while the remaining one-third (34.8%) were evaluated as non-educational.

Table 3. EExamples of Selected Programs Based on Types of Content

Category	Type of Content	Program/Show Title
Specific	Educational	*Mickey Mouse House Club*
		Blippi
		Peppa Pig
		My Little Pony
		Paw Patrol
	Non-educational	*Spongebob Squarepants*
		Oddbods
		Muppet Babies
		Frozen
Generic	Educational	*Nursery Rhymes*
		Learning ABC's and Phonics
	Non-educational	*Baby Shark Song*
		Ryan Toys Review
YouTube Channel Host	Educational	*Lego*
		Cocomelon
		Baby TV

Correlation analysis was performed between first-mentioned shows and screen time and results revealed that show content was not significantly associated with screen time, $r(115) = .004$, $p = .965$ (2-tailed). However, a content evaluation of programs viewed by the children revealed that a higher percentage of them were more educational than non-educational. This suggests that the mothers consciously promoted the educational benefits (e.g., school readiness skills, specific learning area) of touchscreen use among their young children. Or perhaps, this is how mothers understood "appropriate media content." The use of "educational" materials is probably less about the intended child benefits than about mitigating harm and feeling less guilty about allowing their very young children to use touchscreen devices. We discussed more fully in a separate section the mothers' motivations for allowing their children to use touchscreens.

Circumstances and locations of touchscreen use

Table 4 presents the circumstances in which mothers allowed their children to use touchscreen devices. The top three circumstances were the following: while waiting (e.g., in a restaurant or mall, changing diaper), before bedtime, and during meals. Mothers also reported that other instances when their children used touchscreens included when parents

needed to do chores or work at home, when children had tantrums or felt cranky, and during other activities such as a haircut or bath time.

Table 4. Frequency Distribution of Circumstances of Touchscreen Use

Circumstances of Touchscreen Use	No	Yes	Total
While waiting	72	52	124
	58.1%	41.9%	100
Before bedtime	78	45	124
	62.9%	36.3%	100
During meals	83	41	124
	66.9%	33.1%	100
Before nap	91	33	124
	73.4%	26.6%	100
During rides	92	32	124
	74.2%	25.8%	100
At specific times (e.g., morning only)	101	22	124
	81.5%	17.7%	100
After meals	106	18	124
	85.5%	14.5%	100
After bath	107	17	124
	86.3%	13.7%	100
After nap	107	17	124
	86.3%	13.7%	100

Table 5 shows that the top three locations where the children used touchscreens were the bedroom, living room, and public places (e.g., inside restaurant or mall). It seems that circumstances and locations for touchscreen use revolved more around benefiting parents and making parenting and childcare somehow easier. For instance, parents allowed their child to use touchscreens while waiting, especially in public places, to entertain the child and avoid difficult situations like the child getting bored, restless, or even becoming disruptive; before bedtime to more easily put the child to sleep; and during meals to make the child stay put while eating. The locations for touchscreen use also appear to complement the circumstances of touchscreen use. As previously mentioned, parents allowed their child to use a touchscreen in the bedroom to easily put the child to sleep; in the living room, a common open space in the house, to easily monitor the child while the parents or other caregivers were busy doing something; and

public places such as restaurants or malls to entertain and keep the child preoccupied while waiting.

It is important to note that locations for touchscreen use were predetermined options and likely reflect the experiences of particular socioeconomic classes. In the case of the present study, since the majority of the participants came from an upper middle-income group, they were able to relate to the predetermined locations that reflected their socioeconomic status, such as having a living room space in the house or traveling in their own vehicles. However, participants from a low-income group might not be able to relate to certain predetermined location options. For instance, the respondents' house might not have a living room area or the area is used both as living and dining space. Or they may not have their own vehicle, making it unsafe to use the touchscreen device while commuting.

Table 5. Frequency Distribution of Location of Touchscreen Use

Location	No	Yes	Total
Bedroom	32	91	123
	26.0%	74.0%	100
Living room	63	60	123
	51.2%	48.8%	100
Public place (e.g., mall, restaurant)	72	52	124
	58.1%	41.9%	100
Inside car	84	40	124
	67.7%	32.3%	100
Dining room	93	31	124
	75.0%	25.0%	100
No specific place	115	9	124
	92.7%	7.3%	100

Mothers' involvement and motivations

We previously intimated that mothers may have their reasons for allowing their children to use digital media devices as part of their parenting strategies. We discussed how touchscreen engagement may meet educational and childcare goals. The second aim of the study was to explore the mothers' involvement with their children's touchscreen use, as well as their motivations for allowing its use. The results highlighted where our participants learned information about digital media and the perceived parental benefits of children's touchscreen use.

Sources of information regarding digital media

Table 6 presents the different sources from which mothers gathered information such as ideas, advice, or tips on how to manage children's digital media use, as well as choosing appropriate shows and apps for children. Results showed that the mothers' most frequently used source of information was websites (for parents and children) and the least frequently used source was printed materials. Interestingly, although the most frequently used source of information were websites, only about half of the mothers (49.2%) used such sources of information regarding their children's touchscreen use. This may suggest that some mothers seemed less inclined to research relevant information regarding their children's touchscreen use because perhaps they relied more on their personal or family members' knowledge, experiences, and observations regarding their children. This might also imply that mothers in our sample were not aware or informed of recommendations regarding screen time because they were not actively seeking such information online.

Table 6. Frequency Distribution of Sources of Information for Touchscreen Use

Source of Information	No	Yes	Total
Websites	63	61	124
	50.8%	49.2%	100
Family Members	70	54	124
	56.5%	43.5%	100
App Store Reviews	82	42	124
	66.1%	33.9%	100
Friends	83	41	124
	66.9%	33.1%	100
Online Groups	96	28	124
	77.4%	22.6%	100
Printed Materials	113	11	124
	91.1%	8.9%	100

Maternal reasons for children's touchscreen use

The survey also asked mothers to rate their agreement to statements related to reasons for children's touchscreen use. Factor analysis was performed to look into the possible higher-order categories of these motivations. Table 7 presents the rotated matrix of the extraction method and shows that items 18 to 20 were lumped together as Factor 1 (α = .79) while items 21 to 23 (α = .62) were grouped as Factor 2. Item 24 was removed because of its low factor loading in both factors.

Items in Factor 1 appear to be reasons for *enriching the child's learning and experience* while items in Factor 2 appear to be reasons that *facilitate the child's positive state or change the child's negative state*, which parents use as a tool for solving a problem. Factor 1, as a reason for touchscreen use, means that touchscreens may be seen as one of many other options or methods for providing such enriching experiences. Factor 2, on the other hand, may lead to some kind of dependence — if it works as a tool for these purposes, parents are less likely to shift to another tool to do the same job (e.g., reading a print book, talking to children, playing with them). Thus, reasons that loaded in Factor 1 seem to be those that would benefit the children while reasons that loaded in Factor 2 seem to be those that benefit parents.

Table 7. Rotated Component Matrix for Reasons for Children's Touchscreen Use

Reasons	Factor	
	1	2
19 Child's entertainment	**.860**	.358
18 Child's educational tool	**.724**	.473
20 Child's fine motor skills development	**.493**	.525
23 Put child to sleep	-.062	**.554**
21 Pacify/calm the child	.216	**.527**
22 Preoccupy the child so parent can do chore/work	.481	**.520**
24 Form of bonding with family members	.289	-.017

Extraction Method: Principal Component Analysis.

Rotation Method: Varimax with Kaiser Normalization

We explored how the endorsement of these reasons for touchscreen use potentially impacts children's screen time. Using a median split, we identified high ($n = 40$) and low ($n = 83$) scorers on Factor 1 (median = 3.67) and high ($n = 77$) and low ($n = 47$) scorers on Factor 2 (median = 3.00). We observed that children of high scorers on both Factors 1 and 2 had higher screen time than children of low scorers (median of 103 vs. 77.1 minutes and 103 vs. 75 minutes, respectively). It is possible that when mothers found touchscreen use to be beneficial to either the child or themselves, fewer restrictions were placed on the children, which might have increased screen time.

The results explored here seem to complement earlier findings presented on type of content watched and circumstances of touchscreen use. Because mothers in our sample may have perceived that the shows watched by their

children were educational, they may also have perceived touchscreen use to provide benefits to the child, despite evidence on the risks of early onset and prolonged touchscreen use. The parental benefits reported are similar to the electronic babysitter strategy that parents and caregivers employed during the TV-kids generation, or what researchers recently referred to as screen-assisted parenting in the digital age (Elias & Sulkin, 2019). Recall that mothers in our sample allowed their children to use touchscreens in locations or circumstances where they needed to calm or preoccupy their child especially when they had to attend to other tasks. These perceived dual benefits of touchscreen use may pose a challenge to limiting screen time because parental decisions might be influenced more by perceptions and felt experiences at a given moment than by recommendations based on cumulative evidence or negative effects that might not be readily apparent.

Parental mediation

In relation to parental mediation or the strategies that parents use to monitor or regulate their children's touchscreen use, the majority of the mothers (91.9%) reported enforcing rules on their children's touchscreen behavior. For the remaining mothers who did not enforce rules (8.1%), their reasons for non-enforcement included conflict or discrepancy in enforcing rules within extended families (e.g., in-laws or nanny/*yaya),* the age of the child who might be too young to fully understand rules, and the mothers' self-perception that they are not good role models in touchscreen use. Two-thirds of the mothers (65.3%) reported that implementing rules on their children's touchscreen use helped make parenting easier (most of the time, 37.9%; all the time, 27.4%). The high rate of mothers who enforced rules indicates that they indeed exert a conscious effort to monitor and manage their children's touchscreen use.

Possible predictors of screen time

The last objective of this study pertains to identifying some predictors of children's screen time. We presented earlier that while age was correlated with screen time—on average, toddlers use touchscreens longer than infants—the content of programs consumed (e.g., educational or non-educational) was not. In aid of further exploring the roles that mothers play in regulating their children's screen time, we tested in a series of hierarchical multiple regression analysis whether the motivation of mothers and their mediation strategies, along with children's age, were related to the amount of time children spend using touchscreen devices.

First, we regressed screen time on age, followed by the two maternal reasons for touchscreen use entered in the second block. The full model significantly predicted screen time, $F(3, 119) = 8.45$, $p < .001$, explaining

roughly 18% of the variance in screen time scores. The inclusion of the two maternal reasons also improved the model where only age was included, with an R^2 change of 0.08. The coefficients presented in Table 8 show that both age and maternal benefits, but not child benefits, predict screen time: older children and higher perceived maternal benefits are related to higher screen time. This suggests that mothers in our sample primarily let their children use touchscreens because it helped make parenting and childcare easier and more manageable.

Table 8. Hierarchical Regression Coefficients of Children's Age and Benefits of Touchscreen Use

Model	B	Unstandardized Coefficients		Standard-ized Coef-ficients	t	Sig.
		Std. Error	Beta			
2	(Constant)	-80.51	46.61		-1.73	.09
	Child's Age	**3.32**	**0.96**	**.29**	**3.45**	**< .001**
	Factor 1: Benefits for the children	-3.17	12.58	-.02	-0.25	.80
	Factor 2: Benefits for the parents	**33.74**	**11.21**	**.30**	**3.01**	**.003**
Dependent Variable: Overall average screen time						

This result highlights the parents' seeming predicament of having not much choice but to let their children, especially toddlers, use touchscreen devices in order for them to do their chores or work at home or even rest a bit when their children were preoccupied with touchscreens. Letting children use touchscreen may help reduce parents' stress by pacifying their children when they become bored or cranky especially when in public. Letting children use touchscreen could also help childcare routines become easier and more manageable such as during meals or when putting the children to sleep. As Kabali and colleagues (2015) suggested, digital media devices serve as "digital pacifiers" to calm down or distract children as well as manage their behaviors.

A second hierarchical regression analysis was conducted to examine whether the types of parental mediation strategies and children's age can predict screen time; age was entered in block 1 followed by mediation strategies in block 2. The results showed that both parental mediation strategies and children's age significantly predict overall screen time, $F(6,115)$

= 5.66, $p < 001$, explaining around 23% of the variance in screen time scores. The addition of mediation strategies also improved the model with age alone (R^2 change = .13). The standardized coefficients in Table 9 still show that as the child's age increases, screen time also increases. In terms of the types of parental mediation strategies, only diversionary and active strategies predict screen time but in an opposite manner. As the use of diversionary strategy increases, screen time decreases, but as the use of active strategy increases, screen time also increases. This presents interesting implications with regard to parental mediation; not all strategies may decrease screen time, with at least one inadvertently increasing touchscreen use.

Table 9. Hierarchical Regression Coefficients of Children's Age and Types of Parental Mediation Strategies

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		Beta	Std. Error	Beta		
	(Constant)	121.05	63.16		1.92	.06
	Child's age	**3.59**	**1.04**	**.31**	**3.45**	**< .001**
2	Restrictive Strategy	-11.07	10.40	-.10	-1.06	.29
	Active Strategy	**30.94**	**11.97**	**.23**	**2.58**	**.01**
	Co-use Strategy	-3.00	17.06	-.02	-.18	.86
	Technical Safety	-3.86	7.82	-.05	-.49	.62
	Diversionary	**-50.48**	**15.30**	**-.31**	**-330**	**.001**

Dependent variable: Overall average screen time

As mentioned earlier, the more effort parents exert to offer diversionary off-screen activities (e.g., outdoor play, reading printed books) to their children, the more likely that children's screen time would decrease. This is consistent with our findings. On the other hand, parents strive to explain media content to their children using active mediation strategy (Clark, 2011). This strategy may be more applicable to toddlers than infants because the former have a more expansive vocabulary and a higher salience of expressive language. Although one of the goals of parental mediation strategies is to limit or reduce children's screen time, the increased screen time in the findings should not necessarily be viewed negatively because the use of active strategy may actually foster positive parent-child interactions, including increased play time and language use. Screen time increases because parents put extra effort to interact with their children and are more involved with them during touchscreen use. With increasing interest in touchscreen use, perhaps parents also use active mediation as it takes

advantage of children's developing capacity for verbal communication, thought, and action.

Overall, the results showed that the majority of the participants' families owned smartphones and tablets. With the increase in touchscreen family ownership, there is also an increase in access and use—even early ownership—among very young children, including the early onset of use as young as two to four months old. The children's overall average screen time was almost two hours. And when screen time was computed based on age group (infants and toddlers), the infants' overall average screen time was almost one hour while the toddler's screen time was a little more than two hours.

The top three touchscreen activities engaged by children were watching shows, viewing photos, and video chatting/calling. The top three circumstances of touchscreen use were while waiting, before bedtime, and during meals. And the top three locations for using gadgets include bedroom, living room, and public places (e.g., malls, restaurants). Mothers appeared to not rely much on research regarding tips and advice on children's touchscreen use maybe because they rely more on their own experiences and observations of their children. Results also revealed that mothers let their children use gadgets for a longer period of time primarily for parental benefits (e.g., to do work or household chores) than child benefits (e.g., child entertainment).

Evaluations of the type of show content viewed suggested that mothers deliberately chose shows that were more educational than non-educational. But while mothers seemed to value the educational function of touchscreen devices, their reports of the circumstances and locations of children's touchscreen use highlighted the practical value of these devices. Children typically engaged in these activities to help them pass the time, relax, or stay entertained.

In terms of media mediation strategies, diversionary and active strategies predicted screen time but in an opposite manner—the more diversionary strategies were used, the shorter the screen time; while the more active strategies were used, the longer the screen time. In addition, parental benefits and children's age were also related to higher screen time.

Extension of television effects on touchscreen effects

If touchscreens were predominantly used by children for viewing purposes (based on the results of the survey), it could be asserted that they were also used in similar ways to television. Consequently, the demonstrated negative effects of heavy television viewing, up to a certain extent, may also be apparent from too much digital screen time. For instance, young children

who had higher television screen time were more likely to exhibit lesser vocabulary, and that for every one-hour increase in screen time, they were more likely to have language delays (Zimmerman et al., 2007). Too much screen time also reduced play and parent-child interactions, which may have a negative impact on children's social and emotional skills (Kirkorian et al., 2009). These findings have implications for the present study because they suggest that excessive screen time, this time via a newer digital media form, may also have detrimental effects on language and socioemotional development.

Moreover, the unique features of touchscreens (e.g., portable, compact, inexhaustible/unlimited, on-demand) may have a stronger and more pervasive influence on young children's development compared to television, which can possibly even aggravate issues regarding displacement of enriching activities such as social interaction and creative play (Haughton et al., 2015). For instance, the small, compact size of touchscreens can encourage more solitary activities and even exposure to health-related problems such as eyestrain and physical stress, e.g., bad postures, repeated motions (Mantilla & Edwards, 2019). Since young children preferred to use touchscreens for viewing, they can watch any show, anytime, anywhere. Media content, on YouTube for example, is inexhaustible and on-demand and so children virtually never run out of shows to watch. Unlike television where shows are scheduled and limited, web-based shows accessed through touchscreens are potentially available at any given time and may be viewed repeatedly any number of times. Additionally, related content is offered to the viewer alongside the video or right after the video clip ends.

In light of excessive touchscreen viewing by some children in our sample, it is noteworthy to raise the issue of *transfer deficit* phenomenon mentioned earlier. Transfer deficit occurs in children younger than 30 months of age due to their immature attentional skills, and lack of symbolic thinking and memory flexibility needed to effectively transfer information from two-dimensional materials (Barr, 2013). In addition, while infants begin to pay more attention to normal sequence shots by their 18th month (Pempek et al., 2010), it is only at four years when they have a fairly good comprehension and recall of age-directed media content. Recall and comprehension become significantly better in older children and adults (Anderson & Kirkorian, 2015). With all these in mind, parents need to be reminded that children, especially those younger than two years, still learn best through hands-on exploration and social interactions with their caregivers.

With the increase in family touchscreen ownership and early onset of touchscreen use, access and use of these devices are most likely to also increase. The findings of studies in other countries (Ofcom, 2020; Ribner &

McHarg, 2021; Rideout & Robb, 2020) suggested that children nowadays have a much earlier access and use of digital media and that by the end of their second year of life, they could use touchscreen devices with relative ease and expertise. The current study is consistent with these studies and finds that some Filipino children as young as two to four months of age have been exposed to digital media and the typical toddler is able to manage touchscreen devices independently for the purpose of viewing videos.

Perceived benefits of touchscreen use

Inasmuch as this investigation is about the effects of touchscreen use on child development, the present study also sheds light on mothers' practices and beliefs in the digital age. The current study revealed that the mothers' motivations for children's touchscreen use were related to their perceived benefits for their children and themselves. The primary benefit for children was educational (i.e., for learning). The primary parental benefit was instrumental—for mothers to be able to do work or household chores. The latter motivation was related to higher screen time, which is consistent with prior studies (Elias & Sulkin, 2019).

The findings provide insight into why some mothers tend to be laxer when it comes to the use of digital devices. Mothers remain to be primary caregivers (even when there are others in the household) while also having work, as housewives or working mothers (Alampay, 2014), and touchscreens may be seen as a tool that helps them gain time to do this work. Infants and toddlers are often dependent on caregivers and require intensive supervision. Perhaps mothers also negotiate with themselves— how much time they are willing to allow their children to be preoccupied with the device or how much time they want or need for themselves. Hence, screen-assisted parenting might be able to satisfy child-rearing objectives. This study is a step towards accounting for factors that are entrenched in the daily parenting routine (Elias & Sulkin, 2019), such as why mothers allow longer screen time on a daily basis despite existing recommendations.

Benefits of employing more than one mediation strategy

Another highlight of the study is the information gleaned from parental mediation practices regarding touchscreen use. Of particular interest is a diversionary strategy where parents attempt to divert their children's attention from screen time or on-screen activities by offering alternative screen-free activities (e.g., reading books, outdoor play) that are viewed as more positive and educational (Jiow et al., 2016). Its salience is surprising because of its relative novelty as a product of the refinement of the three classic strategies described by Jiow and colleagues (2016). Indeed, diversionary mediation was borne out of the need for strategies that are not

media-related where children are encouraged to explore alternative, screen-free, and productive activities other than sedentary, solitary, and on-screen ones (Eklund & Bergmark, 2013). In addition, diversionary mediation may be popular because restrictive mediation is not always easy to implement (e.g., fights, tantrums, inconsistent caregivers), and co-use occupies the parents with touchscreen use which undoes the goal of having time to do other things. Hence, the results also suggest that any strategy that diverts children's attention away from the screen may be beneficial because they lead to alternative activities or interactions that may produce positive developmental outcomes.

Parenting in the digital age

The results of the present study have important implications not only for child development but for parenting and childcare as well. Touchscreen use presents both benefits and drawbacks and parents play a big role in maximizing its benefits and minimizing its disadvantages. Young children can learn from digital media but learning is highly dependent on the child's age (Radesky & Christakis, 2016). It is also imperative that children are provided with a good balance between on-screen and off-screen activities. Screen-free activities are very important because infants and toddlers learn and develop best through hands-on exploration in their environment and interactions with their parents and other caregivers (Hill et al., 2016). Similarly, socio-emotional skills are learned through regular social interactions (Radesky et al., 2016). Play also occupies a central role in a child's socioemotional development because it fosters enriched, reciprocal parent-child interactions (Radesky & Christakis, 2016).

Limitations and recommendations

The present study focused only on mothers with infants and toddlers who used touchscreen devices and did not account for the child's age and socioeconomic status. The study did not account for touchscreen practices among children belonging to other age groups; neither did it look into perspectives on mediation practices, motivations, and attitudes towards touchscreen use from other significant people (e.g., father, grandparent) in the lives of young children. For future research, other relevant variables such as age groups (e.g., pre-school age and school-aged children, adolescents), the developmental trajectory of the child (e.g., normative or non-normative development), the child's gender, and socioeconomic status could also be considered in the context of digital media use and child development. Voices of other caregivers, particularly fathers, may also be included for comparison with our current data on mothers. The use of probability

sampling to capture more caregivers (e.g., fathers) and improve the external reliability of the study is also recommended.

Second, since the findings of the present study revealed that very young children's most frequently engaged touchscreen activity is watching shows, then more studies should be conducted to look in greater detail at the media content that infants and toddlers consume including relevant factors of media content (e.g., child's age, gender) that may contribute to children's viewing. We did not pay particularly close attention to content because of its lack of statistical relation with screen time. However, Guernsey's (2012) framework, along with other studies, pointed to the powerful effects of media content on child development above and beyond screen time.

Third, parental touchscreen use should also be examined because prior research (Radesky & Moreno, 2018) has demonstrated that parents' digital media practices (e.g., parental screen time) greatly affect children's development as well as parenting and parent-child dynamics (Crist, 2018).

Lastly, a quantitative design allowed us to explore trends in touchscreen practices of infants and toddlers, as well as identify maternal reasons for touchscreen use and their mediation strategies that are aligned with extant research. We were also able to identify predictors of screen time. However, this study was not able to capture how mother-child dyads interact while using touchscreens. Naturalistic observations would greatly complement survey studies because the actual parent-child dynamics and the family contexts of children's touchscreen use can be reported. In addition, in-depth interviews with parents can further shed light on their motivations, beliefs, and child-rearing objectives that can reveal the nuances of how parenting in the digital age is negotiated and enacted.

Concluding remarks

We consider the current research to be an important contribution to the area of digital media and child development in the Philippines because it provides preliminary yet much-needed baseline information regarding the basic touchscreen practices among infants and toddlers. It also contributes relevant information regarding parenting in the digital age. Because of the ubiquity of digital media devices, parents are faced with the challenge of inevitably integrating digital media in the lives of their children. Overall, this study highlights the valuable role that parents play in children's development in the context of touchscreen use in the digital age.

Serving as stewards of very young children, parents are the ones responsible for deciding and dictating the quantity and quality of their children's media access. But beyond the amount and content of screen media exposure, parents should look more closely into the extent of involvement or

participation that they are willing to contribute to the process of touchscreen use. It has been emphasized that parents should provide a balanced set of activities for their children. Parents are reminded that "balanced" is not just a matter of having both on-screen and off-screen activities but ensuring that the screen-free activities engaged in by children can address the different domains of development—such as physical (e.g., outdoor play), cognitive (e.g., book reading), and socioemotional (e.g., social play) aspects. On the other hand, the study also surfaced that parents, particularly mothers, may have their own reasons for allowing their children to use touchscreen devices. Not only should there be a balance between children's activities, but it seems that there should also be a balance between meeting child-rearing objectives and the personal needs or goals of caregivers.

Indeed, the findings of the present study demonstrate, albeit incrementally in the context of the ever-growing research on touchscreen use, that understanding child development in this digital age cannot be devoid of digital media use contexts. To better understand child development, examining the roles of amount of exposure, quality of media content, parental motivations, and parental mediation is a must.

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Notes

¹ In this paper, "touchscreen" is used as a catch-all term to refer to smart mobile media devices such as smartphones and tablets.

Grant Support Details

About the Authors

ANNALYN DE GUZMAN CAPULONG obtained her PhD in Psychology from the University the Philippines Diliman in 2020. She is a registered psychologist and an assistant professor at the Department of Psychology, University of the Philippines Diliman. (corresponding author: adcapulong@up.edu.ph).

JOSE ANTONIO R. CLEMENTE obtained his PhD in Psychology from the University of Macau in 2017. He is a Professor at the Department of Psychology, University of the Philippines Diliman (email: jrclemente@ up.edu.ph).