

Effect of Parents' Time With Children on the Relationship Between the Children's Use of Electronic Devices and Their Sociability

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Abstract

Background: This study explored how parents' roles of accompanying children influence the relationship between children's use of electronic devices and their sociability.

Methods: This study used data from Kids in Taiwan: National Longitudinal Study of Child Development and Care.

Results: The results showed that parents' time with their children on weekdays moderated the relationship between children using stationary devices and their sociability. However, time with children on weekends and holidays mediated the negative effect of children using mobile devices on their sociability.

Conclusion: These findings have implications for future planners of childcare policies and educators regarding how to encourage parents to spend more time with their children and help them acquire sociability.

Keywords: Sociability, Parents' time with children, Electronic devices

Background

In 1948, the World Health Organization stated that health refers to physical, psychological, social, and well-being or comfort, and not simply the concern of illness or weakness [1]. Children's pediatric care has evolved from the previous emphasis on care and rehabilitation for sick children to a focus on children's safety and health. However, health does not simply refer to physical and psychological dimensions, but also includes individuals' acquisition of critical social competences. Social competence includes various important aspects [2-5], meaning individuals with sociability can follow social norms, positively interact with others in daily life, and acquire the individual abilities required in society. As with other kinds of development, sociability is cultivated from childhood. When interacting with their peers, children with positive sociability can cooperate, share, and fit in with others and follow the rules [6]. Those characteristics of sociability influence their future adaptation to the environment, personality development, and emotion management [7]. Thus, it is important to explore factors that affect children's sociability.

The progress of technology has reinforced the prevalence of electronic devices, such as television, computers, tablets, and mobile phones [8]. Nowadays, children have more opportunities to access these products. However, the effects of such technology products on children's sociability are still being disputed [9-10]. Scholars have held positive and negative views on the impact of electronic products on children. Those with negative views argued that children's increased use of such electronic devices negatively influences their development of eyesight, interpersonal interactions, cognition, language, emotion, daily behavior, cooperative ability, and physical health [11]. Chen [12] indicated that using electronic devices may have negatively resulted from the amount of exposure to violent TV among children. Those who hold a positive view stated that if caregivers could control the children's media [13] or discuss TV

content with children, watching TV can have a positive influence on conveying positive information about children [13]. Therefore, it is no surprise that the selection of proper media via TV and mobile devices by parents can positively influence children's sociability and other dimensions[14-16]. Past studies also showed that parental accompaniment is related to intervention during television exposure [17]. Therefore, this study explored whether parents' time with children plays a significant role in assisting with media selection via electronic devices and the relationship between children's use of electronic devices and their sociability.

However, how parents' time with children affects the relationship between the children's use of different electronic devices (mobile or stationary devices) and sociability should be further clarified. A television is usually fixed and not easy to move, but mobile devices such as laptops, tablets, and mobile phones are easy to carry [18]. Because many parents work during the daytime, they might only accompany their children at home in the evenings [19]. Thus, children watching television (or other stationary devices) is quite common for the majority families during weekdays [10]. During the weekends and holidays, because parents usually have more time to take their children out, mobile devices might be more convenient to use, especially during trips to calm children down [19]. Because of the characteristics of electronic devices, this study also investigated how parents' time with children on weekends and holidays versus weekdays affects the relationship between different types of electronic devices and children's sociability.

Based on this evidence, this study proposed the following research questions:

Q1: Does parents' time with children on weekdays or weekends and holidays have a mediating or moderating effect in the relationship between using stationary devices and children's sociability?

Q2: Can the negative effect of using stationary or mobile devices on children's sociability be

lowered by the mediating effect of parents' time with children on weekdays or weekends and holidays?

To determine the effect of parents' time with children on the relationship between children's use of electronic devices and their sociability, other possible factors were treated as control variables. The first was parents' education, because education affects the parents' ability to guide their children's interpersonal interactions, which further influences the children's sociability [7, 20]. Second, parents' negative emotional status can influence their children's emotions and social competence development [21]. However, when parents interact with their children with joyful and positive attitudes, the children can learn sociability, such as empathy, care, and sharing [7]. The final control variable was child's health status. The social competence development of children with poor health status, such as interacting and sharing with peers with mental disabilities and autism, are significantly inferior to children with good health status [22].

Methods

Data and sampling

This study explored these hypotheses through quantitative research, based on data from Kids in Taiwan: National Longitudinal Study of Child Development and Care (KIT). The construction of KIT aimed to establish a long-term database regarding the development of local children and focuses on the process and evolution of the health and various dimensions of children from birth to 8 years old in Taiwan, as well as the effects of families and preschool experience on the children's development [23]. The database project has passed the ethical examination of the Institution Review Board (IRB) of National Taiwan University (No. 201408ES007) and National Taiwan Normal University (No. 201707HS003). The database of KIT wave 1 used in this study was released on April 2, 2019 [24]. This study was also approved to use the database by the

committee on August 14, 2019.

This study analyzed the first group of KIT data, which was limited to parents with children born from April 1, 2013, to March 31, 2014, and aged 36 months and the informed consent was obtained from all subjects. The sampling was based on two phases of the stratified proportionate to size approach; the first sampling unit was town and city, and 358 towns and cities in Taiwan were classified into 19 geographic stratifications. The second sampling unit was parents, who were selected randomly. The first group of KIT participants were 2,164 parents [23], the final sample used in this study. All methods used in this study were carried out in accordance with the guidelines and regulations of the KIT project that were approved by IRB.

Measures

Because the design of the database is precise, the related items in KIT met the requirements of this study. The operational definitions of the variables in this study were consistent with the content in KIT; therefore, the validity issue of the propriety of data [25] in the analysis of the secondary database was avoided.

Independent Variables

Using Stationary Devices

Measurement of this variable was based on one item from the questionnaire: “On average, how much time each day does the child spend on watching TV (including all kinds of recorded media, such as DVDs)?” The scoring is from 1 (*none*) to 12 (*more than 5 hours*).

Using Mobile Devices

Measurement of this variable was based on one item: “Other than TV, on average, how much time each day does the child spend on using mobile devices (e.g., a laptop, a tablet computer, or a smart phone)?” The scoring is from 1 (*none*) to 12 (*more than 5 hours*).

Dependent Variable

The dependent variable, children's sociability, was measured by the sum of four items: "The child can cooperate with other children to accomplish the work"; "When playing with other children, the child takes turns to use the equipment and toys"; "The child likes to share his/her toys with other adults or children"; and "The child shares his/her things (e.g., toys or stationery) with other children." The scoring is from 1 (*never*) to 5 (*always*).

Mediator and Moderator Variables

To clarify the effects of the parents' accompanying their children at different times on the relationship between children's use of electronic devices and sociability, we divided the parents' time with children into two periods: weekdays versus weekends and holidays.

Time with Children on Weekdays

Measurement of this variable was based on the item, "On weekdays, how much time each day do you spend or interact with the child (e.g., playing a game, reading a book together, eating together, or talking)?" Scoring is from 1 (*none*) to 12 (*more than 10 hours*).

Time with Children on Weekends and Holidays

Measurement of this variable was based on the item, "On weekends/holidays, how much time each day do you spend or interact with the child (e.g., playing a game, reading a book together, eating together, or talking)?" Scoring is from 1 (*none*) to 12 (*more than 10 hours*).

Control Variables

To avoid the effects of other variables, this study had the following control variables. Father's and mother's education were based on the item, "The education levels of the child's father and mother." Father's and mother's negative emotional status (NES) were based on the item, "In the past 3 months, have you and your spouse felt sad, depressed, and unhappy?" Scoring is from 1

(*never*) to 4 (*often*). Child's health status was based on the item, "In your opinion, what is the current health condition of the child?" Scoring is from 1 (*serious health issue*) to 4 (*very healthy*).

Results

Regarding using stationary devices, 57% of the children spent less than 1.5 to 2 hours each day watching TV. Compared with stationary devices, children spent much less time using mobile devices. About 78% of the children spent 1 hour or less on a laptop, tablet computer, or smartphone each day (Table 1).

More than 50% of parents spent 1 to 6 hours each day with their children on weekdays, whereas 25.6% ($n = 553$) spent more than 10 hours with their children. However, during weekends and holidays, 69% of parents spent more than 10 hours each day with their children (Table 1).

Participants with a university or two-year college degree were most prevalent among both fathers (32.4%, $n = 701$) and mothers (40.0%, $n = 865$), followed by senior high school graduates for fathers (28.7%, $n = 622$) and mothers (25.9%, $n = 560$). Regarding negative emotional status, 80% of fathers and 74% of mothers did not feel or rarely felt sad, depressed, and unhappy. Finally, more than 62% of children were reported to be very healthy, and only 2.1% were often sick or had severe health problems (Table 1).

This study used regression analysis to examine the relationship between relevant variables and children's sociability. First, this study examined the moderating effect of parents' time with children on weekdays or weekends and holidays on the relationship between the children's use of electronic devices and sociability. Based on the results, the F -value of the overall model is 6.483 ($p < .001$). Among the variables, using stationary devices ($\beta = -.074$, $p < .001$) and using mobile

devices ($\beta = -.054, p < .05$) showed negative correlations with children's sociability. In addition, time with children on weekends and holidays and children's sociability had a significant positive correlation ($\beta = .060, p < .05$). However, time with children on weekdays was not related to children's sociability ($\beta = .042, p > .05$) (Table 2).

When we tested the moderating effects of parents' time with children, only time with children on weekdays moderated the relationship between using stationary devices and children's sociability ($\beta = .048, p < .05$), not time with children on weekends and holidays ($\beta = -.012, p > .05$). Neither time with children on weekends or holidays ($\beta = -.004, p > .05$) nor time with children on weekdays ($\beta = .017, p > .05$) moderated the relationship between using mobile devices and children's sociability (Table 2).

To explore the moderating effects of time with children on weekdays in the relationship between using stationary devices and children's sociability, this study analyzed the simple effects of the previous significant interactive variables. This study classified using stationary devices and time with children on weekdays based on the variable means. Because the mean of using stationary devices was 4.67, a score of 1 to 4, which is lower than the mean in the original questionnaire, was classified as "seldom using stationary devices," whereas a score 5 to 12, which is higher than the mean, was classified as "often using stationary devices." Regarding time with children on weekdays ($M = 7.13$), a score of 1 to 7, which is lower than the mean in the original questionnaire, was classified as "spending less time with children," whereas a score of 8 to 12, which is higher than the mean, was classified as "spending more time with children." According to the results, although children's use of stationary devices negatively influenced their sociability, compared to parents who spent less time accompanying their children on weekdays, those who spent more time positively enhanced their children's sociability (Fig. 1).

Second, this study also attempted to demonstrate whether the relationship between using electronic devices and children's sociability was mediated by parental time with children. Hierarchical regression analysis and multiple linear regression analysis were used. Using mobile devices influenced children's sociability via the partial mediating effect of time with children on weekends and holidays. The results showed that the direct effect of using mobile devices ($\beta = -.061, p < .01$) and using stationary devices ($\beta = -.079, p < .001$) on children's sociability in the first step was significant. After entering the mediators in the second step 1, such as time with children on weekdays and time with children on weekends and holidays, both effects of using mobile devices ($\beta = -.056, p < .05$) and using stationary devices ($\beta = -.075, p < .001$) on children's sociability was reduced (Table 3).

Because only time with children on weekends and holidays was significantly related to children's sociability, we further tested whether the two types of electric devices affected the time with children on weekends and holidays to clarify the mediating effect. The results show only using mobile devices significantly affected time with children on weekends and holidays ($\beta = -.075, p < .001$) (Table 4). Therefore, time with children on weekends and holidays partially mediated the relationship between using mobile devices and children's sociability (Fig. 2).

Discussion

Time with Children on Weekdays Moderated the Relationship between Using Stationary Devices and Children's Sociability

A past study showed that using electronic devices may have negatively resulted from the amount of violent TV exposure among children [12]. However, the current study indicated when the parents spent more time with children on weekdays and children used stationary devices more frequently, their sociability improved. In contrast, when parents spent less time with children on

weekdays and the children used stationary devices more frequently, their sociability was not affected. That is, when parents spent more time with children on weekdays, regardless of using stationary devices, their children's sociability was superior relative to parents who spent less time accompanying them on weekdays. Why did only parents' time spent with children on weekdays moderate between using stationary devices and children's sociability? Stationary devices (such as television) are common in Taiwanese families [26]; thus, they play an important role in conveying daily information in family life [27]. Especially when parents are busy with household chores after work, it can be easier to let their children watch television [17]. Thakkar et al. [28] found that choosing appropriate TV programs has educational functions for children and can enhance their knowledge and imagination. That is, when children use stationary devices, parents can spend time with them and educate them [29]; hence, children will acquire interpersonal skills, such as sharing, being sociable, and cooperating, which reinforces their sociability [30]. Therefore, if parents can spend time accompanying their children when they use stationary devices and take the opportunity to educate them, it will reinforce the development of the children's sociability.

Time with Children on Weekends and Holidays Partially Mediated the Relationship between Using Mobile Devices and Children's Sociability

According to findings of this study, the negative effect of using mobile devices on children's sociability can be partially mediated by time with children on weekends and holidays. With the rapid development of information and communication technology, mobile devices such as tablets and smart phones provide information transmission, communication, video and audio, games, and other convenient functions including entertainment [31]. Therefore, in Taiwan, parents who go out with children on weekends or holidays often use mobile devices as a babysitter [32].

Nowadays, parents using their laptop computer, tablet, or mobile phone to communicate with others, be entertained, or calm their children [33] is quite normal [10]. However, the use of mobile devices can have a negative impact on children's sociability. If parents spend more time to deliver relevant and correct information to the children, they can decrease the negative effect of using mobile devices and reinforce the development of their children's social behavior.

Conclusions

The preschool phase is a critical period for individuals' sociability, and parents or the main caregivers of children considerably influence the children's development [34]. During this phase, without proper care and cultivation, the children's development of sociability can be negatively influenced, including their interpersonal relationships and interactions [20]. According to findings of this study, parents' time spent with their children is a significant factor that influences their sociability. Of two periods, time with children on weekdays was a moderator between using stationary devices and children's sociability, whereas time with children on weekends and holidays had a partial mediating effect between using mobile devices and children's sociability. Although using different types of electronic devices can affect children's sociability based on this result, parental company and intervention can moderate or mediate the negative effect and help children improve their sociability.

Future planners of childcare policies and governmental sectors involved in parental education should consider how to encourage parents to spend more time with their children and learn to educate or transfer life skills to children by accompanying them while using electronic products, so that children can learn to cooperate and share with others through the use of electronic devices in their daily lives.

In addition, children's health, a control variable in this study, was a vital factor for children's

social sociability. Children's health positively influenced their sociability; when children were healthier, their sociability improved. Thus, caregivers of children should reinforce their childcare competence, create a healthy life environment, assist the children with cultivating healthy life habits and skills, and strengthen their health and sociability by participating with them in health activities and parental education [12]. To more thoroughly comprehend factors related to children's sociability, future research should include children's health as an important variable.

Abbreviations

IRB: Institution Review Board; KIT: Kids in Taiwan: National Longitudinal Study of Child Development and Care; NES: Father's and mother's negative emotional status.

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Ethics and consent to participate

The database project has passed the ethical examination of the Institution Review Board (IRB) of National Taiwan University (No. 201408ES007) and National Taiwan Normal University (No. 201707HS003). Written informed consent is obtained from all participating families.

Authors' contributions

CFL and SMT conceived the study, involved in the study design, data analysis, drafted and critically reviewed the manuscript. All authors read and approved the final manuscript, and agree to be accountable for all aspects of the work.

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Availability of data and materials

The datasets used and/or analyzed during the current study are available upon reasonable request

by contacting https://srda.sinica.edu.tw/datasearch_detail.php?id=2953 .

Consent for publication

Not applicable.

Competing interests

The authors declare no competing interests.

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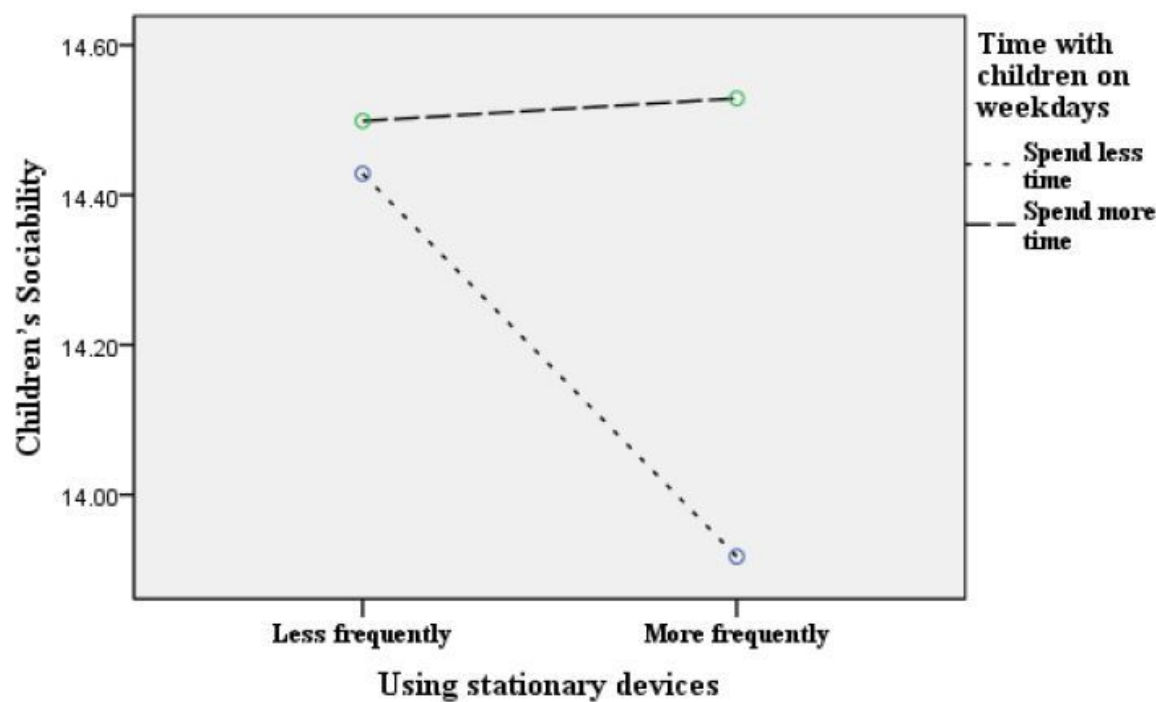
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Figures



Mean of Covariates: Father's education = 14.520, Mother's education = 14.467, Father's NES = 1.730, Mother's NES = 1.858, Children's health status = 3.603, Using mobile devices = 2.758, Time with children on weekends and holidays = 10.783

Figure 1
Interaction effect of using stationary devices and time with children on weekdays

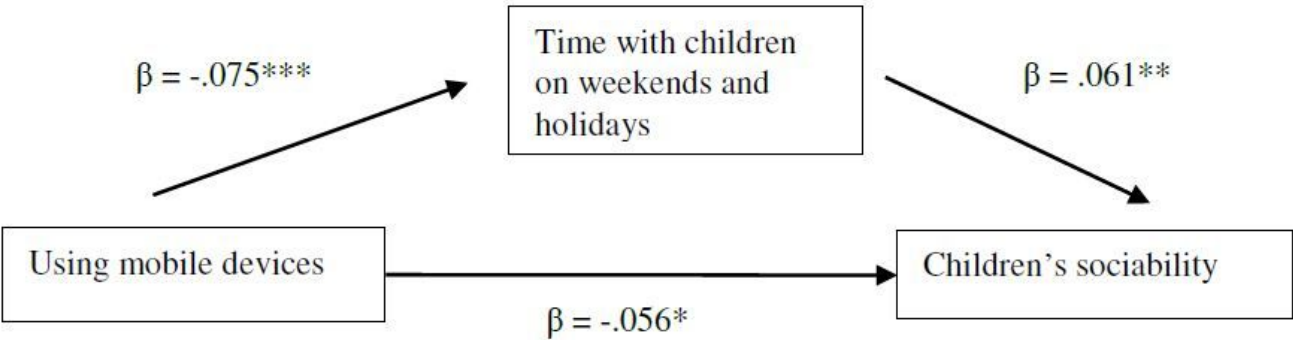


Figure 2

Mediating effect of using mobile devices and time with children on weekends and holidays Note. Control variables: father's education, mother's education, father's NES, mother's NES, and children's health status. * $p < .05$. ** $p < .01$. *** $p < .001$.

Supplementary Files

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