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DIGITAL TOOLS AND LANGUAGE IN CHILDREN AGED BETWEEN 8 TO 36 MONTHS

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ABSTRACT — AIM: In the last ten years, digital tools have become common in children. Language skills are important and emerge in childhood. The purpose of the present study is to find a potential relation between digital tools use and language skills in children aged 8 to 36 months, considering other factors.
METHODS: This is an observational cross-sectional study that included a total of 260 subjects between 8 and 36 months. Parents of all children completed a questionnaire that explores usage of digital tools by children, and another one for language skills (MacArthur-Bates).
RESULTS: We found a significant negative relationship between the daily time of use of digital devices and the gestures and actions Quotient (ß = −0.397) in subjects aged 8 to 17 months, and between the daily time of use and the quotient of the lexicon (ß = −0.224) in subjects aged 18 to 36 months.
CONCLUSION: We have shown that a major use of digital devices was linked to lower abilities of actions and mimics in subjects 8–17 months of age and to worse language performances in subjects aged 18 to 36 months. The other explored factors were not linked to these results.

KEYWORDS — children; digital tools; language; neurodevelopment.

INTRODUCTION

The language skills develop during the first childhood (Gauvain, 2001) through the exploration of the environment that surround children (Bronfenbrenner, 1979; Burlea et al., 2010) The use of digital devices has increased over the years (Vaala et al., 2015). It was found that cartoons that had a high narrative content were positively associated with wider vocabulary skills and expressive language, if there are not identified physical causes (Lupu et al., 2016a; Lupu et al., 2016b). Parents can stimulate an active use of digital tools. The interactions between parents and their children are lower due to the presence of television (Courage & Howe, 2010). Almost all 0 to 4 year old used a mobile device (Kabali et al., 2015). Most of children of 1–3 years of age use mobile devices for entertainment, only. Parents refer mobile devices to be more difficult to control in terms of time and contents. Digital tools are often used to calm children (Kabali et al., 2015). There are not many studies on Italian children, toddlers and preschoolers. The aim of this study was to explore the relationship between language skills and the time spent on digital tools in children aged 8 to 36 months, hypothesizing that devices negatively influence language development. Another goal was to highlight the influence of other factors like gender, age, status, content of digital devices and social activities. It was hypothesized that the shared vision and the contents seen may influence the relationship between the use of digital tools and language skills. A difference is hypothesized between children who use digital devices with their parents and those who use them alone.

METHODS

Sample and Characteristics – the present study was carried out in 260 children (140 males=54%) aged 8 to 36 months (mean=23.5±7.18 months) in 20 nursery schools in Salerno (Italy). The sample consisted of two subgroups: 72 children between 8 and 17 months (mean13.8±3.5) and 188 aged 18 to 36 months (mean=27.1 ± 4.4).The sample had a typical psychomotor development and the two subgroups were homogeneous as for the main features considered. Medical or neuropsychiatric conditions were the only exclusion criteria.

Digital Devices Questionnaire (DDQ) is a non-standard questionnaire for the assessment of the use digital tools by children.

Il Primo Vocabolario del Bambino (PVB) Forma Breve — Italian Adaptation of the MacArthur-Bates Communicative Development Inventory (CDI) Short Form (Fenson et al., 2000): a standardized questionnaire compiled by parents, that consists of the form "Gestures and words", for children between 8 and 17 months, and the form "Words and phrases" to analyze the language skills of subjects aged between 18 and 36 months.

Statistical Analysis — Data were expressed as mean, standard deviation and percentage. The distri-

bution of the data was verified by means of a preliminary normality test (Shapiro-Wilk Normality Test). The relationship between the different variables was evaluated by linear regression analysis. The influence of other factors was verified by subsequent moderation analyzes. Bonferroni's correction for multiple comparisons was used; P-values <–0.0025 were considered statistically significant. Data were analyzed by means of SPSS, version 23.0.

RESULTS

Use of digital devices by children — According to the parents, the first digital tools used by children were television and smartphones, followed by tablets, personal computers and video games. Smartphones (66%) and television (60%) were children's favorite digital devices, but older ones preferred smartphones over smaller ones. The tablet ranked third (252.17%), mainly in older children. The average age of the first use of a digital instrument was always earlier in the group of younger children than in the group of older children. Overall, the mean time spent on digital devices by the children was 2.13 ± 2.04 hours / day. Digital tools were used by children mainly in the presence of their parents (75%) or siblings (9%), while only 5% of cases were used unsupervised; a programmed digital parental control was reported in 11%. Children preferred videos with dialogue (75%). Parents drive digital tool content in 89% of younger children and 41% of older children. Parents in both groups reported allowing their children to use digital tools *to soothe the child* (36%) or *to entertain* (42%). Children often used digital devices even during meals (37%) or before bedtime (9%). According to parents, some children, especially older ones, did not respond to their name when called (2%) or interact with others (5%) when using digital tools. When digital devices were removed, 6% of children were frustrated. About 33% had sleep problems slightly prevaling in the younger group. Finally, 53% of parents said they were concerned about the health consequences of using digital tools, but only 19% of parents consulted their pediatrician.

Relationship between use of digital tools and language skills in children — Linear regression analysis (ß = –0.397; R2 = 0.158; p = 0.001) showed a statistically significant negative relationship between the quotient of actions and gestures (AGQ) and the daily total time of exposure to digital devices. Furthermore, linear regression analysis revealed in younger children a statistically significant negative relationship between the total daily exposure time to digital tools and the shares quotient scores and gestures (AGQ).

DISCUSSION

The aim of our study was to verify whether there was any relation between language skills and the time spent on digital devices in children under 3 years. A significant finding emerged from the analysis of our study is that at least one of the most popular digital devices was used in 97% of children. Digital tools were used by all children aged 18 to 36 months and by 89% of children aged 8 to 17 months. Smartphones (66%) and television (60%) were children's favorite electronic media; a slight preference for smartphones emerged in the group of older children compared to younger children (71% vs 53%). The tablet was preferred by 17% of the total sample and by 21% of children between 18 and 36 months. These results would suggest that there is an increasingly early exposure to digital tools. Digital Devices are used on average 2 h/day, with a slight difference between the two groups. Vandewater et al. (2007) reported that digital media was used by 40% of children aged 6 to 23 months for 2 or more hours per day. Digital devices are used by most children together with their caregiver (75%) or siblings (9%). Automatic parental control is used by 11% of parents. In agreement with previous literature, our results showed that parents let their children use digital devices while they are engaged in other activities (Radesky et al., 2016), to entertain (42%) or to calm the child (36%), during meals (37%) or before the child went to sleep (9%). In some children aged 18 to 36 months, parents reported some atypical behaviors during digital device use, including no response to name when called (2%) or poor interaction with others (5%); 6% of babies cried stubbornly if digital tools was removed. Based on these results, it could be hypothesized the time spent on electronic devices may decrease social relationships and worsen emotional regulation, in agreement with previous studies (Radesky et al., 2014, Reid Chassiakos et al., 2016). On balance, according to reports from parents, about 33% of children had sleep problems, with a slight prevalence in the younger group. Previous studies have already shown an association between sleep disturbances and media overuse by children. Notably, a recent cross-sectional study showed that the daily use of a tablet or smartphone was linked to a shorter total sleep time and a longer sleep onset latency regardless of other factors, for example the type of screen exposure (TV or video game) (Chindamo et al., 2019). Finally, 53% of parents were concerned about their children's health regarding the use of digital tools, but only 19% of parents had already consulted their family doctor. Children who used more time digital devices had a reduced repertoire of communicative gestures. It must be considered that gestures and facial expressions are two important indicators of the pre-

verbal communication skills of children in this age group. In children aged 18 to 36 months, there was a negative relationship between the lexical quotient and the time of digital tools use. In this case, children who used digital tools for longer had less word production. In both cases the relationship found was not significantly affected by gender, age, and socioeconomic status (Reid Chassiakos et al., 2016). Poor cognitive and linguistic skills were associated with early age of onset of media use, cumulative hours of media use and content (Madigan et al., 2020; Moon et al., 2019). Particularly, the evidence shows that media use in children under the age of two has limited benefits; the American Academy of Pediatrics (AAP, 1999, 341–343) discourages media exposure below this age. It would seem, in fact, that verbal and non-verbal problem-solving strategies can be taught thanks to the interaction between parents / guardians and children under the age of 24 months (Brown, 2011). On the other hand, children under 30 months have poor benefit from 2D representations (video deficits) due to the poverty of symbolic thinking, and insufficient flexibility to transfer knowledge to the real world (Barr et al., 2013). Thus, in children under two years old, practical exploration and social interaction would favor the learning of linguistic, sensorimotor, and socio-emotional skills. Other studies suggest that the use of digital devices can benefit children based on age, developmental stage, characteristics of the child, methods of use and content. The use of the digital device, if shared with parents, would lead to an increase in language skills in children (Griffith et al., 2020). In our study the relationship between language and digital device usage was not significantly affected by co-viewing and digital content. This result should better be explored and *active* or *passive* co-vision, should be deepened in future research. Another limitation of the study is to use questionnaires aimed at parents, so further studies should use standardized direct tests to assess language and communication skills through (Radesky et al., 2016).

Over the last ten years, the use of digital tools has become increasingly widespread and, various researchers have shown that new media offer health benefits and risks for young children. In our study it emerged that a prolonged time of use of digital tools was associated with lower linguistic abilities in children between 18 and 36 months, and lower gestural and gestural abilities in children aged 8 to 17 months independently of age, sex, social status economic, content and method of use.

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