

1  
2  
3  
4  
5  
6  
7  
8  
9  
10  
11  
12  
13  
14  
15  
16  
17  
18  
19  
20  
21  
22  
23  
24  
25  
26  
27  
28  
29  
30  
31  
32  
33  
34  
35  
36  
37

Running head: Children's media use, parental supervision and attitudes

**Touchscreen Generation: Children's current media use, parental supervision methods and attitudes towards contemporary media.**

Katarzyna Kostyrka-Allchorne<sup>a</sup>, Nicholas R. Cooper<sup>a</sup>, Andrew Simpson<sup>a</sup>

**Affiliations:** <sup>a</sup>The University of Essex, Essex, United Kingdom

**Address correspondence to:** Katarzyna Kostyrka-Allchorne, Department of Psychology, University of Essex, Wivenhoe Park, Colchester CO4 3SQ, United Kingdom, tel. 0044 1206 873800, email: [kkosty@essex.ac.uk](mailto:kkosty@essex.ac.uk)

## 1 **Abstract**

2

3 **Aim:** To explore media preferences and use among young children, as well as to obtain  
4 information about parental supervision methods and beliefs about media. **Method:** Ninety  
5 parents of 3- to 6-year-olds, recruited from a relatively economically advantaged area in the  
6 United Kingdom, completed a media opinion survey. **Results:** Although traditional television  
7 remains the favourite type of media platform among young children, touchscreen devices are  
8 gaining in popularity, and may promote simultaneous multi-screen use. Moreover, parents  
9 believe that the effects of media on developmental outcomes are generally positive. However,  
10 they do monitor the content of traditional and new media their children are exposed to.

11 **Conclusion:** This study shows an emerging evidence of concurrent multi-screen use among  
12 very young children. More detailed examination of early media multitasking, and its relationship  
13 to cognitive and behavioural outcomes, is necessary.

14

15 **Keywords:** children, media multitasking, media supervision, parents, touchscreens

16

## 17 **Key notes**

- 18 • This study explored young children's (<6) media preferences and use, parental  
19 supervision practices and media attitudes.
- 20 • Young children engage in media multitasking by concurrently using more than one  
21 screen device and media multitasking is predicted by preference for and use of  
22 touchscreen devices.
- 23 • Parents strictly monitor foreground and background media content, but are liberal about  
24 controlling the amount of media use.

25

26

27

## 1 Introduction

2           There is no doubt that the rapid development of digital technology has changed how we  
3 communicate, work and spend our free time. Although many would agree that easy access to  
4 multifunction digital devices, such as smartphones or tablets, and high-speed Internet has  
5 improved our lives, brought about more freedom, and saved the time needed to complete many  
6 daily tasks, very little is known about the impact that modern technology has on adult cognitive  
7 and psychosocial functioning. Even less is known about how digital environment will influence  
8 developmental outcomes.

9           In 'Western' culture, today's older children and adolescents are undoubtedly *digital*  
10 *natives* – children, for whom digital technology is fundamental to daily routine (1). Their  
11 environment is saturated with electronic devices (2) and children appear to fully embrace  
12 opportunities provided by new technology to reduce boredom and to allow efficient use of their  
13 leisure time (3). However, there is a paucity of research that addresses the extent of new media  
14 use among younger children (< 6 years) and the effects of the digital environment on how they  
15 play, learn and interact with others. Traditionally, research has focused on the effects of  
16 television on the developmental outcomes, with a particular interest in how television viewing  
17 relates to learning, attention and behaviour. Many researchers and clinicians have expressed  
18 concern about the potentially deleterious effects of heavy television exposure or viewing  
19 inappropriate content (4, 5, 6). However, over 40 years of research has failed to provide  
20 consistent conclusions about the long-lasting impact of viewing on children's behaviour and  
21 cognition.

22           Considering that today's youngest digital natives are exposed to a rich multimedia  
23 environment on a daily basis, it is questionable whether traditional, single-screen television  
24 viewing remains a favourite childhood pastime. Previous literature suggests that adolescents  
25 and young adults are extensive media multitaskers, who constantly access single or multiple  
26 digital platforms to engage with parallel media activities (7, 3, 8, 9). At the centre of young  
27 people's multitasking activity is a computer, a *meta-medium* that allows the simultaneous use of  
28 several media streams (e.g., film, text, music) and constant switching from one activity to

1 another (10). Very young children may lack cognitive and motor skills required to use a  
2 computer or operate a keyboard and mouse successfully. However, easy-to-use touchscreen  
3 devices such as tablets and smartphones that afford the same multitasking functions may  
4 provide a suitable alternative platform to engage in media multitasking from a very young age.

5         Tablets are becoming increasingly prevalent among preschool children. In the UK, 53  
6 per cent of 3- to 4-year-olds use a tablet at home, with one in seven preschoolers owning their  
7 own (11). Moreover, qualitative findings show that, unlike TV viewing that usually occurs at set  
8 times, young children's touchscreens use is irregular yet frequent (12). However, no quantitative  
9 research investigates whether the availability of these devices affects children's media use.  
10 Commercial adult media research suggests that touchscreens do not replace but are used in  
11 conjunction with traditional screen viewing. For example, 84 per cent of tablet/smartphone  
12 owners use these devices for other activities (e.g., web surfing, games, messaging) while they  
13 watch TV (13). One way, in which children learn behaviour, is the observation of others (14).  
14 Thus, young children who have access to or own a tablet or a smartphone may model their  
15 behaviour on their parents or older sibling screen use and engage in a similar form of media  
16 multitasking.

17         However, a decision whether a child can have a tablet, and how she can use it, depends  
18 on a parent. Ultimately, parents shape children's home environment, and parents' rules and  
19 supervision practices are strong predictors of how much children engage with digital devices  
20 (9). Nathanson (15) proposed three ways in which parents monitor their children's media  
21 exposure. "Active" supervision requires parents to discuss media content with children. In  
22 contrast, "restrictive" supervision imposes rules relevant to the amount of content or exposure.  
23 Finally, "covieing" involves watching a programme with a child. These different forms of  
24 monitoring allow parents to control and shape their children's digital environment across the key  
25 domains of media exposure (i.e., content, amount and context). However, their implementation  
26 is contingent on parents' beliefs about media effects (16), as well as family factors that may  
27 either facilitate or hinder the use of these practices (17). Specifically, the literature suggests  
28 that, on the one hand, parents seek information about age appropriateness and content of films

1 and electronic games, and comply with industry-imposed ratings (18). On the other hand, they  
2 are reluctant to observe paediatricians' recommendations to reduce children's screen time (19)  
3 or may even disagree with such advice (20).

4         Qualitative research provides some explanation for inconsistencies in parents' approach  
5 to supervising children's screen use. Typically, parents use screen devices when occupying  
6 children with alternative activities is more challenging, such as, for example, when doing  
7 housework or in busy public or constrained spaces (e.g., in a doctor's waiting room, in a car  
8 etc.). Moreover, screen devices are used as means of reward and punishment or conflict  
9 reduction (12, 17). Parents also believe that digital media may be beneficial to children's  
10 cognitive and social development. For example, educational programmes and games are seen  
11 as a good source of learning opportunities (12), whereas video calling applications allow face-  
12 to-face communication with extended family (21). Finally, contrary to the concerns about  
13 children's media exposure expressed by childhood experts (4), parents believe that, in general,  
14 traditional media, such as, for example, television and computers, have a positive role in  
15 children's development and that early involvement with technology is beneficial for their  
16 children's prospective school achievements and employment (12, 20).

17         In sum, parental attitudes towards technology and supervision practices appear to play a  
18 vital role in determining how children use screen media at home. However, much of the  
19 evidence comes from the studies that were either conducted before the rapid expansion in use  
20 of touchscreen devices or are qualitative and thus, do not allow exploring the associations  
21 between measured variables. Therefore, the overarching goal of this study is to gain more  
22 insight into the major domains (i.e., children's and parents media use, supervision methods and  
23 knowledge and beliefs about popular media) that shape the family media environment using  
24 quantitative methods. Specifically, the first aim of this study is to document young children's (<6  
25 years) current media preferences and use. The second aim is to examine whether young  
26 children engage in simultaneous multi-screen activities and whether early 'multitasking' with  
27 media is related to the use of touchscreen devices. The final aim is to investigate parents'  
28 monitoring methods and beliefs about contemporary media.

## 1 **Method**

### 2 *Participants*

3           The study was approved by the local Ethics Committee. Before the study began, parents  
4 had received a letter providing information about the project and contact details of the Principle  
5 Investigator. Participants were 90 parents of 3-6-year old children (boys, n=46; girls, n=39; a  
6 further 6 participants failed to provide information about gender); 9% of respondents were  
7 fathers. Children's mean age was 4.23 years (SD= 0.78). Information about parents' education  
8 is provided in Table 1. Although the data regarding participants' ethnicity and income were not  
9 collected, the sample was recruited from preschools and schools predominantly attended by  
10 children from White middle- to high-income families.

### 11 *Materials*

12 A self-reported questionnaire adapted from Funk, Brouwer, Curtis and McBroom (22; see  
13 Supporting Information) contained questions about parents' level of education and media  
14 habits, child's age and gender. Furthermore, parents answered questions regarding their  
15 children's media preferences and media use, media supervision methods, and beliefs about the  
16 effects of media on developmental outcomes.

#### 17 *1.1. Children's media preferences and media use*

18 To measure opinion of their children's media preferences, participants were asked to rate the  
19 popularity of six common screen media platforms (TV, DVD, computer, tablet, game console  
20 and smartphone). Further, three items measured how much time children spent in an average  
21 week on watching TV and films, using a tablet &/or a smartphone and using a computer. In  
22 addition, parents rated the frequency of their child using a tablet to watch TV and films, play  
23 entertainment games and access educational applications (apps). Finally, to assess multi-  
24 screen use, parents were asked to rate how often their child simultaneously used more than  
25 one screen device.

#### 26 *1.2. Parents media use*

27 Parents' entertainment media use was assessed with two items that measured how often  
28 participants watched TV/films and played tablet/smartphone games.

### 1 1.3. *Supervision methods and ratings familiarity*

2 Two questions, each comprising of four items, examined *the ways* (i.e., different forms of co-  
3 viewing and/or restrictive supervision based on, for example, industry ratings), in which parents  
4 supervised children's media content. The first question assessed how parents monitor the  
5 appropriateness of TV programmes and films and the second assessed monitoring of games  
6 and apps. Further, four items were used to assess *the strictness* of supervision in relation to  
7 traditional and new media content. Specifically, two items assessed how strictly parents  
8 monitored the content of television/films watched by a child and games/apps played by a child  
9 (i.e., *foreground* exposure to media). Further two items assessed how strictly parents monitored  
10 the content of TV/film and games/apps played *in the background* when a child was present in  
11 the room. Finally, one item measured whether parents monitored the overall amount of screen  
12 time.

13 Familiarity with industry ratings for media content was assessed with two items.

### 14 1.4. *Beliefs about popular media*

15 Two questions investigated parents' beliefs about the effects of popular media. The first  
16 question measured how parents perceived the severity of four media features that were  
17 understood to be deleterious (i.e., inappropriate language, inappropriate behaviour, violent  
18 content, fast editing pace). The second question measured parents' perception of the potential  
19 positive and negative effects that different features of media might have on children.

20 *(Insert Table 1 here)*

### 21 *Procedure*

22 Two hundred and ten questionnaires were distributed to parents of 3- to 6-year-old  
23 children attending two primary schools and four preschools in a semi-rural county of England.  
24 Parents completed the questionnaires at home and returned the forms to the school office or a  
25 preschool manager. The schools and preschools assisted in the data collection process by  
26 sending text message reminders to eligible parents. The final response rate was 43 per cent.

## 27 **Results**

### 28 1.1. *Children's media use and media preferences*

1 Adopting the procedure employed by Funk and colleagues (22), children's average  
2 weekly media use was calculated by taking the mid-point of each response option, on a scale  
3 ranging from 0 to 15 hours. On average, children spent 13.42 hours per week using different  
4 types of media, and most time - 8 hours per week - was spent on watching television and DVDs  
5 (see Table 2). Independent-samples t-test was used to test gender differences in media use.  
6 The results showed that boys used tablets/smartphones significantly more than girls,  $t(82) = -$   
7  $3.448$ ,  $p=.001$ , 95% CI:  $-3.56$  to  $-0.96$  and there was a trend (not significant) for boys to use  
8 more media overall,  $t(82) = -1.877$ ,  $p=.064$ , 95%CI:  $-5.19$  to  $0.15$ .

9 *(Insert Table 2 here)*

10 Figure 1 shows a detailed breakdown of children's media preferences (rather than use),  
11 estimated by parents. The results of a one-sample t-test (test value = 3, which represents  
12 'neutral' on the response scale) show that television, tablet and DVD mean ratings appear on  
13 the 'most favourite' side of the scale ( $t(89)=10.515$ ,  $p<.001$ , 95%CI:  $0.86$  to  $1.26$ ;  $t(88)=4.005$ ,  
14  $p<.001$ , 95%CI:  $0.22$  to  $0.67$  and  $t(87)=3.964$ ,  $p<.001$ , 95%CI:  $0.28$  to  $0.82$ , respectively).  
15 Moreover, the results of a paired-samples t-test show that, compared with tablets and DVDs,  
16 television remains the favourite type of media platform among this age group ( $t(88) = 2.755$ ,  $p$   
17  $=.007$ , 95%CI:  $0.14$  to  $0.85$  and  $t(87) = 4.675$ ,  $p<.001$ , 95%CI:  $0.34$  to  $0.86$ , respectively).  
18 Finally, the results of a paired-samples t-test reveal that tablets are as favoured as more  
19 traditional DVDs,  $t(87)= -0.537$ ,  $p=.568$ .

20 Conversely, the three remaining media platforms: computer, game console and  
21 smartphone have mean ratings on the 'least favourite' side of the scale ( $t(80)= -4.486$ ,  $p<.001$ ,  
22 95%CI:  $-0.93$  to  $-0.36$ ;  $t(83) = -6.120$ ,  $p<.001$ , 95%CI:  $-1.21$  to  $-0.62$  and  $t(83) = -4.96$ ,  $p<.001$ ,  
23 95%CI:  $-0.90$  to  $-0.38$ , respectively). Therefore, it is reasonable to conclude that they are  
24 relatively unimportant/infrequently used by 3- to 6-year-olds. Consequently, preference ratings  
25 for these platforms were excluded from any further analyses.

26 *(Insert Figure 1 here)*

27 Finally, children's use of tablets was explored (Figure 2). Most frequently, children used  
28 tablets to access educational games and apps, followed by playing entertainment games.

1 Conversely, children rarely used tablets to go online. The results of the one-way ANOVA  
2 showed that compared with girls, boys used tablets significantly more often to play  
3 entertainment games,  $F(82) = 8.459$ ,  $p=.005$  and to access educational apps/games,  $F(81) =$   
4  $4.448$ ,  $p=.038$ .

5

6 *(Insert Figure 2 here)*

### 7 1.2. Children's media 'multitasking'

8 Over 40% of children in the sample have concurrently used more than one screen  
9 device. This breaks down into 23.0% multitasking rarely, 17.8% multitasking sometimes, and  
10 just 3.3% multitasking often. There was no significant difference in the frequency of multitasking  
11 between boys and girls,  $t(82) = -1.304$ ,  $p=.196$ . Controlling for child characteristics (i.e., age and  
12 gender), multi-screen use was positively associated with the amount of time children spent  
13 using *touchscreen devices* ( $\beta=.396$ ,  $p<.001$ ). However, neither the amount of television nor the  
14 amount of computer use predicted multitasking. Similarly, entering preference rating scores for  
15 the three most favoured media platforms into a regression model showed that a preference for  
16 a tablet was positively associated with media 'multitasking' ( $\beta=.271$ ,  $p=.012$ ), whereas the  
17 preference for television and DVDs was unrelated to multi-screen use (both  $p>.05$ ). These  
18 results support our prediction that a preference for tablets and the use of tablets is crucial for  
19 early years media multitasking.

### 20 2.1. Parents media use

21 To assess parents' pattern of media use for entertainment purposes, the parents  
22 reported how often they played tablet/mobile games and how often they watched television and  
23 films. The frequency ratings of tablet/mobile games use fell on the 'never or hardly ever' side of  
24 scale, whereas the frequency of television and film watching fell on the 'often' side of the scale.  
25 The results of the paired-samples t-test indicated that, compared to playing tablet/mobile  
26 games, parents watched television significantly more frequently,  $t(86) = -13.391$ ,  $p<.001$ , 95%  
27 CI: -1.11 to -0.82.

### 28 2.2. Media supervision methods and familiarity with the industry ratings

1 Figure 3 shows that parents mostly rely on industry ratings to judge whether television  
2 programme/film or a game/app are appropriate for their child; and they do so equally for  
3 monitoring traditional television as well as the new media (i.e. digital games and apps).  
4 However, parents' familiarity with the ratings of conventional and new media is not the same  
5 (Table 3). Parents appear to be confident in their understanding of television and film ratings;  
6 over 70% are 'very familiar' with the ratings. In contrast, only 30.7% of parents are 'very familiar'  
7 with the ratings of games and apps and 17.0% are 'not familiar at all'. The results of the paired-  
8 samples t-test confirmed that parents are significantly less familiar with the ratings for games  
9 and apps than they are with the ratings of television programmes and films,  $t(87)=8.099$ ,  
10  $p<.001$ , 95% CI: 0.72 to 1.20.

11 *(Insert Figure 3 here)*

12 *(Insert Table 3 here)*

13 In order to determine which parental characteristics are associated with ratings  
14 familiarity, two regression models were built. In a model in which TV ratings familiarity was the  
15 outcome variable (controlling for maternal and paternal education) the frequency of television  
16 watching was not a significant predictor ( $\beta= .046$ ,  $p=.702$ ). Conversely, games/apps ratings  
17 familiarity was positively associated with the frequency with which *parents* played digital games  
18 ( $\beta= .283$ ,  $p= .017$ ).

19 Finally, Figure 4 presents how strictly parents supervise children's media exposure. The  
20 results of a one-sample t-test (test-value = 2, which represents 'moderately' on the response  
21 scale) show that parents' mean monitoring ratings of *foreground* content of TV/films and  
22 games/apps fall on the 'strictly' side of the scale,  $t(89) = 9.044$ ,  $p<.001$ , 95%CI: 0.43 to 0.68 and  
23  $t(85) = 9.579$ ,  $p<.001$ , 95%CI: 0.46 to 0.70, respectively. Similarly, the mean ratings of  
24 *background* TV/films and games/apps content monitoring appear on the 'strictly' side of scale,  
25  $t(88) = 6.157$ ,  $p<.001$ , 95%CI: 0.32 to 0.64 and  $t(84) = 6.501$ ,  $p<.001$ , 95%CI: 0.34 to 0.64,  
26 respectively. Conversely, the overall amount of screen time is monitored 'moderately', as the  
27 mean ratings were not significantly different from the test-value of 2,  $t(88)=-1.833$ ,  $p= .070$ . In  
28 addition, pairwise comparisons between four content variables (i.e., foreground TV/film,

1 foreground games/apps, background TV/film, background games/apps) show that parental  
2 monitoring of content is equally rigorous for all (all p-values >.05).

3 *(Insert Figure 4 here)*

### 4 2.3. Parents beliefs about popular media

5 When asked to rate the *severity* of various features of television and film that are thought  
6 to be detrimental to young children's development, parents seem most concerned about the  
7 violent content (Figure 5). The results of the paired-samples t-tests show that, compared to  
8 inappropriate language, inappropriate behaviour and fast pace, violent content was rated as the  
9 most harmful ( $t(89) = -6.020$ ,  $p < .001$ , 95%CI: -.63 to -.32;  $t(89) = -4.088$ ,  $p < .001$ , 95%CI: -3.5 to  
10 -1.2, and  $t(74) = 10.845$ ,  $p < .001$ , 95%CI: 1.11-1.61, respectively). Conversely, compared to  
11 inappropriate language and behaviour shown on the screen, parents appear to be least  
12 concerned about the effects of fast editing pace ( $t(74) = 7.625$ ,  $p < .001$ , 95%CI: 0.65 to 1.11 and  
13  $t(74) = 9.915$ ,  $p < .001$ , 95%CI: 0.88 to 1.33, respectively). Interestingly, 16% of parents did not  
14 rate how harmful the editing pace was, some leaving a question mark as a response.

15 *(Insert Figure 5 here)*

16 *(Insert Figure 6 here)*

17 Finally, parents expressed their beliefs about the effects of the popular media on children's  
18 development (Figure 6). The results of a one-sample t-test (test-value = 2, which represents  
19 'somewhat negative' on the response scale) show that parents believe that: (1) overall, the  
20 effects of popular media on children's development are somewhat positive,  $t(85) = 10.613$ ,  
21  $p < .001$ , 95% CI: 0.83 to 1.22; (2) the effects of watching fast-paced programmes are somewhat  
22 negative,  $t(83) = 1.885$ ,  $p = .063$ ; (3) the effects of watching educational shows are positive,  
23  $t(88) = 39.119$ ,  $p < .001$ , 95%CI: 2.24 to 2.48; and (4) the effects of watching violent content are  
24 very negative,  $t(88) = -16.903$ ,  $p < .001$ , 95%CI: -1.82 to -1.44.

25

## 26 **Discussion**

27 The aim of this study was to explore and document children's current media preferences and  
28 media use. Moreover, we set out to establish if young children (<6 years) engaged in

1 concurrent multi-screen use and whether early years media 'multitasking' was related to a  
2 preference for new touchscreen media, for example, tablets. Finally, this study examined how  
3 parents supervised their children's media use and their beliefs about the impact of media on  
4 developmental outcomes.

5 Consistent with the previous literature (23) 3-6-year-olds still prefer television to the  
6 newer forms of media. The average amount of weekly television viewing reported by parents in  
7 this study appears is similar to the amount reported by Funk and colleagues (approximately 8  
8 hours; 16). However, the overall weekly media consumption is higher; 13.42h per week vs.  
9 12.14h reported by Funk et al. (22). Moreover, based on parental estimation, tablets have  
10 become equally as preferred as more conventional DVDs. Further evidence that young  
11 children's media preferences and consumption patterns might be changing is supported by the  
12 finding that over 40 per cent of children's reported weekly media time is spent on using digital  
13 platforms such as tablets and smartphones and - to a lesser extent - computers. Importantly,  
14 this study found an emerging evidence of simultaneous multi-screen use among very young  
15 children. Moreover, media 'multitasking' was positively related to children's preference for  
16 tablets and the use of tablets/smartphones. It appears that the availability of small touchscreen  
17 devices that allow for most of the content to be accessed directly from the home screen with a  
18 simple touch or a swipe of a finger (21), facilitates engaging with multiple media streams even  
19 at a very young age.

20 Currently, very little is known about the relationship between media multitasking and  
21 cognition. The literature is scarce and presents inconsistent results. For example, some findings  
22 point to the detrimental effects of frequent multitasking on the performance in laboratory tests of  
23 executive function (8), and a negative relationship between multitasking and self-reported  
24 cognitive functioning (24). Conversely, other studies failed to support the findings that heavy  
25 media multitasking is related to poor cognitive performance (25), or even provided evidence for  
26 a positive relationship between media multitasking and the ability to integrate information from  
27 multiple sensory systems (26).

1           Although there is no convincing evidence for the deleterious effects of multitasking, the  
2 changes in children's media preferences and the simultaneous use of the several media  
3 streams pose a challenge for parents' supervisory practices. The findings from this study show  
4 that, mostly, parents rely on industry ratings to judge whether media content is appropriate for  
5 their children. However, their self-reported familiarity with the ratings of digital games and apps  
6 is poorer compared to their knowledge of television and film ratings. Perhaps this stems from  
7 the finding that over 50 per cent of parents in our sample do not play digital games or if they do,  
8 it is infrequent. Although it is reasonable to assume that many of the surveyed parents have  
9 adopted various aspects of modern technology at work or personal lives, unlike their *digital*  
10 *native* children, they had spent their formative years before a rapid technology expansion, and  
11 as *digital immigrants*, have yet to adapt to the changed environment (1).

12           The lack of familiarity with games/apps ratings and the cultural divide between *digital*  
13 *natives*, for whom the use of digital media comes naturally and *digital immigrants*, who still need  
14 time to get a full grasp of a new digital environment (1), are not the only challenges related to  
15 media monitoring. Undoubtedly, it is much easier to supervise the use of a family television set  
16 in the living room than it is to control children's activity on touchscreen devices that are portable  
17 and can be easily taken to the bedroom. Anecdotal evidence suggests that despite the  
18 availability of parental control settings, four in five parents do not turn it on, which creates the  
19 possibility of children accessing inappropriate content. This is of particular importance, as past  
20 research into the relations between television viewing and children's cognition and behaviour  
21 suggests that content, rather than the amount of media, is a stronger predictor of developmental  
22 outcomes (6, 27). Moreover, parents appear to be the least concerned about the amount of time  
23 their children spend in front of various screens than they are about harmful foreground and  
24 background content. Yet, the simultaneous use of several media platforms could mean that the  
25 overall amount of media exposure is much higher than what parents perceive to be the  
26 appropriate amount for their children. For example, older children manage to fill 7.38 hours  
27 physically spent in front of screens with over 10 hours of media content (9).

1           Finally, the findings from this study show that parents' ratings of harmful media features  
2 mostly mirror the concerns of researchers and clinicians. Parents consistently rated violent  
3 content and inappropriate language/behaviour presented on the screen as very harmful.  
4 However, despite the recently increased interest among media researchers in the effects of fast  
5 editing pace on children's attention and executive function (28, 29), it appears that many  
6 parents may be unaware of the suggestions regarding the potentially deleterious effects of fast  
7 pace made in the scientific literature. Alternatively, it may be difficult for parents to objectively  
8 quantify what constitutes a 'fast' editing pace and, in consequence, their responses could be  
9 biased. Nevertheless, perhaps parents should be made aware of the experts' concerns  
10 regarding the potentially harmful effects of exposure to rapidly edited material to allow them to  
11 make more informed choices about their children's media diet.

12           Although the data reported in this article are exploratory in nature, they are important as  
13 they point to the evidence of the new type of screen behaviour emerging among 3- to 6-year-  
14 olds. It appears that children begin to engage in simultaneous multiple screen use at a very  
15 young age, which may influence their cognitive functioning and poses challenges to parental  
16 supervisory practices. Yet, the findings from this study are limited by a relatively small number  
17 of responses and ethnically non-diverse (White) sample. Moreover, the area from which  
18 participants were recruited represents one of the most advantaged locations in the United  
19 Kingdom (30). Finally, multi-screen use was assessed with a single question, which only  
20 allowed a glimpse into children's behaviour. Further, more thorough, investigation of young  
21 children's media habits is necessary to make more robust inferences.

22           In summary, this exploratory study documented current media habits of 3- to 6-year-old  
23 children. The findings suggest that traditional television remains the favourite type of media  
24 platform among this age group. However, new touchscreen devices, such as tablets, are  
25 gaining in popularity and facilitate children engaging in multiple screen use, which may create  
26 new challenges for parental media supervision methods. Conversely, parents appear to use the  
27 new media platforms infrequently (at least for entertainment purposes) and are less familiar with  
28 industry ratings for digital games and apps than they are with film and television programmes

1 ratings. Finally, future studies should carry out a more detailed examination of concurrent multi-  
2 screen use among pre-schoolers and primary school children to gain a better understanding of  
3 its relationship to cognitive and behavioural outcomes.

4

5 **Acknowledgements:** We would like to thank our anonymous reviewers for their helpful  
6 feedback. Work on this manuscript was supported by a doctoral scholarship from the University  
7 of Essex received by Katarzyna Kostyrka-Allchorne.

8

## 1 **References**

- 2 1. Prensky M. Digital natives, digital immigrants, part 1. *On the Horizon* 2001; 9:1-6.
- 3 2. Ridout V. Zero to eight. Children's media use in America. *A Common Sense media*  
4 *research study*, 2013.
- 5 3. Jago R, Sebire SJ, Gorely T, Cillero I.H, Biddle SJH. "I'm on it 24/7 at the moment": A  
6 qualitative examination of multi-screen viewing behaviours among UK 10-11 year olds. *Int J*  
7 *Behav Nutr Phy* 2011; 8:85.
- 8 4. American Academy of Pediatrics, Committee on Public Education. Media education.  
9 *Pediatrics*, 1999; 104: 341–43.
- 10 5. Christakis DA, Zimmerman FJ, DiGiuseppe DL, McCarty CA. Early television exposure and  
11 subsequent attentional problems in children. *Pediatrics* 2004; 113: 708-13.
- 12 6. Conners-Burrow NA, McKelvey LM, Fussell JJ. Social outcomes associated with media  
13 viewing habits of low-income preschool children. *Early Educ Dev* 2011; 22: 256–73.
- 14 7. Courage ML, Bakhtiar A, Fitzpatrick C, Kenny S, Brandeau K. Growing up multitasking: The  
15 costs and benefits for cognitive development. *Dev Rev* 2015; 35: 5-41.
- 16 8. Ophir E, Nass C, Wagner, AD. Cognitive control in media multitaskers. *PNAS P Natl Acad*  
17 *of Sci USA* 2009; 106:15583-87.
- 18 9. Rideout VJ, Foehr UG, Roberts DF. Generation M<sup>2</sup>: media in the lives of 8-18 year-  
19 olds. *Kaiser Family Foundation*, 2008.
- 20 10. Wallis C. The impacts of media multitasking on children's learning and development:  
21 Report from a research seminar, New York, NY: *The Joan Ganz Cooney Center at Sesame*  
22 *Workshop*, 2010.
- 23 11. Ofcom. Children's media use and attitudes report, 2015.
- 24 12. Bentley GF, Turner KM, Jago RM. Mothers' views of their preschool child's screen-viewing  
25 behaviour: a qualitative study. *BMC Public Health* 2016; 16:718.
- 26 13. Demeritt C. IAB panel tackles 'Tablets and TV: Mastering Twin-Screen Opportunities'.  
27 Available from: [https://www.iab.com/news/iab-panel-tackles-tablets-tv-mastering-twin-](https://www.iab.com/news/iab-panel-tackles-tablets-tv-mastering-twin-screen-opportunities/)  
28 [screen-opportunities/](https://www.iab.com/news/iab-panel-tackles-tablets-tv-mastering-twin-screen-opportunities/) [Accessed 10th November 2016].

- 1 14. Bandura A. *Social Learning Theory*. New York: General Learning Press; 1971.
- 2 15. Nathanson AI. Parent and child perspectives on the presence and meaning of parental  
3 television mediation. *J Broadcast Electron Media* 2001; 45:201-220.
- 4 16. Vanderwater EA, Park S, Huang X, Wartella EA. "No—You Can't Watch That". Parental  
5 rules and young children's media use. *Am Behav Sci* 2005; 48:608-623.
- 6 17. Jago R, Zahara J, Edwards MJ, Kesten JM, Solomon-Moore E, Thompson JL, Sebire SJ.  
7 Managing the screen-viewing behaviours of children aged 5–6 years: a qualitative analysis  
8 of parental strategies. *BMJ Open* 2016; 6:e010355.
- 9 18. Gentile DA, Humphrey J, Walsh DA. Media ratings for movies, music, video games, and  
10 television: a review of the research and recommendations for improvements. *Adolesc Med*  
11 *Clin*, 2005; 16: 427-46.
- 12 19. Hinkley T, Salmon J, Okely AD, Crawford D, Hesketh K. Preschoolers' physical activity,  
13 screen time, and compliance with recommendations. *Med Sci Sport and Exer* 2012;  
14 44:458-65.
- 15 20. Vittrup B, Snider S, Rose KK, Rippy J. Parental perceptions of the role of media and  
16 technology in their young children's lives. *Journal of Early Childhood Research* 2014; 1-12.
- 17 21. Holloway D, Green L, Love C. "It's all about the apps": Parental mediation of their pre-  
18 schoolers' digital lives. *Media Int Aust incorporating Culture and Policy* 2014; 153: 148-56.
- 19 22. Funk JB, Brouwer J, Curtis K, McBroom, E. Parents of preschoolers: Expert media  
20 knowledge, media-effects beliefs, and monitoring practices. *Pediatrics* 2009; 123: 981-988.
- 21 23. Gutnick AL, Robb M, Takeuchi L, Kotler J. Always connected: The new digital media habits  
22 of young children. *New York: The Joan Ganz Cooney Center at Sesame Workshop*, 2010.
- 23 24. Baumgartner S, Weeda WD, Heijden LL, Huizinga, M. The Relationship Between Media  
24 Multitasking and Executive Function in Early Adolescents. *J Early Adolescence* 2014;  
25 34:1120-44.
- 26 25. Minear M, Brasher F, McCurdy M, Lewis J, Younggren A. Working memory, fluid  
27 intelligence and impulsiveness in heavy media multi-taskers. *Psychon B Rev* 2013;  
28 20:1274-81.

- 1 26. Lui KF, Wong AC. Does media multitasking always hurt? A positive correlation between  
2 multitasking and multisensory integration. *Psychon B Rev* 2012; 19: 647-53.
- 3 27. Linebarger, DL, Barr R, Lapierre MA, Piotrowski JT. Associations between parenting,  
4 media use, cumulative risk, and children's executive functioning. *J Dev Behav Pediatr*  
5 2014; 35:367-77.
- 6 28. Cooper, NR, Uller C, Pettifer J, Stolc FC. Conditioning attentional skills: examining the  
7 effects of the pace of television editing on children's attention. *Acta Paediatr* 2009;  
8 98:1651–55.
- 9 29. Lillard A, Peterson, J. The immediate impact of different types of television on young  
10 children's executive function. *Pediatrics* 2011; 128: 1-6.
- 11 30. English Indices of Deprivation (2015). Available from:  
12 <https://www.gov.uk/government/statistics/english-indices-of-deprivation-2015> [Accessed  
13 25th April 2016].
- 14  
15  
16  
17  
18  
19  
20  
21  
22  
23  
24  
25  
26  
27  
28

1 Table1. The highest level of education reported by parents.

Qualifications level	Highest educational level (%)	
	Mother (n=84)	Father (n=77)
GCSEs, BTEC and lower level vocational qualifications	34.4	42.2
A-levels and intermediate vocational qualifications	35.6	17.8
Diploma in higher education or a university degree	23.3	25.6
Missing information	6.7	14.4

2

3

4

5

6

7

8

9

10

11

12

13

14

15

16

17

18

19

20

21

22

23

24

25

26

1 Table 2. Children's weekly media use (hours per week).

	TV/DVD		Tablet/smartphone		Computer		Total	
	<i>Mean</i>	<i>(SD)</i>	<i>Mean</i>	<i>(SD)</i>	<i>Mean</i>	<i>(SD)</i>	<i>Mean</i>	<i>(SD)</i>
<b>All children</b>	8.00	(3.75)	3.98	(3.35)	1.44	(2.80)	13.42	(6.19)
<b>Girls</b>	8.30	(3.54)	2.60	(2.43)	1.00	(2.12)	11.90	(4.74)
<b>Boys</b>	7.70	(3.98)	4.90	(3.41)	1.80	(3.34)	14.40	(7.13)

2

3

4

5

6

7

8

9

10

11

12

13

14

15

16

17

18

19

20

21

22

23

24

25

26

27

28

1 Table 3. The frequencies of parents' familiarity with industry ratings for traditional and new  
2 media.

3

<b>Familiarity rating</b>	<b>Television and film (%)</b>	<b>Games and apps (%)</b>
Not familiar at all	0.00	17.00
Vaguely familiar	5.60	25.00
Quite familiar	20.00	27.30
Very familiar	74.40	30.70

4

5

6

7

8

9

10

11

12

13

14

15

16

17

18

19

20

21

22

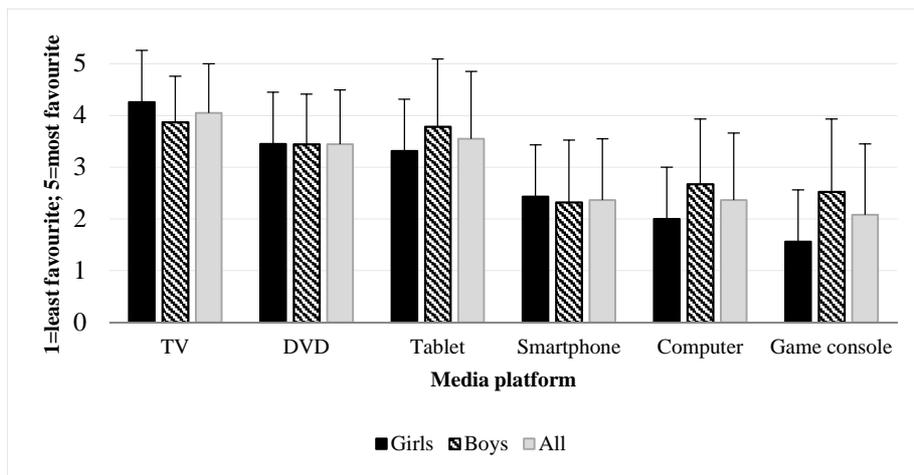
23

24

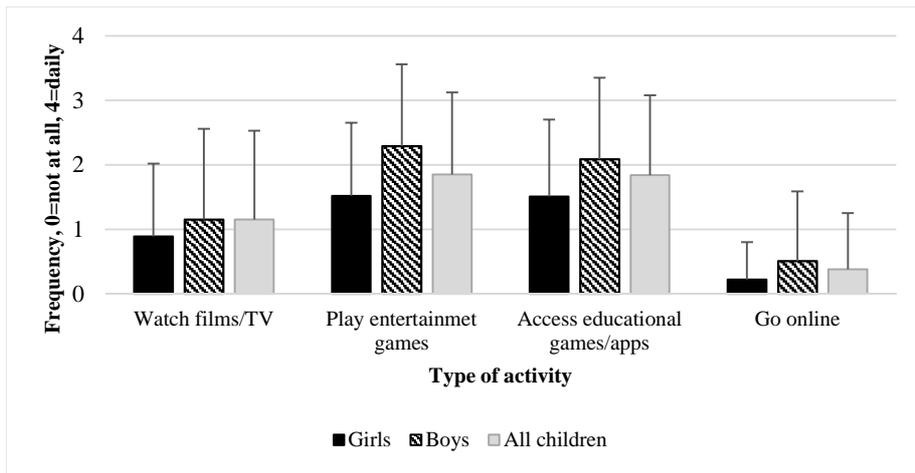
25

26

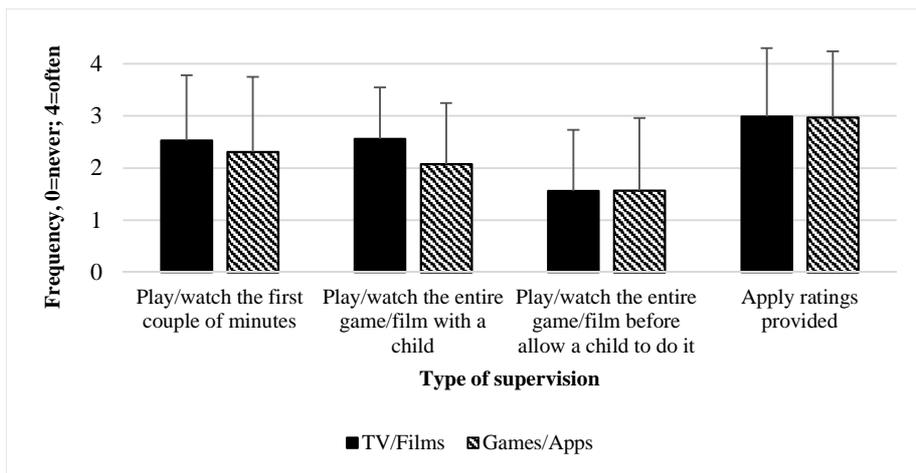
- 1 Figure 1. Children's media preferences by platform (error bars represent standard deviations).
- 2 Figure 2. Children's frequency of tablet use for various media activities (error bars represent  
3 standard deviations).
- 4
- 5 Figure 3. Parents' media supervision methods (error bars represent standard deviations).
- 6
- 7 Figure 4. The strictness of media supervision (error bars represent standard deviations).  
8 \*Denotes where mean ratings were significantly different from the test-value of 2.
- 9
- 10 Figure 5. Ratings of severity of harmful programme features (error bars represent standard  
11 deviations).
- 12
- 13 Figure 6. Parents' beliefs about developmental effects of popular media (error bars represent  
14 standard deviations). \*Denotes where mean ratings were significantly different from the  
15 test-value of 2.
- 16
- 17
- 18
- 19
- 20
- 21
- 22
- 23
- 24
- 25
- 26
- 27
- 28



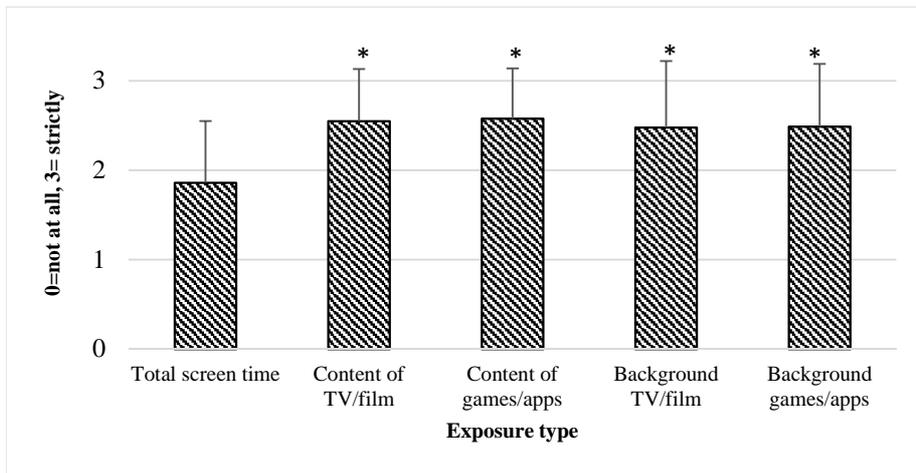
1  
2  
3  
4  
5  
6  
7  
8  
9  
10  
11  
12  
13  
14  
15  
16  
17  
18  
19



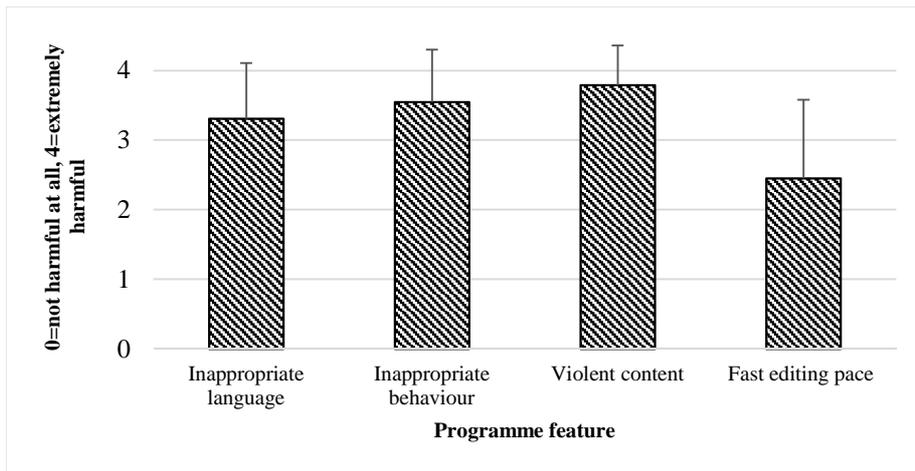
- 1
- 2
- 3
- 4
- 5
- 6
- 7
- 8
- 9
- 10
- 11
- 12
- 13
- 14
- 15
- 16
- 17
- 18
- 19



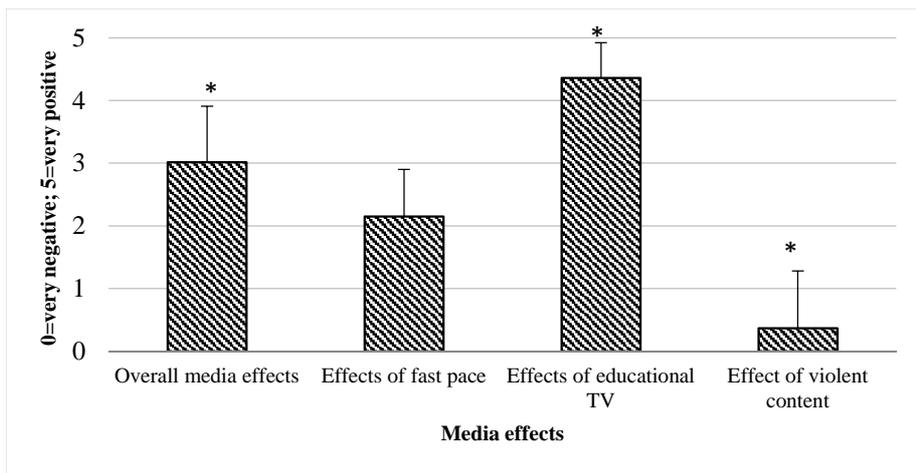
- 1
- 2
- 3
- 4
- 5
- 6
- 7
- 8
- 9
- 10
- 11
- 12
- 13
- 14
- 15
- 16
- 17
- 18
- 19
- 20
- 21
- 22
- 23
- 24



- 8
- 9
- 10
- 11
- 12
- 13
- 14
- 15
- 16
- 17
- 18
- 19
- 20
- 21
- 22
- 23
- 24
- 25
- 26
- 27



- 1
- 2
- 3
- 4
- 5
- 6
- 7
- 8
- 9
- 10
- 11
- 12
- 13
- 14
- 15
- 16
- 17
- 18
- 19
- 20
- 21
- 22
- 23



- 1
- 2
- 3
- 4
- 5
- 6
- 7
- 8
- 9
- 10
- 11
- 12
- 13
- 14
- 15
- 16
- 17
- 18
- 19
- 20
- 21
- 22
- 23
- 24
- 25