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Media Devices in Parents' and Children's Bedrooms and Children's Media Use

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Abstract

Objectives: The American Academy of Pediatrics advises having no media devices in children's bedrooms. We examined the link between media devices in parents' and children's bedrooms and children's media use.

Methods: Ninety parent-child dyads participated in a community-based healthy weight management study targeting 8-to-12-year-olds with body mass index (BMI)-for-age 75th percentile. Parents and children reported the number of media devices in their bedrooms and hours spent using media devices on weekdays and weekend days.

Results: Most children (61%) and parents (92%) had at least one media device in their bedrooms. The numbers of devices in parents' and children's bedrooms were positively correlated. Children with no bedroom media devices reported less weekday media use compared to children with bedroom devices. A similar non-significant pattern was found for children's weekend media use.

Conclusions: Study findings indicate similar media devices in the bedrooms of parents and children and a significant association between media devices in children's bedrooms and their weekday media use. Efforts to reduce media in parent bedrooms may enhance interventions targeting reduction of media use among children, especially those with higher BMI.

Keywords

sedentary behavior; environment; pediatrics

Media use among children contributes to childhood obesity.^{1–3} Authors of a systematic review reported that duration or frequency of television/video viewing and computer use among school-aged children was positively associated with their body mass index (BMI).⁴ When using media, children may be exposed to food advertising, which may result in

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Conflict of Interest Statement

The authors have no conflicts of interest to disclose.

Human Subjects Statement

The study was approved by the University of Minnesota (1207S17761) and Temple University (23977) Institutional Review Boards. Informed parent consent and child assent were obtained prior to data collection.

increased consumption of energy-dense foods and sugar-sweetened beverages.⁵⁻⁷ It is also possible that media use displaces time children may otherwise spend in physical activity.^{8,9} Media use among children with a high BMI is particularly concerning given that one in 3 children are overweight or obese,¹⁰ and obese children tend to spend more time using media devices.^{11,12}

Technological advances have provided children media options beyond television. These options include DVD players, video game systems, computers with Internet access, smartphones, and tablets (hereafter called media devices). Estimates for television watching, video game-playing and computer use among 7-to-18-year-old children are 134 minutes, 40 minutes, and 34 minutes per day, respectively.^{13,14} National data suggest less than 8% of 9-to-11-year-old children meet American Academy of Pediatrics (AAP) media use guidelines of 2 hours or less per day.¹¹

Most interventions that aim to decrease children's media use are behavioral and provide children or parents with skills to reduce media use. Examples include developing a television-viewing plan, setting media use goals, or identifying alternative activities.^{15,16} Several interventions aim to modify the home environment by limiting access to a television set through an electronic television time management device.¹⁷ However, only a few studies tested the effects of removing media devices from the home or bedroom.^{18,19}

Social Ecological Theory suggests the environment (ie, setting of a bedroom environment) influences health behaviors and outcomes.²⁰ Multiple studies support a link between increased television viewing by children and the presence of a television in a child's bedroom.²¹⁻²⁶ Although the AAP advises parents to keep media devices out of child's bedroom, about one-half of 6-to-11-year-old children have a television in their bedroom.²⁷ Parents supervise children's television viewing less and underestimate television watching time by 3 hours per week when a television is in a child's bedroom.^{28,29} Newer media devices, such as smart-phones and tablets, are portable and easily placed in a child's bedroom where they may contribute to increased media use.²⁶ However, less is known about the association between the presence of newer media devices in children's bedrooms and child media use.

Social Cognitive Theory posits that children make behavior choices by observing their parents' behavior.³⁰ Previous studies found that the time children spend viewing television is positively correlated with the television viewing time of their parents.^{27,31} Parents or caregivers (hereafter called parents) of school-aged children are well positioned to reduce children's media use and limit or prohibit the presence of media devices in a child's bedroom.³²⁻³⁴

Guided by Social Cognitive Theory and Social Ecological Theory, we examined whether children with a high BMI (BMI ≥ 75th percentile) and their parents have similar media devices in the bedroom, and whether children with no media devices in the bedroom spend less time using the devices on a weekday or a weekend day compared to children with devices in the bedroom.

METHODS

Baseline data from the Students, Nurses and Parents Seeking Healthy Options Together (SNAPSHOT) study were used for this secondary data analysis. The SNAPSHOT study is a 2-group randomized control trial currently underway in metropolitan Minnesota. The study is an evaluation of the efficacy of a school nurse-led healthy weight management after-school program to reduce excess weight gain among 8-to-12-year-old children with a BMI 75th percentile.³⁵ Participants were recruited January 2014 through July 2016 from one urban and one suburban school district using flyers, school and district website announcements, in-person presentations at school events, and general mailings. Interested parents were instructed to call study staff to complete eligibility screening. Inclusion criteria were English literacy, child living most of the time with the participating parent, and no plans to move outside of the school district within the next 12 months. Children were excluded if they had food allergies, physical limitations and/or medical conditions that would limit their ability to participate in physical activity, and/or emotional health conditions that would limit engagement with other children in group activities.

A team of 2 trained university research staff collected baseline data from 90 parent and child dyads during the summers of 2014, 2015 and 2016. This included measured height and weight collected using standardized protocols³⁶ and self-administered surveys completed by parents and children independently. Both surveys included items about media device availability at home, and media use on weekdays and weekend days. The parent survey included sociodemographic information for the parent and child. The research staff team was available to answer questions about the survey.

Measures

Media devices in parents' and children's bedrooms.—The parent survey asked: “Do you have any of the following media equipment in your bedroom?” and “Does your child have any of the following media equipment in his/her bedroom?” For both questions, media devices assessed included: (1) DVD player; (2) video game system (Play Station, Xbox); (3) computer with Internet access; (4) television; (5) smartphone; and (6) tablet. Response options for each item were yes or no, and were coded as 1 or 0, respectively. This measure was previously reviewed by experts for face validity and evaluated with parents of 6-to-11-year-old children (2-week test-retest reliability intraclass correlation coefficient (ICC) = .51-.96).^{37,38} In the current study, the cell phone and hand-held videogame player items that showed lower ICCs compared to other items (eg, TV or DVD player) in the previous study³⁸ were specified as tablet and smartphone to make the items more relevant to participants. The number of media devices in the parents' and children's bedrooms was calculated by summing the scores of the 6 items (range = 0–6). For analysis, the number of media devices in a child's bedroom was dichotomized as none versus any based on the AAP recommendation.²⁴

Parent and child media use on a weekday and a weekend day.—Both parents and children answered the questions: “On a typical weekday (Monday through Friday), how many hours do you spend...” and “On a typical weekend day (Saturday and Sunday), how

many hours do you spend..." doing the following activities: (1) talking on the phone; (2) texting; (3) watching TV; (4) watching DVDs or videos; (5) playing games with a phone or hand-held device (DS, PSP, iPad, Kindle); (6) playing video games (Xbox, Play Station); and (7) using the computer (Internet, Facebook, playing games on the computer)? This measure was previously used in 14-to-19-year-old adolescents.³⁹ The item of playing games with a phone or hand-held device (item 5) was added for the current study to assess children's video game playing on portable media devices. Response options were 0 hours, ½-hour, 1 hour, 2 hours, 3 hours, 4 hours, and 5 or more hours, which were coded as 0, 0.5, 1, 2, 3, 4, and 5, respectively, and then summed to determine total time spent using each media device on a typical weekday and weekend day.

Participant characteristics.—Parents provided information on demographic characteristics for themselves and their child, including age (continuous), sex (boys or men vs girls or women) and race (white versus non-white that includes American Indian/Alaskan Native, Asian, black/African American, and other races). Economic assistance was assessed with 2 questions: "Does your child receive free or reduced-priced lunches at school?" and "Does your household receive public assistance?" Responses were yes, no, or I don't know. Economic assistance was defined by affirmative responses to one or both questions. BMI (kg/m^2) was calculated for parents and children from measured height and weight. Child BMI z-score and percentile were calculated based upon the US Centers for Disease Control and Prevention (CDC) growth charts to adjust for their age and sex.⁴⁰

Statistical Analysis

Descriptive statistics included participant characteristics, the number of media devices in the bedrooms of parents and children, and time spent using media devices by parents and children on weekdays and weekend days. Bivariate analysis that included chi-square (χ^2), Fisher's exact tests or ANOVA were used to assess the differences in characteristics by the presence of media devices in a child's bedroom and the similarity of number of devices in the parents' and children's bedrooms depending on the variable properties. The association between the number of media devices in the bedrooms of parents and children was tested using Pearson's correlation coefficients. General linear models were used to examine the association between the availability of media devices in the children's bedrooms (dichotomized as none vs any) and the children's weekday and weekend day media use, adjusting for child race/ethnicity, age, sex and BMI z-score, family economic status, number of media devices in the parents' bedrooms (continuous variable) and parents' week day or weekend day media use. All statistical analyses were conducted with IBM SPSS Statistics Version 22.0 (IBM Corp., Armonk, NY).

RESULTS

Table 1 shows that parent mean age was about 40 years old and mean BMI about 31. Most parents were female, one-third were non-white, and about one-half reported receiving economic assistance. Child participants were on average 9 years old and had an average BMI percentile of about 93; over one-half were boys and non-white. Children and parents both spent about 6 to 8 hours per day using media devices on any given day. In bivariate

analysis, more children with one media device in the bedroom had parents with 3 devices in the bedroom when compared to children without devices in the bedroom (65% vs 34%; $p = .01$). Children without media devices in the bedroom spent less time using devices on a weekday than those with devices in the bedroom (5.3 versus 8.5 hours, $p = .01$).

Figure 1 shows the distribution of media devices in the bedrooms of parents and children. There was an average of 3 media devices in a parent's bed-room ($SD = 1.5$) and one media device in a child's bedroom ($SD = 1.6$). Only 8% of parents had no media devices in the bedroom and 53% of parents had 3 media devices in the bedroom. For parents, smartphones (78%) were the most common device, followed by television (68%) and DVD players (46%). Among children, about two-thirds (61%) had one device in their bedroom. Tablets and television were equally common (38%), followed by DVD players (30%); video game systems and computers with Internet access (11%) were among the least common devices found in a child's bedroom. The most common combination of media devices in children's bedrooms was television, DVD player and tablet (16%).

The number of devices in the bedrooms of parents and children was positively correlated ($r = .413$, $p < .001$). As shown in Table 2, more children with parents who had a DVD player, video game system, computer with Internet access or television in the bedroom had the same device in their bedroom, when compared to children of parents without devices in their bedroom (eg, 49% vs 14% for a DVD player). The same pattern was found for smartphones and tablets, but the difference was not statistically significant.

Table 3 shows the results from the adjusted general linear models. Children without media devices in the bedroom spent less time using devices on a weekday than those who had one device in the bedroom (B coefficient = -2.74 , adjusted means 5.6 hours versus 8.3 hours, $p = .02$). A similar but non-significant association was found with media device use on weekend days (B coefficient = -0.31 , adjusted means 7.4 hours versus 7.7 hours, $p = .81$).

DISCUSSION

Despite public health efforts to curb childhood obesity, 17% of school-aged children are obese and 15% are overweight.^{10,41} Media use contributes to child weight gain and cardiovascular disease.^{11,42,43} Furthermore, having a media device (television) in a child's bedroom is associated with increased television viewing and weight gain.^{23,25} Findings from the current study suggest media devices in the bedrooms of parents and children are similar.³¹ More children had media devices in their bedrooms when parents had the same device in their bedrooms, although parents had more devices than their children. Children were less likely to use media devices on weekdays when media devices were not in their bedrooms (5.6 hours a day), than children who had media devices in their bedrooms (8.3 hours a day). These findings suggest that modifying the parent and child bedroom media environment may contribute to reducing media use among children with a high BMI. Current media reduction interventions focus on developing a media use plan, setting screen-time goals, and monitoring media use rather than removing media devices (other than television) from the bedroom.^{18,19} Our findings suggest targeting a reduction in parent media use, particularly in-bedroom media use, may be a valuable addition to interventions that aim to reduce

children's media use and subsequent weight gain, particularly among children with a high BMI.

Access to media devices in a child's bedroom was not significantly associated with child media use on weekend days. The survey questions did not assess educational use of media devices. It is possible that children self-reported educational device use at school or home as media use, which may be more prevalent on weekdays than weekend days. Furthermore, parents are generally less strict about their children's weekend media use than their weekday use.⁴⁴ This overall increase of weekend media use might have attenuated the weekend media use difference between children with and without media devices in their bedrooms. Further studies should define the purpose of media use (leisure versus educational) and assess the location and specific time children use media devices.

The prevalence of media devices in the bedrooms of parents and children is noteworthy. Nearly all parents (92%) had at least one device in their bedroom, with a smartphone the most common. Among children, 61% had at least one media device in the bedroom. Televisions and tablets were the most common devices in a child's bedroom; video game systems and computers with Internet access were the least common. Atkin, Corder, and van Sluijs²⁶ found a 10% increase in the presence of a computer and a 28% decrease in the presence of a television in the bedrooms of 9th grade children compared to 5th grade children. The children in the current study were on average 9.4 years. This suggests the types of media devices in children's bedrooms may change as children age. Interventions that aim to decrease children's media use in the bedroom may be more effective during the early elementary school years. This hypothesis merits further study.

A clear strength of this study is that parent and child dyad data allowed for a comparison of parents' bedroom media environment to that of their children. To our knowledge, this study is the first to demonstrate that presence of media devices in the parent's bedroom is correlated with the presence of media devices in the child's bedroom. Future studies to replicate this finding in larger and more diverse samples are merited. Other strengths of the current study included the assessment of common media devices beyond television, and media use segregated by weekday and weekend day use. This approach contributes to a better understanding of child media use. Finally, BMI for parent and child were calculated using measured (objective) height and weight.

Limitations of the study include the self-report nature of the media use data. Also, there was no adjustment for possible multitasking with media devices (ie, using computer while watching television). One national study estimated that 8-to-18-year-old children used media for 7.4 hours after adjusting for 30% of multitasking media use time.²⁵ This is slightly higher than the media use noted among the current study sample. However, the age difference among the study samples should be noted when making a comparison. It seems plausible that older children would multitask more than the younger children in our study sample. Additionally, examination of the association between types of media devices and child media use was not possible due to the small sample size. Instead, the presence of media devices was dichotomized as one or more versus none, which is consistent with the AAP recommendation to have no media devices in the bedroom.²⁴ An additional study

limitation was the use of a convenience sample of parent and child dyads participating in an intervention study targeting children with a high BMI, which disallowed a comparison of media device presence by child weight status. Therefore, the study findings may not be generalized to all 8-to-12-year-old children. Lastly, causality of the association between the presence of media devices in the child's bedroom and media use cannot be inferred due to the cross-sectional study design.

In contemporary society, children have increased access to various portable media devices. Our results suggest that parent role modeling is likely a contributor to the media use environment of the bedrooms of children with a high BMI. Efforts to reduce media in parents' bedrooms may enhance interventions targeting reduction of media use among children with a high BMI.

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Figure 1.
Distribution of the Number of Media Devices in the Bedrooms of Parents and Children,
Minnesota, 2014–2016 (N = 90)

Table 1

Sample Characteristics Stratified by the Number of Media Devices in Children's Bedrooms, Minnesota, 2014–2016 (N = 90)

	Total Sample	N (%)		p-value ^a
		No Device in Bedroom	1 Device in Bedroom	
Child Sex				
Girl	41 (46%)	13 (37%)	28 (51%)	.20
Boy	49 (54%)	22 (63%)	27 (49%)	
Parent Sex				
Women	85 (94%)	32 (91%)	53 (96%)	.37
Men	5 (6%)	3 (9%)	2 (4%)	
Child Race/ethnicity				
Non-white ^b	47 (52%)	16 (46%)	31 (56%)	.32
White	43 (48%)	19 (54%)	24 (44%)	
Parent Race/ethnicity				
Non-White	31 (34%)	9 (26%)	22 (40%)	.16
White	59 (66%)	26 (74%)	33 (60%)	
Economic Assistance				
No	43 (48%)	21 (60%)	22 (40%)	.06
Yes	47 (52%)	14 (40%)	33 (60%)	
Devices in Parent Bedroom				
< 2	42 (47%)	23 (66%)	19 (35%)	.01
3	48 (53%)	12 (34%)	36 (65%)	
		Mean ± SD		
Child age	9.4±0.9	9.5±0.9	9.3±0.9	.40
Parent age	39.8±7.2	40.8±7.1	39.1±7.2	.27
Child BMI z-score	1.7±0.6	1.6±0.6	1.8±0.6	.29
Child BMI ^c percentile	92.6±7.3	91.5±7.6	93.3±7.0	.26
Parent BMI ^c	31.0±8.8	29.3±9.3	32.1±8.4	.14
Child weekday media use	7.2±5.4	5.3±4.7	8.5±5.4	.01
Child weekend media use ^d	7.6±5.6	6.7±5.5	8.1±5.7	.26

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	Total Sample	N (%)		p-value ^a
		No Device in Bedroom	1 Device in Bedroom	
Parent weekday media use	6.5±5.0	5.4±3.5	7.2±5.7	.08
Parent weekend media use	6.8±4.4	5.3±3.5	7.7±4.7	.01

Note.

^a: χ^2 or Fisher's exact test was used for dichotomous variables and ANOVA test was used for continuous variables.

^b: Non-white includes American Indian/Alaskan Native, Asian, Black/African American, and other races

^c: BMI = Body Mass Index calculated from objectively measured height and weight (kg /m²)

^d: N = 89 due to missing data

Table 2
Associations of the Presence of Media Devices in the Bedrooms of Parents and Children, Minnesota, 2014–2016 (N = 90)

	Media Device in Children's Bedroom		p-value ^a
	No	Yes	
Media Device in Parents' Bedroom			
DVD Player			
No	42 (86%)	7 (14%)	< .001
Yes	21 (51%)	20 (49%)	
Video Game System			
No	75 (93%)	6 (7%)	.01
Yes	5 (56%)	4 (44%)	
Computer with Internet Access			
No	68 (96%)	3 (4%)	.01
Yes	12 (63%)	7 (37%)	
Television			
No	25 (86%)	4 (14%)	.01
Yes	31 (51%)	30 (49%)	
Smartphone			
No	20 (100%)	0 (0%)	.11
Yes	59 (84%)	11 (16%)	
Tablet			
No	38 (67%)	19 (33%)	.27
Yes	18 (55%)	15 (45%)	

Note.

^a. χ^2 or Fisher's exact test was used.

General Linear Models of the Association between Media Devices in Children’s Bedrooms and Their Media Use^a on Weekdays and Weekend Days^b

Table 3

Parameter	Model 1: Child weekday media use (N = 90)			Model 2: Child weekend media use (N = 89)		
	B coefficient	Standard error	p-value	B coefficient	Standard error	p-value
Child Bedroom Media None versus any	-2.74	1.19	.02	-0.31	1.31	.81
Parent Bedroom Media 1-unit (device) increase	0.04	0.39	.93	0.40	0.42	.34
Child Race/Ethnicity White versus non-white	-1.01	1.23	.42	-2.19	1.33	.10
Child Sex Boy versus girl	2.02	1.12	.08	1.23	1.21	.31
Child Age 1-unit (year) increase	0.46	0.63	.47	1.11	0.70	.12
Child BMI z-score 1-unit (z-score) increase	0.78	0.92	.40	1.24	1.01	.22
Economic Assistance Any versus none	1.27	1.28	.32	0.70	1.36	.61
Parent Weekday Media Use 1-unit (hour) increase	0.14	0.12	.24	-	-	-
Parent Weekend Media Use 1-unit (hour) increase	-	-	-	0.17	0.14	.24

Note.

^a: Child media use included time spent talking on the phone, texting, watching TV, watching DVDs or videos, playing games with a phone or hand-held devices, playing video games, and using the computer

^b: Adjusted for the Number of Parent Bedroom Media Devices, Parent Media Use and Select Sample Characteristics, Minnesota, 2014–2016