Handheld Media Use at School:

Increased Use Negatively Impacts Reading Outcomes

Abstract

Two studies were conducted to investigate the possibility that portable video game (PVG) devices and cell phones displaced children's leisure reading. In study one, 120 fourth and fifth grade children completed a survey about their media habits and found that bringing PVG devices to school and talking on cell phones negatively related to leisure reading. In study two, 136 fourth, fifth, and sixth graders completed a similar survey and found that cell phones but not PVGs negatively related to children's leisure reading. These data extend the displacement literature by illuminating the impact these newer technologies have on reading outcomes.

Keywords: Children, Video Games, Cell phones, Reading

A large body of evidence now documents the importance of leisure reading. Indeed, independent reading outside of school is an important predictor of academic achievement, general knowledge, and problem solving in children (Cunningham & Stanovich, 1991; Krashen, 1993; Ross; 1999). Despite these benefits, reading for pleasure decreases as children age (Guthrie & Wigfield, 2000; National Endowment of the Arts, 2007). Although several reasons have been offered to explain this phenomenon, such as parental involvement (Klauda, 2009) and reading motivation (Guthrie & Wigfield, 2000), one of the most popular explanations concerns children's television use, such that television displaces time children could have spent reading (e.g., Neuman, 1995). A recent study of over 2,000 children by the Kaiser Family Foundation (Rideout, Foehr, & Roberts, 2010) seems to support this claim. The nationally representative study found that children aged 8-18 spent over five hours per day with television and video games but only 38 minutes per day reading for pleasure.

What is less understood is if portable media platforms (e.g., cell phones, handheld video gaming systems) impact literacy activities in the same (negative) way. On the one hand, the Kaiser Family Foundation study suggests that it does. The study found that the proportion of children owning a cell phone jumped from 39% to 66% over the past five years, and such ownership likely explained a sizeable portion of young people's increased media consumption. In fact, children's total time spent playing video games increased by about 24 minutes over the past five years (from :49 to 1:13), and 20 minutes of that increase was because of cell phone use and portable video games (PVG).

On the other hand, recent research indicates that use of portable media platforms is associated with an increase in positive literacy outcomes. Plester and Wood (2009) suggested that texting is positively related to literacy development because children enjoy the 'playful mix

of written and spoken language features that characterize text language" (p. 1110). And in fact, the researchers found support for this idea. Their study on a British sample of preteens found that the younger the child received a cell phone, the better their word reading ability (Plester & Wood, 2009). Similarly, research on video games finds video games are an important tool for education because of their enticing reward structure (Gee, 2007).

Thus, the purpose of this study was to examine whether new and portable technologies, such as cell phones and video games, interfere or displace leisure reading. The study also investigated the alternative possibility that such technologies would improve the likelihood of leisure reading in two studies of elementary school students.

Influence of Media Use on Children's Leisure Reading and Writing

According to Clark and Rumbold (2006), leisure reading is reading done by choice. Both reading material that caters to one's personal interests and reading at a time and place that suits the reader characterize leisure reading. Unfortunately, research indicates that few children read for leisure. For example, in Walberg and Tsai's (1984) seminal work, 2,890 teens were surveyed about their about their reading habits. Their findings showed that 5% of teens read over three hours the previous day but nearly half (44%) of the sample indicated that they had not read at all. A more recent study reveals a similar trend. Juster and colleagues (2004) gathered information on how children aged 6-17 used their leisure time. The data from over 3,000 participants revealed that children spent 77 minutes on average reading each week. This amount was miniscule relative to television use, as children watched nearly 15 hours of television per week. Furthermore, leisure reading decreases with age. Specifically, those in the oldest age group (15-17) read only 50 minutes per week, which was the lowest among all age groups.

A great deal of research has investigated the connection between reading and television viewing. However, conclusions surrounding the relationship are mixed. Studies by Beentjes and van der Voort (1988) and Comstock and Scharrer (1999) suggest that there is a negative relationship between reading and television viewing. Specifically, the articles suggest that television viewing displaces the time children could have spent reading and/or other activities thought to promote reading skills. Other research explains that the phenomenon is not that simple. For example, Ennomoser and Schneider (2007) argue that the relation is curvilinear, rather than linear. The seminal work by Neuman (1988) on this topic highlights the complexity of the relationship. Her work examined eight statewide reports of the National Assessment of Educational Progress. She found that reading scores differed very little among children who viewed less than 4 hours of television each day. However, viewing more than 4 hours per day eradicated this homogeneity, as reading scores dropped significantly beyond this point. Lastly, some research reports a positive relationship between television use and reading. Research by Splaine (1978) posits that viewing television may motivate children to read books based on their beloved television shows or characters. Additionally, some research argues that reading television subtitles can improve reading skills (Koolstra, van der Voort, & van der Kamp, 1997).

Although video games are a strikingly different medium due to their interactivity and sometimes portability, there are similar divisions within the research. A notable body of work exists that suggests that games are capable of improving literacy albeit not in the traditional sense. Work by Gee (2007; 2010) epitomizes this perspective. His argument is that games simulate what people read in books. He explains that books are similar to instruction manuals. Although crucial, they are prohibitively difficult to comprehend when people are unable to experience the book concepts alongside their real world analogs. Games address this disconnect

by allowing people to manipulate certain concepts virtually that result in enriched learning experiences. For example, *Portal* is a puzzle game that can teach a great deal about physics. It does so not by have players read anything or watch instructional videos but through trial-and-error. Gee claims that games like *Portal* force people to engage with high level topics that can motivate learning beyond the games themselves. Some research shows that game-based learning is an effective teaching tool (e.g., Jonathan, Lynne, & Wanda, 2010; Kanthan & Senger, 2011), which provides some evidence corroborating Gee's foundation.

However, specific discussions regarding reading displacement are notably absent within Gee's perspective. Although games may improve some facets of problem solving and enhance certain skills, more time spent playing games may very well mean less time for reading, especially reading for pleasure. Regarding displacement, a Kaiser Family Foundation (Rideout et al., 2010) report found that children aged 8-18 read 38 minutes each day but spent 73 minutes per day playing video games. Concerning older children, about quarter of 8th and 9th graders say that playing video games negatively affects their homework and academic performance (Lynch, Genitle, Olson, & van Brederode, 2001) and half of those aged 8-14 report that video games sometimes or often keep them from their homework (Ballard, 2003).

Although both of these perspectives on games and literacy are informative, neither address specific advances surrounding portable video gaming (PVG). Game systems such as the Nintendo (3)DS, Sony PSP, Sony Vita, and more recently smart devices based on the iOS and Android operating systems offer gaming anywhere, anytime. Extant research reveals that these devices are common. For example, Tandon et al. (2012) surveyed 713 child-parent dyads of children aged 6-11 as part of the Neighborhood Impact on Kids Study. Their results showed that the majority of children owned PVG devices. Moreover, factors such as education level and SES

failed to affect the likelihood of ownership. The aforementioned Kaiser Family Foundation report (Rideout et al., 2010) similarly found that nearly two-thirds of children (65%) had access to PVG devices and children used them about 90 minutes each day.

Due to the apparent popularity of portable gaming devices, it is possible that these technologies interfere with reading for pleasure via displacement in a way similar to traditional gaming (i.e., computer or console-based gaming). Specifically, if the ability to play games pervades most spaces and opportunities, the time children spend reading for leisure may diminish. Yet the previously mentioned research by Splaine (1978) and Koolstra et al (1997) regarding television bolster the possibility that PVGs may positively shape reading outcomes by generating interest in reading. Thus, the first research question asked:

RQ1: Is there a relationship between ownership of PVGs and leisure reading among children in 4th and 5th grade?

The ubiquity of video games is impressive; yet, the pervasiveness of cell phones far out paces gaming. As Baron (2008) reports, 2.73 billion people worldwide had mobile phone access in early 2007. More than simply placing and receiving calls, phones are used to text, game, browse the web, and more. Regarding texting specifically, people now send more texts than they make phone calls (Mindlin, 2008). As a result, there exists the possibility that texting may impact literacy, given its reliance on reading and composing.

Research by Plester and Wood (2009) proposed three reasons that texting may facilitate literacy. First, texting may affect literacy simply by means of exposure. There is evidence supporting the idea that literacy improves when children are surrounded by texts, be them books, video game cases, or cell phones/computers with access to information (Marsh, 2005). Second, is phonological awareness, which highlights the use of words to spell out speech sounds rather than

words (e.g., Yo bro, wanna cum 2 da mall wiv us). Research shows that children with heightened phonological awareness tend to perform better on reading tests (Blachman et al., 1994). Finally, the third reason that cell phones may affect literacy is via the enjoyment that texting may bring children. This perspective argues that hands on manipulation of words, even if it involves bending or breaking rules, may aid literacy (Plester & Wood, 2009).

Despite these possibilities, the notion remains that cell phone use may interfere with time spent reading. For example, nearly one-third of 8-10 year olds and two-thirds of 11-14 year olds own cell phones (Rideout et al., 2010). Overall, they reported that children talk on the phone for about half an hour, text for an hour and a half, and use cell phones as a media platform (e.g., watch movies and play video games) for about 50 minutes. Moreover, rather than remaining constant, cell phone ownership and use among children are on the rise. Thus, there is a cogent concern that cell phones may be displacing reading for leisure among children. Due to this possibility, we posed the following research question:

RQ2: Is there a relationship between cell phone ownership and leisure reading among children in 4^{th} and 5^{th} grade?

Study 1
Methods

Sample

The survey was conducted in a mid-size town located in the Midwest (pop. 100,000). Fourth and fifth graders (N = 120) were recruited from two local schools. One of the schools was a public elementary school (kindergarten through fifth grade) and the other was a private Christian school (kindergarten through twelfth grade). Students were asked to complete a brief survey in exchange for a small reward (a $3 yo-yo). The schools were also provided with compensation on a per student basis ($5 per student).

Participants ranged in age from 8-12 years old (M = 10.27, SD = .87) and were evenly split in terms of gender (59 girls, 59 boys, 2 missing data). Slightly more fourth graders (n = 67) participated than fifth graders (n = 49). The sample was diverse compared to the U.S. population as a whole: 56.8% White, 9.3% Black, 17.8% Hispanic/Latino, 2.5% Asian/Pacific Islander, 0.8% Native American/American Indian, 5.9% described their race as other, and 6.8% checked multiple racial categories.

Procedure

Principals of elementary and middle schools in the area were contacted through mail. The mailings explained the purpose of the study, the benefits to the school, and the benefits to the students. Thirty-five letters were mailed out to local principals and two schools responded.

Once a suitable time had been ascertained between the researchers and the fourth and fifth grade teachers, researchers visited individual classrooms to recruit students. On the first visit, researchers provided all students with consent packets that needed to be taken home to their parents to be signed and then brought back to the school. A drop box was then left in the classroom for approximately one week to collect returned packets. If time permitted, the researchers stopped by the school a second time to check on the number of packets in the drop box. After sufficient time had passed, the researchers contacted the teachers again to set up a third visit.

During the third visit, students with complete consent packets were allowed to participate in the study. Before beginning, students were informed that the study concerned reading and writing for fun and that they should think about non-school reading and writing when answering those questions. Surveys were then passed out to participating students. Researchers and

homeroom teachers monitored participants and answered questions during the survey. The majority of questions were clarification questions.

Measures

Demographics. Participants reported their gender (male = 0; female = 1) and age.

Leisure Reading. Participants responded to a question that asked, "How often do you read books for fun?" using a 4 pt. scale (*never*, *a little*, *a lot*, *always*; scored 1-4; $M = 2.47$, $SD = 1.04$).

Handheld Media Use. Participants were asked how often they played PVGs (*never*, *a little*, *a lot*, *always*; scored 1-4; $M = 1.77$, $SD = .89$) and talked on a cell phone ($M = 1.93$, $SD = .91$).

Handheld Media Use at School. Participants were asked how often they brought PVGs ($M = 1.15$, $SD = .36$) and cell phones to school ($M = 1.21$, $SD = .50$). Response options were *never*, *sometimes*, *a lot*. No student responded *a lot*, so the variable was recoded as a dichotomous measure (0, 1). Consistent with the educational protocol at elementary schools across the country, it was against school rules to bring either of these items onto school grounds.

Power Analysis

G*Power was utilized to calculate the power of the design. Three power analyses were conducted (*alpha* = .05, $N = 120$) for three standard effect sizes, small ($r = .10$), medium ($r = .30$), and large ($r = .50$) (Cohen, Cohen, West, & Aiken, 2003; Erdfelder, Faul, & Buchner, 1996). The design had excellent power to detect a large (.99) or medium effect (.95), but low power to detect a small effect (.21).

Results

Correlation Matrix

Zero order bivariate correlations were calculated to better understand relationships between all variables in the study (see Table 1). Older children were more likely to bring PVGs and cell phones to school. Boys were more likely to play PVGs and girls were more likely to bring cell phones to school. Increased PVG play was positively related to bring PVGs to school; likewise, increased talking on a cell phone was positively related to bringing both PVGs and cell phones to school. Bringing PVGs to school was positively related to bringing cell phones to school.

Hierarchical Regression

To address the research questions, a hierarchical regression was carried out with leisure reading as the dependent variable and the other variables entered by block: block 1 (age, gender, play PVG, talk cell phone), block 2 (PVG to school), block 3 (cell phone to school), and block 4 (PVG to school × gender, play PVG × gender, cell phone to school × gender, talk cell × gender).

The regression was significant at blocks 1 and 2 (reported at block 2): $r = .34$, F change $(1, 105) = 4.91$, $p = .02$ (see Table 2). Students that talked more on cell phones and those who brought PVGs to school were less likely to leisure read. Playing PVGs and bringing cell phones to school were not related to leisure reading. None of the gender interactions were significant.

Discussion

The goal of the first study was to investigate the possibility that PVG use and cell phone use interfered with leisure reading. We found that bringing PVG devices to school and talking on cell phones was negatively related to leisure reading. Furthermore, results show that girls were more likely to bring cell phones to school, whereas boys were more likely to play PVGs. Additional research should examine the reasons for why this is; and furthermore, whether or not this finding was restricted to geographic setting.

Regarding leisure reading, research shows that students who enjoy leisure reading tend to have greater comprehension of written text (Braten & Stromso, 2003; Dermitzaki, Andreou, & Paraskeva, 2008). Whether or not comprehension of text is a factor in reading is unclear, but given our findings, could be useful in future research. This is important to note because a key finding suggested that children who talk on cell phones and brought PVGs to school were less likely to engage in leisure reading, so it may be that those children respond to stimuli different from those who tend to enjoy reading. For instance, research on children's reading practices suggest ways to increase leisure reading–poor readers tend to be less interested in reading, but more interested in graphical representations, which can increase comprehension and satisfaction (Rusted & Coltheart, 1979). Given the advancements in technologies, it is important to consider the variables which may affect children who have less desire to read, and the ways that may improve reading.

Although the aforementioned results provide compelling evidence suggesting that both PVG and cell phone usage may interfere with leisure reading, we conducted a second study to investigate this relationship further for three reasons. First, the unexpected lack of variance on the measure asking how often children brought portable video game devices to school prompted us to rethink the response options. Because no one selected "a lot," we sought to change the format of the response options in an attempt to capture more variance. Second, we wanted to add 6th graders to the sample to explore if older children exhibited the same finding. Third, we wanted to see if the pattern of results replicated in a second study.

Study 2
Method

Participants

Fourth, fifth, and sixth graders (N = 136) were recruited from three elementary schools located in three medium-sized Midwestern towns (pop. 30,000 – 100,000). The schools were all public and served kindergarten through sixth grade. Students were asked to complete a brief survey in exchange for a small reward (a $3 yo-yo). The schools were also provided with compensation on a per student basis ($5 per student).

Participants ranged in age from 9-13 years old (M = 10.87, SD = .88). Slightly more girls (55.9%) participated than boys (44.1%). The sample was fairly balanced across grade level, with roughly equal numbers of fourth (39.0%), fifth (27.5%), and sixth graders (22.8%). Most of the participants described themselves as White, however there was also a relatively large percentage of Hispanic children in the sample (consistent with the demographics of the region): 70.6% White, 1.4% Black, 20.6% Hispanic/Latino, 2.2% Asian/Pacific Islander, 1.5% Native American/American Indian, with 3.6% describing their race as other.

Procedure

Principals of elementary and middle schools in the area were contacted through mail. The mailings explained the purpose of the study, the benefits to the school, and the benefits to the students. If a principal agreed to let the research team visit, then the researchers contacted individual fourth, fifth, and sixth grade teachers at that school. Thirty recruitment letters were sent out to schools, and six principals expressed interest in the study. Three schools were selected at random from those six to participate. Across the three participating schools, 8 teachers (3 fourth, 3 fifth, and 2 sixth) volunteered to let researchers visit their class.

On the first visit to each classroom, the researchers provided all students with consent packets that needed to be taken home to their parents to be signed and then brought back to the school. A drop box was then left in the classroom for approximately one week to collect returned

packets. If time permitted, the researchers stopped by the school a second time to check on the number of packets in the drop box. In total, 160 packets were sent out and 136 were returned (85% return rate). After sufficient time had passed, the researchers contacted the teachers again to set up a third visit.

During the third visit, students with complete consent packets were allowed to participate in the study. Surveys were then passed out to participating students. Researchers and home room teachers monitored participants and answered questions during the survey. The majority of questions were clarification questions (e.g., what "ethnicity" meant). Upon the survey's completion, the students lined up single-file to receive their yo-yos.

Measures

Demographics. Participants reported their gender (male = 0; female = 1) and age.

Leisure reading. Participants responded to a question that asked, "How often do you do read books for fun?" using a 4 pt. scale (*never*, *a little*, *a lot*, *always*; scored 1-4; $M = 2.75$, $SD = 1.15$).

Handheld Media Use. Participants were asked how often they played PVGs (*never, once a month, once a week, almost every day*; scored 1-4; $M = 2.28$, $SD = 1.18$) and talked on a cell phone ($M = 2.83$, $SD = 1.24$).

Handheld Media Use at School. None of the elementary schools involved with the current study allowed students to bring PVGs or cell phones to school. Given that, students were asked "How often do you bring the following items to school?" Participants indicated their selection using a 4 pt. scale (*never, once a month, once a week, almost every day*; scored 1-4). Students reported bringing PVG systems ($M = 1.51$, $SD = 0.96$) and cell phones to school ($M = 2.10$, $SD = 1.33$).

Power Analysis

G*Power was utilized to calculate the power of the design. Three power analyses were conducted (alpha = .05, k = 3, N = 136). The design had excellent power to detect a large (.99) or medium effect (.97), but low power to detect a small effect (.25).

Results

Correlation Matrix

Zero order bivariate correlations were calculated to better understand relationships between all variables in the study (see Table 3). Older children were less likely to play PVGs and more likely to bring cell phones to school. Children that played PVGs were more likely to talk on cell phones and bring PVGs and cell phones to school. Increased talk on cell phones was related to bringing cell phones to school. Contrary to study 1, bringing PVGs to school was negatively related to bringing cell phones to school.

Hierarchical Regression

Identical to study 1, a hierarchical regression was carried out with leisure reading as the dependent variable and the other variables entered by block: block 1 (age, gender, play PVG, talk cell phone), block 2 (PVG to school), block 3 (cell phone to school), and block 4 (PVG to school × gender, play PVG × gender, cell phone to school × gender, talk cell × gender).

The regression was significant at blocks 1 and 3 (reported at block 3): r = .36, F change (1, 119) = 4.65, p = .03 (see Table 4). Girls were more likely to leisure read. Students that talked more on cell phones and those who brought cell phones to school were less likely to leisure read. Playing PVGs and bringing PVGs to school were not related to leisure reading. None of the gender interactions were significant.

Discussion

The goals of the second study were to utilize a new measure to address the lack of variance found in the first study, to extend the work to older children (6^{th} graders), and to replicate our initial findings in study one. Several key findings reinforce the importance of the second study. First, we found that older children were less likely to play PVGs, but were more likely to bring cell phones to school. Similarly, children who played PVGs were also more likely to both talk on their phones and bring cell phones and PVGs to school, which suggests a divergence among PVGs and cell phones. With the onset of video games available to play via cell phone, children may be looking to use mobile devices that support several functionalities (e.g., talking with their friends and playing games). In many cases, cell phones are even smaller than handheld video game devices. The iPhone 4 and 5 have comparable battery life to the Nintendo DS (Kotaku, 2013), a device popular among children. However, the iPhone has the advantage of being a touch screen device with less buttons and physical affordances that could limit functionality in the Nintendo DS. As such, the shift in use from PVGs to cell phones, as found in the second study, is an important one. Research should continue to examine the types of devices used by children and explore the underlying mechanisms driving selection.

Furthermore, results in study two indicate the necessity to study different age and grade levels of children. The differences in mobile devices that children use and their relationship to reading changes as children get older, so the findings in in the second study help to validate study one.

Similar to study one, talking on cell phones was negatively related to leisure reading. Additionally, study two found that bringing cell phones to school was also negatively related to children's reading for leisure. However, unlike the findings from study one, portable video game devices were not related to reading outcomes. These findings point to a need to study children's

reading behaviors on devices such as tablets and cell phones. Schools are continuously integrating technology into the classroom, but with rapid changes in computers, tablets, and cell phones, it is not yet clear what specific factors may help to instill motivation for leisure reading (Paul, 2013).

General discussion

An impressive corpus of research illustrates the importance leisure reading (Anderson, Wilson, & Fielding, 1988; Guthrie & Alvermann, 1999; McKool, 2007). However, there is an omnipresent concern that other media is displacing reading. The purpose of the current research was to investigate whether newer technologies, such as portable video game devices and cell phones, interfered or displaced children's reading for leisure. Regarding PVG devices, we found that bringing these consoles to school was negatively related to leisure reading. Thus, our data provide some supporting evidence that these devices displace reading for leisure among children. This finding is troubling, as the majority of children across education level and SES own PVG devices (Rideout et al., 2010; Tandon et al., 2012).

For cell phones, our data suggest that bringing phones to school and cell phone use in general was negatively related to leisure reading among fourth, fifth, and sixth graders. These findings corroborate the notion that cell phone usage may displace children's reading for leisure. Because cell phone ownership among children has increased year after year and nearly one-third of 8-10 years olds own cell phones, this relationship highlights a cogent concern. Furthermore, cell phone use was negatively related to PVG use, which suggests that cell phones may be taking the place of PVGs among children.

Limitations and Conclusions

A primary limitation of the current research is its reliance on correlational data. The relationships revealed by our data suggest that the featured technologies may displace reading. However, this connection does not refute the findings and suppositions of other researchers suggesting that both games and cell phone use may have some positive benefits regarding literacy. Future work should seek to disentangle the present concepts to better understand the influence of these technologies on leisure reading and beyond into the benefits of reading.

Second, the current data only represent the media use of fourth, fifth, and sixth graders from a single geographic location (Midwest). Thus, the behaviors of the students within our sample may not be indicative of all children within the included age groups. Future work should expand sampling criteria to include more diverse locations and age groups. Third, we conducted study one in 2008 and study two in 2009. Because of this, time may be an unaccounted for factor. It is possible that this was a transitory time for the included technologies. Fourth, the possibility still exists that PVGs and cell phones may result in positive effects on reading, as the current study did not include measures of these outcomes. As a result, we do not know if these portable devices positively impact reading comprehension or phonetics.

Despite the aforementioned limitations, the current work makes a noteworthy contribution to the literature by extending knowledge of leisure reading and displacement by incorporating newer technologies. Both portable video games and cell phones were negatively related to children's time spent reading for leisure. These findings highlight the ability of these technologies to detract from reading and underscore their impressive pervasiveness.

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Table 1.

Study 1: Correlation Matrix

	1.	2.	3.	4.	5.	6.
1. Age						
2. Gender	.02					
3. Play PVG	.12	.18*				
4. Talk Cell	.00	-.08	.17†			
5. PVG – School	.17†	.00	.25**	.21*		
6. Cell – School	.23*	-.19*	.13	.27**	.39***	

Notes. Zero-order correlations for all variables. PVG = portable video game.

†$p < .10$ *$p < .05$ ** $p < .01$ ***$p < .001$

Table 2.

Study 1: Hierarchical Regression Predicting Children's Leisure Reading by Age, Gender, and Handheld Media Use

	β	t	$R^2\Delta$
Block 1:			.07†
Age	-.05	-.53	
Gender	.02	.16	
Play PVG	-.05	-.55	
Talk Cell	-.25	-2.63*	
Block 2:			.04*
PVG – School	-.23	-2.22*	
Block 3:			.00
Cell – School	.03	.28	
Block 4:			.03
PVG – School × Gender	.40	1.05	
Play PVG × Gender	.35	1.25	
Cell – School × Gender	-.04	-.14	
Talk Cell × Gender	-.06	-.20	
N		110	

Notes. Hierarchical regression analysis with $R^2\Delta$ reported for each block. PVG = portable video game. †$p < .10$ *$p < .05$

Table 3.

Study 2: Correlation Matrix

	1.	2.	3.	4.	5.	6.
1. Age						
2. Gender	-.05					
3. Play PVG	-.15†	.04				
4. Talk Cell	.14	.05	.19*			
5. PVG – School	-.08	.05	.28**	.12		
6. Cell – School	.33***	.14	.16†	.49***	-.20*	

Notes. Zero-order correlations for all variables. PVG = portable video game.

†$p < .10$ *$p < .05$ ** $p < .01$ ***$p < .001$

Table 4.

Study 2: Hierarchical Regression Predicting Children's Leisure Reading by Age, Gender, and Handheld Media Use

	β	t	$R^2\Delta$
Block 1:			.10*
Age	.14	1.60	
Gender	.23	2.68**	
Play PVG	-.02	-.24	
Talk Cell	-.18	-2.03*	
Block 2:			.00
PVG – School	.01	.08	
Block 3:			.03*
Cell – School	-.23	-2.16*	
Block 4:			.02
PVG – School × Gender	.14	.65	
Play PVG × Gender	-.23	-.97	
Cell – School × Gender	-.07	-.43	
Talk Cell × Gender	.32	1.17	
N		125	

Notes. Hierarchical regression analysis with $R^2\Delta$ reported for each block. PVG = portable video game. *$p < .05$ **$p < .01$