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Children and the Internet: Developmental Implications of Web Site Preferences Among 8- to 12-Year-Old Children

Courtney K. Blackwell, Alexis R. Lauricella, Annie Conway, and Ellen Wartella

The Internet is quickly becoming a favored medium for children, but few studies have investigated the content and types of activities children engage with online. The current study uses data collected from a national sample of 442 8- to 12-year-old children to investigate children's Internet content preferences during middle childhood. Results indicate that YouTube and Facebook were the two most favored Web sites. Additionally, there were significant differences by age and gender. Overall, results suggest children's Web site preferences are consistent with emotional, social, and cognitive development encountered in middle childhood.

The Internet is quickly becoming a popular media outlet for today's youth, as the majority of 8- to 18-year-olds goes online at least once a day (Rideout, Foehr, & Roberts, 2010). Time spent with computers also increases with age and appears to jump considerably from middle childhood to adolescence. Younger children (8- to 10-year-olds) spend an average of 46 minutes per day on a computer compared to 11- to 12-year-olds, who spend an average of 1 hour and 46 minutes per day

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(Rideout et al., 2010). While time spent with media is an important measure, it is crucial to understand the content children engage with online as well (D. R. Anderson, Huston, Schmitt, Linebarger, & Wright, 2001; Guernsey, 2007).

Few studies have looked at what children do online, especially in middle childhood, or the developmental differences, as measured by age and gender, which may exist in children's online activities. It is imperative to understand what children do online to help parents and teachers teach media literacy but also to ensure that children are engaging with safe online content. The current study addresses these needs by exploring 8- to 12-year-olds' favorite online activities, specifically examining how older (11- to 12-year-olds) and younger (8- to 10-year-olds) children as well as boys and girls differ in these activities.

Internet Content and Developmental Theory

Youth are going online at increasing rates, engaging in a range of computer activities and spending the most time on social networking sites, watching online videos (e.g., YouTube), and playing online games (Rideout et al., 2010); however, we do not know how many children within each age group engage in each activity. Given the developmental differences that occur between middle childhood (ages 8–12) and adolescence, it is important to examine how younger children, who are still developing emotionally, cognitively, and socially (Huston & Ripke, 2006), may be engaging with online sites.

Emotionally, children in this age group develop self-regulation and more self-control (Eccles, Wigfield, & Schiefele, 1998) as they distance themselves from their parents and develop closer peer groups (Huston & Rikpe, 2006). They also begin to develop a self-concept and self-esteem (Feldman, 2009), evaluating self-worth in the context of others (Elkind, 1967). Socially, youth develop ''chumships,'' which are more intimate, closer relationships than ever before experienced in early childhood (Sullivan, 1953). The importance of ''fitting in'' with peers also is characteristic of this age group, especially since youth spend a good portion of their day with peers at school (Huston & Ripke, 2006).

The cognitive shift from middle childhood to adolescence is marked by increased hypothetical reasoning (Flavell, Miller, & Miller, 2002) and an ability to discriminate between whether fictional media content is realistic or probable in real life (Dorr, 1983). Children gain the ability to grasp abstract ideas and metacognitive thoughts (Huston & Ripke, 2006). As Rogoff (1998) noted, cognitive development particularly for children in this age group is a collaborative process, involving adults and peers in the context of sociocultural activities.

Today, child development is played out in online environments as well as traditional offline ones. Turkle (1995) described how the Internet allows users to create and test new identities in a safer place than the offline world as well as how self-presentation online can help users better understand their offline selves. Livingstone (2009) concluded that social networks afford youth access to peers with privacy

from their parents. Research also shows that social networks can foster emotional intimacy and strengthen offline relationships (e.g., Subrahmanyam & Smahel, 2011; Valkenburg & Peter, 2007).

The affordances of social networks for development are important given recent research suggesting younger children are using social networks alongside their older peers. American children 11 to 14 years old spend most of their online time on social networks (Rideout et al., 2010), and 38% of UK children 9 to 12 years old have a profile on one or more social networks (Livingstone, Haddon, Gorzig, & Olafsson, 2011). Further, the May, 2011 *Consumer Reports* noted, ''of the 20 million minors who actively used Facebook in the past year, 7.5 million of them were under 13.'' Even 8- to 10-year-old children, well below the 13-year-old age minimum for most social networking sites, indicate they spend approximately 5 minutes per day on these sites (Rideout et al., 2010). If younger children are using social networks in these ways, these activities could shape cognitive, social, and emotional development, with more opportunities for younger children to engage in tasks traditionally reserved for adolescents and adults.

Media Content and Gender

In general, girls tend to be more forthcoming with personal information and are more likely to share their emotions (Buhrmester & Prager, 1995; O'Neill, Fein, Velit, & Frank, 1976), while boys tend to be more physically aggressive (Eaton & Enns, 1986). Research demonstrates girls favor television programs that deal with friendships and other human relationships, while boys favor cartoons and action adventure programs (Huston & Wright, 1998; Lemish, 2007). Further, several studies have found gender differences in adolescents' online preferences. More adolescent females aged 12–17 used the Internet for social relationships (Lenhart, Rainie, & Lewis, 2001). Similarly, Stern's (2002a, 2002b) qualitative research on adolescent girls' online homepages showed that girls were personal, intimate, and emotional. Alternatively, more 12- to 17-year-old boys use the Internet for sports, playing games, and creating their own homepage (Lenhart et al., 2001). Boys also make more references to video games and sports on their online homepages (Stern, 2004). In one of the only studies on preadolescents, 10- to 14-year-old girls were more ''socially anxious'' and had closer friendships compared to boys (Valkenburg & Peter, 2007). To date there is no research on gender difference in online preferences for children in middle childhood.

Age-Appropriateness and Quality

Research with older media platforms, such as television, has demonstrated the importance of youth watching age-appropriate quality content. A body of literature on preschool television has proven the importance of age-appropriateness content for young children (Wright et al., 2001), but research on older children and teenagers

focuses on the negative influences of inappropriate content. Numerous studies have demonstrated the consequences of youth watching violent television (e.g., Calvert, 1999; Cho & Cheon, 2005; Lemish, 2007) and playing violent video games (e.g., C. A. Anderson, 2003; Calvert, 1999). Additional concerns arise over interacting with strangers online, cyberbullying, and the Internet's negative influence on socialization (e.g., Subrahmanyam & Lin, 2007). Thus, understanding whether youth engage with age-appropriate Web sites could have considerable consequences. While Web sites like Facebook have 13 and older age restrictions, many younger children report using this site and other social networks regularly (Rideout et al., 2010). With research showing that younger adolescents are more likely to interact with strangers online and show more risk taking behaviors and less maturity in these interactions (Valkenburg, Schouten, & Peter, 2005), there are growing concerns about the influences of social networking sites on children. Further, youth are reporting games as a frequent online activity (e.g., Rideout et al., 2010), but there is little information on what specific game sites youth are visiting or whether these are age-appropriate games for them to engage with on a regular basis. Overall, without knowing what children do online, it is impossible to determine whether the content they engage with is appropriate or of high quality and what implications the content may have for their social, emotional, and cognitive well-being.

Cross-Platform Engagement

With the advent of mobile devices, such as smartphones and tablet computers, children can now access the Internet on platforms anywhere, anytime. Lenhart (2012) found that while only 8% of 12- to 13-year-olds owned a smartphone, 92% of owners used their cell phone and 30% used a tablet computer to access the Internet. However, few have looked specifically at the 8- to 12-year-old age group and whether or not children use mobile devices to access the same or different content than they would access on computers.

Current Study

Given that lack of research on children during middle childhood, the current study examines 8- to 12-year-old's Internet use and Web site preferences. The main research questions are:

RQ_1: What sites are 8- to 12-year-old children using on the Internet?
RQ_2: Are younger (8- to 10-year-olds) and older (11- to 12-year-olds) children using different Web sites?
RQ_3: Do boys and girls favor different Web sites?
RQ_4: Do 8- to 12-year-olds visit high quality, age-appropriate sites?
RQ_5: Is favored Internet content the same across multiple platforms?

Method

Participants

Participants represented a subsample of 442 8- to 12-year-old children from a larger national sample of 909 children and adolescents who completed an online survey. While not a nationally representative sample, 48 states were represented (excluding Alaska and Wyoming). The mean age of children in this subsample was 10 years old ($SD = 1.42$), with roughly equal numbers of children represented at each age level: 18% 8-year-olds, 20% 9-year-olds, 21% 10-year-olds, 18% 11-year-olds, and 23% 12-year-olds. There were approximately the same number of girls (52%) and boys (48%), and the sample was primarily Caucasian (80%).

The majority of participants had access to computers at home (84%), and most (63%) children go online at least once a day, while the remaining 39% go online a few times a week or less. However, there was a range in the amount of time youth spend online each day. Twenty-six percent go online for less than 1 hour, 27% for 1–2 hours a day, and 10% for 3 or more hours a day.

Procedure

The Museum of Science and Industry, Chicago (2011) developed an online survey to gain information on youth media consumption. Survey Monkey distributed the survey to parents of 8- to 17-year-olds in the United States via its ongoing consumer panel. Panel members are engaged in surveys no more than once every 4 days and are provided non-cash incentives in terms of points, which can be redeemed for prizes. The parents of children who took this survey varied in terms of level of education: 21% have a high school degree or less, 25% some college, and 39% a college degree, and 15% a graduate degree. Additionally, there was variation in levels of income, with about a third (34%) of the sample making $34,000 or less, a third (36%) making between $35,000–$74,000, and a third (31%) making $75,000 or more.

Panel members were contacted via email and asked to allow one child within the household between 8 and 17 years old to complete the survey. The link to the online survey was embedded in the email. Once parents gave their permission, children and adolescents completed the survey, which took approximately 20 minutes.

Coding

As part of the survey, children were asked to list up to three of their favorite Web sites. Children were not asked to put these Web sites in order of preference, therefore Web sites were treated as equally favored and not given a rating. A list of 201 Web sites was compiled, for which frequencies were calculated to determine

Table 1
The Frequencies and Percentages for the Top 10 Favored Web Sites of 8- to 12-Year-Olds

Web Site	Frequency	%
YouTube	113	26%
Facebook	78	18%
Disney	55	12%
Club Penguin	43	10%
Webkinz	40	9%
Nick	33	8%
Pogo	23	5%
Poptropica	19	4%
PBS Kids	18	4%
Google	18	4%

Note. Percentages were determined using $N = 422$ to represent the proportion of children 8–12 who named the Web site as a favorite. Because children could name up to 3 favorite Web sites, an individual can be represented in multiple categories.

how many children listed each Web site as one of their top three favorites. The top 10 Web sites with the highest frequencies were determined from the complete list and percentages representing the number of children who favored the Web site compared to the entire sample ($N = 442$) were obtained (Table 1). Because children could list up to three favorite Web sites, reported percentages may not add up to 100%.

Web Site Categories.

To obtain data on more general trends of Web site use, 15 categories were developed to represent *types* of Web sites. The primary researcher open-coded all of the Web sites and developed a coding manual (Appendix A) to be used by a trained researcher who double-coded 22% of the sample to achieve an inter-rater reliability of .87, well above the suggested .7 acceptable range. When coders disagreed, the Web sites in question were discussed, and the coding manual was consulted until agreement was made. The researchers acknowledge that some Web sites have many components with which to engage, such as games and videos, but in order to systematically code Web sites into one type, decisions were made based on the overall content or theme of the Web sites (e.g., SIKids.com is a sports-related Web site that has game components but is categorized as sports). A complete list of frequencies and percentages of the proportion of children who named a Web site within each category is available in Table 2. Notably, many of the top 10 Web sites were represented in the top Web site categories.

Table 2
The Frequencies and Percentages for the 15 Web Site Categories

Web Site Category	Frequency	%
Video/movie	128	29%
TV show/network	106	24%
Virtual world	99	22%
General game	92	21%
Social network	88	20%
Search/reference	49	11%
Toy	38	9%
Educational	24	5%
Other	20	5%
Games for girls	17	4%
Buying	15	3%
Sports	12	3%
Music	8	2%
Unclear	8	2%
AdverGames	3	1%

Note. Percentages were determined using $N = 422$ to represent the proportion of children 8–12 who named the Web site as a favorite. Because children could name up to 3 favorite Web sites, an individual can be represented in multiple categories.

Internet Frequency.

Time spent using the Internet was measured using a 7-point Likert scale, anchored by *Never* and *3+ hours a day*.

Age Groups.

Prior media research suggests that even within middle childhood, developmental trends (Erikson, 1963) and media consumption patterns (Rideout et al., 2010) differ based on age. For this study, children were broken up into two age groups: younger children (8–10) and older children (11–12).

Web Site Content: Age-Appropriateness and Quality Ratings.

Due to the high variability of individual Web sites, only the top 10 Web sites were manually coded, assigning one code for age-appropriateness and one for overall quality using Common Sense Media (2012) ratings (CommonSenseMedia.org). While Common Sense Media does not have age or quality ratings for all Web sites present on the Internet, ratings were available for the top 10 Web sites. Raters

for Common Sense Media include those in academia, media, and parenting contexts and have experience reviewing for newspapers, trade magazines, and online databases. All reviewers go through a training process to understand Common Sense Media's child development guidelines for evaluating media, as well as a trial review period where they work with the editor to ensure the reviews meet the Common Sense Media guidelines. (For more information see http://www.commonsensemedia.org/about-us/our-mission/faqs).

For age-appropriateness, we used the Common Sense Media specific age rating (0–17). For overall quality, Common Sense Media offers a star rating system from 1–5 stars: 1 = ''don't bother;'' 2 = ''disappointing;'' 3 = ''just fine;'' 4 = ''really good;'' and 5 = ''the best.'' Because children could list up to three sites, average age-appropriateness scores and average quality ratings were obtained for each child by averaging the Common Sense Media raw scores for all of the Web sites a child listed. For example, if a child listed a Web site that was rated for 7-year-olds and a Web site rated for 13-year-olds, his/her average age-appropriateness score was 10. If a child favored a Web site rated 3 stars and a Web site rated 5 stars, his/her average quality score was 4 stars. (For more information on rating, see http://www.commonsensemedia.org/about-us/our-mission/about-our-ratings).

Results

The following analyses primarily focus on the Web site category data as these capture general trends as opposed to specific Web sites. However, the analyses of age-appropriateness, quality ratings, and cross-platform engagement sections required specific Web site content and the top 10 Web sites were used for these analyses. The age-appropriateness and quality ratings are based on Common Sense Media's Web site ratings, and while Common Sense has one of the largest compilations of ratings and reviews of children's media, these results should be interpreted with caution as the results may be a reflection of the rating system.

Age Differences in Time Use & Content

A 2 Age X 7 Internet Use (''never,'' ''less than once a week,'' ''once a week,'' ''a couple of times a week,'' ''less than 1 hour/day,'' ''1–2 hours/day,'' ''3+ hours/day'') Pearson's chi-square test was conducted to examine differences in the frequency of Internet use by age. Overall chi-square results showed the amount of time spent on the Internet differed by age ($\chi^2 = 26.68$, $df = 6$, $p < .01$). Subsequent z-tests comparing column proportions showed that significantly more older children (32.8%) go online for 1–2 hours a day compared to younger children (22.8%). Additionally, significantly more older children (14.8%) go online for 3 or more hours a day compared to younger children (6.2%).

A series of 2 Age X 2 Web site Category (e.g., video/movie clip site, social network site, TV show or network site) Pearson's chi-square tests were conducted (Table 3; Table 4). Separate analyses were performed for each Web site category to explore age differences for those who favored a site in a certain category versus those who did not. In Table 3, we present the differences in the proportions of children within each age category for each Web site type. In Table 4, we present the Mantel-Haenszel common odds ratio estimated for each comparison to assess the relative strength of the relationship between age and Web site categories.

More younger children named TV show or network Web sites ($\chi^2 = 6.60$, $d = 1$, $p < .05$), virtual world Web sites ($\chi^2 = 5.35$, $df = 1$, $p = .02$), toy Web sites ($\chi^2 = 3.90$, $df = 1$, $p < .05$), and educational Web sites ($\chi^2 = 6.40$, $df = 1$, $p = .01$) compared to older children. On the other hand, a higher percentage of older children named video clip or movie Web sites ($\chi^2 = 10.21$, $df = 1$, $p < .01$), social networks ($\chi^2 = 22.39$, $df = 1$, $p < .01$), general game Web sites ($\chi^2 = 6.73$, $df = 1$, $p < .01$), and search/reference sites ($\chi^2 = 7.18$, $df = 1$, $p < .01$) as their favorites compared to younger children. In general, the odds ratio estimates were consistent with the significant chi-square analyses presented above as the significance of these estimated was $p < .05$ and the confidence intervals did not include 1. The only exception was toy Web sites, where the estimate was barely significant at $p = .05$ and 1 was included in the confidence interval, albeit just barely as the upper bound was 1.01. However, this suggests a weaker relationship in age differences for toy Web sites.

Gender Differences in Time Use & Content

A 2 Gender X 7 Internet Use Pearson's chi-square test was conducted to examine gender differences in time spent using the Internet. Overall, the analysis was not statistically significant, but girls (32%) were significantly more likely to spend 1–2 hours/day online compared to boys (21.3%).

A series of 2 Gender X 2 Web site Category Pearson's chi-square tests were used to examine gender differences in the types of content girls and boys engage with online (Table 3; Table 4). In Table 3, we present the differences in the proportions of boys and girls who favored a site within each Web site category. In Table 4, we present the Mantel-Haenszel common odds ratio estimated for each comparison to assess the relative strength of the relationship between age and Web site categories.

Significantly more girls named TV show or network sites ($\chi^2 = 6.70$, $df = 1$, $p = .01$), virtual worlds ($\chi^2 = 30.71$, $df = 1$, $p < .001$), and games for girls Web sites ($\chi^2 = 16.14$, $df = 1$, $p < .01$) as their favorites; significantly more boys favored general game Web sites ($\chi^2 = 4.54$, $df = 1$, $p < .05$), and sports sites ($\chi^2 = 6.26$, $df = 1$, $p < .05$). There were no significant differences in gender for social networking sites, though more girls (22%) compared to boys (18%) favored these sites. The odds ratio estimates were consistent with the significant chi-square analyses presented above as the significance of these estimates was $p < .05$ and

Table 3
Pearson's χ^2 Analysis of Age (8–10, 11–12) X Web Site Category and of Gender (Male, Female) X Web Site Category

	TV Show/ Network	Video Clips	Social Network	Toys	Educational	General Games	Virtual Worlds	Games for Girls	Sports	Search/ Reference
					Age					
8–10 yr olds	28.2%[a]	23.2%[a]	12.4%[a]	10.8%[a]	7.7%[a]	16.6%[a]	26.3%[a]	4.2%[a]	2.7%[a]	7.7%[a]
11–12 yr olds	18%[b]	37.2%[b]	30.6%[b]	5.5%[b]	2.2%[b]	26.8%[b]	16.9%[b]	3.3%[a]	2.7%[a]	15.8%[b]
					Gender					
Girls	29%[a]	25.5%[a]	21.6%	9.1%[a]	6.9%[a]	16.9%[a]	32.9%[a]	7.4%[a]	0.9%[a]	12.1%[a]
Boys	18.5%[b]	32.7%[a]	18%	8.1%[a]	3.8%[a]	25.1%[b]	10.9%[b]	0.0%[b]	4.7%[b]	10%[a]

Note. Statistical significance should be read separately for age and gender. Differing superscript letters (*a* vs. *b*) indicate a significant difference at $p < .05$ level between the age and gender groups. For example, more 8- to 10-year-olds (denoted with a superscript *a*) favor TV Show/Network Web sites compared to 11- to 12-year-olds (denoted with a superscript *b*).

Table 4
Odds Ratios for χ^2 Analysis of Age (8–10, 11–12) X Web Site Category and of Gender (Male, Female) X Web Site Category

	Age			Gender		
	Estimate	Sig.	CI (.95)	Estimate	Sig.	CI (.95)
TV Show/network	0.56	0.01	[0.35, 0.89]	1.80	0.01	[1.15, 2.82]
Video clips	1.96	<0.01	[1.29, 2.97]	0.71	0.10	[0.47, 1.07]
Social cetwork	0.13	<0.01	[1.93, 5.08]	1.26	0.34	[0.79, 2.01]
Toys	0.48	0.05	[0.23, 1.01]	1.14	0.70	[0.59, 2.23]
Educational	0.27	0.02	[0.09, 0.08]	1.88	0.15	[0.79, 4.51]
General games	1.84	0.01	[1.16, 2.92]	0.61	0.03	[0.38, 0.96]
Virtual worlds	0.57	0.02	[0.36, 0.92]	4.01	<0.01	[2.40, 6.69]
Games for girls	0.76	0.60	[0.28, 2.11]	—	—	—
Sports	1.01	0.99	[0.32, 3.24]	0.18	0.03	[0.04, 0.81]
Search/reference	2.25	<0.01	[1.23, 4.12]	1.25	0.45	[0.69, 2.27]

Note. Due to the fact that no boys were represented in the cell for favoring Games for girls, an odds ratio could not be calculated.

the confidence intervals did not include 1, suggesting relatively strong relationships between gender and the particular Web site types.

Age-Appropriateness of Web Sites

Descriptive statistics for the average age ratings within each age group showed a bimodal distribution for younger children, with modes around 8 and 13 years of age, and a mean average age rating of 10.18 ($SD = 2.51$, $N = 154$). Older children, on the other hand, generally favored Web sites for 13-year-olds, with a mean average age rating of 11.75 ($SD = 2.36$, $N = 115$). Despite these averages, no Web sites in the sample were rated for 10- to 12-year-olds.

A 2 Age X 3 Average Age Rating Category (7–9, 10–12, 13–16) Pearson's chi-square test was significant ($\chi^2 = 24.51$, $df = 2$, $p < .01$). Subsequent z-tests comparing column proportions showed significant differences between age groups for the 7–9 and 13–16 average rating scores: younger children (49.4% compared to 23.5%) favored content for 7- to 9-year-olds while older children (61.7% compared to 32.5%) favored content for 13- to 16-year-olds.

Additionally, a 2 Gender X 3 Average Age Rating Category Pearson's chi-square test showed significant differences in age appropriateness ratings by gender ($\chi^2 = 19.73$, $df = 2$, $p < .01$). Subsequent z-tests showed that girls (48.7% compared to 23.4%) were more likely to favor content for younger audiences (7- to 9-year-olds)

while boys (59.5% compared to 34.8%) were more likely to favor content for older children (13- to 16-year-olds).

Quality of Web Sites

Children, on average, favored Web sites with 3.75 out of 5 stars ($SD = .57$, $N = 27$). A 2 Age Group X 4 Quality Rating (2 stars through 5 stars)[1] Pearson's chi-square test was overall significant ($\chi^2 = 7.76$, $df = 3$, $p = .05$). Subsequent z-tests comparing column proportions showed significant differences in age groups for 4- and 5-star ratings, such that a larger proportion of 11- to 12-year-olds (75.7% compared to 64.3%) favored 4-star Web sites while a larger proportion of 8- to 10-year-olds (7.1% compared to 0.9%) favored 5-star Web sites.

A 2 Gender X 4 Quality Rating Pearson's chi-square test showed significant differences in quality rating by gender ($\chi^2 = 8.45$, $df = 3$, $p < .05$). Subsequent z-tests showed a higher proportion of girls (29.7% compared to 15.3%) favored 3-star quality Web sites, while a larger proportion of boys (77.5% compared to 63.3%) favored 4-star quality Web sites.

Cross-Platform Engagement

To assess whether children access similar content on their mobile devices as they do on computers, data on favorite browser-based and downloaded apps were analyzed for those owning a smartphone and those owning a non-phone mobile device, such as an iPod Touch or tablet computer. Smartphone users were distinct from non-phone mobile device users, such that no child in the sample had both a smartphone and a non-phone mobile device.[2] For the 14% of 8- to 12-year-olds who used a smartphone, Angry Birds was the most popular app (25%), followed by Facebook (15%) and YouTube (8%). For the 12% of children using an iPod Touch or tablet, Angry Birds, Facebook, and YouTube were again the most frequently reported apps for both browser-based and downloaded apps. For the former, 16% of children named Angry Birds, 12% named YouTube, and 7% named Facebook. For the latter, 20% of children named Angry Birds, 7% named YouTube, and 5% named Facebook.

Discussion

The Internet is a popular media activity with a wide range of Web sites favored by 8- to 12-year-old children. However, this study demonstrated that certain types of Web sites are more popular and more frequently visited than others. Specifically, favored Internet sites vary based on child age and gender.

Video clip and movie Web sites, especially YouTube, and social networking sites, in particular Facebook, are among the favored Web sites of 8- to 12-year-

old Internet users, particularly for older children. This is consistent with previous research indicating that tweens are frequent users of social networking sites (e.g., Livingstone et al., 2011) and that the most popular online activity for 8- to 18-year-olds is watching movies online (Rideout et al., 2010). Because older children spend more overall time online compared to younger children, this extra time may be spent on both video/movie clip Web sites and social networking sites. Younger children, on the other hand, frequent television network Web sites, virtual world Web sites, toy Web sites, and educational Web sites, suggesting a distinct developmental difference between the older and younger children in middle childhood. While the 11- to 12-year-olds may be more focused on gaining independence, developing closer peer ties, and experimenting with identity, the 8- to 10-year-olds still trend towards early childhood activities focused on children's television, education, and imaginary play.

There were also significant differences in Web site preferences by gender, which is consistent with previous research on television program preferences (Huston & Wright, 1998; Lemish, 2007) and online activities of teenagers (e.g., Stern, 2002a; 2002b; Valkenburg & Peter, 2007). The higher frequency of girls on virtual worlds reflects their desire for more intimate, emotional content (Huston & Wright, 1998; Lenhart et al., 2001), and our study also aligned with prior research suggesting boys dominate online gaming (e.g., Lenhart et al., 2001). Interestingly, we found no differences in gender for social networking sites, suggesting girls and boys in middle childhood favor social networking sites equally.

There is evidence that children access the same Web sites on computers and mobile devices. While mobile devices are not as prevalent among 8- to 12-year-olds, those who have them visit apps that reflect children's reported favored Web sites—YouTube and Facebook. Angry Birds was the most popular app among mobile device users, but because Angry Birds started as an app and continues to be primarily accessed as an app (Brian, 2012), it is not surprising that this game was not represented as a favorite Web site.

Age-Appropriateness

This study demonstrated that children are still finding their way to Web sites that are not considered age-appropriate. Provided that Common Sense Media is the leader in children's media reviews and ratings and has trusted and trained reviewers rating material, we believe that while there may be some bias associated with our results based on the rating systems, the rigor with which Common Sense conducts its ratings provides a valid system for assessing the age-appropriateness and quality of children's Web site preferences.

Older children favored Web sites meant for 13-year-olds while younger children were split between Web sites for 7- to 9-year-olds and 13-year-olds. Additionally, girls favored Web sites for 8-year-olds and boys favored Web sites for 13-year-olds. Television research shows that boys outgrow younger programs more quickly than

girls (Lemish, 2007), which may be the reason why boys in this study were less apt to favor Web sites appropriate for younger children. However, no Web sites in this study were rated by Common Sense Media (2012) for 10- to 12-year-olds, and when exploring the landscape of online content for this age group, we found it is indeed lacking. Common Sense Media has 282 Web sites rated for 7- to 9-year-olds but only 159 Web sites for 10- to 12-year-olds. Further, there is almost the same number of rated Web sites for 13-year-olds (139 Web sites) as there is for the entire 10- to 12-year-old age group. From a developmental perspective, this lack of age-appropriate content for 10- to 12-year-olds means that children in this age group are either engaging with content that is slightly young or slightly mature for them without an opportunity to engage with content that meets them at their social, emotional, and cognitive developmental stage.

Indeed, a large proportion of 8- to 12-year-olds favored YouTube and Facebook, both of which are rated for 13-year-olds, which may explain the large percent of children whose Internet preferences had an average age rating of 13. While only 25% of children reported going online to visit Facebook, this is still a large number of underage children frequenting a social network meant for teenagers and adults. Further, it is not just the 11- to 12-year-olds, but 34% of Facebook users in this study were 8- to 10-year-olds.

The high incidence of underage children on social networking sites is of concern given previous government regulation to avoid such an issue (i.e., COPPA). As this study shows, many underage children go on Facebook by lying about their age, and boyd, Hargittai, Schultz, and Palfrey (2011) found that many parents are aware of this and allow their children to create accounts on Facebook with fake ages and profiles. This could have important developmental implications as younger children have the potential to engage in developmental tasks traditionally reserved for older youth and teenagers. Engaging in these online social interactions prior to necessary cognitive and emotional development that occurs throughout middle childhood could lead to negative encounters or poor decision-making. As a result, teachers and parents need to be aware of what children are doing online and to teach media literacy and safe online habits at younger ages than perhaps previously thought.

Quality

The average quality ratings of the Web sites visited by each age group ranged from ''fair'' to ''really good'' quality. This suggests that while children may be going to very poor quality Web sites and to very high quality Web sites, the average child engages with slightly above average quality Web sites. This finding is important in light of television research with slightly younger children that demonstrates children can learn key social and cognitive skills from quality television (e.g., D. R. Anderson et al., 2001; Jennings, Hooker, & Linebarger, 2009). Thus, not only is it reassuring that youth engage with high quality online content given the hype over children

accessing and engaging with poor content, but the implications of this finding are encouraging and deserve further research into whether such content can lead to similar outcomes as television.

Limitations & Future Research

It is important to note that while these data provide an important understanding of what 8- to 12-year-old children do online, this study was unable to explore the specific ways in which children engage with these sites online. This is especially pertinent with the two most frequented Web sites, YouTube and Facebook, as there are a multitude of options and activities to do on these sites. Future research should collect more detailed information to better understand specific activities 8- to 12-year-olds engage with on large, popular Web sites. Additionally, we were unable to gain information on the context of media use, such as parent mediation, or individual information on parent education or socioeconomic status, in addition to children's digital skills. These are important characteristics that may shape children's Internet use (Nikken & Jansz, 2013) and should be collected in future work. Finally, while there may be concerns over the use of Common Sense Media as a source for the age-appropriateness and quality ratings, we believe that the rigor with which they conduct reviews and ratings of children's media and the fact that they have one of the largest compilations of reviews conducted by trained reviewers lends to the validity of the ratings. While these are certainly limitations of the current study, we believe that the novelty of this work overcomes such limitations.

Developmental Implications

Traditionally, development is thought to influence media use, such that children at specific developmental periods use media that aligns with such development. However, the current study provides preliminary evidence that the relationship between development and media use may be bidirectional, such that not only does development influence media use but media use may also influence development. Given that younger children favor social networking sites, which are traditionally reserved for teens and young adults, their interactions on these sites may speed up their social development at an emotional and cognitive stage that may not be ready for advanced social development tasks. Further, the dearth of Internet content available for 10- to 12-year-olds is noteworthy, and even among the available Web sites, youth are not favoring them compared to Web sites for slightly younger or slightly older children. These findings suggest a need to provide media literacy at an earlier age to ensure that children engage in safe and developmentally appropriate interactions and activities online as well as a need to develop more engaging online material for youth in middle childhood.

Appendix A: Web Site Type Classifications

TV or Video Sites

TV Show or TV Network.

This includes television show Web sites, such as icarly.com, or television network Web sites, such as Nickelodeon, Disney, PBS Kids, and Cartoon Network.

Video Clip or Movies.

This includes Web sites where children can watch video clips or movies, including YouTube, miniclip, and Netflix.

Game Sites

General Games.

This includes Web sites where children can play games. This category includes both larger game Web sites, such as pogo.com, which have a variety of games available to play, and specific game Web sites, such as worldofwarcraft.com, which focus on one game.

Advergames.

This includes Web sites that provide games or activities clearly linked to advertising a product, such as mycokerewards.com or McWorld.com.

Games for Girls.

This includes Web sites specifically promoted towards girls as apparent by the URL or the headings on the main Web sites page, including tygirls.com, gamesforgirls.com, girlsgogames.com, topmakeovergames.com, and dressupwho.com.

Virtual World Sites

This includes Web sites where children can create their own avatar or pet and enter an online community where their avatar interacts with other avatars or where they can take care of their pet. These Web sites include Club Penguin, webkinz.com, poptropica.com, petpetpark.com, neopets.com, moshimonster.com, and sims.com. Additionally, this category includes virtual world games connected to Facebook, such as Farmville and Cityville.

Specific Content Sites

Sports.

This includes Web sites where children can check sports scores or information on sports, including espn.com, cbssports.com, and sikids.com (Sports Illustrated Kids). Some children wrote ''sports'' or a certain sport, such as ''football,'' as their favorite Web site, and these were also coded as sports Web sites.

Music.

This includes Web sites where children can listen to and stream music, such as Pandora.com and itunes.com.

Educational.

This includes Web sites that promote educational material and games, such as coolmath4kids.com, hoodamath.com, vmathlive.com, and studyisland.com. Additionally, this includes educational services, such as tutor.com and khanacademy.com.

Toys.

This includes Web sites tied to specific toys and that offer content and games related to the toys, including hotwheeels.com and transformers.com.

Other Types of Sites

Social Network.

This includes social networking sites, namely Facebook, MySpace, and Twitter.

Buying.

This includes Web sites where children can buy items, including amazon.com, ebay.com, bidstart.com, and toysrus.com.

Information Retrieval/Search Engine/Email.

This includes search engines, reference sites, and email sites, including google.com, yahoo.com, msn.com, Wikipedia.com, hotmail.com, weather.com, and if the child reported ''email'' as a favorite Web site. Additionally, this includes larger Web sites where children can go to get more information about certain topics and/or interact with others through forums, such as imdb.com, nintendo.com, and playstation.com.

Other Web Sites

This includes Web sites that did not fit into one of the above categories and could not stand on their own as a new category. Examples of Web sites in this category include aspca.com, atlantichotel.com, and myyearbook.com. Additionally, this includes Web sites where it was unclear what children were doing due to the varied activities offered, such as games, videos, recipes, and buying items. These Web sites include americanfamily.com and xboxlive.com.

Unknown Web Sites

Some children provided general answers or Web sites that we could not confirm, such as ''researching airplanes,'' ''horses,'' or ''ackad games.''

Notes

[1]No Web sites listed received 1 star.

[2]Due to the small sample size ($N = 60$ for Smartphone users, $N = 55$ for non-phone mobile smart device) of 8- to 12-year-olds actually using these devices and reporting on their favorite apps, only frequencies could be obtained.

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