# Media Use, Face-to-Face Communication, Media Multitasking, and Social Well-Being Among 8- to 12-Year-Old Girls

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An online survey of 3,461 North American girls ages 8–12 conducted in the summer of 2010 through *Discovery Girls* magazine examined the relationships between social well-being and young girls' media use—including video, video games, music listening, reading/homework, e-mailing/posting on social media sites, texting/instant messaging, and talking on phones/video chatting—and face-to-face communication. This study introduced both a more granular measure of media multitasking and a new comparative measure of media use versus time spent in face-to-face communication. Regression analyses indicated that negative social well-being was positively associated with levels of uses of media that are centrally about interpersonal interaction (e.g., phone, online communication) as well as uses of media that are not (e.g., video, music, and reading). Video use was particularly strongly associated with negative social well-being indicators. Media multitasking was also associated with negative social indicators. Conversely, face-to-face communication was strongly associated with positive social well-being. Cell phone ownership and having a television or computer in one's room had little direct association with children's socioemotional well-being. We hypothesize possible causes for these relationships, call for research designs to address causality, and outline possible implications of such findings for the social well-being of younger adolescents.

*Keywords:* late childhood, social well-being, media, multitasking, computers

Extensive research has addressed social developmental processes and outcomes and the many effects of media use (primarily TV) on cognitive development (e.g., Calvert & Wilson, 2008; Parke & Clarke-Stewart, 2010; Pecora, Murray, & Wartella, 2007). Yet the intersections of social well-being and media use patterns in the current era of multiscreen media multitasking (with TVs, computers, and mobile devices) have not been examined. Another key omission has been the failure to assess time spent in face-to-face communication in studies of the relationships of media use on social development. This oversight is important given the shift from face-to-face communication to mediated interpersonal communication, even among children (Rideout, Foehr, & Roberts, 2010).

This study examined this important set of relationships in a large-scale survey on traditional and new media use and face-to-face communication and social well-being indices in girls 8 to 12 years old. Specifically, we addressed the relationships between these girls' media use, face-to-face communication, and media multitasking and their overall social success, feelings of acceptance and normalcy among friends, and relative dominance of in-person/online friends as sources of positive and negative social feelings.

## Growing Up Digital

In a national sample of over 2,000 8- to 18-year olds, the Kaiser Family Foundation (Rideout et al., 2010) found that the average total time that children reported experiencing media in "TV, Music/audio, Computer, Video games, Print, and Movies" rose to 10 hr 45 min (treating simultaneous media use as distinct activities) per day in 2009, up from 8 hr 33 min in 2004 and 7 hr 29 min in 1999—a 44% increase over a decade. These figures do not include reported hours spent texting, phoning, or using computers for schoolwork. Perhaps most remarkable is that the reported proportion of time spent multitasking—the proportion of media time spent using more than one medium concurrently—increased from 16% in 1999 to 26% in 2004 to 29% in 2009.

Apart from the increase in overall time spent consuming media is the finding that youth consume 20% of their media on a "third screen" (other than TV and computer): mobile smartphones and game consoles (Rideout et al., 2010). The Pew Internet & American Life Project (Lenhart, Ling, Campbell, & Purcell, 2010) reported that 75% of 12- to 17-year-olds owned cell phones, with 87% of them texting and half of the texters (over one third of all 12- to 17-year-olds) sending 50+ texts daily. Studying 8- to

18-year-olds, Rideout et al. (2010) found that 66% of children owned their own cell phones and 76% owned their own iPod/music players. Fifty-eight percent of 12-year-olds now own a cellphone (Lenhart, Purcell, Smith, & Zickuhr, 2010), up from 18% in 2004. Teens also increasingly use social network sites: A growing number (73%) of online 8- to 18-year-olds use social network sites (Lenhart, Purcell, et al., 2010) for an average of 37 min per day (Rideout et al., 2010). Given this rapidly changing media ecology for the interactions that shape social development, it is vital to conduct empirical inquiries to understand how this new digital climate is being taken up by and is influencing youth.

Considerable interest has also developed in media multitasking (Roberts, Foehr, & Rideout, 2005). This interest has been spurred by popular media attention and by the demonstration that heavy chronic media multitaskers (college students) performed much more poorly than light media multitaskers in three key aspects of cognitive functioning: filtering, working memory management, and task switching (Ophir, Nass, & Wagner, 2009).

Despite these findings on adult cognitive differences as a function of chronic media multitasking, no research has yet examined media multitasking by youth and its relationship to social well-being. Parents express concerns about high media use by their children and children's friends and its likely developmental consequences (Wallis, 2010), and Rideout et al. (2010, p. 13) found that those 8- to 18-year-olds who spent more time with media reported being less content (as measured by an index composed of questions on having lots of friends, getting along well with parents, being happy at school, not being bored, not feeling sad and unhappy, and not getting in trouble a lot). On the other hand, cell phones and other multitasking facilitators are also experienced by youth as contributing to the developmental task of individuation from parents (Lenhart, Ling, et al., 2010). Research has also indicated that intimacy (Subrahmanyam & Greenfield, 2008), identity (Huffaker & Calvert, 2005; Manago, Graham, Greenfield, & Salimkhan, 2008; Valkenburg, Schouten, & Peter, 2005), developing existing friendships (Bessière, Kiesler, Kraut, & Boneva, 2008; Gross, 2004; Valkenburg & Peter, 2007), and other developmental tasks are played out online, so one may expect media use to potentially relate to the developmental challenges of growing intimacy with friends and other aspects of social well-being.

Although children are increasing their consumption of media and their media multitasking, face-to-face communication remains vital. While media are acknowledged central players in childhood socialization (Ito et al., 2010; Livingstone, 2009), face-to-face communication with peers and adults continues to be recognized as a key determinant of social and emotional development (Denzin, 2010; Rogoff, 2003). Hence, it is significant that no previous study has included measures of time spent on face-to-face communication together with the use of mass and interpersonal new media, particularly given this confluence of social developmental issues.

Our study encompasses late childhood (ages 8–9) and young adolescence (ages 10–12). Eight- to twelve-year-olds must deal with developmental challenges including growing intimacy with friends, exposure to risky behaviors among peers, increasing individuation from family, greater responsibilities and assumed autonomy in schoolwork and home life, and the approach of puberty. These years comprise a pivotal time devoted to identity formation, the development of social networks with friends who can serve as

models and peers for mutual support, and learning to effectively navigate the social world. Masten et al.'s (1995) longitudinal study of 191 children used structural equation modeling to determine that peer social success is one of three major dimensions of competence in late childhood (ages 8–12). Increasingly outside the bounds of the family with their peers (Larson & Richards, 1991), young adolescents are becoming more aware of how they think about themselves and how others are thinking about them (Harter, 1999) while also learning to express and read emotions and interpret other signals that provide social feedback from their actual or potential friends (Saarni, Campos, Camras, & Witherington, 2006). They participate in conversations with new personal sources about what is right and wrong and about models to aspire to, they receive feedback on their own actions and values, and they experience self-validating mirroring that contributes to their identity development.

The developmental challenge of intimacy is to acquire the competencies for developing and maintaining close and meaningful personal relationships. As Hartup (1996) observed, "having friends" is a proxy for "being socially skilled"—because making and keeping friends is an ongoing task with many detractions and distractions. Furthermore, intimacy is formed, developed, and sustained through mutual social exchanges with responsive others and includes feeling accepted and understood (Buhrmester & Furman, 1987; Reis & Shaver, 1988). Buhrmester (1996) observed that high-quality friendship is characterized by high levels of positive features such as prosocial behaviors like support and intimacy and low levels of negative features such as conflicts and rivalry, with friendship quality affecting self-esteem, social adjustment, and academic development. Demaray and Malecki (2002) found significant positive relationships for adolescents between social support from their friends, parents, classmates, and teachers and a variety of positive indicators including social skills, academic competence, leadership, and adaptive skills. Significant negative relationships were found between social support and a variety of negative indicators such as conduct problems, aggression, hyperactivity, anxiety, depression, and withdrawal. Berndt (2002) reviewed evidence that mutual self-disclosure is an important predictor of intimacy and quality in adolescent friendships. In short, feeling that one has close friends, finding it easy to make and keep friends, feeling important to friends, feeling accepted and understood, and feeling supported are all indicators of social success and the development of intimacy.

On a related dimension, social competence in late childhood is also associated with feelings of acceptance rather than rejection and of normalcy among peers (e.g., Asher & Coie, 1990). Peer acceptance is believed to promote the development of high-quality friendships, whereas peer rejection leads to challenges in establishing them (Nangle, Erdley, Newman, Mason, & Carpenter, 2003) and issues in later personal adjustment (Ladd, 2006; Parker & Asher, 1987). In Bagwell, Newcomb, and Bukowski's' (1998) longitudinal study, adults who had lower levels of preadolescent peer rejection reported having greater self-worth as adults, whereas those who felt high levels of peer rejection as children were shown to have higher levels of psychopathological symptoms.

Another developmental challenge is dealing with exposure to risky behaviors among peers. Having more friends that parents think of as a bad influence can be a concern given that peers

influence problem behaviors such as smoking, alcohol use, drug use, and delinquency (Urberg, Degirmencioglu, & Pilgrim, 1997).

Eight- to twelve-year-olds are also in a developmental period when a good night's sleep is especially important for healthy functioning. While we know that sleep patterns change and develop constantly during adolescence (Laberge et al., 2001) and emerge from complex interactions of biological needs and cultural norms, findings of sleep time differences as a function of media use and media multitasking are potentially important for children because reductions in sleep contribute to daytime sleepiness (Saarenpää-Heikkilä, Laippala, & Koivikko, 2000), negatively affect executive functions such as planning, organizing one's activities, and allocating attention (Sadeh, Gruber, & Raviv, 2003; Wolfson & Carskadon, 1998), and lead to other emotional and behavioral performances such as negative mood, irritability, and decreased motivation (Carskadon, 2002). Van den Bulck (2004) also found that adolescents spending more time online slept less, slept later during weekdays, and said they felt more tired.

This study thus examined a set of research questions attending to some of the central developmental tasks of the age period described above:

1. How do media use and multitasking relate to feelings of social success, an important indicator of social well-being and of how one is dealing with the developmental task of intimacy?

2. How do media use and multitasking relate to the developmental task of maintaining feelings of normalcy and not feeling rejected, compared with peers?

3. How do media use and multitasking relate to how many friends one's parents think are a bad influence?

4. How do media use and multitasking relate to hours of sleep?

5. How do media use and multitasking relate to the predominant source of girls' experience of both positive and negative feelings? Here we sought to determine how 8- to 12-year-old girls derive feedback signals of social success from online and/or in-person friends, an emerging issue for a new media multitasking era.

## Method

### Participants: Characteristics and Limitations

The findings are based on results from two surveys of girls between the ages of 8 and 12 years conducted in August and September 2010. The survey link was advertised in the August/September 2010 issue of the bimonthly *Discovery Girls* magazine, an American publication that targets 8- to 12-year-old girls and regularly conducts similar surveys of the interests and activities of readers, including over 1,000,000 girls in the United States and Canada. A half-page advertisement invited readers to visit the Discovery Girls website and complete a survey in order to be entered into a drawing for a free iPod.

A first survey ran for approximately 2 weeks and elicited 2,301 valid responses. A second survey, including several supplemental

questions, was released for a further 2 weeks and obtained an additional 1,160 responses, for a total of 3,461 respondents (age 8, $n = 189$; age 9, $n = 469$; age 10, $n = 860$; age 11, $n = 1,033$; age 12, $n = 910$) from all 50 states of the United States and from Canada. To prevent the same girl from responding twice, the survey could not be retaken from the same computer.

We recognize that this sample is not necessarily representative of the U.S. population of 8- to 12-year-old girls, because it was restricted to readers of *Discovery Girls* magazine who could answer an online survey. Ninety-five percent of the respondents had computer access in their homes, which is well above the national average. However, consistent with Lenhart, Ling, et al.'s (2010) figure of 58% of 12-year-olds owning a cell phone, 60.9% of the 12-year-olds in this sample owned cell phones (for our 8- to 12-year-old girls, cell phone ownership was lower, 42.3%). We also do not have income, parent education, race, or ethnicity data for participants.

Despite these limitations, this type of data set is arguably much richer and broader than most extant research with children examining *relationships between variables* instead of absolute values. For example, virtually any classroom research suffers from more serious population constraints, homogeneity of populations, and geographic limitations than does this data set, which draws from a North American sample. So while we urge caution in interpreting the base rates of the variables, we are guardedly optimistic that the relationships between variables are not strongly affected by potential biases, notably in income and geography.

### Overview of Survey

The survey was conducted through SurveyMonkey.com, an online survey-creation portal, and linked directly from the DiscoveryGirls.com website. The survey consisted of five sections and took approximately 20 min to complete. The first section asked about age, access to computers and televisions, and some general questions about the respondent's friends. A second section asked about average daily usage of different media both individually and together with other media. The girls were also asked to report the amount of time they spent interacting face to face both without other media and in conjunction with other media. The third section asked the girls to rank their level of agreement with different statements about their general social outlook. The fourth section asked them to compare their online friends with their in-person friends along various dimensions. The fifth and final section included miscellaneous questions concerning video usage, sleep, and cell phone usage.

### Materials, Procedure, Coding, and Analysis

For each of six media use categories and the seventh category of face-to-face conversations, girls were first asked, "On an average day, how long do you $X$?" where $X$ reflects their experiences using each of the six media categories listed below and the category of face-to-face communication. The question was followed by a multiple-choice scale with options and numerical values assigned for analysis: *never* (0), *less than 1 hour* (0.5), *about 1–2 hours* (1.5), *about 2–3 hours* (2.5), *about 3–4 hours* (3.5), or *more than 4 hours* (4.5). The categories presented to participants were as

follows:[1] (a) watching video content (TV, YouTube, movies, etc.), including playing video games[2]; (b) listening to music; (c) reading or doing homework; (d) e-mailing or sending messages/posting on Facebook, MySpace, etc. (not including Facebook chat); (e) texting or instant messaging (including Facebook chat); (f) talking on the phone or video chatting; and (g) participating in face-to-face conversations.

If a participant indicated any response other than *never,* she was then presented with the question "On an average day, while *X*-ing, how often are you doing the following other activities at the same time?" For this question, participants were presented with a matrix depicting a list of the categories, including the category given in the question (rows), and were given the same multiple-choice scale for hours of use (columns) as in the previous question.

Because the categories of activity were based on media application instead of media platform, we could account for the increasingly common behavior in which a computer or other media platform technology is used for more than one purpose, for example, sending e-mails as well as reading, listening to music, and watching videos. As more media platforms become multi-use, it is increasingly appropriate to describe multitasking in terms of activities rather than platforms.

## Coding: Definition of Multitasking Measures

*Level of media multitasking* was defined as the mean number of media a person simultaneously consumes when consuming media (Ophir et al., 2009). We adapted the media multitasking questionnaire developed by Ophir et al. (2009) to create a media multitasking index (MMI) for each participant. For each of the six media use categories, we first asked, "How many hours do you spend using medium *i*?" (defined as $h_i$). We then asked, for each of the six media use categories *i,* "While using [medium *i*], how much time do you spend using [medium *j*]?" (defined as $m_{i,j}$), where *j* also ran across the six media use categories.

It was then a straightforward matter to compute the MMI as follows:

$$MMI = \left( \sum_{i \in media\ categories} \sum_{j \in media\ categories} m_{i,j} \right) \Big/ \sum_{i \in media\ categories} h_i$$

Thus, the MMI is a count of the number of additional media an individual is using when using a medium.

*Level of face-to-face multitasking* was calculated in a similar manner. We determined the amount of time spent interacting face to face. We then summed the amount of time spent using media (not including face-to-face interaction) while the person was interacting face to face. Finally, we divided the latter by the former.

## Coding and Analysis

E-mail/social network use and instant messaging (IM) use were highly correlated both as a single task and across the various categories of multitasking (correlations ranged from .54 to .80, all *p*s < .001). We therefore combined e-mail/social network use and IM use into a single media use category: *online communication use.*

On the basis of theory and factor analysis, we created two indices—*social success* and *normalcy feelings*—from responses to

the instruction "Please rate how much you agree with each statement" which was followed by statements concerning respondents' feelings about themselves and their friends. Each statement was followed by a six-point response scale: *strongly disagree* (1), *disagree* (2), *somewhat disagree* (3), *somewhat agree* (4), *agree* (5), and *strongly agree* (6).

*Social success* is an index that comprised the following items: "I feel like I have a lot of friends," "People my age understand me," "I feel like I have a lot of close friends," "I find it easy to make friends," "I find it easy to keep friends," "I feel like I'm important to my friends," and "I feel accepted by people my age." The index was highly reliable (Cronbach's $\alpha = .87$).

*Normalcy feelings* is an index that comprised these items: "Compared to people my age, I feel normal," "I often feel like I'm not normal compared to people my age" (reverse coded), and "I often feel rejected by other people my age" (reverse coded). The index was reliable ($\alpha = .68$).

*Friends parents think are a bad influence* was based on one question: "How many friends do you have that your parents think are a bad influence?" The options for answers were "0", "1", "2", and "3 or more" (= 3).

We created two additional indices—*source of positive feelings (online/in-person)* and *source of negative feelings (online/in-person)*—from questions comparing respondents' relative feelings for their online friends versus their in-person friends. The question instruction stated, "'Online Friends' are the friends that you interact with MOSTLY online. 'In-Person Friends' are friends that you interact with MOSTLY in person. Please answer the following questions." The response scale had six points: *definitely online friends* (1), *mostly online friends* (2), *somewhat online friends* (3), *somewhat in-person friends* (4), *mostly in-person friends* (5), and *definitely in-person friends* (6).

*Source of positive feelings* is an index that comprised the following items (with response alternatives described in the previous paragraph): "Who do you share more secrets with?" "Which do you want to be more like?" "Which do you trust more?" "Which do you feel safer with?" "Which do you value more?" "I enjoy talking more to . . .," "Which understands your feelings more?" "I fit in better with . . .," "I feel closer to . . .," "I feel more similar to . . .," "I feel more comfortable with . . .," "Which would you miss more on a desert island?" "In which group do you have more close friends?" "Who makes you feel more accepted?" "I feel better after

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[1] Note several differences from the Kaiser Family Foundation report (Rideout et al., 2010), which did not include, as we did, hours children spent texting, on the phone, on computer when doing homework, or in face-to-face communication. Rather than asking about the computer as a separate medium, the survey measured uses of computers under each of the media use categories: for listening to music, playing videogames, watching video content, reading/homework, emailing/sending messages and posting on Facebook, MySpace, and so forth.

[2] In the second survey, "playing video games" was separated from "video use." "Playing video games" was a negligible part of video use; over 40% of respondents never used video games, more than 80% of respondents played for less than 1 hr, and only 3.1% of respondents used videogames more than nonvideo. Hence, when pooling the results from the first and second surveys in the subsequent analyses, we combined "playing video games" with "video use" into a single video use category. The results were not affected when we omitted video games in the pooled analysis.

talking to . . .," and "I feel more supported by . . .." The index was highly reliable ($\alpha$ = .94).

*Source of negative feelings* is an index of the following items (with response alternatives described above): "I feel more judged by . . .," "I feel more stressed by . . .," and "Which can hurt your feelings more . . .?" The index was highly reliable ($\alpha$ =.75). In contrast to the items for sources of positive feelings, approximately half of all respondents attributed their negative feelings to online friends, whereas the other half attributed their negative feelings to in-person friends (i.e., "feel judged," 51%; "more stressed," 56%; "hurt feelings," 47%).

*Hours of sleep* was based on an answer to a single question.

## Analysis Plan

Our standard analysis strategy was regression. Each of the categories of media use and the category of face-to-face communication were predictor variables. We used age as a predictor variable as well. To understand issues of media technology access, we asked whether there was a TV set in the respondent's room (15.8%; 93.9% had a TV in the home), whether there was a computer in her room (16.2%; 94.6% had a computer in the home), and whether she owned a cell phone (42.3%). Because of issues of multicollinearity, we included media multitasking in the second step of the regression. We examined the possibility of interactions with age by including interaction terms for the six media use measures, face-to-face communication, and media multitasking in a third step of the regression. None of these terms was significant, so we excluded them from the tables presented below.

One of our concerns in the analyses that follow was that there may be extremity effects in which the high end of the predictor variable masks or reverses the effects in the middle of the distribution. For example, it might be that reading is generally beneficial but that extreme amounts of reading could be detrimental. To test this possibility, for each of the media categories and the media multitasking index, we ran the regression analyses including squared terms. That is, we squared each of the categories of media use, media multitasking, and face-to-face communication and included them as predictor variables in the third stage of the analysis. The idea behind this approach is that the squared term accentuates the effects of the largest values (if the values are greater than 1) by increasing their distance from the mean relative to smaller values. If there is homogeneity of effect across the range of the variable, the squared term will not be significant. If the high values are related to the dependent variable in one direction while the lower values are related in a different direction, the squared term will be significant and will have a sign opposite that of the linear effect. Finally, if the high values are related to the dependent variable in the same direction as the lower values but more strongly, the squared term will be significant and will have the same sign as the linear effect.

## Results

### Descriptive Summary of Key Variables

The average amount of total media use per day (not including face-to-face communication) was 6.90 hr ($SD$ = 3.40). The 25th percentile was 4.3 hr, the median was 5.9 hr, and the 75th percen-

tile was 8.2 hr. These levels are somewhat lower than those in the Kaiser Family Foundation 2010 survey (10.75 hr) for children ages 8–19 years, but our study did not include boys or older children, who are heavier media users than girls and younger children, respectively (Rideout et al., 2010). The average amount of time spent in face-to-face interaction per day was 2.10 hr ($SD$ = 1.49). The 25th percentile was 0.42 hr, the median was 1.5 hr, and the 75th percentile was 2.8 hr.

When using a medium, the average 8- to 12-year-old girl uses 1.4 ($SD$ = 1.00) other media concurrently; that is, the average *MMI* was 1.4. This is much lower than the levels of media multitasking found among college students ($M$ = 4.36; $SD$ = 1.52; Ophir et al., 2009), although the scale in that study was slightly different (10 media categories vs. six in our study, and a four-point scale vs. a six-point scale in our study). For the 8- to 12-year-olds in our study, the 25th percentile was 0.60, the median was 1.24, and the 75th percentile was 1.97. The distribution was relatively normal. The 8- to 12-year-olds had an average use of 1.40 other media during face-to-face interaction ($SD$ = 1.68). The 25th percentile was 0.17, the median was 0.75, and the 75th percentile was 1.94. The distribution was heavily skewed to the left.

Although there was variance for all individual items that constituted the source of positive feelings index (and the overall index), no more than 10.1% of respondents ranked online friends more positively than in-person friends for even one item. Even heavy online media users tended to derive their positive feelings principally from in-person friends. In contrast to the items associated with sources of positive feelings, approximately half of all respondents attributed their negative feelings to online friends, whereas the other half attributed their negative feelings to in-person friends (i.e., "feel judged," 51%; "more stressed," 56%; "hurt feelings," 47%).

Correlations between the various categories of media use are presented in Table 1. Correlations between the six categories (five media use and face-to-face communication) are not large, suggesting that the different categories of use attract different individuals. The relatively high positive correlation ($r$ = .44, $p$ < .001) between online communication use and talking on the phone coupled with the low correlations between these activities and face-to-face communication suggests that face-to-face communication is neither a substitute for nor a complement to online communication.

The correlation between social success and normalcy feelings is moderate and positive ($r$ = .52, $p$ < .001), although factor analysis

Table 1
*Correlation Matrix for Hours of Media Use and Face-to-Face Communication*

| Measure | 1 | 2 | 3 | 4 | 5 | 6 |
|---|---|---|---|---|---|---|
| 1. Video | — | .12*** | −.03 | .20*** | .16*** | .04* |
| 2. Music | | — | .18*** | .30*** | .26*** | .14*** |
| 3. Reading | | | — | .01 | .02 | .19*** |
| 4. Online communication use | | | | — | .44*** | .06*** |
| 5. Talking on phone | | | | | — | .08*** |
| 6. Face-to-face communication | | | | | | — |

* $p$ < .05.   *** $p$ < .001.

suggests they are distinct. The relative importance of online versus in-person friends for positive versus negative feelings is small and negative ($r = -.10$, $p < .001$).

## Regression Analysis

**Media multitasking.** Table 2 presents the results for media multitasking. Of the media categories, music, talking on the phone, and online communication were positively related to media multitasking, suggesting that these activities tend not to be the sole attentional focus of 8- to 12-year-old girls. This interpretation is consistent with the fact that cell phone ownership and having a television in one's room were both positively associated with greater media multitasking. Face-to-face communication was negatively related to media multitasking even when we controlled for media use. (Owing to space constraints, we reference only significant relationships.)

**Face-to-face multitasking.** The results for level of media use while engaged in face-to-face interaction are presented in Table 3. Every category of media use (except reading) was strongly and positively related to face-to-face multitasking; reading was negatively related. Face-to-face communication was negatively related to face-to-face multitasking. This could be an artifact of the computation (because face-to-face communication is in the denominator), or it could be that children who spend more time in face-to-face communication value it more and thus don't use media simultaneously. Younger children tended to do more multitasking while in face-to-face interactions. Presence of a television in the respondent's bedroom was strongly associated with more face-to-face multitasking. Media multitasking was very strongly and positively related to face-to-face multitasking, suggesting that *multitasking is a generalized behavior.*

**Social success.** Results for social success are presented in Table 4. Video use was strongly and negatively associated with social success; reading use was moderately and negatively associated with social success. Face-to-face communication was positively associated with feelings of social success. Older girls in the 8- to 12-year-old age range felt less social success than did younger girls.

**Feelings of normalcy.** Table 5 illustrates that, consistent with the results for social success, video use and reading were nega-

tively associated with normalcy feelings, whereas face-to-face communication was positively associated with them. Both media multitasking and age were negatively associated with feelings of normalcy.

**Numbers of friends one's parents think are a bad influence.** Table 6 reveals that video use, talking on the phone, and online interactions were all strongly associated with having a greater number of friends perceived by parents as bad influences, while face-to-face communication was negatively related. Media multitasking was very strongly and positively related with this variable.

**Hours of sleep.** The results depicted in Table 7 demonstrate that video use and online communication use were negatively associated with number of hours of sleep. Face-to-face communication was positively related to hours of sleep. Age was strongly and negatively related to hours of sleep. Having a television in one's room and owning a cell phone were associated with less

Table 2

*Summary of Regression Analysis for Variables Predicting Media Multitasking*

| Variable | B | SE B | β |
|---|---|---|---|
| Intercept | 0.84*** | 0.07 | |
| Video use | 0.01 | 0.01 | .01 |
| Music use | 0.13 | 0.01 | .16*** |
| Reading use | −0.02 | 0.01 | −.02 |
| Talking use | 0.30 | 0.02 | .22*** |
| Online communication use | 0.23 | 0.01 | .37*** |
| Face-to-face communication | −0.09 | 0.01 | −.13*** |
| Age | 0.00 | 0.01 | −.00 |
| Cell phone ownership | 0.09 | 0.03 | .04** |
| Television in room | 0.17 | 0.04 | .06*** |
| Computer in room | 0.06 | 0.04 | .02 |

*Note.* $R^2 = .39$ ($p < .001$).
** $p < .01$.  *** $p < .001$.

Table 3

*Summary of Hierarchical Regression Analysis for Variables Predicting Media Use While Face-to-Face*

| Variable | B | SE B | β |
|---|---|---|---|
| Step 1 | | | |
| Intercept | 1.97*** | 0.13 | |
| Video use | 0.06 | 0.02 | .05** |
| Music use | 0.17 | 0.02 | .13*** |
| Reading use | 0.00 | 0.03 | .00 |
| Talking use | 0.35 | 0.04 | .15*** |
| Online communication use | 0.21 | 0.02 | .20*** |
| Face-to-face communication | −0.49 | 0.18 | −.43*** |
| Age | −0.49 | 0.02 | −.30*** |
| Cell phone ownership | −0.08 | 0.02 | −.05 |
| Television in room | 0.03 | 0.06 | .01 |
| Computer in room | 0.26 | 0.08 | .06*** |
| Step 2 | | | |
| Media multitasking | 0.84 | 0.03 | .51*** |

*Note.* $R^2 = .13$ for Step 1; $\Delta R^2 = .31$ for Step 2; ($p$s $< .001$).
** $p < .01$.  *** $p < .001$.

Table 4

*Summary of Hierarchical Regression Analysis for Variables Predicting Social Success*

| Variable | B | SE B | β |
|---|---|---|---|
| Step 1 | | | |
| Intercept | 5.19*** | 0.08 | |
| Video use | −0.10 | 0.01 | −.13*** |
| Music use | 0.02 | 0.01 | .02 |
| Reading use | −0.04 | 0.02 | −.05* |
| Talking use | −0.02 | 0.03 | −.02 |
| Online communication use | 0.02 | 0.01 | .03 |
| Face-to-face communication | 0.07 | 0.00 | .11*** |
| Age | −0.06 | 0.02 | −.07*** |
| Cell phone ownership | −0.04 | 0.04 | −.02 |
| Television in room | 0.03 | 0.05 | .01 |
| Computer in room | −0.01 | 0.05 | −.01 |
| Step 2 | | | |
| Media multitasking | .02 | .02 | .00 |

*Note.* $R^2 = .39$ for Step 1; $\Delta R^2 = .30$ for Step 2; ($p$s $< .001$).
* $p < .05$.  *** $p < .001$.

Table 5
*Summary of Hierarchical Regression Analysis for Variables Predicting Feeling of Normalcy*

| Variable | $B$ | $SE\ B$ | $\beta$ |
|---|---|---|---|
| Step 1 | | | |
| Intercept | 13.2*** | 0.25 | |
| Video use | −0.32 | 0.06 | −.11*** |
| Music use | 0.02 | 0.06 | .00 |
| Reading use | −0.20 | 0.07 | −.06** |
| Talking use | −0.10 | 0.10 | −.02 |
| Online communication use | −0.13 | 0.05 | −.06** |
| Face-to-face communication | 0.20 | 0.05 | .08** |
| Age | 1.4 | 0.31 | .09*** |
| Cell phone ownership | −0.14 | 0.14 | −.02 |
| Television in room | 0.05 | 0.19 | .01 |
| Computer in room | −0.01 | 0.18 | −.00 |
| Step 2 | | | |
| Media multitasking | −0.18 | .08 | −.05* |

*Note.* $R^2 = .05$ for Step 1 ($p < .001$); $\Delta R^2 = .00$ for Step 2 ($p < .03$).
* $p < .05$. ** $p < .01$. *** $p < .001$.

Table 7
*Summary of Hierarchical Regression Analysis for Variables Predicting Hours of Sleep*

| Variable | $B$ | $SE\ B$ | $\beta$ |
|---|---|---|---|
| Step 1 | | | |
| Intercept | 4.73*** | 0.10 | |
| Video use | −0.06 | 0.02 | −.06** |
| Music use | −0.03 | 0.02 | −.03 |
| Reading use | 0.03 | 0.02 | .03 |
| Talking use | 0.01 | 0.03 | .01 |
| Online communication use | −0.04 | 0.02 | −.05* |
| Face-to-face communication | 0.04 | 0.01 | .05** |
| Age | −0.09 | 0.02 | −.09*** |
| Cell phone ownership | −0.09 | 0.06 | −.04* |
| Television in room | −0.19 | 0.06 | −.06*** |
| Computer in room | −0.03 | 0.06 | −.01 |
| Step 2 | | | |
| Media multitasking | −0.10 | 0.03 | −.09*** |

*Note.* $R^2 = .03$ for Step 1; $\Delta R^2 = .01$ for Step 2; ($ps < .001$).
* $p < .05$. ** $p < .01$. *** $p < .001$.

sleep. Media multitasking was strongly and negatively related to amount of sleep.

**Examination of extremity effects.** To support the interpretation of the results that follow, we felt that it was important to test for extremity effects, that is, the possibility that these relationships were due to the heaviest users driving the results. For video use, online communication use, media multitasking, and face-to-face communication, none of the squared terms were significant after we controlled for the linear term, which suggests that the most extreme users were not driving these effects. For reading, conversely, the squared term was clearly significant in both analyses and in the direction opposite of the main effect (social success: $B = −0.26$, $SE\ B = 0.08$, $\beta = −.20$, $p < .001$; feelings of normalcy: $B = −0.11$, $SE\ B = 0.05$, $\beta = −.11$, $p < .02$),

suggesting that the association between reading and negative socioemotional measures applies only to the most extreme readers.

**Online versus in-person friends as sources of positive or negative social feelings.** Finally, we turn to the relative importance of online and in-person friends in positive and negative social feelings. The results for sources of positive feelings are presented in Table 8. This index comprised items referencing whether it was with online or in-person friends with whom the respondent felt most trust, safety, value, understanding, acceptance, closeness, and comfort. Smaller values were associated with online-friend sources of positive feelings; higher values were associated with in-person-friend sources of positive feelings.

Video use was associated with online friends providing a more important source of positive social feelings. The two forms of direct communication—online communication use and talking on the phone—were also associated with online friends as a more important source of positive social feelings. Face-to-face commu-

Table 6
*Summary of Hierarchical Regression Analysis for Variables Predicting Number of Friends One's Parents Think Are a Bad Influence*

| Variable | $B$ | $SE\ B$ | $\beta$ |
|---|---|---|---|
| Step 1 | | | |
| Intercept | 0.46*** | 0.07 | |
| Video use | 0.04 | 0.01 | .06*** |
| Music use | 0.02 | 0.01 | .03 |
| Reading use | −0.02 | 0.02 | −.02 |
| Talking use | 0.08 | 0.02 | .07*** |
| Online communication use | 0.04 | 0.01 | .07** |
| Face-to-face communication | −0.03 | 0.01 | −.06** |
| Age | −0.00 | 0.01 | −.01 |
| Cell phone ownership | −0.01 | 0.03 | −.01 |
| Television in room | 0.05 | 0.04 | .02 |
| Computer in room | −0.02 | 0.08 | −.01 |
| Step 2 | | | |
| Media multitasking | 0.08 | 0.02 | .10*** |

*Note.* $R^2 = .03$ for Step 1; $\Delta R^2 = .01$ for Step 2; ($ps < .001$).
** $p < .01$. *** $p < .001$.

Table 8
*Summary of Hierarchical Regression Analysis for Variables Predicting Sources of Positive Feelings*

| Variable | $B$ | $SE\ B$ | $\beta$ |
|---|---|---|---|
| Step 1 | | | |
| Intercept | 5.60*** | 0.06 | |
| Video use | −0.02 | 0.01 | −.04* |
| Music use | 0.01 | 0.01 | −.03 |
| Reading use | 0.01 | 0.01 | .03 |
| Talking use | −0.51 | 0.02 | −.06** |
| Online communication use | −0.09 | 0.01 | −.05*** |
| Face-to-face communication | 0.06 | 0.01 | .05*** |
| Age | 0.05 | 0.01 | −.09 |
| Cell phone ownership | 0.04 | 0.03 | −.04 |
| Television in room | −0.04 | 0.04 | −.06 |
| Computer in room | −0.03 | 0.04 | −.01 |
| Step 2 | | | |
| Media multitasking | −0.05 | 0.02 | −.07** |

*Note.* $R^2 = .07$ for Step 1; $\Delta R^2 = .01$ for Step 2; ($ps < .001$).
* $p < .05$. ** $p < .01$. *** $p < .001$.

nication was very strongly associated with positive feelings emerging more from in-person interactions. Media multitasking was associated with a greater orientation to finding positive feelings from online friends.

**Sources of social stress.** In Table 9, smaller values of the dependent variable indicate online-friends as the primary sources of stress, while higher values are associated with in-person-friends as the primary source of stress. The results indicate that video use was strongly associated with higher levels of social stress from in-person friends, while music and reading were strongly associated with greater levels of social stress from online friends. Compared with older girls, younger girls found more social stress from in-person as opposed to online friends.

## Discussion

Certain types of media use—video (five of five analyses), online communication (four of five analyses), and media multitasking (four of five analyses)—were consistently associated with a range of negative socioemotional outcomes. These negative results for video are consistent with results from other studies (Funk & Buchman, 1996; Rideout et al., 2010; Van den Bulck, 2004), but the results for online communication and media multitasking are entirely new. Conversely, face-to-face communication was consistently associated with a range of positive socioemotional outcomes. Even though prior research found that pre- and early adolescents who communicated online more often felt closer to their existing friends (Valkenburg & Peter, 2007), the opposite associations of face-to-face communication and online communication for positive socioemotional experiences found in this study suggest that face-to-face communication and online communication are not interchangeable.

### Media Multitasking

Media multitasking was associated with a series of negative socioemotional outcomes in 8- to 12-year-old girls: feeling less social success, not feeling normal, having more friends whom

Table 9
*Summary of Hierarchical Regression Analysis for Variables Predicting Sources of Social Stress*

| Variable | B | SE B | β |
|---|---|---|---|
| Step 1 | | | |
| Intercept | 3.44*** | 0.14 | |
| Video use | 0.09 | 0.03 | .07*** |
| Music use | −0.09 | 0.03 | −.07*** |
| Reading use | −0.08 | 0.03 | −.05** |
| Talking use | −0.09 | 0.05 | −.04 |
| Online communication use | 0.03 | 0.02 | .03 |
| Face-to-face communication | 0.10 | 0.02 | .09*** |
| Age | −0.02 | 0.03 | −.02 |
| Cell phone ownership | −0.01 | 0.06 | −.00 |
| Television in room | −0.13 | 0.08 | −.03 |
| Computer in room | −0.08 | 0.08 | −.02 |
| Step 2 | | | |
| Media multitasking | −0.07 | 0.04 | −.04 |

*Note.* $R^2 = .02$ for Step 1 ($p < .001$); $\Delta R^2 = .0$ for Step 2 (*ns*).
** $p < .01$. *** $p < .001$.

parents perceive as bad influences, and sleeping less. Consistent with access to technology leading to more multitasking, owning a cell phone as well as having a television in one's room were both positively associated with media multitasking, although having a computer in one's room was not. Media multitasking was associated with more intense feelings (both positive and negative) toward online friends than in-person friends when we controlled for media use. Intriguingly, the level of face-to-face communication was strongly negatively associated with media multitasking, as if media multitasking and face-to-face communication were in a trade-off relationship for 8- to 12-year-old girls.

Our new measure of media multitasking revealed that the use of multiple media at one time was associated with a number of negative social correlates. Coupled with the association of media multitasking and problems with cognitive control of attention (for college students: Ophir et al., 2009), the current results suggest that the growth of media multitasking should be viewed with some concern.

### Face-to-Face Communication

The variable most closely associated with a wide range of positive social feelings was the same variable consistently omitted in studies of media use: time spent in face-to-face communication. Higher levels of face-to-face communication were associated with greater social success, greater feelings of normalcy, more sleep, and fewer friends whom the children's parents believed were a bad influence. Although we cannot determine causality using this one-wave survey, the results for the clear positive correlates of face-to-face communication and the negative correlates of media multitasking are highly suggestive.

Observations suggest that children and adults are increasingly more willing to use technologies when with other people, such as texting at the dinner table and web surfing while chatting with friends (e.g., Abelson, Ledeen, & Lewis, 2008). Indeed, every category of media use except reading was positively associated with using media while interacting face to face. However, unlike media multitasking, the amount of time spent in face-to-face communication was *negatively* related to face-to-face multitasking. People who frequently interact with people face to face seem to feel less need to use other media while doing so. This is suggestive evidence that these high face-to-face communicating girls do not want distraction. These results provide more evidence that face-to-face communication and multitasking may attract different profiles of children or may represent participation in different social environments.

### Age

Older respondents reported doing more media multitasking (similar to the results of Rideout et al., 2010), having less positive social feelings and lower levels of feelings of normalcy, and sleeping less than younger respondents. Age did not interact with any other variables.

### Implications

The current research provides a number of new insights into the relationships between media and young girls' social well-being.

First, we have shown that high uses both of media that do not involve interacting with others as well as media that do involve interacting with others tend to be associated with negative measures of 8- to 12-year-old girls' social well-being. The results here suggest that even media meant to facilitate interaction between children are associated with unhealthy social experiences. The idea that online communication would open up a rich social world that benefits young girls' social and emotional development is belied by these findings.

We express cautions similar to that issued by Rideout et al. (2010) in their study of media in the lives of 8- to 18-year-olds: "This study cannot establish whether there is a cause and effect relationship between media use and [social consequences]. And if there are such relationships, they could well run in both directions simultaneously" (p. 13). The kinds of empirical studies that could provide warranted inferences about causal relationships between media use patterns, face-to-face interaction, and social well-being would need to be longitudinal, to follow specific cohorts, and to provide either experimental interventions with controls or "natural experiments" that allow for controls. In either case, groups matched according to characteristics of participants presumed to make a difference would be compared with respect to their different experiences with media use. Then outcomes in terms of social well-being, sleep, and other variables would be compared for experimental group participants and controls. It would also be valuable in future studies to include new survey items that distinguish media use and multitasking associated with media production rather than consumption, as production activities are more likely to be positively associated with the development of educationally valued technological fluencies (Barron, Walter, Martin, & Schatz, 2010), which might result in healthier social development. We also need to have a more differentiated account of the content and purposes of media use and media multitasking than our study provided, as some forms of individual and social learning uses of media and media multitasking (as in parents' "active mediation" in video co-viewing with children: Reiser, Williamson, & Suzuki, 1988) could contribute positively to social and cognitive development. New studies could also ground claims about children's media use with more granular methodologies such as media time-use diaries, experience-sampling methodologies, electronic monitoring techniques, wearable computers for media capture, or direct observations (also see Vandewater & Lee, 2009).

We emphasize in closing that our society is experiencing an unprecedented shift in media ecology. The choices that our children are making—when and how they engage with these media and in what situations—are shaping their social relationships, social well-being, and time availabilities for school-related study and other activities. These findings should orient our attention to the associations emerging in a new media landscape for child development. Open questions remain, with enormous societal choices: Are high media use and media multitasking causing issues in social well-being, or are children with challenged social competencies drawn to spending more time plugged into multiple technologies? Are adolescents becoming more oriented to online than face-to-face friendships, and with what consequences? For these and many other questions of concern for parents, teachers, and policymakers, new research studies are required.

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