

MEDIA MULTITASKING AMONG AMERICAN YOUTH: PREVALENCE, PREDICTORS AND PAIRINGS

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TABLE OF CONTENTS

1. INTRODUCTION	1
2. BACKGROUND RESEARCH.....	3
3. PREVALENCE: HOW COMMON IS MEDIA MULTITASKING?.....	7
4. PREDICTORS: WHO IS MEDIA MULTITASKING?	9
5. PAIRINGS: WHICH MEDIA ARE USED TOGETHER?	11
6. THE JUGGLING ACT: HOW DO CHORES, EATING, AND SOCIALIZING FIT WITH MEDIA USE?	17
7. CONCLUSION.....	23
APPENDIX—METHODOLOGY.....	25
ENDNOTES	33
REFERENCES	35

1. INTRODUCTION

In the past, multitasking was a juggling act performed by busy adults, as they tried to manage jobs, chores, carpools, and PTA meetings. But recently, teens and tweens have turned into the real experts at multitasking, as their lives become chock-full of organized activities. For them, multitasking has simply become a way of life: “If I couldn’t multitask, I couldn’t do what I do... I’d have to cut a sport, or cut a class” says one high school junior (Hafner, 2001).

Much of the multitasking young people do revolves around media use. The way young people use media is changing dramatically. Anecdotal evidence suggests that “media multitasking,” or engaging in more than one media activity at a time, is a common occurrence. New technologies, such as the computer, appear to foster obsessive “multitasking,” namely constantly switching between such activities as instant messaging (IM), email, ordering a book online and catching a quick headline. Handheld items make it easier to multitask, allowing a teen, for example, to play a videogame or text message a friend while watching TV.

Such multitasking is also a model of behavior that media companies actively promote in their commercials and in the publicity for the games and websites. As a result, teens spend more time using several media simultaneously than ever before. In 2005, a Kaiser Family Foundation report showed an increase in media multitasking: 26% of media time is spent on multiple media, up from 16% of media time in 1999.

“I multitask every single second I am online. At this very moment, I am watching TV, checking my email every two minutes, reading a newsgroup about who shot JFK, burning some music to a CD and writing this message.” – 17-year-old boy
(Lenhart, Rainie, & Lewis, 2001)

Of course, media multitasking is not a new phenomenon. Two decades ago, it was not unusual to see a young person read while listening to music, or flip through a magazine while watching television. But until recently, academic studies did not mention or track simultaneous or shared media time. It is the computer that promotes multitasking, providing natural breaks in work (download times, etc.) and regular interruptions (instant message pop-up screens). Hence, today’s youth, who have grown up with computers, are perhaps more prone to media multitasking.

While the 2005 Kaiser Family Foundation study documented the percent of media time spent media multitasking, this analysis describes the teens most likely to “media multitask” and which media are combined the most in multitasking. It also looks at how other characteristics and teen behaviors affect media multitasking.

This is a new area for researchers. With the exception of anecdotal evidence and a few surveys, researchers have little information about the extent and nature of adolescent media multitasking. The questions we are investigating are new: questions such as “How prevalent is media multitasking?” “Who is media multitasking?” “Is media multitasking behavior related to other media behaviors or personal characteristics?”, and “Which activities are most often multitasked?”

Although no research has focused specifically on the effects of media multitasking on teens and on their environment, conventional wisdom and brain research support the idea that there are limits to how much our brains can process at once. The research also indicates that performance decreases when a person attempts to perform two tasks simultaneously. Multitasking may also affect the ability to comprehend content. In addition, if a media multitasking environment becomes the norm for young people, advertisers and pro-social marketers will have to rethink how to reach youth with their messages.

“I’m always talking to people through instant messenger and then I’ll be checking email or doing homework or playing games AND talking on the phone at the same time.” — 15-year-old girl (Lenhart et al., 2001)

If teens frequently and easily shift attention among media, advertisers will need to become more creative with their messages. On the other hand, there may be hidden positive benefits in the ability to manage media multitasking among adolescents. Further research may show that media multitasking is a valuable life skill.

This research takes initial steps in investigating media multitasking. Before any research agenda can move forward, we must understand a bit more about the nature of media multitasking.

2. BACKGROUND RESEARCH

Only recently has media multitasking been recognized as a factor worth investigating (Brown & Cantor, 2000; Roberts & Foehr, 2004; Roberts, Foehr, & Rideout, 2005; Roberts, Foehr, Rideout, & Brodie, 1999; The Media Center at the American Press Institute, 2004a; Yahoo! & Carat Interactive, 2003). Often, studies of the use of media such as computers and television are surveys that do not naturally capture simultaneous media use. Roberts and colleagues (1999, 2004, 2005) were the first to use multiple measures to estimate both exposure to multiple media and media use (media exposure reduced by the proportion of time spent doubling up on media). This report analyzes those data in greater detail.

Studies on Prevalence of Media Multitasking

A 2003 study of 13- to 24-year-olds, while lacking any information about media multitasking's prevalence, reported that when most young people multitask, this multitasking is centered around online activities. It also concluded that media activities they are most likely to engage in while going online are listening to music and watching TV (Yahoo! & Carat Interactive, 2003). The researchers characterized young people's media multitasking this way: "Multitasking (using various media simultaneously) is the Millennial's specialty, and the growth in the amount of media being used by young people is largely explained by their multitasking behavior. The 'Net plays a central role in their multitasking, acting as the "hub" media (sic) that they focus upon most." (Yahoo! & Carat Interactive, 2003, p. 11).¹

Two studies out of the Pew Internet Project suggest that young people are engaging in computer-based multitasking, as well as more general multitasking while using media (Lenhart, Madden, & Hitlin, 2005; Lenhart et al., 2001). In 2001, the researchers wrote: "When teens are logged on, they are often multi-tasking, simultaneously emailing, instant messaging, surfing the Web, and if they are fortunate enough to have two phone lines, a cell phone, or a broadband connection, talking on the phone, too." (Lenhart

et al., 2001, p. 13). In its discussion on media multitasking, the 2005 report focused primarily on instant messaging. Analyzing the short delay between a teen's message and a response, the researchers note: "Teens have long harnessed these small moments during IM conversations to enable them to accomplish other tasks while conversing. When teens go online, they will use IM as a "conversational" centerpiece while conducting other business in the time gaps" (p. 23). Two quotes from focus groups in this study highlight this propensity to multitask during IM:

"I usually check my email and I have an online journal and so I'll write in that, chat with my other friends, and if I have little things to do around the house then I can do it [while instant messaging] because unless it's somebody that responds quickly, then I can just go around and do something real quick and come back." – *High School Female* (Lenhart et al., 2005)

"I do more than one thing at once [while online] because my connection is so slow. If I dedicated my attention to one webpage, I'd go crazy waiting for it to load every time." – *High School Male* (Lenhart et al., 2005)

Other studies support the idea that technologies such as instant messaging are among the most often reported as multitasked behaviors (Grinter & Palen, 2002).

Recently, researchers have turned their attention to media multitasking among adults. One study estimates that for adults, almost a quarter of media use (23.7%) is spent with more than one medium (Papper et al., 2004).² A number of proprietary reports also investigate the incidence of media multitasking, or simultaneous media use among adults (see: The Media Center at the American Press Institute, 2004a, 2004b).

How Our Brains Handle Multitasking

When young people attempt to process information from more than one medium at the same time, how do their brains handle the data? There is little agreement in the neurological and psychological literature on how our brains actually function when we try to process more than one message, or accomplish multiple tasks simultaneously (Meyer & Kieras, 1997). Many theories attempt to account for the delay in response when we try to do two tasks simultaneously, or in rapid succession. Most information processing theories suggest that there is a limit to what our brains can actually process “simultaneously” (Meyer & Kieras, 1997; Pashler, 2000). Research shows that while we can perceive two stimuli in parallel, we cannot process them simultaneously (Pashler, 2000). This phenomenon has been named the psychological refractory period (PRP). The PRP refers to the extra time required to respond to a stimulus the closer it is presented to another stimulus. Though a few pairs of tasks have been found for which the PRP does not apply, most simple tasks result in a delayed response when paired with another simple task.

Researchers are uncertain about what exactly causes the bottleneck in processing. Many suggest that the bottleneck is at the retrieval, or action planning, stage, but how simultaneous tasks are managed in the brain is not understood (Meyer & Kieras, 1997; Pashler, 2000). Some researchers speculate that there may be a central executive processor that cues tasks, while others suggest that bottlenecks arise because the brain cannot “maintain two mappings in an active state” (Pashler, 2000, p. 301).

One of the major costs associated with multitasking has to do with brain resources. Using magnetic resonance imaging to monitor the brain while participants engage in multiple tasks researchers have found that the activation volume is significantly less when two tasks are performed simultaneously than the sum of the activation areas when each of the tasks is performed independently (Just et al., 2001; Klingberg & Roland, 1997). These findings hold for both similar tasks (tasks handled by the same area of the brain) (Klingberg & Roland, 1997), as well as dissimilar tasks (spatial relations and semantic categorization — handled by two separate areas of the brain) (Just et al., 2001).

One interpretation of these results indicates that there may be an upper limit to the amount of brain tissue that can be activated at any one time. They suggest that when we perform two actions simultaneously, we devote reduced resources to each one (Just et

“I get bored if it’s not all going at once, because everything has gaps – waiting for a website to come up, commercials on TV, etc.”
 – 17-year-old girl
 (Lenhart et al., 2001)

al., 2001). Another interpretation of these results suggests that it may be that there are limits on how much attention a person can pay to more than one task. (Just et al., 2001). This explanation is in line with Lang (2000), and other information processing theories (Meyer & Kieras, 1997). Some recent pioneering research also suggests that distractions affect how information is learned, changing the memory system used and making the information less useful later (Schmid, 2006).

More recently, the communication literature has shed light on message attention and processing in the context of multiple-message environments. A number of dual-attention studies have examined situations that more closely resemble today’s media multitasking situations. The findings from this research ultimately suggest the outcome one would expect: we cannot attend to and process simultaneously multiple non-related messages.

Researchers agree that when two channels are semantically consistent (audio and visual track on a television news program), users can attend to, process and recall information with ease, using a process called perceptual grouping (Grimes, 1990, 1991). However, when the two channels convey semantically different information, viewers can recall less information, and often successfully focus on one channel only (Bergen, Grimes, & Potter, 2005; Drew & Grimes, 1987; Grimes, 1991; Lang, 1995; Reese, 1984). One example of semantically different information is CNN’s divided screens with tickers and running headlines. Despite attempts to impart a variety of information on the same screen, and using both audio and visual channels, audiences can only successfully process information from different channels (audio and visual) when it is semantically consistent (Bergen et al., 2005).

While research on general multitasking is informative, the situations set up in experiments are task-oriented, and often under time pressures. In an approach more likely to resemble modern media multitasking situations, some newer studies have documented the detrimental effects of having the television on in the background (regardless of content) while performing other cognitively demanding tasks such as reading (Armstrong, 2000; Armstrong, Boriarsky, & Mares, 1991; Armstrong & Greenberg, 1990; Armstrong & Sopory, 1997; Furnham, Gunter, & Peterson, 1994).

The term media multitasking encompasses a variety of new and different kinds of processing situations. In a great deal of

media multitasking situations, young people are not attempting to process non-complementary messages simultaneously, but rather are switching back and forth between different activities. Neurological research has identified the portion of the brain responsible for the switching activities (Wallis, 2006; Wood & Grafman, 2003), but little is known about the effects of constant switching between media in a contemporary media environment.

“I usually finish my homework at school ... but if not, I pop a book open on my lap in my room, and while the computer is loading, I’ll do a problem or write a sentence. Then, while mail is loading, I do more. I get it done a little bit at a time.” – 14-year-old boy
(Wallis, 2006)

Researchers have all too often focused on identifying the possible negative effects of a behavior. However, managing multiple media may have plenty of positive effects as well. Media users are learning at a young age how to juggle multiple activities, use time efficiently and use existing technologies in creative ways, albeit sometimes not as originally intended. While there are drawbacks to media multitasking, there may be advantages as well.

3. PREVALENCE: HOW COMMON IS MEDIA MULTITASKING?

How prevalent is media multitasking among young people? Are they really using different media at the same time? We found that while some teens and tweens seem to use more than one medium, e.g., that they media multitask, often, a substantial number do not. The data in this study come from two different sources: diary recordings of 3rd–12th graders who were asked to keep a record of how much time they used different media and which media they used together, and survey responses of 7th–12th graders.

The diary data from 3rd–12th graders allow us to calculate the proportion of media time reportedly spent using at least two media. This proportion was calculated at the individual level, taking a respondent's total time using at least one secondary medium and dividing by their total time with primary media.³ The average proportion of media time spent media multitasking was .21.⁴ However, 19% of all diary respondents who spent some time with media (N=685) did not use a secondary media in the entire week of the diary. Of kids who spent some time with primary media and some time media multitasking over the week of the diary (N=549), the proportion of media time spent media multitasking is .26. When analyzed only for 7th–12th graders, each of the diary results is within 1 percentage point of the results for the whole sample of 3rd–12th graders.

Data from the survey, looking at multitasking during specific media activities, support the findings from the diary. As shown in Table 1, when asked how often they use other media when using each of four media (print, TV, computer, and videogames), anywhere from a quarter to a third of 7th–12th graders report multitasking most of the time. When we broaden “most of the time” responses to include “some of the time,” a majority of kids

report media multitasking each of the media we asked about. On the other hand, anywhere from 12 to 19% report that they never multitask the medium in question. In short, some young people multitask each medium a lot; others do so little or not at all.

As one might expect, these data suggest that some kids media multitask constantly while others, indeed a sizable proportion, do it very little or not at all. It appears that about a 1/5 of young people devote very little, if any, time to media multitasking. This approximation seems consistent, based on both the survey and the diary data. The 19% of 8- to 18-year-olds who didn't use any secondary media in an entire week of media use seems generally consistent with the range of 12-19% of 7th–12th graders who report never using another media in conjunction with one of the media listed. When we look at kids who do spend some of their media time media multitasking, they spend about a quarter of their time with at least one other medium.

How Often Are Media the Priority and How Often Are They the Background?

It is helpful to see how time is divided among media, as well as within media. That is, when using a medium such as television, how often is it the primary medium and how often is it a secondary medium?⁵ Figure 1 illustrates the amount of time devoted to each media activity both as a primary and as a secondary activity.

While young people spend more time with most media activities as primary media, they devote more time to email and websites as secondary activities than they do as primary activities.

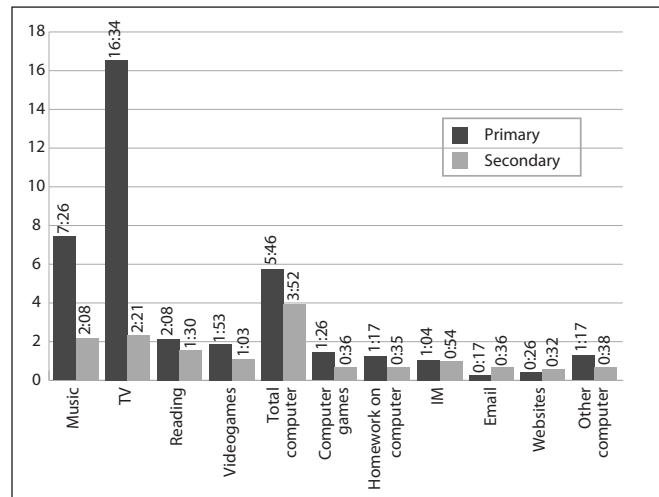
TABLE 1. SURVEY RESPONSES TO MEDIA MULTITASKING QUESTIONS: PERCENT OF 7TH–12TH GRADERS WHO SAY THEY...

	Most of the Time	Some of the Time	Most/Some	Little of the Time	Never	Little/Never
Multitask other media while reading	28	30	58	26	16	42
Multitask other media while watching TV	24	29	53	28	19	47
Multitask other media while listening to music	33	30	63	25	12	37
Multitask other media while using the computer	33	29	62	23	14	37
Do multiple things at the same time on the computer	39	25	64	19	14	33

This indicates that young people often engage in other media activities as their primary activity while using email or visiting websites. Only slightly more time is devoted to IM as a primary activity than as a secondary activity, suggesting that IM is frequently paired with other media activities as well. In general, computer activities are often secondary. When all computer time is summed (“total computer time”), almost four hours a week are spent on secondary computer use, and almost six on primary use.

Surprisingly, kids also spend a lot of time reading and playing videogames as secondary media activities as well. Reading is not difficult to imagine as a secondary activity (reading with the television on, or while something downloads on the computer), but videogames seem less probable as a secondary activity. However, young adult males will often stack two televisions on one another — one devoted to television and the other to videogames, so that they can use both simultaneously.

FIGURE 1. TOTAL WEEKLY HOURS (BASED ON DIARY DATA) DEVOTED TO...



*TV refers to time spent watching television, DVDs or videos. Time is given in hours:minutes.

In contrast, television (which includes television and DVDs or videos)⁶ dominates as a primary media activity. It is eight times more likely to be a primary media activity than a secondary media activity, and music more than three times more likely to be a primary activity. Given the ease with which teens could label both of these activities as secondary, the incidence of these as primary activities, particularly for music, is surprising. That said, aside from total computer, more time is devoted to television as a secondary activity than to any other secondary activity. These two facts together — the prominence of television as a primary medium as opposed to a secondary medium, and its prominence as a secondary medium compared to any other media — illustrate the sheer volume of time devoted to television.

4. PREDICTORS: WHO IS MEDIA MULTITASKING?

Before looking at how media affect teen behavior, it is critical to understand which teens multitask and with which media. Are all young people equally likely to media multitask, or do some have a higher propensity than others? This issue interests not only media scholars, but also media corporations and advertisers trying to capture the teen market.

The survey data analyzed in this paper offer a unique opportunity to correlate young people's self-reported media multitasking behaviors with demographics, personality traits, and household rules and media availability. This section presents a regression analysis of the survey data, which is a statistical analysis used to model the relationship between variables, in this case a predictive model of the likelihood that a young person will media multitask. It focuses on a media multitasking index as the dependent variable. Because many of the questions of interest were asked only of 7th–12th graders, this analysis focuses only on the older children in the dataset.

The regression analyses, which included 18 predictor variables (all listed in Table 2), examined the relationship between media multitasking and various potential predictors such as race, education, income, media exposure and gender. (See the Appendix for a full explanation of the regression methods.) The regression model with all 18 predictors explained 24% of the variance of media multitasking.

The regression coefficients (Table 2) indicate that, controlling for all other variables, five characteristics contribute clearly to predicting media multitasking. They are gender (with girls tending to multitask with various media more than boys), media exposure, the prominence of television in the household, computer

ownership/placement and sensation-seeking personality traits (as defined by a list of questions about risk-taking activities). Each of these contributes significantly to predicting media multitasking. Each contributing variable's Beta, or standardized coefficient, illustrates the relative contribution of each. Media exposure is the strongest predictor, followed by having a computer and being able to see a television from it, sensation-seeking, and living in highly TV-oriented household. Gender and not having a computer contribute slightly less.

The regression analyses show that if all things are equal, adolescents who are exposed to more media are more likely to media multitask. This was an expected outcome. As kids add more media activities to their limited free time, they must media multitask in order to accommodate them. In a previous study (Roberts & Foehr, 2004), youths who were high users of print, computer or television spent more time with other media than youths who were moderate or low users of each of those media. In order for youths to spend such large amounts of time with media, some of that time must have been spent media multitasking. The authors hypothesized that those high media users were the ones most likely to multitask their media use.

Interestingly, computer placement near a television close enough to view TV from the computer is another strong predictor of media multitasking. It is important to remember that the comparison group is those who have a computer but cannot see a television from it. This predictor speaks to "opportunity" to multitask. Hence, simply the addition of a TV in the vicinity of the computer increases media multitasking.

TABLE 2. REGRESSION ANALYSIS COEFFICIENTS

Regression Model	Standardized Coefficients (Beta)	Significance
(Constant)		0.000
Grade	0.00	0.896
Black	0.03	0.199
Hispanic	0.00	0.951
Other Race	0.01	0.786
Girl	0.11	0.000
College	0.05	0.096
NA Education	0.01	0.580
Median Income	0.04	0.238
East	0.03	0.418
South	0.02	0.480
Midwest	-0.02	0.664
Suburban	-0.02	0.603
Rural	-0.04	0.211
Media Exposure	0.23	0.000
Highly TV Oriented	0.15	0.000
No Computer*	-0.08	0.008
Can See TV From Computer	0.18	0.000
Sensation Seeking	0.16	0.000

*Not significant in other analysis (see Appendix for details).

Young people who like risk and adventure and are “sensation seekers” are more likely to media multitask. Sensation seekers are averse to boredom and generally seek adventure and exciting experiences. It follows, then, that sensation seekers are more likely to have multiple media “balls” in the air at any one time.

Young people who live in a highly television-oriented household are also more likely to media multitask. Households characterized as highly TV-oriented have no rules about TV, usually watch during meals and often leave the TV on regardless of whether anyone is watching. These circumstances naturally increase opportunity to media multitask.

Girls are more likely to media multitask than are boys. This may not come as a surprise given the general assumption that women are superior multitaskers (O’Connell, 2002; Shellenbarger, undated). Women have larger prefrontal cortexes (the part of the brain responsible for multitasking) and some suggest women’s brain architecture makes them better multitaskers (Fisher, 1999). Evolutionary psychology makes the argument that women need to be better multitaskers; women’s evolutionary role, caring for offspring, required that they juggle multiple activities, and those who were successful survived (Ellison, 2005). Girls today, perhaps genetically primed for it, multitask what is at the center of their environment: media. In fact, little research exists on multitasking proficiency; though research does confirm that women do multitask slightly more often (Schneider & Waite, 2005), there is very little research to support the idea that women are actually “better” multitaskers than men (Mahany, 2005). Nonetheless, the data

analyzed for this report indicate that adolescent girls do spend more of their media time multitasking. This could have more to do with the media activities they choose (IM, email, websites and music) than with some inherent ability or drive to multitask.

Finally, not having a computer (compared to those who have a computer but cannot see a television) seems to be associated with less media multitasking, as would be expected given the role of the computer in providing opportunities to media multitask. (See the Appendix for details.)

Also noteworthy are the characteristics that did not influence media multitasking — the null findings. Race, age, income and education, often predictors of media use, were not significant predictors in this model. While race, age, income and education may predict media use, they do not appear to indicate the likelihood to media multitask (see Appendix for a discussion of the limitations of the measures of education and income in this dataset).

5. PAIRINGS: WHICH MEDIA ARE USED TOGETHER?

When a young person uses two or more media simultaneously, which ones are used together? Is music often on in the background? When playing videogames or reading, do young people devote full attention to the task at hand? Are young people always doing more than one thing at a time on the computer? This section looks at which media are used together, regardless of which medium was primary and which was secondary. How are media most commonly used together? How are they paired?

These questions have ramifications across many fields, and are especially pertinent as media become more accessible, portable, faster and dynamic. Do young people pair media that require different senses? What else are young people doing when they are using media socially? Media multitasking poses interesting and troubling dilemmas for advertisers. How much should they pay for attention that is divided? Which medium is most likely to get the adolescent user's focused attention?

The data provide a number of avenues to explore how young people use media together. Most straightforward are children's responses to the survey questions outlined in Table 1. Responses to these items indicate that young people are least likely to use other media while watching television, and they are most likely to media multitask computer activities. These findings remain remarkably stable throughout all of the analyses.

The diary data offer another way to look at how media are paired. To get a more detailed look at young people's media multitasking behaviors, time spent with pairs of primary/secondary media for the week was calculated. This analysis includes television (including DVDs and videos), music, reading, videogames and six computer activities: games, IM, email, websites, homework on the computer, and "other" computer activities. (*It is important to remember that this analysis looks at time spent pairing media, regardless of whether the media were primary or secondary activities.*⁷)

Table 3 illustrates that television is by far the least likely medium to be media multitasked.⁸ Only about 17% of time spent watching television is shared with another medium. Music and reading are the next least likely to be media multitasked, with about 1/3 of each medium's time shared with another medium. Videogames are slightly more likely to share time with other media at 41% shared time. Young people are most likely to combine computer activities with other media. Email is the most likely activity to be media multitasked, with 83% of email time spent concurrently with another media activity. IM and websites are the next most likely candidates for media multitasking, with almost 3/4 of time with each activity shared with other media activities. Computer games share 67% of their time with other media, homework on the computer shares 60% of its time, and other computer activities share about half of their time with other media.

TABLE 3. OF ALL PRIMARY AND SECONDARY TIME SPENT WITH ... PROPORTION THAT IS ALSO SPENT WITH ANOTHER OF THESE MEDIA (SUMMARY OF TABLES 4A-I)

TV	17%
Music	33
Reading	35
Videogames	41
Other Computer	49
Homework on the Computer	60
Computer Games	67
IM	74
Websites	74
Email	83

**Proportions are sums calculated at the aggregate level.*

Tables 4a-i show each media activity and how its time is shared with other media activities. Starting with Table 4a, one can see that no media activity garners more than 5% of television time. This is due, in part, to the amount of time devoted to television – far more than to any other medium. But given how easy people assume it is to multitask while watching television, it is surprising that teens and tweens do not media multitask more while watching TV. On the other hand, television is more likely to be shared with non-media activities such as eating and doing chores than it is with media activities, as discussed in the next section on pairing non-media activities with media activities.

As Table 4a shows, the most likely media pairing for television is music (5%). While music is the most likely pairing, the proportion of television's time devoted to music is low. No other media activity garners 5% of total television time. The massive amounts of time devoted to television make the proportion of shared media time pale in comparison to other media. That is, time with television is so dominant that other media seem insignificant. As will be seen, television does play an important role in media multitasking as one of the most common pairings with other media — that is, it seems to often be on while other media are in use.

When listening to music, teens are most likely to watch television, if involved with another medium. Ten percent of music time is shared with television. Computer games, IM, videogames and reading each account for about 4% of music time, but other media activities are each 3% or less.

The two most popular media activities while reading are watching television (11% of reading time) and listening to music (10% of reading time). Other media activities do not approach 5% of reading time. It is not hard to imagine reading time shared with music or television. Reading is seemingly easily paired with television (during commercials, or simply monitoring TV rather than focusing full attention on it) and music (which has different sensory inputs). It is less likely that teens will read while on the

TABLE 4A. OF TOTAL WEEKLY TIME SPENT WITH TELEVISION, PROPORTION OF TIME SPENT PAIRING IT WITH OTHER MEDIA

TV/DVD/Videos/DVR	Proportion of TV time	Time spent
Total TV/DVD/Video (primary and secondary) across week		18.91
Pairing TV and Music	5%	0.98
Pairing TV and Videogames	3%	0.50
Pairing TV and Reading	2%	0.41
Pairing TV and IM	2%	0.33
Pairing TV and Computer Games	2%	0.32
Pairing TV and Homework on the Computer	1%	0.22
Pairing TV and Other Computer	1%	0.17
Pairing TV and Email	1%	0.14
Pairing TV and Websites	1%	0.12
Pairing TV and any other medium	17%	3.20

computer or playing interactive videogames. Not surprisingly, among individual computer activities, reading is most commonly paired with homework on the computer. IM, “other computer activities,” and games share about equal proportions of time with reading. Perhaps young people sit in front of the computer with a book or magazine open, switching to it while, for example, waiting for an IM response or game partner.

When playing videogames (Table 4d) or computer games (Table 4e), young people are mostly likely to share the time with television and music. Both media can be monitored and don't require full engagement of all senses. While teens play computer games while using other media, they share little of their videogame time with any media other than TV and music. It is interesting that television is the most common pairing for videogames. This suggests that young people who play videogames and watch TV at the same time are either playing hand-held videogames or have two televisions, one devoted to videogames and the other to television content. Gaming is visual, auditory and intensely interactive, therefore more consuming than most other media.

Teens and tweens are most likely to use several media simultaneously while on the computer. Interestingly, while 41% of videogame time is media multitasked, 67% of computer game time is media multitasked. Young people spend about the same proportion of time watching TV and listening to music while gaming, with the difference being that while playing computer games, young people are more likely to be spending time IMing and doing other things on the computer (each of those accounts for 8% of computer gaming time). It would be interesting to know what young people mean by the term “other computer” activities in this context. Because of easy accessibility to other computer activities, players are less likely to pay exclusive attention to the computer game, lending credence to the hypothesis that the computer is a multitasking station.

TABLE 4B. OF TOTAL WEEKLY TIME SPENT WITH MUSIC, PROPORTION OF TIME SPENT PAIRING IT WITH OTHER MEDIA

Music	Proportion of music time	Time spent
Total Music (primary and secondary) across week		9.57
Pairing Music and TV	10%	0.98
Pairing Music and Videogames	4%	0.42
Pairing Music and IM	4%	0.38
Pairing Music and Reading	4%	0.36
Pairing Music and Computer Games	4%	0.35
Pairing Music and Homework on the Computer	3%	0.28
Pairing Music and Other Computer	2%	0.15
Pairing Music and Email	1%	0.12
Pairing Music and Websites	1%	0.11
Pairing Music and any other medium	33%	3.16

In order to share time with computer games, a media activity has to be one that falls under the category of easy “switching,” with the possible exception of listening to music (especially if game sound effects are turned off).

While doing homework on the computer, a teen or tween is most likely to share that time with two favorite recreational activities: music (15% of the time) and television (12%). However, IM (8% of homework time on the computer), reading (6% of homework time on the computer), and looking at websites (5%) are next most likely to be paired with doing homework on the computer. When teens are on the computer doing homework, they devote a fair amount of time switching between other computer activities.

Instant messaging is the type of activity that is easily segmented, and therefore would seem likely to be multitasked. Again, music (20%) and television (17%) are the media activities most likely to share time with IM, but other computer activities such as homework on the computer (8%), computer games (8%), websites (7%), and email (6%) are also frequent IM pairings. Instant messaging is particularly interesting, because with its pop-up windows, it actively interrupts any other computer activity, making it hard to ignore. It is not surprising that 3/4 of IM time is shared with other media activities.

Email follows a similar pattern to IM, but paired time is spread much more evenly across an array of activities. A comparably smaller proportion of email time is devoted to music (14%) and television (16%), and more to other computer activities such as IM (13%), other computer (12%), computer games (9%), homework on the computer (8%), and websites (6%). Compared to other computer activities, email shares less time with non-computer based activities, suggesting that perhaps young people are slightly more focused on the computer when email is involved.

TABLE 4C. OF TOTAL WEEKLY TIME SPENT READING, PROPORTION OF TIME SPENT PAIRING IT WITH OTHER MEDIA

Reading	Proportion of reading time	Time spent
Total Reading (primary and secondary) across week		3.63
Pairing Reading and TV	11%	0.41
Pairing Reading and Music	10%	0.36
Pairing Reading and Homework on the Computer	3%	0.11
Pairing Reading and Videogames	3%	0.10
Pairing Reading and Computer Games	2%	0.08
Pairing Reading and Other Computer	2%	0.07
Pairing Reading and IM	2%	0.07
Pairing Reading and Email	1%	0.03
Pairing Reading and Websites	1%	0.03
Pairing Reading and any other medium	35%	1.26

Visiting websites is the only activity that is paired more often with another computer activity (IM for 15% of website time) than with TV (12%) or music (12%). Computer games (10%) and homework on the computer (9%) are other computer activities that rival that amount of time. Websites and IM appear to be a natural pairing. Indeed, half of teenaged instant messengers have included a link to a funny website or article in an instant message (Lenhart et al., 2005). It appears common for young people to discuss website content with friends via IM.

This next section of this report (The Juggling Act: How Do Chores, Eating and Socializing Fit with Media Use?) highlights the idea that when young people are watching TV as a primary activity, they are not usually using other media, but when they are using several media simultaneously, one of them is likely to be TV. In addition, the computer emerges as a major multitasking promoter by providing the opportunity to do several things at once. The majority of time spent on any individual computer activity is shared with other media activities. The diary data discussed above reinforce the survey respondents’ self reports about computer multitasking (39% of 7–12th graders reported that “most of the time” they’re on the computer, they’re doing more than one activity at a time). The computer’s role in fostering media multitasking seems well established given its new presence on the media scene.

TABLE 4D. OF TOTAL WEEKLY TIME SPENT PLAYING VIDEOGAMES, PROPORTION OF TIME SPENT PAIRING IT WITH OTHER MEDIA

Videogames	Proportion of videogame time	Time spent
Total Videogames (primary and secondary) across week		2.96
Pairing Videogames and TV	17%	0.50
Pairing Videogames and Music	14%	0.42
Pairing Videogames and Reading	3%	0.10
Pairing Videogames and Computer Games	2%	0.06
Pairing Videogames and Homework on the Computer	2%	0.05
Pairing Videogames and Other Computer	1%	0.04
Pairing Videogames and Email	1%	0.02
Pairing Videogames and IM	1%	0.02
Pairing Videogames and Websites	0%	0.01
Pairing Videogames and any other medium	41%	1.23

TABLE 4E. OF TOTAL WEEKLY TIME SPENT PLAYING COMPUTER GAMES, PROPORTION OF TIME SPENT PAIRING IT WITH OTHER MEDIA

Computer Games	Proportion of computer game time	Time spent
Total Computer Games (primary and secondary) across week		2.04
Pairing Computer Games and Music	17%	0.35
Pairing Computer Games and TV	16%	0.32
Pairing Computer Games and Other Computer	8%	0.16
Pairing Computer Games and IM	8%	0.15
Pairing Computer Games and Websites	5%	0.09
Pairing Computer Games and Reading	4%	0.08
Pairing Computer Games and Email	4%	0.08
Pairing Computer Games and Videogames	3%	0.06
Pairing Computer Games and Homework on the Computer	3%	0.06
Pairing Computer Games and any other medium	67%	1.37

TABLE 4F. OF TOTAL WEEKLY TIME SPENT DOING HOMEWORK ON THE COMPUTER, PROPORTION SPENT PAIRING IT WITH OTHER MEDIA

Homework on the Computer	Proportion of HW computer time	Time spent
Total HW Computer (primary and secondary) across week		1.87
Pairing Homework on the Computer and Music	15%	0.28
Pairing Homework on the Computer and TV	12%	0.22
Pairing Homework on the Computer and IM	8%	0.15
Pairing Homework on the Computer and Reading	6%	0.11
Pairing Homework on the Computer and Websites	5%	0.09
Pairing Homework on the Computer and Other Computer	4%	0.08
Pairing Homework on the Computer and Email	4%	0.07
Pairing Homework on the Computer and Computer Games	3%	0.06
Pairing Homework on the Computer and Videogames	3%	0.05
Pairing Homework on the Computer and any other medium	60%	1.11

TABLE 4G. OF TOTAL WEEKLY TIME SPENT INSTANT MESSAGING, PROPORTION OF TIME SPENT PAIRING IT WITH OTHER MEDIA

IM	Proportion of IM time	Time spent
Total IM (primary and secondary) across week		1.96
Pairing IM and Music	20%	0.38
Pairing IM and TV	17%	0.33
Pairing IM and Computer Games	8%	0.15
Pairing IM and Homework on the Computer	8%	0.15
Pairing IM and Websites	7%	0.15
Pairing IM and Email	6%	0.11
Pairing IM and Other Computer	5%	0.09
Pairing IM and Reading	3%	0.07
Pairing IM and Videogames	1%	0.02
Pairing IM and any other medium	74%	1.45

TABLE 4H. OF TOTAL WEEKLY TIME SPENT EMAILING, PROPORTION OF TIME SPENT PAIRING IT WITH OTHER MEDIA

Email	Proportion of email time	Time spent
Total Email (primary and secondary) across week		0.88
Pairing Email and TV	16%	0.14
Pairing Email and Music	14%	0.12
Pairing Email and IM	13%	0.11
Pairing Email and Other Computer	12%	0.11
Pairing Email and Computer Games	9%	0.08
Pairing Email and Homework on the Computer	8%	0.07
Pairing Email and Websites	6%	0.05
Pairing Email and Reading	4%	0.03
Pairing Email and Videogames	2%	0.02
Pairing Email and any other medium	83%	0.73

TABLE 4I. OF TOTAL WEEKLY TIME SPENT VISITING WEBSITES, PROPORTION OF TIME SPENT PAIRING IT WITH OTHER MEDIA

Websites	Proportion of websites time	Time spent
Total Websites (primary and secondary) across week		0.97
Pairing Websites and IM	15%	0.15
Pairing Websites and TV	12%	0.12
Pairing Websites and Music	12%	0.11
Pairing Websites and Computer Games	10%	0.09
Pairing Websites and Homework on the Computer	9%	0.09
Pairing Websites and Other Computer	7%	0.07
Pairing Websites and Email	5%	0.05
Pairing Websites and Reading	3%	0.03
Pairing Websites and Videogames	1%	0.01
Pairing Websites and any other medium	74%	0.71

The Computer as a Gateway to Diverse Activities

One could argue that individual computer activities like IM or email do not deserve to be considered as equals to media giants such as television. Instead, the computer should be considered as a whole, as a medium in and of itself. However, when the computer is considered as a whole, as a medium, time spent doing multiple things on the computer is, in effect, wiped out. For example if, during one half hour, a young person reported homework on the computer as a primary activity and IM as a secondary activity, each of those would be counted as “computer time” but not as multitasking time. When each computer activity is considered as individual medium (as in the previous section), that same half hour is counted as time spent media multitasking IM and computer-based homework. The distinction between the computer as a medium and the computer as a gateway to individual computer activities turns out to be an important one, emphasizing the commonness of doing multiple things on the computer “simultaneously.”

When the computer is examined as a medium, it resembles traditional media such as music and reading in terms of how much of its time is shared with other media. However, when computer activities are examined individually, as equals to traditional media activities such as television viewing and music listening, they look nothing like traditional media. Computer activities are far and away the most media multitasked activities, sharing the majority of their time with other media.

The lines between media are becoming more and more blurred. As people can use the computer for more media activities, such as watching television programs, it will become more evident that the computer is merely a gateway to activities. With this definition comes the realization that what matters is the activity, not the platform. However, having such an eclectic mix of activities available on one platform has a very clear effect on media multitasking.

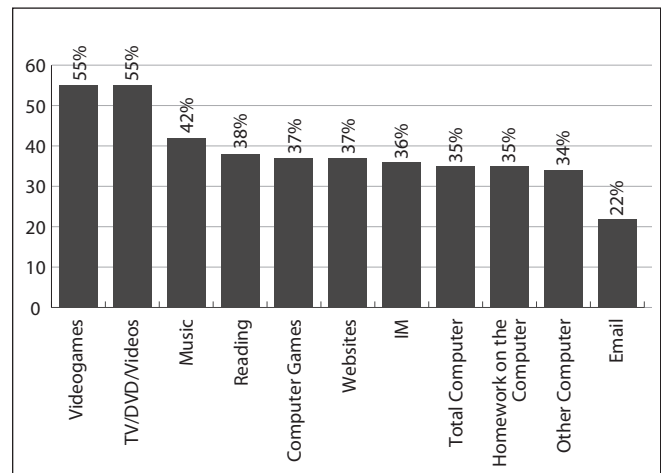
6. THE JUGGLING ACT: HOW DO CHORES, EATING, AND SOCIALIZING FIT WITH MEDIA USE?

This section explores how often, when young people's *primary* activity is using media, they are also doing something else other than media at the same time. Unlike the previous section, this analysis only considers time with the medium when it was designated the primary activity the young person was engaging in at the time.

One of the most interesting findings has to do with the absence of multitasking, that is, when teens and tweens concentrate solely on a particular media activity. Looking at Figure 2, one can see which media activities are least likely to be shared with any other activity.⁹ Television and videogames are the least likely primary media activities to be multitasked with any other activities. Fifty-five percent of both primary television and primary videogame time is devoted to nothing else. Also somewhat surprisingly given today's busy lifestyles (and its suitability as a background activity) listening to music was listed as a primary media activity without any secondary activities 42% of the time. Email is the most likely media activity to be multitasked; only 22% of email time is devoted to nothing else. Supporting findings discussed above, all computer activities congregate in being the most likely to be multitasked, with the least amount of time devoted to doing "nothing else."

Over half of television time (as a primary medium) is devoted to nothing else (see Table 5a). The next most popular activity is eating; young people report eating 14% of the time that they watch television. This finding lends support to the body of

FIGURE 2. PROPORTION OF TIME, FOR EACH PRIMARY MEDIUM, DEVOTED TO DOING "NOTHING ELSE" (SUMMARY FROM TABLES 5A-K)



research linking television viewing with obesity (Anderson & K.E., 2006; Robinson, 1999; Robinson, 2001). This proportion of TV time spent eating is more than double the next most popular activity, homework, at 6% of television time. Chores, talking on the phone, listening to music, computer time and other unidentified activities each share 4% of television time when television is the primary activity. Indeed, if one were to sum the media vs. non-media activities, one would see that television is far more likely to be shared with non-media activities (28%) than with other media activities (13%, see Endnote 9). Perhaps when

TABLE 5A. PROPORTION OF PRIMARY TELEVISION TIME SHARED WITH SECONDARY ACTIVITIES

	Proportion of TV time	Time spent
Total Weekly Time with Primary TV (and DVD/Videos)		16.56
<i>Secondary Activity:</i>		
Nothing	55%	9.11
Eating	14%	2.29
Homework not on the Computer	6%	0.96
Phone	4%	0.71
Chores	4%	0.68
Other (not computer)	4%	0.68
Music	4%	0.68
All Computer	4%	0.65
Reading	2%	0.34
Videogames	2%	0.34
IM	1%	0.24
Computer Games	1%	0.17
Homework on the Computer	1%	0.13
Email	1%	0.11
Websites	1%	0.10
Other Computer	1%	0.10

TABLE 5B. PROPORTION OF PRIMARY MUSIC TIME SHARED WITH SECONDARY ACTIVITIES

	Proportion of music time	Time spent
Total Weekly Time with Primary Music		7.43
<i>Secondary Activity:</i>		
Nothing	42%	3.11
Other (not computer)	14%	1.04
Homework not on the Computer	9%	0.67
Eating	8%	0.62
Phone	8%	0.59
All Computer	7%	0.51
Chores	6%	0.48
Videogames	4%	0.31
TV/DVD/Videos	4%	0.31
Reading	4%	0.28
IM	3%	0.23
Homework on the Computer	2%	0.14
Email	1%	0.09
Computer Games	1%	0.08
Other Computer	1%	0.07
Websites	1%	0.05

television is the primary medium, that is, when one is trying to follow a storyline, it is simply more difficult to process additional content, unless it is during a commercial. Activities like eating and chores are well-practiced routines that require little cognitive focus, and are a perfect pairing for television.

Music as a primary medium is a bit of an enigma. Forty-two percent of time that music is the primary medium, it is the only activity — that is, youngsters report doing nothing else. Images of teens sitting and enjoying music without doing anything else are reminiscent of the pre-television era. However, teens report doing this rather frequently when music is their primary medium. Perhaps young people do still spend time lying on their beds, staring at the ceiling and listening to music. Interestingly, when they are not focusing exclusively on music, they report that the activity that garners the most amount of time is “something else,” (14% percent of primary music time) presumably not a media activity (though one cannot be sure). Music appears to be a somewhat unique case in the failure of the response options to capture what it is young people are pairing with music. Perhaps the “other” activity could be hanging out with friends. Research has shown that music is a social medium, both for its use in social situations and as fodder for conversation and identity (Christenson

& Roberts, 1998). Transportation activities (driving, walking, riding the bus) might also account for some of the “other” activities. The four next most likely secondary activities when music is the primary media activity are homework not on the computer (9% of primary music time), talking on the phone (8%), eating (8%) and chores (6%). Non-media activities dominate as secondary activities when music is the primary activity. Non-media activities make up 32% of music time (not including the 14% of time devoted to “something else” which likely is also non-media) versus 21% of primary music time devoted to secondary media activities. Music’s portability, the possibility of having it along constantly, may help to explain why non-media activities are common companions. Music can be a companion while other media may not be able to, given portability constraints. Also, music, unlike television and reading, does not require visual focus and this may explain the high incidence of the “something else” category. Perhaps when the primary activity is music, young people are using it to complement social activities, or they choose secondary non-media activities that require more cognitive focus (e.g. building a model airplane, playing cards or making jewelry) which are not included in the list of possible activities.

TABLE 5C. PROPORTION OF PRIMARY READING TIME SHARED WITH SECONDARY ACTIVITIES

	Proportion of reading time	Time spent
Total Weekly Time with Primary Reading		2.14
<i>Secondary Activity:</i>		
Nothing	38%	0.82
Homework not on the Computer	14%	0.29
Eating	11%	0.23
Other (not computer)	9%	0.19
Chores	6%	0.12
All Computer	5%	0.10
Music	4%	0.08
TV/DVD/Videos	3%	0.07
Phone	3%	0.06
Homework on the Computer	2%	0.04
Videogames	1%	0.03
IM	1%	0.02
Email	1%	0.02
Computer Games	1%	0.02
Other Computer	1%	0.02
Websites	1%	0.01

TABLE 5D. PROPORTION OF PRIMARY VIDEOGAME TIME SHARED WITH SECONDARY ACTIVITIES

	Proportion of videogame time	Time spent
Total Weekly Time with Primary Videogames		1.88
<i>Secondary Activity:</i>		
Nothing	55%	1.04
TV/DVD/Videos	9%	0.16
Eating	8%	0.16
Music	6%	0.11
Reading	4%	0.07
Homework not on the Computer	3%	0.06
All Computer	3%	0.06
Phone	3%	0.05
Other (not computer)	2%	0.04
Chores	2%	0.03
Homework on the Computer	1%	0.02
Email	1%	0.01
Computer Games	1%	0.01
IM	0%	0.01
Websites	0%	0.01
Other Computer	0%	0.01

When teens read (for fun), they also report that secondary activities tend to be non-media related. Much of the time there is nothing else. Thirty-eight percent of primary reading time is devoted to nothing else. Primary reading shares its time with homework not on a computer (14%), eating (11%) and other activities, “something else” (9%). The most likely secondary media activities for a young reader are time on the computer (5%) and listening to music (4%). Overall, 33% of primary reading time is devoted to non-media secondary activities and 14% to media activities. In the case of reading, it is not surprising that secondary activities are more heavily non-media focused. Reading requires significant cognitive focus and the non-media options listed are less likely to need full attention.

Videogames and television rank highest in the proportion of their playing or viewing time that is devoted to nothing else (55%). This finding reveals a focus on videogames more in line with what Roberts et. al (2005) anticipated, explaining their exclusion of videogames from a set of survey questions about media multitasking (see Table 1 on page 8). Videogames are the one non-computer activity for which media time outweighs non-media time in secondary activities. The most likely second-

ary activity while playing videogames is watching television (9% of primary videogame time). As mentioned earlier, this suggests the use of handheld videogames or multiple television sets in the same location. Eating (8% of primary videogame time) and music (6%) are the next most likely activities to be shared with videogames. Overall, 16% of primary videogame time is devoted to non-media activities and 22% to media activities. It is difficult to imagine performing some of the non-media activities, such as chores, during videogame play since the player is quite literally tied to the game. In addition, the interactivity required by videogames limits multitasking possibilities.

Computer activities are the most multitasked activities in this study and most of the time devoted to secondary activities is overwhelmingly media-based (which makes them quite different from TV, music or reading). A little over a third of the time devoted to most computer activities is devoted to nothing else. The most consistent secondary activity while on the computer is another computer activity or multiple other computer activities (between 21% and 38% of primary activity time, depending on the computer activity, is devoted to another computer activity, “Secondary All Computer”). After other computer activities, the

TABLE 5E. PROPORTION OF PRIMARY COMPUTER GAME TIME SHARED WITH SECONDARY ACTIVITIES

	Proportion of computer game time	Time spent
Total Weekly Time with Primary Computer Games		1.44
<i>Secondary Activity:</i>		
Nothing	37%	0.54
All Computer	21%	0.30
Music	19%	0.27
TV/DVD/Videos	11%	0.16
IM	7%	0.11
Other Computer	7%	0.10
Phone	6%	0.08
Eating	6%	0.08
Homework not on the Computer	6%	0.08
Websites	5%	0.07
Reading	4%	0.06
Videogames	4%	0.05
Email	4%	0.05
Other (not computer)	3%	0.05
Chores	2%	0.03
Homework on the Computer	2%	0.03

TABLE 5F. PROPORTION OF PRIMARY COMPUTER-BASED HOMEWORK TIME SHARED WITH SECONDARY ACTIVITIES

	Proportion of homework on the computer time	Time spent
Total Weekly Time with Primary Homework on the Computer		1.28
<i>Secondary Activity:</i>		
Nothing	35%	0.44
All Computer	24%	0.31
Homework not on the Computer	16%	0.21
Music	11%	0.14
IM	7%	0.09
TV/DVD/Videos	7%	0.09
Eating	6%	0.08
Websites	6%	0.08
Reading	6%	0.08
Phone	5%	0.07
Email	5%	0.06
Other (not computer)	4%	0.05
Other Computer	4%	0.05
Computer Games	3%	0.03
Chores	2%	0.03
Videogames	2%	0.03

activity that is consistently next in line in proportion of time is music (between 7% and 19% of primary computer time).

Other popular secondary activities when the primary activity is on the computer vary by what the computer is being used for. When the computer is used for:

- computer games, popular secondary activities (after total computer time and music) are TV (11%), IM (7%) and “other computer” (7%). Phone, eating and homework not on the computer each garner 6% of game time.
- IM, popular secondary activities (after total computer time and music) are websites (10%), TV (9%), and email (8%).
- email, popular secondary activities (after total computer time and music) are eating, TV, and other computer activities, each sharing 11% of email time. Ten percent of email time is also shared with the telephone.
- websites, IM shares the largest proportion of time (9%) after total computer and music.

It is evident that when young people use media, they frequently engage in several secondary activities; this is particularly true when they use a computer. The clear indication for this is that the summed proportion of time spent on secondary activities totals more than 100% for two of the computer activities. Respondents were asked to indicate “what else” they were doing when engaging

in their primary media activity, and to “circle as many answers” as they needed. This suggests that especially when they were on the computer, young people are sometimes doing more than two things at a time (the primary media activity, a secondary activity, and another activity). This image certainly fits with the picture often portrayed by media of a teenager sitting at the computer hopping between homework, IM, websites, etc. with the TV or some music on in the background. It also lends more credence to the idea of the computer as a multitasking station.

Overall, young people are most likely to focus all their attention (do nothing else) on the medium at hand when they are watching television or playing videogames, and are least likely to focus their attention exclusively when they are using a computer. This level of relative focus was also found among adults during television viewing (Papper et al., 2004). These researchers called television the “800-pound gorilla” because of its dominance as a primary medium, both in terms of time and attention, but also because of its prevalence as a secondary medium (Papper et al., 2004). This finding holds for young people, with music taking a close second.

TABLE 5G. PROPORTION OF PRIMARY INSTANT MESSAGING TIME SHARED WITH SECONDARY ACTIVITIES

	Proportion of IM time	Time spent
Total Weekly Time with Primary Instant Messaging		1.06
<i>Secondary Activity:</i>		
Nothing	36%	0.39
All Computer	29%	0.31
Music	15%	0.16
Websites	10%	0.11
TV/DVD/Videos	9%	0.09
Email	8%	0.09
Eating	7%	0.08
Homework not on the Computer	6%	0.07
Phone	6%	0.07
Homework on the Computer	5%	0.06
Computer Games	4%	0.05
Reading	4%	0.05
Chores	3%	0.03
Other Computer	3%	0.03
Other (not computer)	3%	0.03
Videogames	1%	0.01

TABLE 5H. PROPORTION OF PRIMARY EMAIL TIME SHARED WITH SECONDARY ACTIVITIES

	Proportion of email time	Time spent
Total Weekly Time with Primary Email		0.28
<i>Secondary Activity:</i>		
All Computer	38%	0.11
Nothing	22%	0.06
Music	12%	0.03
Eating	11%	0.03
TV/DVD/Videos	11%	0.03
Other Computer	11%	0.03
Phone	10%	0.03
Computer Games	8%	0.02
Websites	8%	0.02
IM	7%	0.02
Homework not on the Computer	6%	0.02
Reading	5%	0.01
Chores	4%	0.01
Other (not computer)	4%	0.01
Homework on the Computer	4%	0.01
Videogames	3%	0.01

When watching TV, listening to music or reading, non-media activities dominate as secondary activities. However, when on the computer, or, to a lesser extent, when playing videogames, media activities dominate as secondary activities. Future research should examine the nature of media multitasking during computer use. It is worth examining whether these are cases of serial use or of simultaneous use. For instance, the multitasking of computer activities is likely a serial process — switching between activities, while the multitasking of non-computer media such as music may be more “simultaneous.”

Computers have made multitasking easy — indeed, they have encouraged it. The frequent pairing of instant messaging and websites is a good example. The computer allows young people to look at a website and communicate via IM within the same visual space. On the other hand, IM is not a common pairing with TV, while eating is. Once television content becomes more prevalent on the computer, it is likely that young people will communicate via IM during the natural breaks in television dialogue. Television, as a stand-alone screen lacking interactive capabilities (for the majority), discourages media multitasking.

TABLE 5I. PROPORTION OF PRIMARY WEBSITE TIME SHARED WITH SECONDARY ACTIVITIES

	Proportion of website time	Time spent
Total Weekly Time with Primary Websites		0.43
<i>Secondary Activity:</i>		
Nothing	37%	0.16
All Computer	29%	0.12
Music	14%	0.06
IM	9%	0.04
Computer Games	7%	0.03
Email	6%	0.03
Eating	4%	0.02
Other Computer	4%	0.02
Other (not computer)	4%	0.02
TV/DVD/Videos	4%	0.02
Phone	4%	0.02
Homework on the Computer	3%	0.01
Reading	3%	0.01
Homework not on the Computer	3%	0.01
Chores	2%	0.01
Videogames	1%	0.01

TABLE 5J. PROPORTION OF PRIMARY "OTHER COMPUTER" TIME SHARED WITH SECONDARY ACTIVITIES

	Proportion of other computer time	Time spent
Total Weekly Time with Primary "Other Computer"		1.29
<i>Secondary Activity:</i>		
Nothing	34%	0.44
All Computer	30%	0.39
Other (not computer)	14%	0.18
Music	7%	0.09
Email	6%	0.08
TV/DVD/Videos	6%	0.07
Computer Games	5%	0.06
IM	5%	0.06
Phone	5%	0.06
Eating	4%	0.06
Reading	4%	0.05
Websites	4%	0.05
Homework not on the Computer	4%	0.05
Chores	3%	0.04
Videogames	3%	0.04
Homework on the Computer	2%	0.03

TABLE 5K. PROPORTION OF PRIMARY TOTAL COMPUTER TIME SHARED WITH SECONDARY ACTIVITIES

	Proportion of all computer time	Time spent
Total Weekly Time with Primary Any Computer		5.77
<i>Secondary Activity:</i>		
Nothing	35%	2.03
All Computer	27%	1.53
Music	13%	0.75
Reading	8%	0.46
Homework not on the Computer	7%	0.43
Other Computer	7%	0.42
Email	7%	0.38
TV/DVD/Videos	6%	0.35
Eating	6%	0.34
Websites	6%	0.34
Other (not computer)	6%	0.34
Phone	6%	0.32
IM	5%	0.31
Videogames	5%	0.27
Homework on the Computer	4%	0.24
Chores	3%	0.15
Computer Games	2%	0.14

7. CONCLUSION

For many young people, living in today's media world demands that they synchronize tasks. Most teens and tweens spend at least some of their media time shared between more than one medium. Among those who do at least some media multitasking, young people devote about a quarter of their media time to more than one medium. On the other hand, there appears to be a solid proportion of young people, around 1/5 of 8- to 18-year-olds, who spend very little, if any, of their media time with more than one medium.

Television¹⁰ remains dominant in the lives of young people. Despite a great deal of hype about how new technologies are changing the face of media for young people, television remains central. Television eats up far more time than any other medium. Not only is its sheer volume of time important, but also when television is the primary medium, it is the focus (that is, it shares very little of its time with other media or with other activities in general). While the impact of newer media is significant, the importance of television in the lives of young people should be neither underestimated nor downplayed. It will be interesting to see, as the television and computer become more integrated, whether television's dominance will diminish, either in time or in focus. Once "television" programs become more readily available on the computer, they are also more readily available for multitasking.

Two major findings emerge from this research regarding the pairing of media. First, it is evident that when watching TV, a young person is not usually media multitasking (indeed, is less likely to be multitasking than when using any other medium), but when a young person is media multitasking there is likely television involved.

Second, computer activities are the most multitasked activities in this study and, unlike the situation with television, music or reading, most of computer time devoted to secondary activities is overwhelmingly media-based. When teens engage in a computer activity such as IM or web surfing, they spend the majority of that

time also using other media, especially on other activities on the computer. The way young people use the computer appears to be very different from how they use more traditional media. When they watch TV, listen to music or read, non-media activities such as eating and doing chores dominate when they are engaging in secondary activities. However, when they are on the computer, they usually are doing something else, and media activities dominate as secondary activities. In fact, for teens using the computer, the most consistent secondary activity is another computer activity. The computer truly appears to be a media multitasking station, and may be at least partly responsible for an increase in media multitasking.

While often party to media multitasking, traditional media such as television and music do not appear to foster media multitasking, whereas the computer appears to be a serious media multitasking promoter.¹¹

This research also suggests that some young people are more likely to media multitask than others. Certainly more research is needed to understand the nuances of likelihood to media multitask, but the current findings can guide us in our search for more detailed answers. Young people who are exposed to the most media, those who have a computer and can see a television from it, those who are sensation seekers, those who live in highly TV-oriented households, and girls (more than boys) are all more likely to media multitask. These characteristics seem to point to two factors that may drive media multitasking: a need, or a motivation, to media multitask (to fit in everything they want to do), and the opportunity to media multitask.

The importance of opportunity in media multitasking cannot be emphasized enough. In every analysis, the opportunity theme emerges as an important factor both in predicting media multitasking and explaining possibilities for pairing media. The computer is the most media multitasked medium because it offers many opportunities for media multitasking, both within itself as well as across other platforms (e.g. a TV in the background).

The migration of media into young people's bedrooms (Roberts, 2000; Roberts & Foehr, 2004; Roberts et al., 2005; Roberts et al., 1999) is likely in part responsible for media multitasking because it increases the opportunity to use more than one medium at a time. As media devices grow in number and become more portable, opportunities for media multitasking are likely only to increase.

In thinking about the concept of "opportunity," though, we should not limit the discussion to which media are available. We must look at the user's goals and the medium's properties within the concept of "opportunity." That is, is the *user* available for media multitasking (i.e. not completely focused on a task) and will the media's properties allow it?

No research has focused specifically on the effects of modern-day media multitasking, but research ultimately suggests that brain capacity is finite and attention to one task diminishes as another is introduced (Just, et al, 2001). But what is the broader implication of media multitasking?

Experts certainly believe that if young people media multitask and do so from an early age, genes will adapt (Seligman, 2006). But research suggests that changes will happen not just over time, through natural selection, but in one's own lifetime. Contrary to early brain research, neurological work over the last few decades has shown that the brain changes based on use. The phrase "use it or lose it" has been coined to help explain neurological adaptation throughout life (Diamond, 1988). Dendrites, the extensions of nerve cells that receive input from other nerve cells, increase or decrease in number based on use. Research has shown that animals, as well as people, inhabiting "enriched environments," those providing more stimulating experiences than control environments, experience more brain growth (Mohammed et al., 2002). The neurological literature allows informed speculation about the impact of excessive media multitasking. It is clear that the brain adapts based on use. Neurological literature suggests that the prefrontal cortex, or Brodmann's Area 10, is responsible for handling multitasking. In young people who devote a great deal of time to media multitasking, could we expect the prefrontal cortex to be well endowed, while there would be weaknesses in the areas of the brain responsible for other activities requiring extended concentration such as a calculus proof, painting an intricate scene, or taking the SAT? That is, perhaps all the time spent media multitasking develops the prefrontal cortex at the expense of other areas of the brain. It is possible, however, that with all the multitasking practice our brains will adapt and be able to balance both multitasking and extended concentration. Comments such as "my son can process all the information on screen at once, but I can only focus on one thing" are illustrative of neurological

adaptation forces at work. Many young people's brains are well practiced at managing multiple kinds of information in virtual simultaneity. In this media-heavy world, it is likely that brains that are more adept at media multitasking will be passed along and these changes will be naturally selected. After all, information is power, and if one can process more information all at once, perhaps one can be more powerful.

One favorite speculation is that today's multitasking lifestyles leave no time for reflection, no time for thought or creativity (Brooks, 2001). As one reporter put it: "We now live and work on 'Internet time,' which seems to be a combination of dog years lived according to Moore's Law" (Meade, 2003). That said, media multitasking is a phenomenon that likely will not disappear, and so we must try to understand it as well as its effects.

The complications wrought by media multitasking raise a number of questions for those who want to reach young people with important messages. If young people's media attention is divided, how can they be reached? Will messages placed in different media eventually be absorbed? Will a media synergy approach be enough to overcome divided attention? Can ultra-multitaskers ever be reached?

This report just scratches the surface of the complexities involved with media multitasking. It provides some preliminary guidance for reaching young people in this new media landscape. First, it is important to realize that not everyone is media multitasking all of the time. Most young people spend some time media multitasking and those who do spend, on average, a quarter of their media time with multiple media. On the other hand, sensation seekers, those shown to be more likely to engage in risky behaviors (hence in greater need of being reached with positive messages), are more likely to media multitask. Second, some media, at least for now, seem to retain focus better than others. Television, to which young people devote the most amount of time, is least likely to be shared with other media, and thus remains a good option for reaching young people. Messages integrated into the narrative are less likely than PSAs to fall victims to multitasking. A synergistic approach that involves multiple media and gets young people talking (in person, via text messaging, IM, or email) also fits with how young people use media. Finally, the best time to reach a young person with a message is when they are ready for it. The Internet offers an ideal way to make information available when a young person is seeking it — and in that scenario, the information won't get lost in the media multitasking madness.

APPENDIX—METHODOLOGY

Estimating time with media (indeed, time devoted to anything), particularly among children, is a complex task. Each approach, and the technicalities and logistics of implementing it, brings different problems and benefits, and more often than not produces different results (Anderson & Field, 1991; Anderson, Field, Collins, Lorch, & Nathan, 1985; Greenberg et al., 2005; Larson, 1989; Papper et al., 2004; Robinson, 1985). A number of scholars (Comstock & Scharrer, 1999; Papper et al., 2004; Roberts & Foehr, 2004; Robinson, 1997) provide detailed accounts of the intricacies of measuring time, and more specifically, time using media. Accurate measurement of time spent with media is inextricably intertwined with measurement of media multitasking. No single study can provide the definitive answer to how much time young people spend with media or media multitasking, but instead, provides a best possible estimate given the methodology used.

The current study analyzes data collected in 2003/2004. The original study consisted of two parts: 1) a nationally representative sample of 2032 3rd–2th graders (8- to 18-year-olds) who responded to written questionnaires asking about many facets of their media behavior, and 2) a self-selected sub-sample of 694 respondents who also completed a seven-day diary of their media use.¹²

Sampling

The survey sample was obtained using a stratified, two-stage national probability sample. At stage 1, schools were randomly selected from a list of approximately 80,000 public, private, and parochial schools in the U.S. At stage 2, grades and classes within grades were randomly selected to participate. The sampling design permits oversampling by various criteria (e.g., grade level, race/ethnicity, etc.). This study includes an oversample of Black and Hispanic students, enabling a number of between group comparisons among different racial/ethnic groups.

Data from the primary survey are weighted to ensure a nationally representative sample of students. Weights are based on data from the National Center for Education Statistics and from the U.S. Bureau of the Census. The weighting procedure

controls distribution of students by grade, region of the country, nature of residence locale (urban, suburban, rural), gender, and race/ethnicity.

Students who completed the basic questionnaire were also invited to keep a seven-day, media use diary. This procedure produced a self-selected (thus non-representative) diary sample of 694 students. Because the sample was self-selected, the diary data for the analyses in this paper are not weighted.

Survey Administration

Respondents completed self-administered questionnaires in their classrooms. Questionnaires required approximately 40 minutes to complete. Different reading abilities in younger and older students resulted in the use of slightly different questionnaires for 3rd–6th graders and 7th–12th graders, adolescents responding to more questions than younger children. Trained interviewers were present in each classroom to answer any questions and provide assistance to students if needed.

The survey instrument was completely anonymous; respondents returned questionnaires in sealed envelopes.

Questionnaire Items

Questionnaires were developed to enable as complete a description of U.S. young people's media environment and behavior as possible given classroom time constraints.

Items assessing a variety of aspects relating to children's media environments and use were included in the survey. General topic areas include: media environment (physical and social), amount of media exposure (primarily non-school exposure), non-media time, media content consumed, social context of media use, demographics¹³, and social-psychological characteristics. The survey items used in this secondary analysis receive a more complete description in the discussion of the regression methods on below. Additionally, a complete copy of the survey instrument and further details about the survey and diary methods can be found in Roberts et al., (2005).

Media Use Diaries

A self-selected sub-sample of young people who completed the classroom survey also kept a relatively demanding, seven-day media use diary. The diary asked kids to respond to four primary questions for each half hour of the day beginning at 6:00 a.m., and finishing at 12:00 a.m. The four primary questions were:

- What kind of media [if any] were you using?
- What else were you doing [while using a medium]?
- Where were you?
- Who was with you?

For each of the seven diary days, respondents were also asked to estimate the amount of time they spent in school, working at a job, doing chores, doing homework, participating in clubs/sports/hobbies, etc., and being in any form of child care or after school program.

Finally, the diary contained items asking about the degree to which respondents “channel surfed” when watching television, how much they used instant messaging, how well they were able to withstand boredom, and why they might use two media at the same time. See Roberts et al. (2005) for a sample of the media diary.

Secondary Analysis Methods

This secondary analysis has three primary components, using both parts of the original study, survey and diary. Each part of the original study offers unusual strengths. The survey, with its representative sample, offers a portrait of adolescents in America, a rare opportunity in media research in the public domain. In contrast, the diary, although lacking representativeness, offers rich detail and real-time examples over an extended period. While the survey offers a more shallow view that is representative of adolescents in America, the diary paints a richer, more complete picture of media use. The two in combination give a more detailed look at media multitasking among young people than any that has been offered before.

The data primarily focus on recreational use of media — that is, use of media outside of school, for fun. For example, time spent reading for school was not measured. However, the analyses in this report include the use of a computer for schoolwork because it was available in the dataset and because of the computer’s anticipated role in media multitasking. With that exception, the media use represented in these analyses is recreational media use.

The question of prevalence of media multitasking is addressed using both the survey data and the diary data. Straightforward responses of 7th–12th graders to the survey questions on media multitasking are used, as is a scale comprised of these variables.

The diary data of 3rd–12th graders also play a key role in the analysis of prevalence of media multitasking. Variables were compiled and computed across 252 time periods (36 half-hour slots over 7 days) to create a “media multitasking proportion.” This proportion represents, at the individual level, the proportion of time with primary media that is also spent using at least one other medium.

A half-hour of primary media use was assigned each time a respondent recorded using media in a half-hour slot. Primary media included in the media multitasking proportion were: listening to music; watching TV; watching videotapes/DVDs; reading for fun; playing videogames; playing computer games; doing homework on the computer; instant messaging; emailing; visiting websites; and other computer activities (items 1–3, and 5–12 in Table A1). Watching movies in a theater was excluded because its special environment was considered an exception to media multitasking. Respondents were asked to record media use if they were using a medium for at least 15 minutes. It is likely, for example, that at times a half-hour was assigned when only 20 minutes were actually spent with a medium. On the other hand, there certainly were instances when a young person used media during a half-hour period and did not record it because it did not meet the 15-minute minimum.

Additionally, a half-hour of secondary media use was assigned when at least one medium was recorded. Secondary activities included in the calculation are: homework on the computer; watching TV; videos or DVDs; reading; playing videogames; playing computer games; instant messaging; emailing; and visiting websites and other computer activities (items 6–15 in Table A2). As with estimating primary media use, likely some secondary use was overlooked while some was overcounted. In all likelihood these errors are random and they even out across the week.

The question of “how are young people media multitasking?” is primarily addressed in a series of analyses conducted with the diary data of 8- to 18-year-olds. Variables were computed across the 252 time periods of the media diary to allow examination of which media are used in combination with one another. The media diary offers something not feasible with the survey data: a look at the nature of media use during a given period of time.

The question of “who is multitasking,” is addressed using a regression analysis run on the survey data. The nationally representative data offer a unique opportunity to examine 7th–12th graders’ responses to questions about media multitasking, and provide a glimpse into media behaviors of adolescents across the country. Details about methods and measures can be found later in this Appendix. Because of the representative sample, findings from the regression analysis can be used to characterize adolescents all across America.

TABLE A1. DIARY QUESTIONS RELATED TO PRIMARY MEDIA USE**1. WERE YOU DOING ANY MEDIA ACTIVITIES FOR AT LEAST 15 MINUTES? (CIRCLE ONLY ONE ANSWER — PLEASE DO NOT LEAVE BLANK)**

Yes - Answer the questions below.

No - Go to the next time slot.

Please see activities listed in Question 2 for examples of media activities.

2. WHAT WAS YOUR MAIN MEDIA ACTIVITY? (CIRCLE ONLY ONE ANSWER) Please circle the number that matches the one media activity that you were paying most attention to. Then answer the next three questions about the media activity that you circled.

1. Listening to music
2. Watching TV
3. Watching videotapes/DVDs
4. Watching a movie (in a theater)
5. Reading for fun (books, magazines, etc.)
6. Playing video games (handheld or player)
7. Playing computer games
8. Doing homework on the computer
9. Instant Messaging
10. Emailing
11. Visiting websites
12. Other computer activities

Validating Survey and Diary

One question that arises in the situation of multiple data sources is whether the two provide complementary data. That is, do the data point to the same, or different, conclusions? Most critical for this secondary analysis, is whether kids characterized as “high” multitaskers based on their responses to the multitasking questions in the survey, do in fact, spend the most time media multitasking according to their media diaries. Indeed, the 4-item media multitasking score from the survey and the amount of time devoted to any secondary media use from the diary are statistically significantly correlated ($r=.17$, $p<.001$, $n=357$) among 7th–12th graders. In addition, “low multitaskers” according to the survey, spend far less time using any secondary media than those classified as “mid” or “high” multitaskers according to the survey (see Table A3).

Regression Methods

The regression model was run in two different statistical programs to ensure that weighting and clustering of the sample did not affect results.¹⁴ The first analysis ran a linear, multiple regression model in SPSS (SPSS Inc., 2001) using unweighted data. The argument can be made that because all of the variables that are used in weighting these data are controlled

TABLE A2. DIARY QUESTIONS RELATED TO SECONDARY MEDIA USE**3. WHAT ELSE WERE YOU DOING? (CIRCLE AS MANY ANSWERS AS YOU NEED) Please circle the number or numbers that match the other things you were doing when you were reading, listening to music, playing a video game, watching TV or a movie, or using the computer. If you were doing “Something else,” please write in your answer.**

1. Nothing else
2. Chores
3. Eating
4. Talking on the phone
5. Homework (not on the computer)
6. Homework (on the computer)
7. Listening to music
8. Watching TV, videos or DVDs
9. Reading
10. Playing video games
11. Playing computer games
12. Instant Messaging
13. Emailing
14. Visiting websites
15. Other computer activities
16. Something else: (write in activity)

(that is, included in the analysis), the analysis does not need to be weighted. The data were weighted using grade, region, size of place of residence, gender and race/ethnicity. Each of these variables was entered into the model. However, because a complex sampling approach was used to obtain these data, a second analysis was run. The second analysis, run in Stata (Stata Corporation, 1999), accounted for the weights and the strata within the data, and closely resembled the results of the unweighted analysis.

The regression analysis includes a dependent variable and a total of 18 independent variables.

TABLE A3. MEAN WEEKLY TIME WITH ANY SECONDARY MEDIA (ACCORDING TO DIARIES) AMONG LOW/MID/HIGH MEDIA MULTITASKERS FROM SURVEY

Survey Multitasking Score (4 item)	Mean	N
Low - <8	2.83	46
Mid 8-14	7.94	247
High - >14	11.70	64

ANOVA $p<.005$

Dependent Variable

The dependent variable, media multitasking frequency, is an index of four questions, presented below. Response options were: Most of the time, Some of the time, A little of the time, and Never (response options repeat for all questions).

- When you read books or magazines, how often do you do any of the following activities at the same time: use a computer, watch TV or listen to music?
- When you watch TV, how often do you do any of the following activities at the same time: use a computer, read or listen to music?
- When you listen to music, how often do you do any of the following activities at the same time: use a computer, watch TV or read?
- When you use a computer how often do you do any of the following activities at the same time: read, watch TV or listen to music?

After the frequencies were examined, the variables were each reverse coded so that a higher number would represent increased likelihood to media multitask, and missing data were replaced with the series mean.¹⁵ A factor analysis revealed that these four questions loaded on one factor, explaining 42% of the variance (see Table A4), and with a Cronbach's Alpha of .74. The four items were summed to create an index ranging from 4 to 16.

Independent Variables

Independent variables were entered into the regression model in SPSS in blocks based upon the nature of the variables.¹⁶ Demographic variables comprise the first block, including grade (continuous), gender (dichotomous), race/ethnicity (three dichotomous variables: Black or not, Hispanic or not, and Other or not, with White as the reference), highest parent education (two dichotomous variables: some college or not, and missing on education variable or not, with high school or less as the reference),

median income of the ZIP code in which the child attends school (continuous), region (3 dichotomous variables: East or not, South or not, and Midwest or not, with West as the reference), and size of place (two dichotomous variables: suburban or not, and rural or not, with urban as the reference). Grade was used in lieu of age because the data were weighted on grade. The correlation between grade and age is .94 ($p < .000$) among 7th–12th graders. These demographic variables were chosen both because of their importance in acting as controls as well as their importance in relation to media multitasking.

The second block entered into the regression consists of media-related variables, including total recreational media exposure (continuous)¹⁷, TV orientation (compiled variable, described below), computer ownership and placement (two dichotomous variables: no computer, and has computer and can see TV from it, with has computer and cannot see TV from it as the reference). These variables were each selected for the theoretical predictive power expected of them. For example, it is natural to expect that as media exposure increases, media multitasking is likely to increase as well. At some point a young person must media multitask in order to reach such large amounts of exposure time. A young person who lives in a household that is highly television-oriented watches more TV, or at least has the television on as a constant companion, and perhaps uses other media while watching. This situation might be expected to produce increased media multitasking. Finally, anecdotal evidence as well as limited previous research suggest that the computer is at the center of media multitasking. Young people with a computer are more likely to media multitask than those without, and those who can see a TV from their computer have even more opportunity to multitask.

TABLE A4. FACTOR ANALYSIS VARIANCE EXPLAINED FOR DEPENDENT VARIABLE: MEDIA MULTITASKING

Factor	Initial Eigenvalues			Extraction Sums of Squared Loadings		
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	2.25	56.31	56.31	1.69	42.28	42.28
2	0.68	17.09	73.40			
3	0.61	15.17	88.57			
4	0.46	11.43	100.00			

Finally, the third block consisted of one variable related to personal characteristics, a scale measuring sensation-seeking tendencies (scale, discussed below). One might suspect that young people with sensation-seeking traits are more likely to media multitask in order to maintain a high level of stimulation and excitement.

Independent Variable Scales and Compiled Variables

TV orientation: This variable indicates whether a child is from a home that is highly TV-oriented by selecting respondents only if they responded in the most extreme category on the three questions below. These respondents live in homes where there are no rules about watching TV, the TV is usually on during meals and is on most of the time regardless of whether anyone is watching. Twenty-eight percent of 7th–12th graders live in highly TV-oriented households.

- How often is a TV usually on in your home (even if no one is watching)?

Most of the time	1
Some of the time	2
A little bit of the time	3
Never	4
- In your home, is the TV usually on during meals, or not?

Yes, the TV is usually on during meals	1
No, the TV is <u>not</u> usually on during meals	2
- Does your family have any rules about watching television at your home?

Yes, my family has rules about watching television	1
No, my family does not have rules about watching television	2

Sensation-seeking scale: This scale contains items related to a concept called sensation seeking, originally set forth by Zuckerman (1964). Sensation-seeking is a construct measuring tendencies toward thrill and adventure seeking, experience seeking, disinhibition and susceptibility to boredom. The operationalization and measurement of sensation-seeking has evolved and been adapted over the decades since its inception (Arnett, 1994; Zuckerman, 2000, 2002; Zuckerman, 1994). While the comprehensive sensation-seeking scale is comprised of dozens of items and several subscales (Zuckerman, 1964), researchers often use two or three items as a proxy for the general concept (Slater & Rasinski, 2005). Time limitations precluded more than a few questions relevant to sensation seeking. The items originally considered for the scale include:

- How well does each of the following statements describe you? Is each statement a lot like you, somewhat like you, not much like you, or not at all like you?
Response options include: A lot like me, Somewhat like me, Not much like me, Not at all like me.
 - I like friends who are exciting, even if they are wild
 - I sometimes choose friends my parents disapprove of
 - I am often bored
 - I like new and exciting experiences, even if I have to break the rules
 - I get into trouble a lot

After the frequencies were examined, certain variables were reverse coded so that a higher number would represent increased sensation seeking, and missing data were replaced.¹⁸ A factor analysis suggested a one-factor solution, explaining 40% of the variance. One of the variables (“I am often bored”) did not acquire a high enough loading and was left out of the scale. In retrospect, this makes sense because characteristically, sensation seekers keep themselves from being bored. Perhaps an item such as “I am easily bored” would have been a better fit. The four items have a Cronbach’s Alpha of .64. The four items were summed to create a scale ranging from 4 to 16.

Additional Details on Regression Analysis Results

The regression analyses were run in two statistical programs. The multiple linear regression in Stata (see Table A5), accounting for the dataset’s weights and strata, produced results strikingly comparable to the SPSS analysis. The model accounted for slightly less variance .228 (vs. .241 in SPSS) but had a higher F statistic $F=26.39$, $p<.001$ (vs. $F=20.92$ in SPSS). The coefficients and their significance levels closely resemble one another in both of the analyses, with one exception: not having a computer. In the Stata analysis, no computer (compared with having a computer from which you cannot see a TV) did not achieve statistical significance. This insignificant finding could be due to a number of factors, including variable coding and respondent distribution.

The categories of computer ownership in this regression model are:

- No computer (17.2%, N=207)
- Have computer but cannot see television from it (reference category, 25.2%, N= 303)
- Have computer and can see television from it (57.6% N=694)

The middle category is the reference category and the other two are entered as dummy variables. The variables are coded as above in order to include all of this information and maintain mutually exclusive categories.

When the regression analysis is run with the simple variable “have a computer at home” (with weights and strata applied) excluding any reference to location of the computer in relation to the TV, there is a strong, significant, positive effect for owning a computer. This leads the researcher to believe that the non-significant result for “no computer” is in part due to the comparison group, “have computer but cannot see TV.” The “no computer” category contains the fewest respondents. It is possible that when the weights and strata are applied, this group is stretched too far to achieve significance. The model, however, is stronger and more explanatory when the variable includes information regarding the location of the computer in relation to the television.

TABLE A5. STATA REGRESSION MODEL

Survey linear regression

Number of obs = 1204
 F(18, 36) = 26.39
 Prob > F = 0.0000
 R-squared = 0.2289

Multitasking Index	Coef.	Std. Err.	t	P> t 	95% Conf. Interval	
Grade	.0208867	.0594435	0.351	0.727	-.0983418	.1401152
Black	.3460579	.367865	0.941	0.351	-.3917859	1.083902
Hispanic	-.0951907	.2988445	-0.319	0.751	-.6945968	.5042154
Other Race	.1719555	.4512044	0.381	0.705	-.7330459	1.076957
Girl	.6392824	.1839739	3.475	0.001	.2702774	1.008287
College	.1741948	.2132447	0.817	0.418	-.2535199	.6019095
NA Education	.2530674	.3930345	0.644	0.522	-.53526	1.041395
Median Income	4.62e-06	6.99e-06	0.662	0.511	-9.39e-06	.0000186
East	.165618	.3183549	0.520	0.605	-.4729211	.8041572
South	-.0942849	.415972	-0.227	0.822	-.928619	.7400492
Midwest	-.0437511	.2974098	-0.147	0.884	-.6402795	.5527774
Suburban	.0177023	.326845	0.054	0.957	-.6378656	.6732703
Rural	-.2088575	.2714474	-0.769	0.445	-.753312	.3355971
Media Exposure	.123185	.0126148	9.765	0.000	.097883	.148487
Highly TV Oriented	1.038776	.2288741	4.539	0.000	.5797125	1.497839
No Computer	-.5307919	.441346	-1.203	0.234	-1.41602	.354436
Can See TV From Computer	1.259136	.2484146	5.069	0.000	.7608795	1.757393
Sensation Seeking	.1633839	.0461313	3.542	0.001	.0708562	.2559116
Constant	6.323184	.9513955	6.646	0.000	4.414927	8.231442

ENDNOTES

¹ One wonders, however, whether this study, based on an online sample and focus groups, may be skewed toward technology-oriented teens who may be more likely than most to media multitask.

² Another company focuses on researching adults' media multitasking behaviors. The Media Center at the American Press Institute releases information to the press about a series of proprietary studies conducted by BIGresearch called the Simultaneous Media Usage Study (i.e. SIMM).

³ Respondents with no recorded primary media time were excluded from the analysis (1.3%, N=9). In addition, a handful of respondents had media multitasking proportions greater than 1 (.8%, N=6). These respondents were excluded because secondary media use should not have been recorded without a primary medium recorded. These errors likely occurred during data entry.

⁴ This estimate, .21, differs slightly from an analysis reported in Roberts et al., 2005 due to inclusion of slightly different items and to the calculation of the proportion at the individual, rather than the aggregate level.

⁵ As described in the Appendix, the diary asks young people to indicate, for each half-hour segment of the day, whether they used media for at least 15 minutes, which media, and whether they were doing something else while they were engaged with a primary medium. A straightforward calculation of the amount of time in a week devoted to each medium as a primary and as a secondary medium is illustrative of how media are used together.

⁶ "Television" refers to time spent with television, DVDs and videos throughout this paper. Though they were asked about separately for primary media use, they were combined for secondary media use. In order to achieve consistency and comparability, they have been combined for all analyses.

⁷ For example, any time television was a primary medium and reading the secondary medium, or vice versa, a half-hour of television/reading media multitasking was counted. These pairs were then summed for a calculation of total time spent with each pair (regardless of which medium was primary and which was secondary) for an entire week. Then, at the aggregate level, a proportion was created: for each medium, what proportion of that medium's total time (both primary and secondary) was spent paired with each of the other media asked about. Creating a proportion of time provides a perspective that builds in some equality. That is, because there is such imbalance in the amount of time devoted to various media, a proportion breaks it out in a way that makes the various media more comparable. This approach gives a more detailed accounting, for each half-hour over an entire week, of which media are used in conjunction with one another. Individual computer activities are considered each in their own right, and as equals to other media such as television and music.

⁸ Table 3 shows, for each medium, the proportion of time spent multitasking it with each other medium. Using a sum of the proportion of total time spent multitasking each medium (see Tables 4a-i), a number was calculated that estimates the proportion of each medium's total time that is spent multitasking with another medium. Because diary respondents could mark multiple secondary activities, this proportion is inflated by those instances when multiple secondary media activities were indicated. That is, if television was the primary activity, and reading and websites were both marked as secondary activities, each was counted as a half-hour of paired time, and that is reflected in the proportion.

⁹ In order to create a proportion of time devoted to an activity, the total weekly amount of time devoted to a primary media activity was divided by the weekly amount of time spent with each secondary activity at the aggregate level. The proportion of time devoted to secondary activities was summed, excluding "Nothing" (because respondents were not engaging in a secondary activity) and "Any computer" (to avoid double counting computer activities), creating a "Proportion of time spent with other activities." (See Tables 5a-k) Because respondents could indicate multiple secondary activities, in a couple of instances, a sum of the individual proportions of time devoted to secondary activities may exceed 100%, and act as an indication of likelihood of doing multiple secondary activities. The higher the proportion of time spent with secondary activities, the more likely that the primary activity is to be multitasked with more than one of the activities listed in Table A2.

¹⁰ "Television" encompasses pre-recorded television, DVDs and videos along with regular television viewing.

¹¹ Two media, videogames and reading, seem less involved in media multitasking, and play chameleon-like roles. In both cases, over a third of their time is spent shared with other media, but because not as much time is devoted to either medium, neither are common pairs for other media. The case of videogames requires some clarification. On the surface, the data appear to tell contradicting stories. On one hand, videogames share more of their time with other media (41%) than any other medium (television, music, the computer, and print media). On the other hand, young people are most likely to focus their attention (do nothing else) exclusively on the medium at hand when their primary activity is playing videogames. When their primary activity is playing videogames, they report doing "nothing else" 55% of the time (the same proportion as for television). There are a couple of explanations that help untangle these findings. First, videogames proportionally share much of their time with other media because, in contrast to media such as television or music, they do not devote nearly as much time to videogames. Hence, any time shared with other media seems large because the denominator is relatively small. Television is a common partner for all media while videogames are not. This difference between television and videogames is only possible because of the large discrepancy in time devoted to television versus videogames. Second, videogames are the one non-computer activity for which media time outweighs non-media time in secondary activities. This skew toward media activities dominating

secondary activities during videogaming is likely because media, particularly media such as television and music, which are the most likely pairs, can be shared with videogames through monitoring. Other non-media tasks, as well as interactive media tasks, are not as easily paired with videogames. The focus given to videogames is likely a result of the physical and cognitive interaction required to continue the activity, whereas television content will continue with only partial attention paid to it (i.e. Comstock's "monitoring" behavior; see Comstock & Scharrer, 1999).

Reading also deserves some discussion. While reading and music share nearly equal proportions of time with other media, reading, unlike the other two media activities, is not as common a pairing with other media. Television and music are consistently the most common pairings with other media: that is, they share the greatest proportions of other media's time. This phenomenon is possible because young people devote much less time to reading than they do to television and music.

¹² Diaries were received from 798 participants. However, a number of diaries with excessive missing data, several with numerous responses that were extreme outliers, and a few from young people who were 19–20 years old were excluded.

¹³ Parent education and income, our two primary indicators of socioeconomic status, represent the two most problematic measures of all the demographic characteristics we have employed because both measures contain substantial error. Information on parent education is obtained by proxy; that is, the child serves as proxy for the parent. Obviously there is good reason to be wary of child-based reports of parent education. Many children, particularly younger children, simply may not know the level of education achieved by parents; others may be misinformed for any of several reasons. Thus, we must assume that there is a good deal of error in this variable.

Income poses a different problem. Children are even less likely to know level of household income than level of parent education. Because it is almost impossible to obtain accurate estimates of household income from school-aged youth, we have used federal estimates of median community income for the ZIP code area of each participating school. Thus, respondents are classified as low income (under \$35,000 median income), middle income (\$35,000–\$50,000), or high income (over \$50,000) depending on the median income of the ZIP code area in which the child's school is located. The problem, of course, is that some students from higher income households attend schools located in low-income ZIP code areas, and that some students from lower income households attend schools located in relatively higher income ZIP code areas. Thus, by characterizing individuals on the basis of aggregate data, we introduce error of a different sort into our second measure of socioeconomic status.

¹⁴ See Appendix for details on sampling and weighting.

¹⁵ The factor analysis was run with and without missing responses replaced and the results were, for all intents and purposes, the same. The number of missing responses for each of the items is: q26, 1 missing case; q41, 7 missing cases; q53, 6 missing cases; q64, 34 missing cases.

¹⁶ The variables were entered simultaneously in Stata, in effect, the same approach as the final model in SPSS. Entering the variables in blocks in SPSS shows the increase in variance explained with the addition of each set of variables.

¹⁷ Total media exposure includes time reported in survey with: television videos/DVDs/pre-recorded television; movies; books; magazines; newspaper; radio; CDs/tapes/MP3s; videogames and computer activities.

¹⁸ The factor analysis was run with and without missings replaced and the results were, for all intents and purposes, the same. No individual item had more than 15 missing cases, and all but one had 10 or fewer.

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