

Electronic Media Use, Reading, and Academic Distractibility in College Youth

LAURA E. LEVINE, Ph.D., BRADLEY M. WAITE, Ph.D., and LAURA L. BOWMAN, Ph.D.

ABSTRACT

Activities that require focused attention, such as reading, are declining among American youth, while activities that depend on multitasking, such as instant messaging (IMing), are increasing. We hypothesized that more time spent IMing would relate to greater difficulty in concentrating on less externally stimulating tasks (e.g., academic reading). As hypothesized, the amount of time that young people spent IMing was significantly related to higher ratings of distractibility for academic tasks, while amount of time spent reading books was negatively related to distractibility. The distracting nature and the context of IMing in this population are described.

INTRODUCTION

ACTIVITIES THAT REQUIRE intense, focused attention, such as reading novels, are decreasing among young people, while those that require the division of attention, such as instant messaging (IMing), are on the rise.^{1,2} A recent Kaiser Family Foundation (KFF) study of 2,032 young people aged 8–18 found that “As new media technologies . . . become available, [young people] don’t . . . (or can’t) increase the number of hours they spend with media—so they are increasingly becoming media multitaskers, IMing while doing homework and watching TV.”³ IMing has become a major part of young people’s lives since emerging as a major mode of interaction in the late 1990s. KFF’s 1999 survey of youth media use did not even ask about IMing, but by 2003–2004, IMing had become the second most popular computer activity after computer games, averaging 27 minutes per day among 15- to 18-year-olds.³

The nature of IMing

IMing is a communication tool that allows an individual to communicate in separate typed conversations with many people at the same time while online using the computer. Each user develops a “buddy list” of people from whom that person will accept instant messages (IMs). When users activate their IM software, these messages appear on their computer screen whenever someone is contacting them. Instant messengers may be notified with a pop-up at the bottom of their screen when people on their buddy list are active or idle in IM. IMing creates multiple interruptions and multitasking demands that might put stress on cognitive processing.

The interruptive nature of IMing has been of concern in the context of the work world. For example, researchers studying performance issues on the Navy’s Tomahawk missile control found an unintended effect. Sailors’ attention to the IMing used

by the researchers to assess their performance actually interfered significantly with the sailors' ability to carry out missile control.⁴ "Advances in computer technologies . . . allow people to perform multiple activities at the same time. However, people's cognitive capabilities have not increased."⁵ As a result, interruptions have been found to cause serious problems for effective functioning in work situations such as piloting a plane.⁵

What impact might all of this multitasking and constant interruption have on young people's academic activity? Teens are reporting difficulty with concentrating on their schoolwork, with 15-year-olds experiencing more difficulty concentrating than 10-year-olds.⁶ Larson attributed this developmental difference to a decrease in intrinsic motivation in school-based tasks. However, it could also be that teens are multitasking while doing their schoolwork or that over time, the multitasking that young people are doing is taking a toll on their ability to focus attention on one activity in depth. "Habitual multitasking may condition their brain to an overexcited state, making it difficult to focus even when they want to."⁷

Little research has been done on the relationship between the use of interactive media and the ability to focus attention. In this study, we examine the relationship between one of these new interactive technologies, IMing, and college students' perceptions of their own ability to focus on academic tasks. Our goals in the present study are to examine (a) the amount of IMing being done by young college students in relation to other media use; (b) the nature of IMing in this population: how they are using this technology; and (c) the relationship between IMing and distractibility for academic tasks. We hypothesized that greater amounts of time spent IMing would be related to greater difficulty in concentrating on less externally stimulating tasks, particularly on academic reading.

METHOD

Participants

One hundred fifteen female and 46 male college students, aged 17 to 20 years (mean age = 18.37 years, SD = 0.64), completed the measures for this study. Students were primarily white/non-Hispanic (83%) from working- and middle-class families. Fifty-eight percent lived on campus. Students were enrolled in general psychology classes and received course credit for their participation; student academic majors were well distributed and came from all the schools in the University.

Measures and procedure

Students completed a 55-item questionnaire designed to measure various aspects of their electronic media use, reading (nonelectronic), and distractibility for academic tasks. Demographic data were also reported.

Amount of IMing

In order to place IMing in the overall context of participants' media use, students reported their amount of Internet use, IMing, television viewing, video/computer game playing, music listening, as well as their frequency of reading books for pleasure, reading newspapers, and reading magazines. Responses for electronic media were made on a seven-point scale corresponding to the following intervals: 0, 1–7, 8–14, 15–21, 22–28, 29–35, 36 or more. Each nonzero choice (except 36 or more) encompasses exactly 7 hours; the arithmetic midpoints of each are spaced equal intervals apart. We thus treated these data as interval scaled for analytic purposes. Responses for reading books, newspapers, and magazines were made on an eight-point scale corresponding to the following intervals: 0, < 1, 1–2, 3–5, 6–9, 10–13, 14–17, 18 or more.

Nature of IMing

Participants reported on the nature of their use of IM in two ways: descriptions of general use and descriptions of their most recent IM session. For general use, students reported how often their IM software was on when their computer was on: never (1) to very often (5). Students also reported two measures designed to estimate the level of potential disruption experienced while IMing: (a) the number of people (if any) they typically IMed at the same time (open-ended response) and (b) whether they typically responded right away when they were working on their computer and received an IM: never (1) to always (5).

To examine the context of a "typical" IM session, participants described their most recent IM session. Students reported how long ago their most recent IM session was using a six-point ordinal scale (today, this week, last week, 2–3 weeks ago, 1–3 months ago, > 3 months ago). They also reported the number of people with whom they IMed during that session, the length of time they IMed, and what else they were doing while IMing. Students rated their feelings of distractibility during the IM session on 3 seven-point bipolar scales (focused-distracted, attentive-preoccupied, and engaged-uninvolved).

Distractibility for academic tasks

Students completed five-point Likert scales—strongly agree (1) to strongly disagree (5)—for seven items designed to measure distractibility for academic tasks (e.g., “I get distracted easily when reading class assignments,” “I feel impatient when I read my textbooks”). We designed these items specifically to measure *academic* distractibility, that is, distractibility relating to specific typical class related activities.

RESULTS

Principal components analysis (PCA) for distractibility for academic tasks

We conducted a PCA on the seven items designed to measure distractibility for academic tasks. Two components were extracted. The first had an eigenvalue of 2.37 and explained 34% of the variance. Four items loaded above 0.6 on this factor. The items (and factor loadings) were “I find it easy to focus on assigned readings” (−0.691), “I feel impatient when I read my textbooks” (0.768), “I get distracted easily when reading class assignments” (0.779), and “I rarely do the assigned readings for my classes” (0.623). We labeled the factor as “distractibility for academic tasks” and retained it for use in further analyses. A separate analysis indicated acceptable internal consistency of these four academic distractibility items ($\alpha = 0.74$). To assess the validity of our scale, we correlated a separate group of students’ ($N = 97$) scores on our Distractibility for Academic Tasks scale with standard measures of distractibility and impulsiveness, namely the Barratt Impulsiveness Scale^{8,9} and the Internal Restlessness Scale.¹⁰ Pearson correlations between our academic distractibility measure and these two standard measures were 0.521 ($p < 0.001$) and 0.479 ($p < 0.001$) respectively, indicating that our measure of academic distractibility had acceptable construct validity. A second factor had an eigenvalue of 1.35 and explained 19% of the variance. Two items loaded above 0.6 on this factor. These two items reflected self-appraisals of writing ability and as such were outside of the focus of this paper. Thus, we dropped this factor from further analyses.

Testing gender differences

A preliminary multivariate analysis of variance (MANOVA) comparing all media use variables and distractibility for academic tasks by gender was significant, Pillai’s $F(11, 131) = 3.567$, $p < 0.001$, $\eta^2 =$

.230. However, follow-up univariate one-way analyses of variance (ANOVAs) demonstrated that there was only one variable with a significant gender difference. Male students played significantly more video/computer games ($M = 2.15$, $SD = 1.00$) than did female students ($M = 1.46$, $SD = 0.59$), $F(1, 143) = 26.185$, $p < 0.001$. All other univariate ANOVAs were nonsignificant ($p > 0.05$). Therefore, we decided to collapse our data between genders for all further analyses.

Amount of IMing

In order to envision the overall context of media use by our sample of young persons, we present descriptive media use data in Table 1. Students reported that their most commonly used media were the Internet, IMing, and listening to music. When asked about their reasons for using the Internet, use for IMing was the second highest endorsed reason (77% reporting IMing as “very often” or “often” a reason for their Internet use). This percentage was surpassed only by use for research (79%). The percentage of students reporting that they “very often” or “often” use the Internet for IMing exceeded the percent who use it for e-mail (74%).

Nature of IMing

We wanted to describe how students are using IM. The frequencies reported in this section are the percentage of students who endorsed “very often” or “often” for the indicated items; we use the term “frequently” in this section to represent this percentage. The great majority of students (90.1%) reported that they frequently IM. Nearly three quarters (73.4%) reported that they frequently had their IM turned on when their computer was on. A typical IM session was reported to last 75.2 minutes ($SD = 34.62$) with a total of 2.93 different people ($SD = 1.38$). Sixty-three percent reported that they frequently respond to IMs right away when they are working on the computer. When asked about their most recent IM session, 90% reported that it was “today” or “this week.” Thirty percent reported that during this most recent IM session, they were doing academic work at that same time. Of those doing academic work, 87% reported doing the academic work online or on the computer. Seventy-three percent reported that they were doing other activities in addition to IMing. Students reported IMing during the most recent IM session with a mean of 3.91 different people ($SD = 4.58$), most frequently with friends (96%).

We combined the three bipolar adjective pairs designed to measure students’ rating of their own fo-

TABLE 1. MEANS, STANDARD DEVIATIONS, AND ZERO-ORDER CORRELATIONS FOR MEDIA USE VARIABLES

Variable	M	SD	1	2	3	4	5	6	7	8	9	10	11
1. Read books	1.98	1.09	—	0.152*	0.116	-0.060	-0.035	-0.075	0.062	-0.027	0.115	-0.054	-0.364***
2. Read newspapers	2.06	0.87	—	—	0.343***	0.038	0.161*	-0.059	0.016	0.165*	-0.088	0.065	-0.120
3. Read magazines	2.42	1.00	—	—	—	0.171*	0.154*	0.067	0.103	0.222**	-0.067	0.104	-0.148*
4. Watch television	2.67	0.93	—	—	—	—	0.357***	0.124	-0.036	0.164*	-0.026	-0.086	0.048
5. Internet use	3.58	1.46	—	—	—	—	—	0.188**	0.245***	0.763***	0.176*	0.147*	0.114
6. Video/computer games	1.64	0.83	—	—	—	—	—	—	0.155*	0.215**	0.135*	-0.133*	0.073
7. Listen to music	4.02	1.68	—	—	—	—	—	—	—	0.298***	0.095	0.128	0.132*
8. Instant message	3.35	1.68	—	—	—	—	—	—	—	—	0.295***	0.227**	0.190**
9. Respond quickly to IM?	3.70	0.82	—	—	—	—	—	—	—	—	—	0.070	0.115
10. N people IM with?	2.93	1.39	—	—	—	—	—	—	—	—	—	—	-0.05
11. Academic distractibility	0.0	1.00	—	—	—	—	—	—	—	—	—	—	—

* $p < 0.05$; ** $p < 0.01$; *** $p < 0.001$.

Note: Scales are not the same for all variables. See method section for scale details.

cus and distractibility during the most recent IM session and labeled this new variable "distractibility during most recent IM session" Scores on the combined distractibility variable could range from 3 to 21. Observed distractibility scores ranged from 3 to 16 ($M = 9.13$, $SD = 2.82$). Chronbach's alpha for this variable was 0.69. Using Pearson correlations, we found that students who report being quick to respond when someone IMs them were significantly more likely to report feeling distractible during their most recent IM session ($r = 0.187$, $p = 0.009$). Distractibility during the most recent IM session was not significantly correlated ($p > 0.05$) with the frequency of having the IM on when the computer is on ($r = 0.057$), the number of people IMed during the most recent session ($r = -0.051$), the length of the most recent IM session ($r = -0.020$), or the number of other activities that the student reported doing during the IM session ($r = -0.119$)

Zero-order correlations of media variables and distractibility for academic tasks

At the zero-order, distractibility for academic tasks (factor 1) was significantly ($p < 0.05$) negatively correlated with reported frequency of reading books for pleasure and reading magazines and was significantly positively correlated with frequency of IMing and listening to music. Descriptive statistics and Pearson correlations among media use variables and distractibility for academic tasks are presented in Table 1. Given the nature of the measurement scale for the reading variables, we also calculated Spearman's ρ for the zero-order correlations. The results followed the same pattern, so we decided to report the Pearson correlations and conduct a parametric regression analysis.

Multiple regression analysis predicting distractibility for academic tasks

A multiple regression analysis using electronic and nonelectronic media use variables (e.g., frequency of reading books, newspapers, and magazines; frequency of IMing, Internet use, watching television, playing video/computer games, and listening to music; the number of people the student typically IMs at the same time; and how quickly the student responds to IMs) to predict distractibility for academic tasks was conducted. All variables except for two had no more than three cases of missing data. The two with more missing data measured the number of different people with whom the student typically IMed and the frequency that they responded "right away" when IMed. These variables had usable data for 145 and 150 out of 161 possible cases respectively. We used a mean substitution technique to handle missing data, although additional analyses yielded essentially identical regression results using pairwise or listwise deletions. The regression was significant, $F(10, 150) = 4.257$, $p = 0.000$, $R^2 = 0.221$. Distractibility was significantly negatively predicted by the frequency of reading books for pleasure ($\beta = -0.347$, $p = 0.000$) and significantly positively predicted by the amount of IMing ($\beta = 0.290$, $p = 0.019$). See Table 2 for regression details.

DISCUSSION

When examining the correlates of students' self-described distractibility for academic reading, our hypothesis was confirmed. The amount of time they spent IMing was significantly related to more dis-

TABLE 2. REGRESSION ANALYSIS SUMMARY FOR MEDIA USE VARIABLES PREDICTING DISTRACTIBILITY FOR ACADEMIC TASKS

<i>Variable</i>	<i>B</i>	<i>SEB</i>	β
Read books	-0.319	0.068	-0.347**
Read newspapers	-0.046	0.090	-0.041
Read magazines	-0.145	0.080	-0.145 ^a
Watch television	0.054	0.088	0.050
Internet use	-0.085	0.083	-0.124
Video/computer games	-0.038	0.093	-0.031
Listen to music	0.078	0.046	0.131
Instant message	0.173	0.073	0.290*
Respond quickly to IM?	0.042	0.098	0.033
N people IM with?	-0.086	0.058	-0.114

Note: $R^2 = 0.221$ ($N = 161$, $p < 0.001$).

^a $p < 0.07$; * $p < 0.019$; ** $p < 0.001$.

tractibility for academic reading, while amount of time spent reading books was negatively related to distractibility. In addition, distractibility during IM sessions was positively related to their likelihood of responding right away when IMed.

There are three ways in which IMing might interfere with academic reading: (a) displacement of time available for study, (b) direct interference while studying, and (c) development of a cognitive style of short and shifting attention. The first possibility is that Internet use, and IMing in particular, displaces the amount of time spent on activities such as reading.^{3,11-14} We found that time spent on IMing was the third most frequent use of media. Even this finding is somewhat deceptive because the second highest reason for using the Internet, after research, was IMing. Ninety percent of our sample reported using IMing frequently and for an average of 75 minutes, so these students were spending considerable time in this activity.

There was also evidence that some students were IMing while carrying out academic tasks, which would likely provide a direct interference with focus on those tasks.¹⁵⁻¹⁷ The distracting, multitasking nature of IMing was apparent. Most (63%) responded right away whenever they received an instant message and were IMing three or four people at the same time. The majority were involved in other activities while IMing, with 30% doing academic work at the same time.

The findings are also consistent with the third possibility, that IMing helps to create a cognitive style based on quick, superficial multitasking rather than in-depth focus on one task such as reading. The idea that cognitive style may be shaped by experiences with fast-moving media has found support in research on children who watch a great deal of television and/or watch it from early in life. Levine and Waite found that the more television children watched, the more likely their teachers were to rate them as impulsive and inattentive in the classroom.¹⁸ Christakis et al. found that greater amounts of television viewed by children when they were one and three years of age were associated with attentional problems at age seven.¹⁹ We know that adolescent brains are continuing to develop, particularly in the area of the prefrontal cortex, which has been linked to attention control.²⁰ We can speculate that this brain development may be affected by frequent activities such as IMing to change their styles of attentional focus and cognitive processing.

This study was designed as an exploratory, descriptive look at the distracting nature of IMing and other media use. A more extensive, standardized measure of academic distractibility would add to the evidence presented here. The correlational na-

ture of this study prevents us from determining causality. Future experimental studies should be designed to test the relative validity of each of the three possible explanations of the link between distractibility and IMing.

Will we think in a different way because of our use of multitasking, interruptive media? Will students find increasing difficulty with traditional modes of learning through reading books and articles? Will depth and intensity of thought be exchanged for speed? Thomas Friedman of the *New York Times* describes the current tendency toward the use of "continuous partial attention" as "when you are on the Internet or cell phone or Blackberry while also watching TV, typing on your computer and answering a question from your kid. That is, you are multitasking your way through the day, continuously devoting only partial attention to each act or person you encounter. . . . Who can think or write or innovate under such conditions?" He speculates that eventually "we [will] all get diagnosed with some version of attention deficit disorder."²¹

It is possible that new approaches to learning will emerge. For example, action video games have been found to improve aspects of visual attention.²² Perhaps positive results may also be found for IMing and multitasking. It is clear that this new technology is growing and that we must understand the impact it will have on our youth.

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Address reprint requests to:

Dr. Laura E. Levine
 Psychology Department
 Central Connecticut State University
 1615 Stanley St.
 New Britain, CT 06050

E-mail: LevineL@ccsu.edu

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