

A Relationship between Text Message Volume and SAT Writing Test Scores

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Abstract

The purpose of this study was to reveal whether there is a relationship between students' volume of text messaging and formal writing performance on the Scholastic Aptitude Test writing section. The study also examined gender as a contributing variable in this measure. The design included a questionnaire that collected data to show whether any relationships exist that indicate a correlation between paired scores. The sample was taken from college freshmen who completed the SAT writing test before the fall 2011 semester. The results of the study showed a significant negative relationship between female students' average monthly text message volume and SAT writing scores.

Keywords: text messaging, SMS, writing scores, high school students, college freshmen, higher education, relationship, correlation, SAT test

Background

Text messaging has become one of the preferred methods of telecommunication for teens and young adults today. To promote the use of such technology, most cellular service providers such as AT&T Mobility, Verizon Wireless, T-Mobile, and Sprint offer unlimited texting plans as options to their services. In addition, there are the newer "smartphones" like the Blackberry, iPhone, and Droid, which make the process of sending a text message all the more easier for consumers. Current research on the subject reveals that text messaging is on the rise as a dominant form of communication among people today. The Nielson Company (2009) reported that "the average U.S. mobile teen now sends or receives an average of 2,899 text-messages per month compared to 191 calls" and that "the average number of texts has gone up 566% in just two years, far surpassing the average number of calls, which has stayed nearly steady" (p. 8). It was further reported that "more than half of all U.S. teen mobile subscribers (66%) say they actually prefer text-messaging to calling" and "thirty-four percent say it's the reason they got their phone" (The Nielson Company, 2009, p. 8).

Such claims were supported by the Pew Research Center, where a study by Lenhart, Ling, Campbell, and Purcell (2010) showed that "between February 2008 and September 2009, daily use of text messaging by teens shot up from 38% in 2008 to 54% of all teens saying they text every day in 2009" (p. 30). Beyond the increase in frequency, teens are also reported to be sending large quantities of text messages each day. According to Lenhart, Ling, Campbell, and Purcell (2010):

About 14% of teens send between 100-200 texts a day, or between 3000 and 6000 text messages a month. Another 14% of teens send more than 200 text messages a day – or more than 6000 texts a month. In light of these findings, it is not surprising that three-quarters of teens (75%) have an unlimited text messaging plan. (p. 32)

Lenhart and her colleagues identified three main reasons why teens are choosing texting over talking (p. 47). First, sending text messages is a form of asynchronous communication and is more discrete than traditional voice phone calls.

Second, text messaging can serve as a “buffer” when communicating with friends around parents—in addition to being a more comfortable form of communication when discussing intimate or personal subjects with possible romantic interests. Lastly, Lenhart, Ling, Campbell, and Purcell (2010) described texting as “a simple way to keep up with friends when there is nothing special that needs to be communicated” (p. 47).

Just as talk time has become shorter, text messages themselves are a short method of communication. According to Buczynski (2008), “text messaging, or more specifically, SMS (Short Message Service) texting enables text messages up to 160 characters long to be sent and received by mobile phones” (p. 263). At an average word length of five, an average “text” would only allow a total of 32 words per message.

This limitation in characters may be one of the reasons teens tend to abbreviate and often ignore the rules of spelling and grammar when texting. Another reason for abbreviations is the use of secret codes. With the many abbreviations used by teens when texting, it is no wonder that teenagers are sending and receiving thousands of text messages each month. As Vosloo (2009) made clear, “texting does not always follow the standard rules of English grammar, nor usual word spellings. It is so pervasive that some regard it as an emergent language register in its own right” (p. 2). Like any new technology or rising trend, there will be people in the media and research fields seeking to both understand its potential, as well as determine whether any negative consequences could result from its use.

The majority of the current literature on text messaging has focused on sociological connections (Taylor & Harper, 2003; Faulkner & Culwin, 2005; Igarashi, Takai, & Yoshida, 2005) and emotional links (Reid & Reid, 2007; Igarashi, Motoyoshi, Takai, & Yoshida, 2008; Lin & Peper, 2009), literacy (McWilliam, Schepman, & Rodway, 2009; Plester, Wood, & Joshi, 2009; Rosen, Chang, Erwin, Carrier, & Cheever, 2010), and the ways schools can use the technology to enhance a student’s education (Harley, Winn, Pemberton, & Wilcox, 2007; Hill, Hill, & Sherman, 2007; Naismith, 2007; Buczynski, 2008). While studies have shown positive correlations between students who text and the intimacy levels of their communication (Igarashi, Takai, & Yoshida, 2005), questions still remain in regards to texting and its relationship to formal writing ability in the classroom.

One such inquiry into text messaging is to determine whether the time high school students spend texting instead of talking over the phone has a positive or negative impact on their formal writing skills. A review of literature on the subject has uncovered little research regarding the impact of texting on formal writing skills and the research that has been done is somewhat contradictory. Dr. Beverly Plester, the head researcher on the Children’s Text Messaging and Literacy projects at Coventry University, has conducted studies with her colleagues on children that show a positive correlation between text message volume and their competence with literacy and language (Plester, Wood, & Joshi, 2009, p. 158).

A study by Larry Rosen, Jennifer Chang, Lynne Erwin, L. Mark Carrier, and Nancy A. Cheever (2010) showed a positive relationship between texting and informal writing, but a negative correlation between texting volume and formal writing among young adults (p. 433). Another scholar on the subject is executive director emeritus of the National Writing Project and lecturer at the University of California’s Berkeley Graduate School of Education, Richard Sterling. Sterling concluded that a sufficient amount of writing, even through texting, is very beneficial and can develop student writing in a positive way (Vosloo, 2009, p. 5-6).

The problem is that texting is replacing talking among teens (Lindley, 2008, p. 19) yet their primary form of communication in the classroom is oral communication and formal writing. Plester, Wood, and Bell (2008) claimed that texting (which is more conversationally based) is appearing in standard written English and that “this concern, often cited in the media, is based on anecdotes and reported incidents of text language used in schoolwork” (p. 138). Rosen, Chang, Erwin, Carrier, and Cheever (2010) added that “educators and the media have decried the use of these shortcuts, suggesting that they are causing youth ... to lose the ability to write acceptable English prose” (p. 421). Lastly, Vosloo (2009) stated that “for a number of years teachers and parents have blamed texting for two ills: the corruption of language and the degradation in spelling of youth writing” (p. 2).

At this time, only a small number of studies have been focused on the impact that high levels of text messaging may have on teenagers, and even fewer studies have been focused on their ramifications on formal writing in an education setting. Simply put, further research is needed to reveal the impact that high levels of text messaging may have on teenagers and young adults when it comes to formal writing performance.

First-year college students were chosen for this study because they are over 18 years old (for consent purposes) and because “they communicate with friends via MPTM (mobile phone text messages) on a daily basis, and have many opportunities for forming new relationships upon arriving to campus” (Igarashi, Takai, & Yoshida, 2005, p. 692). The study sought to determine whether there was a relationship between the number of text messages that these students sent/received and their scores on the Scholastic Aptitude Test (SAT) writing test. The study also examined gender as a possible contributing factor in such correlations.

Research Questions

1. Is there a relationship between upper high school students’ average monthly volume of text messaging and their formal writing performance on the SAT writing placement test?
2. Is there a relationship between upper high school male students’ average monthly volume of text messaging and their formal writing performance on the SAT writing placement test?
3. Is there a relationship between upper high school female students’ average monthly volume of text messaging and their formal writing performance on the SAT writing placement test?

Hypotheses

1. There will be no significant relationship between the average number of text messages the entire sample sent and received per month and their formal writing performance on the SAT writing section.
2. There will be no significant relationship between the average number of text messages male students sent and received per month and their formal writing performance on the SAT writing section.
3. There will be no significant relationship between the average number of text messages female students sent and received per month and their formal writing performance on the SAT writing section.

Theoretical Framework

The theoretical framework for this study was based on the theories of Moffett and Gibson who “contend that these choices are determined by one’s sense of the relation of speaker, subject, and audience” (Flower & Hayes, 1981, p. 365). In other words, the style and substance of one’s writing is a matter of context that can and will vary from situation to situation. This theory supports the idea that students may write one way when sending text messages to friends and an entirely different way when writing formal papers for their college professors. The framework is reinforced by Lloyd Bitzer’s “Rhetorical Situation” theory which “argues that speech always occurs as a response to a rhetorical situation, which he succinctly defines as containing an exigency (which demands a response), an audience, and a set of constraints” (Flower & Hayes, 1981, p. 365).

Method

Participants

The population for this study included a sample of freshmen students at a regional college in Massachusetts during the 2011-12 academic year. The total population of freshmen students at the time of the study was approximately 465 students. A demographic profile of the college’s students showed that the majority of the student body was between the ages of 18 and 21 years-old and of predominantly white ethnicity. This lack of diversity at the college was one of the main reasons that age and ethnicity were not variables chosen to be examined in the study.

The student body at the time of the study was approximately 2/3 female and 1/3 male. In total, the college graduated 270 students last year, of which 68 were male and 202 were female. Finally, SAT test scores are not required for admission to this school, however the college does record the information since 91% of applicants submit their SAT results.

Measures

The main instrument used in this study was the SAT Writing section of the SAT Reasoning Test. Beyond this instrument, a short voluntary questionnaire was administered to collect each student’s gender and a set of text message data showing the volume of text messages sent and received during the two months prior to the time the student took the SAT. During the weeks following the initial distribution, the researcher collected all remaining questionnaires, along with the documentation of the students’ reported text message totals.

Students unable to complete the questionnaire on paper were provided with a link to complete it online. The students were asked to forward cell phone statements electronically or to bring a hard copy of their cell phone evidence to the researcher's office during the second week of the study.

To confirm validity of the reported text message totals, the first page of all reported months' cell phone bills were requested by the researcher for each of the months the students reported. Two alternative ways for students to validate their text message totals included: a) students forwarding text message responses from cellular service providers showing the total number of text messages sent and received in a given month to the researcher, and b) students forwarding email message responses from cellular service providers showing the total number of text messages sent and received in a given month to the researcher. Electronic validation was the most popular method, with over 83% of the sample providing text message totals in this way.

Validity of SAT writing scores and gender was confirmed with administrative college officials at the Registrar's office. Regarding the SAT, multiple organizations and college systems, such as the University of California system, have conducted studies on the validity of this test. Studies from the University of California and the College Board have shown similar results—where the writing section has been found to be “the most predictive section of the SAT, slightly more predictive than either math or critical reading” (College Board, 2010, p. 1).

Procedure

Before conducting any research, the author completed an application to the Liberty University Institutional Review Board (IRB), as well as a similar application to the Committee for the Protection of Human Subjects (CPHS) at the college of study. The study complied with all FERPA regulations. The questionnaire included an informed consent form, granting the author permission to obtain and/or verify the students' SAT writing scores from the college Registrar's office. This informed consent also assured students that their information would be kept confidential, secure, used only for the purpose of this study, and would be properly destroyed at the end of the study. Students were also given the option to discontinue the study at any time. The order of general procedures included:

1. Contacting all faculty members teaching freshmen writing courses in the spring semester to explain the study and to ask permission to visit their writing classes during the spring semester to distribute the questionnaire to freshmen students who have completed the SAT exam and the ENG: 101 Writing I course.
2. Visiting each section of ENG 102: Writing II or ENG102H: Honors Writing II in the spring semester to distribute and collect all questionnaires.
3. Emailing the survey link to any students who were absent from class or unable to complete the paper copy for any reason.
4. Sending a follow-up email to participants requesting proof of the text message numbers reported on their questionnaires.
5. Validating all text message totals and SAT scores.
6. Collecting and entering all validated information into spreadsheets.
7. Analyzing all data using SPSS.

Participants were contacted when the investigator visited their freshman writing classes to distribute the short voluntary questionnaire. Students who were absent and/or unable to complete the questionnaire on paper were emailed all documents and provided with a link to take the questionnaire online. Each of the students were asked for their gender, college class, their best SAT Writing Score, and their total number of text messages during the two months before they took the SAT. Students had to retrieve cell phone bills or contact their cell phone provider for this information.

Before distributing the questionnaire, the investigator reviewed an informed consent document. Students in the classroom were given up to 10 minutes to review and sign the document. All informed consent documents were collected before distributing the questionnaire. Students who received the documents electronically were asked electronically sign and email the investigator the consent form before completing the questionnaire. Because the questionnaire was delivered to most students during a class session, students were only given 15 minutes to complete the questionnaire. Students that did not complete it during this timeframe were allowed to submit it to the investigator by the following week.

There were two options for students to submit late questionnaires to the investigator: 1) by hand delivering it in person to the researcher's office; or 2) by entering the information electronically and submitting their final answers via Survey Monkey. Finally, students signed the questionnaire to grant the investigator permission to verify the two academic scores from the Registrar's office.

Valid proof of text message data (electronic or via printed cell phone bill) listing the number of text messages sent and received per month was collected within a week of all participants having completed the questionnaire. This data was tallied and averaged to develop a mean that represented each student's average monthly text message use. Since participants only included freshmen college students who have taken the SAT writing test, all questionnaires by students who did not take the SAT writing test were removed from the sample. Other questionnaires omitted from the test included surveys where text message data was not validated.

The data was first organized into a spreadsheet with the following columns: 1. Student Name (coded as a "Participant Number" for privacy), 2. Gender, 3. Total Text Messages for Month One, 4. Total Text Messages for Month Two, 5. Mean Text Messages average before SAT, and 9. SAT Writing Score.

This raw data was then broken down into smaller spreadsheets of isolated data sets to be analyzed. Spreadsheet A included data for analysis of the entire sample that compared the students' SAT writing scores and mean total monthly text messages from the two months immediately preceding that test. It included columns for: 1. Participant Number, 2. SAT Writing Score, and 3. Mean Total Text Messages.

Spreadsheet Two included data for analysis based on gender. It showed the entire male population and entire female population's text message means beside their SAT writing scores. This table included columns for: 1. Participant Number, 2. Gender, 3. SAT Writing Score, and 4. Mean Total Text Messages. This list was sorted by gender and divided into two groups—male and female.

The population's combined text message means was analyzed within their respective data sets and then any differences in these correlations were examined by gender between the male and female participants. The strengths of these procedures included:

- Gathering the primary data after the fact to eliminate the influence the study would have if the data were collected during the months the students took the test and were engaged in their texting.
- Isolating and analyzing the data in multiple ways to strengthen consistent relationships and suggestion(s) of the study.
- Recording two consecutive months of text message data from the months before the students took the SAT test, for an accurate texting habit snapshot of the students during this time period.

Since there were two independent variables (one categorical and one continuous) and one continuous dependent variable, the ideal test for this study was a test that focused on multiple regression where data could be used for prediction between variables and the amount of variance they accounted for. Testing for multiple regression showed "how much variance in the DV is accounted for by linear combination of the IVs" [and] "how strongly related to the DV is the beta coefficient for each IV" (Marenco, 2011, p. 5).

A multiple linear regression analysis to assess this data with the intended power of 0.80, level of significance of 0.05, and a medium effect size of 0.25 (25 points on the SAT scores on a scale of 200 to 800 points, and a quarter of a point [0.25] on the students' final writing course grade on a scale from 0.7 to 4.0) required a minimum sample size of 55 students to participate in the study. This calculation was made using the software program G*Power 3.1.3.

Results

A total of 127 fully-completed questionnaires were obtained by the end of the collection period. There were 79 female respondents and 48 male respondents. Out of these 127 questionnaires, 91 were collected via the paper version distributed to students in the Writing II classrooms and 36 were submitted to the researcher electronically through SurveyMonkey.com. Over 80% of the participants emailed their cell phone bills or forwarded text messages from their cell phone service providers indicating their monthly text message totals. The rest of the students provided hard copies of their cell phone bills.

The mean SAT writing score of all participants was $M = 489.36$. The range for this score was 200 to 800 points, indicating the mean score of these students to be almost perfectly in the middle range. Gender was entered as 0 for male and 1 for female, where $M = .6282$ can be translated to 62.82% of the participants being female. Lastly, the average monthly text message volume for this group was just over 2,405 text messages per month.

The standard deviation for the SAT writing score was 64.91 points from the mean. The standard deviation for gender was the expected .49. The standard deviation for average monthly text message volume showed the highest level of variety at 2,405.08.

In the ANOVA results, the Sum of Squares column shows the total sum of squares to be $TSS = \Sigma(y - \bar{y})^2 = 324467.95$, with the residual sum of squares to predict y to be $SSE = \Sigma(y - \hat{y})^2 = 321726.32$. Applying the formula $R^2 = TSS - SSE$, divided by TSS, the result is .008. Using gender and monthly text message volume together to predict SAT writing scores provides an 8% reduction in the prediction error relative to using only \bar{y} alone.

The resulting total degrees of freedom (df) was 77, with an F statistic of .320 and a level of significance of .727^a. The F statistic was close enough to 1 that it failed to reject the null hypotheses. Since the alpha level of significance for this study was .05, the p -value of .727 was not statistically significant—failing to show a significant relationship between these variables. The regression equation for predicting text message volume was $E(Y) = .440X$ gender + 494.16 where Beta (the probability of a Type II error) was just .003. The regression equation for predicting gender is $Y = .003X$ texts + 494.16 where Beta was -.092. The 95% confidence interval for the slope was -30.18 to 31.06 for gender and -.009 to .004 for average monthly text message volume. Again, with the level of significance for this study set to .05, the results of .98 and .43 ($p > .05$) failed to reject the null hypotheses, showing no significant relationship among these variables.

The histogram for partial regression in the SAT writing score correlation and P-Plot showed a relatively standard distribution for this test. Three scatterplots were produced to show any relationships between: 1) texting volume and SAT writing scores for all students, 2) texting volume and SAT writing scores for male students, and 3) texting volume and SAT writing scores for female students.

Scatterplot of Texting Volume and SAT Writing Scores for All Students.

The dot cluster for the first test did not show a significant positive or negative relationship between variables. The Pearson correlation for all students was -.09 with a level of significance of .21. This data failed to reject the null hypothesis (H_{01}) which stated that there would be no significant relationship between the average number of text messages the entire collective sample sent and received per month and their formal writing performance on the SAT writing section.

Scatterplot of Texting Volume and SAT Writing Scores for Male Students.

The dot cluster in the second test did not show a significant positive or negative relationship between variables. The Pearson correlation for male students only was .10 with a level of significance of .30. This data failed to reject the null hypothesis (H_{02}) which stated that there would be no significant relationship between the average number of text messages male students sent and received per month and their formal writing performance on the SAT writing section.

Scatterplot of Texting Volume and SAT Writing Scores for Female Students.

The dot cluster in the third test showed a negative relationship between variables. The Pearson correlation for female students only was -.33 with a level of significance of .01. This data rejected the null hypothesis (H_{03}), showing a significant negative relationship between the average number of text messages female students sent and received per month and their formal writing performance on the SAT writing section.

Discussion

This research applied to other similar studies by building upon Plester's assessment on texting and literacy by examining an older age group and cross-examining the age group of the study by Rosen and his colleagues. Unlike Dr. Beverly Plester's studies on younger children that showed a positive correlation between text message volume and their competence with literacy and language (Plester, Wood, & Joshi, 2009, p. 158), this study on college students revealed mostly no positive correlation between text message volume and formal college writing scores.

The results of research question #3 in this study were more closely related to the study by Larry Rosen, Jennifer Chang, Lynne Erwin, L. Mark Carrier, and Nancy A. Cheever (2010) whose research showed a negative correlation between texting volume and formal writing among young adults (p. 433). While two of the three tests showed no significant correlation, the results of research question #3 in the present study indicated that a relationship may exist between the number of text messages female students sent and received on average (before taking the SAT) and their formal writing performance on the SAT writing test.

For the analysis, the Pearson correlation for female students was $-.33$ with a level of significance of $.01$. This data may suggest that as female students mature beyond high school, the relationship between their text message frequency and quality of formal writing performance decreases. At the very least, the study showed the negative correlation between the SAT writing test and the average monthly volume of text messages for female students to be significant.

Lenhart, Ling, Campbell, and Purcell (2010) revealed that high school age females “are the most active texters, with 14-17 year-old girls typically sending and receiving 100 text messages a day, or more than 3000 texts a month” (p. 31). This was supported by Plester’s studies on younger students, which found that females demonstrated a greater knowledge of textisms compared to males (Plester, Wood, & Joshi, 2009, p. 157).

The implications of the current study receive further support by Faulkner and Culwin’s study which showed that the volume of text messaging tends to decline with age (Faulkner & Culwin, 2005, p. 180). Their study indicated that text messaging was more popular with females and that males had a tendency to send shorter text messages than females (p. 181).

The study by Rosen and his colleagues found that females reported using more contextual and linguistic textisms in comparison to males (p. 434). Their study indicated that “those participants with some college who reported sending more text messages demonstrated worse formal writing” (Rosen, Chang, Erwin, Carrier & Cheever, 2010, p. 433) and that “the negative associations between texting and literacy ... appear to moderate to some degree by gender and by level of education in young adults” (p. 437).

A study of 151,316 students (54 percent female) by Krista D. Mattern, Brian F. Patterson, Emily J. Shaw, Jennifer L. Kobrin, and Sandra M. Barbuti (2008) revealed that “females, on average, score higher on the SAT writing section (SAT-W) ($F = 557$, $M = 550$)” (p. 5), which may account for there being no significant correlation between text message frequency and SAT writing scores when examining males independently or males and females together. Drouin (2011) noted that:

These different samples have the potential to produce contradictory results, as do the different methodologies used (e.g. literacy tasks and methods of analysis). Moreover, it is possible that the text messaging boom that has taken place in the United States in the last few years may have affected the relationships between texting and literacy. (p. 72)

It is also possible that that as text messaging becomes more popular, that “college students with greater reading and spelling abilities may be using text messaging more frequently, or that those with poorer literacy skills may be using text messaging less frequently” (Drouin, 2011, p. 72). There are so many angles to approach on this subject matter that the research in this field has only just begun.

Limitations

The study had a number of limitations. First, it was targeted only toward freshman college students from one institution. The students at this college were not the most ethnically diverse and were predominantly between the ages of 18 and 24. Second, the study only averaged two months of text message volume during the two months before the time students took the SAT for their monthly mean texting average in this correlation. These limitations were set to encourage student participation by not overwhelming them with a larger amount of data to present to the researcher.

Further limitations included the fact that test results from the last time the students took the SAT exam could have been up to two to three years old, at a time where the students may not have had a cell phone. The study was limited in scope in that it only set out to seek a relationship between monthly text message volume and one validated writing instrument with the SAT writing score.

Other limitations included not examining the students' text message sent and received totals separately, because at the time of the study some providers did not separate these totals on their monthly statements. Also, the study did not examine the students' cell phone plans (e.g. the number of free talk minutes or any text message limits they may have been restricted to following each month). Lastly, the study did not examine the students' cell phone capabilities (e.g. whether they had a Blackberry, other smart phone, or a phone with a keyboard interface that could result in easier texting).

Recommendations

This research is one of a small handful of studies just beginning to examine this new and rapidly growing technology and its impact on the educational performance of students. The results showed a strong normal distribution in the SAT writing score test and a significant negative correlation between female students' SAT writing score and their number of average monthly text messages.

Because of the relatively small sample size of this study and the significant negative correlation found between female students' SAT writing score and number of average monthly text messages, future correlational studies using the SAT writing score and gender are recommended. Some closely-related future studies on this subject could include comparing students' average monthly text message volume to other validated writing tests, such as the ACT (American College Test) COMPASS (Computerized Adaptive Placement Assessment & Support System) exam.

Since this study only sought to find a relationship between its variables, continued studies could be conducted to determine if one variable actually leads to the other and why. The concept of this study as a whole may encourage future research on the correlation between the volume of various other types of technology usage and the quality of formal writing by both college students and younger children as well.

Summary

This study was significant to the subject in that it addressed the question that so many teachers, parents, and students have about the potential relationship(s) between SMS technology and students' formal writing skills in the classroom: Is there a relationship between students' average monthly volume of text messaging and their formal writing performance?

The results of the study may lead educators and students toward a greater understanding of how text messaging volume and a teenager's writing development are related. This perspective could provide administrative insight as to how text messaging should be managed and used by and within an educational institution. At the very least, this synthesis of information and the findings of the research may help direct future studies on this subject.

Future correlational studies comparing formal writing scores and gender are recommended, as are continued studies that attempt to determine if one variable leads to the other and why. Lastly, future studies could be conducted in this area to seek a correlation between the volume of other types of technology use and educational performance measures by both college students and younger children alike.

References

- Buczynski, James A. (2008). Libraries begin to engage their menacing mobile phone hordes without shhhhh! *Internet Reference Services Quarterly*, 13(2/3), 261-269.
- College Board. (2010). *SAT validity studies*. Retrieved from <http://professionals.collegeboard.com/data-reports-research/sat/validity-studies>
- Drouin, M. (2011). College students' text messaging, use of textese and literacy skills. *Journal of Computer Assisted Learning*, 27, 67–75.
- Faulkner, X., & Culwin, F. (2005, March). When fingers do the talking: A study of text messaging. *Interacting with Computers*, 17(2), 167-185.
- Flower, L. & Hayes, J. R. (1981, December). A cognitive process theory of writing. *College Composition and Communication*, 32(4), 365-387. Retrieved from <http://kdevries.net/teaching/teaching/wp-content/uploads/2009/01/flower-hayes-81.pdf>
- Harley, D., Winn, S., Pemberton, S., & Wilcox, P. (2007, August). Using texting to support students' transition to university. *Innovations in Education & Teaching International*, 44(3), 229-241.
- Hill, J. B., Hill, C. M., & Sherman, D. (2007). Text messaging in an academic library: Integrating SMS into digital reference. *Reference Librarian*, 47(97), 17-29.
- Igarashi, T., Motoyoshi, T., Takai, J., & Yoshida, T. (2008, September). No mobile, no life: Self-perception and text-message dependency among Japanese high school students. *Computers in Human Behavior*, 24(5), 2311-2324.
- Igarashi, T., Takai, J., & Yoshida, T. (2005, October). Gender differences in social network development via mobile phone text messages: A longitudinal study. *Journal of Social & Personal Relationships*, 22(5), 691-713.
- Lenhart, A., Ling, R., Campbell, S., & Purcell, K. (2010, April 20). Teens and mobile phones: Text messaging explodes as teens embrace it as the centerpiece of their communication strategies with friends. *Pew Research Center*. Retrieved from <http://www.pewinternet.org/~media/Files/Reports/2010/PIP-Teens-and-Mobile-2010-with-topline.pdf>
- Lin, I-M., & Peper, E. (2009, March). Psychophysiological patterns during cell phone text messaging: A preliminary study. *Applied Psychophysiology & Biofeedback*, 34(1), 53-57.
- Lindley, D. (2008, November). Telecommunications: Teens who text. *Communications of the ACM*, 51(11), 19.
- Marengo, A. (2011). *When to use a particular statistical test*. California State University: Northridge. Retrieved from <http://www.csun.edu/~amarengo/Fcs%20682/When%20to%20use%20what%20test.pdf>
- Mattern, K. D., Patterson, B. F., Shaw, E. J., Kobrin, J. L., & Barbuti, S. M. (2008). *Differential validity and prediction of the SAT*. Research Report No. 2008-4: College Board. Retrieved July 19, 2010, from <http://professionals.collegeboard.com/profdownload/Differential Validity and Prediction of the SAT.pdf>
- McWilliam, L., Schepman, A., & Rodway, P. (2009, July). The linguistic status of text message abbreviations: An exploration using a Stroop task. *Computers in Human Behavior*, 25(4), 970-974.
- Mills, R. (2010, June 22). Does using an internet based program for improving student performance in grammar and punctuation really work in a college composition course? *Education*, 130(4). 652-656.
- Naismith, L. (2007, July). Using text messaging to support administrative communication in higher education. *Active Learning in Higher Education*, 8(2), 155-171.
- Plester, B., Wood, C., & Bell, V. (2008, November). Txt msg n school literacy: Does texting and knowledge of text abbreviations adversely affect children's literacy attainment? *Literacy*, 42(3), 137-144. Retrieved from <http://www3.interscience.wiley.com.ezproxy.liberty.edu:2048/cgi-bin/fulltext/121481340/PDFSTART>
- Plester, B., Wood, C., & Joshi, P. (2009, March). Exploring the relationship between children's knowledge of text message abbreviations and school literacy outcomes. *British Journal of Developmental Psychology*, 27(1), 145-161.
- Plester, B. & Wood, C. (2009, July). Exploring relationships between traditional and new media literacies: British preteen texters at school. *Journal of Computer-Mediated Communication*, 14(4), 1108–1129. Retrieved from <http://onlinelibrary.wiley.com/doi/10.1111/j.1083-6101.2009.01483.x/pdf>
- Reid, D. J., & Reid, F. J. M. (2007, June). Text or talk? Social anxiety, loneliness, and divergent preferences for cell phone use. *CyberPsychology & Behavior*, 10(3), 424-435.
- Rosen, L., Chang, J., Erwin, L., Carrier, L. M., & Cheever, N. A. (2010). The relationship between “textisms” and formal and informal writing among young adults. *Communication Research*, 37(3) 420-440.
- Taylor, A. S., & Harper, R. (2003). The gift of the gab: A design oriented sociology of young people's use of mobiles. *The Journal of Collaborative Computing*, 12(3), 267-296.
- The Nielsen Company. (2009, June). *How teens use media: A Nielsen report on the myths and realities of teen media trends*. Retrieved from http://blog.nielsen.com/nielsenwire/reports/nielsen_howteensusemedia_june09.pdf
- Vosloo, S. (2009, April). *The effects of texting on literacy: Modern scourge or opportunity?* Shuttleworth Foundation. Retrieved from <http://citeseerx.ist.psu.edu/viewdoc/download?doi=10.1.1.175.2588&rep=rep1&type=pdf>

Appendix A: Demographics of Teens Who Text


Demographics of teens who text

The percentage of teens in each group who text

	% of teens
Total teens	72%
Boys	68%
Girls	77
Age	
12-13	61%*
14-17	77
Race/ethnicity	
White, Non-Hispanic	73%
Black, Non-Hispanic	78
Hispanic (English-speaking)	75
Household income	
Less than \$30,000/yr	62%*
\$30,000-\$49,999	76
\$50,000-\$74,999	72
\$75,000+	81

* indicates a statistically significant difference.

Source: Pew Research Centers Internet & American Life Project, Teens and Mobile Phones Survey, conducted from June 26 September 24th, 2009. n=800 teens ages 12-17 and the margin of error for the total sample is +/- 4%.



(Lenhart, Ling, Campbell, & Purcell, 2010, p. 31)

Appendix B: Voluntary Student Questionnaire

This questionnaire is being administered to collect data for Professor Brian Wardyga’s doctoral dissertation at Liberty University.

Circle one answer each:

- 1. I am a: a) male b) female
- 2. My age is: a) 18 to 21 b) Over 21
- 3. My best SAT Writing Score was (number should be 200 – 800): _____ ***If you do not recall your SAT writing score, just leave it blank.**
- 4. My total number of text messages (sent & received) during the 2 months before I took the SAT:
 Month 1: _____ Month 2: _____

***If you do not have instant access to your text message totals, just call customer service right now at:**

AT&T By Phone: 1-800-331-0500 or just dial **611** from your wireless phone
By Online Account: <https://www.att.com/olam/registrationAction.olamexecute>

Sprint By Phone: 1-888-211-4727 or just dial ***2** from your wireless phone
By Online Account: <https://mysprint.sprint.com/mysprint/pages/sl/common/createProfile.jsp?notMeClicked=true>

T-Mobile By Phone: 1-877-453-1304 or just dial **611** from your wireless phone
By Online Account: <https://my.t-mobile.com/Login/Registration.aspx>

Verizon By Phone: 1-800-922-0204 or just dial **611** from your wireless phone
By Online Account: <https://myaccount.verizonwireless.com/accessmanager/public/controller?action=displayRegistration&goto=>

Informed

Consent:

By signing below, I agree that above information is 100% accurate to my knowledge. I agree to provide electronic or printed proof of my text message totals. My signature provides Professor Wardyga with permission to obtain or verify my SAT writing score from the Registrar’s Office. This informed consent assures students that their info will be confidential, secure, used only for the purpose of this study, and will be destroyed properly at the end of the study. Students have the option to discontinue the study at any time. Finally, your professor will not be aware of whose scores are being used and whose are not (i.e. participation in this study will not affect your grades in this class).

Name (Print Clearly): _____

Signature: _____ **Date:** _____

Email Address: _____ **Cell #:** _____

Appendix C: Consent Form

A Relationship Between Text Message Volume and SAT Writing Test Scores
Brian J. Wardyga
Liberty University
School of Education

You are invited to be in a research study seeking a relationship between text message volume and formal writing performance at the high school level. You were selected as a possible participant because you are a college freshman student who has recently taken the SAT writing test, have completed Writing I, and who is assumed to use a cell phone for texting as a regular means of communication. Please read this form and ask any questions you may have before agreeing to participate in the study.

This study is being conducted by: Brian J. Wardyga, Assistant Professor of Communication at Lasell College and Doctoral student for the School of Education at Liberty University.

Background Information:

The purpose of this study is to reveal whether there is a relationship between students' average monthly volume of text messaging and formal writing performance at the high school level. The study seeks to determine whether there is a relationship between the number of text messages that college students send and their scores on the Scholastic Aptitude Test (SAT) writing test. The study will also examine gender as a possible contributing factor in such correlations.

Procedures:

If you agree to be in this voluntary study, you will be asked to complete a short questionnaire indicating your gender, college class, your best SAT Writing Score, and your total number of text messages during the 2 months before they took the SAT. By completing and signing the questionnaire, you provide Brian Wardyga permission to verify your SAT writing score with the Registrar's Office. This informed consent assures you that your information will be kept confidential and secure, used only for the purpose of this study, and will be destroyed properly at the end of the study. You have the option to discontinue the study at any time. Finally, your professor will not be aware of whose scores are being used and whose are not (i.e. participation in this study will not affect your grades in this class).

Risks and Benefits of Being in the Study

Participants are at minimal risk in this research. They will be asked to answer a handful of questions that are not unlike questions they filled out when applying to college or questions on a take home. The entire process shouldn't take the average participant more than 15 minutes to complete and is not expected to have a lasting impact on them mentally, emotionally or physically.

The most difficult part of the survey may be for students to contact the cell phone provider for their text message totals, which can be done via phone, text, or email--where students will be able to use the communication method they are most comfortable with.

The only direct benefit the investigator can foresee for participants is development of knowledge on how to obtain their cell phone plan's text message information if they did not understand how to access this information prior to the questionnaire.

This study would benefit society in the following ways:

1. It would address the question that so many teachers, parents, and students have about the potential relationship(s) between SMS technology and students' formal writing skills in the classroom.
2. The study would lead educators and students to a greater understanding of how text messaging volume may relate to a teenager's writing development and ability to effectively present him or herself through writing.
3. It would provide administrative insight as to how text messaging should be managed by the school; e.g. should it be encouraged or banned from the classroom?
4. It can be of value in solving the problem by providing theories about the relationship(s) to be tested with further research. For example, if a relationship were to be found between high text message volume and low writing scores, studies could be conducted to determine if one variable leads to the other.
5. It would encourage future studies such as the association between the frequency and/or volume of technology usage and the quality of formal writing by students of all ages.

Confidentiality:

The records of this study will be kept private. In any sort of report the investigator might publish, he will not include any information that will make it possible to identify a subject. Research records will be stored securely and only the investigator will have access to the records. All data will be collected in person by only the investigator and stored in a lockable file cabinet and/or password protected electronic database. Careful attention will be made to not link survey information to participant identity.

Once the text message data is paired with the formal writing data, all electronic data containing participants' names will be both deleted and electronically shredded within a 3-year period after the study, while hard copy data with participants' names will be physically shredded and disposed in the same timeframe.

Voluntary Nature of the Study:

Participation in this study is voluntary. Your decision whether or not to participate will not affect your current or future relations with the Liberty University or Lasell College. If you decide to participate, you are free to not answer any question or withdraw at any time without affecting those relationships.

Contacts and Questions:

The researcher conducting this study is Brian J. Wardyga. You may ask any questions you have now. If you have questions later, you are encouraged to contact Brian at his office [...], by phone at [...], or by email at [...].

If you have any questions or concerns regarding this study and would like to talk to someone other than the researcher(s), you are encouraged to contact the Institutional Review Board, Dr. Fernando Garzon, Chair, 1971 University Blvd, Suite 1582, Lynchburg, VA 24502 or email at [...].

You will be given a copy of this information to keep for your records.

Statement of Consent:

I have read and understood the above information. I have asked questions and have received answers. I consent to participate in the study.

Participant Signature: _____ Date: _____

Signature of Investigator: _____ Date: _____

Appendix D: Participant Data Omitted Due to Missing and/or Non-Validated Monthly Text Message Totals

SAT: Respondent ID	Gender	Month A1	Month A2	Txt Mean (A)	SAT Writing
1666784981	female	1500	2000	1750.0	480
1664614116	male	1432	1413	1422.5	n/a
1664577180	female	200	300	250.0	n/a
1664500271	male	53	41	47.0	n/a
1664080537	female	10000	11000	10500.0	n/a
1663856402	female	12000	10000	11000.0	530
1662884743	female	Over 1000	Over 1000	n/a	490
1662867099	female	250	400	325.0	n/a
1662615805	male	1234	900	1067.0	n/a
1662517280	male	don't know	don't know	n/a	480
1662347810	female	500	600	550.0	n/a
1662308072	male	988	1192	1090.0	n/a
1662296297	female	986	998	992.0	n/a
1662278839	male	1300	1800	1550.0	480
1635101158	female	n/a	n/a	n/a	n/a
1630517598	female	978	1124	1051.0	400
1629961378	male	41	36	38.5	410
1629604181	female	1058	997	1027.5	n/a
1629523408	female	846	1241	1043.5	340
1629453277	male	0	0	0.0	
1628711892	female	1014	974	994.0	n/a
1628685403	female	298	405	351.5	590
1628641362	male	97	153	125.0	480
1628605696	female	4719	5297	5008.0	n/a
1628596745	female	0	0	0.0	n/a
1628588080	male	393	435	414.0	n/a
1628585635	female	288	225	256.5	580
1628543122	female	1000	1000	1000.0	440

Appendix E: Participant Data Omitted Due to Missing SAT Scores

Respondent ID	Gender	Month A1	Month A2	Txt Mean (A)	SAT Writing
1664500271	male	53	41	47.0	n/a
1663393102	female	1678	1786	1732.0	n/a
1663286965	female	unknown	unknown	n/a	n/a
1663066052	male	327	274	300.5	n/a
1662867099	female	250	400	325.0	n/a
1662308072	male	988	1192	1090.0	n/a
1662296297	female	986	998	992.0	n/a
1662290500	male	3567	3864	3715.5	n/a
1635101158	female	n/a	n/a	n/a	n/a
1633531196	male	3324	2213	2768.5	n/a
1632849291	male	2,398	2,490	2444.0	n/a
1631781699	male	4432	3815	4123.5	n/a
1629604181	female	1058	997	1027.5	n/a
1629453277	male	0	0	0.0	n/a
1629340021	male	0	0	0.0	n/a
1629296774	female	4589	5236	4912.5	n/a
1629027791	male	178	256	217.0	n/a
1628875244	female	1026	601	813.5	n/a
1628839835	female	3778	4890	4334.0	n/a
1628821031	female	1259	2049	1654.0	n/a
1628671356	male	823	948	885.5.0	n/a
1628667482	female	0	0	0.0	n/a
1628605696	female	4719	5297	5008.0	n/a
1628588080	male	393	435	414.0	n/a
1628582306	female	980	775	877.5	n/a

Appendix F: Participant Data Omitted Due to Missing or Non-Validated Pre-SAT Text Message Totals

Respondent ID	Gender	Month A1:	Month A2:	Txt Mean (A)	SAT Writing
1663988774	female	34675	32478	33576.5	510
1663286965	female	unknown	unknown	n/a	n/a
1662517280	male	don't know	don't know	n/a	480
1662332184	female	no access	no access	n/a	510
1662276043	female	19878	22576	21227.0	700
1635101158	female	n/a	n/a	n/a	n/a
1630868292	female	n/a	n/a	n/a	410
1629961378	male	41	36	38.5	410
1629523408	female	846	1241	1043.5	340
1628685403	female	298	405	351.5	590
1628641362	male	97	153	125.0	480
1628607289	male	76	71	73.5	n/a
1628596745	female	0	0	0.0	n/a
1628585635	female	288	225	256.5	580

Appendix G: Sample Participant Data Tested for the SAT Writing Score Correlational Analysis

Respondent ID	Gender	Month A1	Month A2	Txt Mean (A)	SAT (A)
1670188179	female	1497	1546	1521.5	400
1663880609	female	0	0	0	520
1663762623	male	689	827	758	430
1663633697	male	344	231	287.5	390
1663426584	female	3024	2651	2837.5	370
1663343605	female	789	421	605	510
1662943838	male	6059	7003	6531	480
1662562136	female	3546	4354	3950	420
1662514361	male	1298	1462	1380	520
1662480807	male	2023	3034	2528.5	580
1662480095	male	375	422	398.5	490
1662451957	female	7098	9941	8519.5	490
1662413022	female	569	537	553	490
1662395182	female	2938	2938	2938	540
1662319977	female	927	753	840	600
1662313657	male	808	979	893.5	510
1662306529	male	932	878	905	570
1662294263	male	547	623	585	470
1634606811	male	9546	8319	8932.5	390
1634539682	female	300	100	200	480
1634325835	female	3129	3245	3187	440
1632593820	female	1324	1234	1279	470
1632477498	female	2175	2085	2130	500
1630957174	female	1145	989	1067	460
1630659910	male	564	487	525.5	560
1630180726	female	1593	1389	1491	450
1630129939	male	2064	1837	1950.5	520
1630094533	female	508	636	572	470
1630039261	female	3562	3265	3413.5	420
1629914329	female	1765	1870	1817.5	490
1629907123	female	106	119	112.5	430
1629811552	male	1341	1457	1399	470

1629715556	female	2353	3000	2676.5	500
1629676638	female	0	0	0	480
1629594089	female	602	773	687.5	470
1629558344	female	478	699	588.5	460
1629504075	female	123	156	139.5	500
1629457634	female	8930	6385	7657.5	530
1629353636	female	897	954	925.5	480
1629256768	female	2409	1578	1993.5	480
1629231189	female	874	1562	1218	560
1629212584	male	2284	2886	2585	440
1628927498	male	213	197	205	530
1628915177	female	4003	4233	4118	490
1628911293	male	1345	1238	1291.5	400
1628910912	male	2810	2901	2855.5	390
1628866047	female	400	121	260.5	510
1628861524	female	702	868	785	430
1628814223	female	5	5	5	590
1628800760	female	675	754	714.5	570
1628797347	female	4269	4371	4320	410
1628794653	female	420	366	393	510
1628777600	male	70	89	79.5	340
1628761682	male	105	112	108.5	400
1628759492	female	374	277	325.5	620
1628731887	male	3124	2869	2996.5	480
1628725605	male	12304	12763	12533.5	500
1628705460	female	4187	4756	4471.5	460
1628705207	female	506	458	482	510
1628686493	female	2436	2943	2689.5	420
1628676270	female	1956	2152	2054	520
1628673581	male	2495	2073	2284	550
1628661262	male	0	0	0	520
1628620008	female	3558	4765	4161.5	470
1628605802	male	1000	985	992.5	390
1628592753	female	1687	2430	2058.5	590
1628576938	female	234	256	245	600
1628566571	female	654	598	626	490
1628543079	male	368	387	377.5	490
1628532839	female	3526	3491	3508.5	430
1628506472	male	1	2	1.5	540
1663606953	female	0	0	0	550
1628871267	female	5445	6332	5888.5	400
1628814120	female	1378	947	1162.5	n/a
1628805448	male	3476	4109	3792.5	670
1628658663	male	8051	7412	7731.5	610
1628597682	female	4361	3472	3916.5	470
1628560255	male	0	0	0	540
