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Phone Use and Attention: A Multitasking Study

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Abstract

This study investigated the relationship between texting and attention. Specifically, the ability to comprehend visual cues as well as verbal cues. This was measured through a set of questions based on three video clips the participants were asked to watch and then answer comprehension questions at the end of each video. This study utilized both a control group and an experimental group. Participants in the experimental group were asked to have a texting conversation with the researcher while also watching the videos and those in the control group were just asked to watch the videos. Both groups were asked to answer the same set of questions at the same designated time during the experiment. Participants included undergraduate students (n=20) from the College of Saint Benedict and Saint John's University. Findings include significant results between texting and visual comprehension, texting and audio comprehension, and texting and total comprehension.

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In today's society, it is all about the hurrying and bustling and getting from one place to the next as fast as possible. We have a high demand and a high speed pace in society. This environment provided way for multitasking to emerge. Multitasking inhibits us from being fully present in every moment because our attention is constantly split two ways; neither activity is receiving our full attention. If we are constantly splitting our attention and living in two activities at once, we are not able to attain all the information from either activity.

This has been a significant debate revolving around the classroom. Several studies have been conducted to assess how technology in the classroom helps or hinders an individual's education. Using technology, other than for educational purposes, in a college classroom has been proven to be a predictor of college GPA. Using technology as a distraction, or trying to multitask with it, is associated with a lower college GPA and has shown to be a better predictor of college GPA than time spent studying (Bellur, Nowak, & Hull, 2015). Another study shows that while using technology for educational purposes can actually promote learning, using technology for other purposes within the classroom does, in fact, interfere with learning (Mark, Gudith, & Klocke, 2008). Class time is an essential part of learning and thus, should not be spent texting or using other media distractions while in the classroom.

A common idea that college students have is that more time studying leads to higher grades and thus, a higher GPA. This is, in fact, true but using media while studying has been proven to hinder the effectiveness of study time. Students who switched between studying and media use over the course of an hour actually only stayed on task for about nine minutes and had lower exam scores (Patterson, 2016). Many students multitask while studying as well switching between phone/media use and course work (Junco & Cotton, 2012). While students may believe

they are being effective in their studying even with media multitasking, results from Patterson's study on exam preparedness shows otherwise. According to these findings, multitasking, in regards to studying, is not very effective and actually inhibits the ability to learn the material fully.

With media multitasking hindering effective study time as well as classroom success, we are left with the question: how much do we really learn with the distractions? A study conducted by Terry, Mishra, and Roseth asked students this same question, using a self-report design to assess their attitude towards technology use. They found that 62.7% of their participants reported that they thought technology both hurt and promoted their educational success while 33.3% of the students reported that it helped their success; only 4 participants reported it hurting their education (Terry, Mishra, & Roseth, 2016). Although some students may believe they are able to media multitask without it hindering their ability to learn, they are overestimating their ability and it does, in reality, still take away from their learning (Wu, 2017). Although most people do not realize the deficiency in learning caused by media multitasking, multitasking is near impossible and, in fact, productivity can be increased by setting aside technology while engaged in learning activities.

The purpose of this study is to analyze the question, does media multitasking hinder one's ability to fully learn? If so, which is affected more, visual learning, or auditory learning? This study will analyze this question and assess its credibility within a college classroom. I hypothesize that media multitasking will have a negative association with attention. As attention will be measured by comprehension, I also hypothesize that audio comprehension will be higher than audio comprehension.

Methods

Design

This is a simple, between groups experimental study. The first experimental group was instructed to have a texting conversation with the researcher while watching the video clips and the control group was instructed not use technology while watching the slideshow. An additional group was included in the secondary research. This group was asked to use Facebook while watching the video clips.

Participants

My sample consisted of 36 participants with ages ranging from 18-21 years. Participants were selected from two small private institutions from Minnesota, the College of Saint Benedict and Saint John's University. The participants were selected by convenience.

Materials

To assess attention, participants were asked to fill out a test at the end of each video; in total, there are three tests, one after each video. The tests ask questions based on what the two groups noticed during the experiment. The participants in both experimental groups will receive a texting script of questions they are to respond to.

Procedure

Participants will be assigned to the two groups through block randomization. In the control condition, participants were instructed not to use technology and watch three short videos where the subjects are having a conversation. The first set of questions ask about what the subjects were wearing. After the second video, the participants are asked what the subjects were talking about and the third video questions ask a mixture of the two sets of questions. In the experimental condition, participants were asked to have a texting conversation with the

researcher while also watching the videos. The same test was given to the experimental groups. Each test is given after each video. Statistical analysis was completed using SPSS.

Results

ANOVA results show significance ($F(35)=10.537$, $p=.000$). Audio comprehension for the control group is $M=4.0$ ($SD=.853$), for texting experimental group $M=2.5$ ($SD=1.17$), for Facebook experimental group $M=2.33$ ($SD=.888$), and for total $M=2.94$ ($SD=1.22$). Overall audio comprehension $M=2.94$ ($SD=1.22$). An independent samples t-test found a significant difference of audio comprehension between control and texting experimental group ($t(22)=3.593$, $p=.002$), control and Facebook experimental group ($t(22)=4.69$, $p=.000$), and an insignificant difference between texting experimental group and Facebook experimental group ($t(22)=3.94$, $p=.698$).

Visual comprehension for the control group is $M=3.5$ ($SD=1.09$), for texting experimental group $M=1.42$ ($SD=.793$), for Facebook experimental group $M=1.75$ ($SD=.965$), and for total $M=2.22$ ($SD=1.31$). Overall visual comprehension $M= 2.22$ ($SD=1.311$). An independent samples t-test found a significant difference of visual compression between control and texting experimental group ($t(22)=5.363$, $p=.000$), control and Facebook experimental group ($t(22)=4.17$, $p=.000$), and an insignificant difference between texting experimental group and Facebook experimental group ($t(22)= -.924$, $p=.365$).

Total comprehension for the control group is $M=7.5$ ($SD=1.57$), for texting experimental group $M=3.92$ ($SD=1.24$), for Facebook experimental group $M=4.08$ ($SD=1.44$), and for total $M=5.17$ ($SD=2.17$). An independent samples t-test found a significant difference of total comprehension between control and texting experimental group ($t(22)=6.212$, $p=.000$), control and Facebook experimental group ($t(22)=5.556$, $p=.000$), and an insignificant difference between

texting experimental group and Facebook experimental group (t(22)= -3.03, p=.764). The maximum score that could be achieved for both audio and visual comprehension was 5 and the maximum score for total comprehension was 10. A paired samples t-test was used to assess overall audio comprehension vs. overall visual comprehension which came back with significant results (t(35)=3.331, p=.002).

Discussion

The results of this study supported my first hypothesis showing a significant association between media multitasking and attention measured by comprehension. This shows that media multitasking hinders one's ability to learn and fully comprehend the material. Media multitasking leads only to partial comprehension and takes longer to understand the material (Bowmen et al., 2010). In my study, the control group participants performed considerably better on the quiz questions after each video than both experimental groups because the participants in the experimental groups were constantly task changing and were not able to fully concentrate on the video. For the first experimental group, since they were given the task to text the researcher, this was their primary priority. This was shown through coherent texts sent to the researcher. The text messages followed the script and showed no signs of being distracted (i.e. incoherent sentences, misspelled words, accidental typing, etc.). Since there was no way to measure the priority of attention for the second experimental group, no claims can be made regarding priorities for the second experimental group. However, similar results were yielded between the first experimental group and the second. Therefore, it is possible the participants treated their task the same as those in the texting group.

The second hypothesis was also proven correct. Audio and visual comprehension are different when looking at media multitasking. Audio was found to have a higher comprehension

rate in both control and experimental groups and visual comprehension was much lower. This could be due to limitations of the visual working memory. The ability to recall details of what we see, included in our working memory, is quite poor (Rajsic, Swan, Willson, & Pratt, 2017). This is consistent with the results of this study when using a within groups analysis of the experimental groups and the control group. When analyzed by independent groups, there was no significant difference between visual comprehension scores and audio comprehension scores in comparison to the other group. In other words, the experimental groups did not have a stronger relationship between the visual and audio comprehension scores than the control group. As predicted, the two experimental groups, even though a different media was used, there were no significant differences between the groups. The Facebook experimental group stayed consistent with the other findings and presented a significant difference between audio and visual comprehension.

The external validity of this study is low due to the use of a convenience sample. For a more representative data sample, it would be necessary to use random sampling and a larger sample. Construct validity is present in this study as the test questions at the end of each video clip did not cause a floor or ceiling effect in the data. Outliers within my data set could have influenced the data and contributed to a higher or lower mean. A way to correct this would be to increase sample size in order to decrease effects of outliers on the mean. Overall, this study shows interesting correlations between media multitasking and comprehension and can provide a justification for turning off technology and distractions while in the classroom.

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