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4-25-2019

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Tri, Maria, "The Effects of Multitasking on Motor Performance" (2019). *Celebrating Scholarship and Creativity Day*. 84.

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The Effects of Multitasking on Motor Performance

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Abstract

This study investigated whether multitasking would have an effect on motor performance. Specifically, I observed undergraduate students from a midwestern liberal arts college—College of Saint Benedict and Saint John’s University. In past research, Schwebel, McClure, & Porter (2017) had observed various college students about distracted pedestrian behavior on their college campus. Their results found changes in self-reports about their intentions, but not a specific behavior change. The undergraduates that participated in this study ($N = 20$) were assigned to two conditions by block randomization. Then they were given the task to walk down and back up a flight of stairs in the Henrita Academic Building at the College of Saint Benedict. Participants were measured in seconds with a stopwatch on how long it took them to walk down and then up a flight of stairs. Participants in the control condition were asked to walk down and then up the stairs at a normal pace, not skipping any steps, with no distractions. Participants in the experimental condition were asked to respond to various text messages that were sent to them while walking down and up the stairs. A t-test of independent means was calculated to analyze the data of this experiment. The results showed a statistically significant mean difference between the two conditions $p = .000$, $d = 4.1$. This suggests that multitasking while performing a motor task, demonstrates some impact on how long it takes for an individual to successfully complete the task.

Keywords: multitasking, texting, motor performance

The Effects of Multitasking on Motor Performance

In the last decade, text messaging has increased significantly. Due to the invention of the smart phone, almost everyone today has a cell phone that is capable of communicating with others no matter the distance. Texting has also increased dangers for civilians while multitasking. While most individuals think they can perform tasks well while multitasking, recent research has found that texting interferes with performing various motor performances.

With the increase dangers of texting while multitasking, this has led legislatures to pass specific laws in attempt to prevent these dangers, such as texting and driving. Motor performance includes the ability to complete a task that requires movement. Walking is a motor skill that many people don't put much thought into—especially walking while texting. In a study done by Lazaros, Xu, & Londt (2012), who studied middle school students and their ability to cross the street in a simulation while talking on the phone. They found that many students had difficulties navigating while using their phone in the simulation course they had created.

In addition, Cheng, Hinton, & Paquette (2018) discuss that when an individual is given a second task while walking, their ability to keep a steady pace decrease. Especially when an individual is challenged with the task of texting, their attention is focused on their phone rather than their surroundings. There have also been reports made that individuals have difficulty recalling their surroundings while texting and walking. Evidence has shown that when having to multitask, young adults focus more of their attention on cognitive tasks rather than motor performance, which leads to a change in walking patterns (Cheng, Hinton, & Paquette, 2018). Weksler and Weksler (2012) also discovered similar behaviors in older adults that when using their phone while crossing the street, they endangered themselves by unsafely walking into oncoming traffic more frequently than those who were not using their phone. Schwebel, McClure, & Porter (2017) had observed various college students about

distracted pedestrian behavior on their college campus. Their results found changes in self-reports about their intentions, but not a specific behavior change.

In this study, it is predicted that students who are distracted by texting on their smartphone will take a longer amount of time to walk down and up a flight of stairs than those who are not distracted by their smartphone.

Methods

Design

This study is an independent groups design post-test only experiment.

Participants

There were 20 participants in this study, with 10 in each condition. The participants were from midwestern liberal arts colleges, the College of Saint Benedict and Saint John's University.

Materials and Procedures

Participants were assigned to conditions by block randomization. Participants cellphone numbers were recorded from those in the experimental group before the trial in order for them to receive text messages. Participants were measured in seconds with a stopwatch on how long it took them to walk down and then up a flight of stairs in the Henrita Academic Building at the College of Saint Benedict. Participants in the control condition were asked to walk down and then up the stairs at a normal pace, not skipping any steps, with no distractions. Participants in the experimental condition were asked to respond to various text messages that were sent to them while walking down and up the stairs. Participants that were in the experimental group were asked to lock their phone screen in order for them to receive the first text message. A text was sent to the participant and once they received the text, they were allowed to begin walking. The participants were expected to respond to the texts in full sentences and once they went down the set of stairs and back up, the stopwatch was stopped.

Results

A t-test of independent means was calculated to analyze the data of this experiment. The number of seconds that participants in the control group took to walk down and up the stairs was $M =$

17.7; $SD = 2.21$. The number of seconds that participants in the experimental group took to walk down and up the stairs was $M = 28.02$; $SD = 2.79$. The results showed a statistically significant mean difference between the two conditions $p = .000$, $d = 4.1$.

Discussion

Due to the previous research conducted that investigated the effects of multitasking and walking patterns, I hypothesized that those who were distracted by texting on their phone would take a longer amount of time walking down and up the stairs. My results had supported this hypothesis; those who were distracted by texting on their phone took a longer amount of time to walk down and up the stairs than those who were not distracted by texting. This result shares similar findings of other past research about multitasking and motor performance.

The internal validity for this study was strong due to using block randomization. Participants did not know what group they were in and knew exactly the task they had to complete. The task was simple and easy to follow and the directions given were clear and concise. Every participant used the same set of stairs to conduct the experiment.

As for construct validity, a pilot test was conducted to make sure each condition measured what it was supposed to measure. During the pilot test for both conditions, the results showed a significant difference in number of seconds it took for participants to walk down and up the stairs. Statistical validity was strong, due to a significant mean difference and a very large effect size despite the number of participants. This study did not have external validity because there was no random sampling.

In the future, I would like to examine whether gender differences would have an effect on multitasking as well as comparing individuals from a range of ages. Instead of focusing on the texting aspect of smartphones, it would be interesting to investigate if playing games on a smartphone would have the same effect texting does on motor performance. Based on my results from this study, I predict

that there would be significant differences in older ages on multitasking and motor performance as well as those who would play games on their phone—compared to those who do not.

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