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Learning to Read on a Battlefield:

Can Action Video Games Serve as a Training Task for Enhancing Reading Capabilities?

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Abstract

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Peter Shlanta

Action video games have been consistently associated over the years with a range of visual benefits, including widened visual attention window, processing speed of visual stimuli, and saccadic eye movement control. These same visual functions are also essential to reading speed and comprehension. However, only video games which involve direct reading challenges, such as pronunciation games, have been studied for an influence on reading capabilities on healthy populations (Schwartz, 1988). If action video games are capable of enhancing the fundamental functions of reading, it is essential to examine the relationship between action video games and reading skill. The purpose of the current study is to examine whether or not action video games can serve as a training task to improve participants' reading speed without sacrificing reading comprehension. Results and future directions are discussed.

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Chapter One:

Introduction

First introduced in the 1970's, video games have experienced massive growth in terms of both popularity and complexity, and such growth has made video games a prominent part of the entertainment industry worldwide. According to the Entertainment Software Rating Board (ESRB), which reviews all marketed video games prior to their distribution, 67% of American households in 2010 reported playing some type of video game, with the average play time being eight hours a week (Entertainment Software Rating Board, 2010). Furthermore, the ESRB reported a wide age range among video game players, with 49% of gamers between the ages of 18 – 49 and 26% of players over 50 years old. The same report also showed that the gender gap is beginning to close with roughly 40% of these gamers being women. These statistics demonstrate the popularity of video games in today's society and why it is no surprise that psychologists have begun to take an interest in studying the games' influence on players.

One area of research which has been consistently replicated are the associations of action video games (AVG) and visual perception factors. Researchers have found associations between higher self-report AVG gameplay hours and visual benefits such as heightened visual attention (Chisholm, Hickey, Theeuwes, & Kingstone, 2010; Hubert-Wallander, Green, & Bavelier, 2010) and increased processing speed of visual stimuli (Appelbaum, Cain, Darling, & Mitroff, 2013; Dye, Green, & Bavelier, 2009; Mack & Ilg, 2014). Although these findings are consistent, only a limited amount of research has focused on how these potential visual benefits transfer to real-world tasks outside of gameplay. One task that may benefit from AVG exposure is reading, as visual attention and perceptual span have been found to facilitate advanced reading skills (Bélanger, Slattery, Mayberry, Rayner, 2012; Franceschini, Gori, Ruffino, Pedrolli, & Facoetti, 2012). If this is the case, then controlled exposure to AVGs may be able to serve as a training task to aid slow readers with their visual attention, visual processing speed, and perceptual span benefits. The present study will examine three hypotheses. The first hypothesis is that an interaction effect of game condition and testing time is expected. Participants who complete an AVG gameplay session will show a faster reading speed from a pre- to post-test reading task while participants who play a non-action video game (NAVG) will not demonstrate a reading speed increase. The second hypothesis is that reading comprehension will remain consistent from pre-test to post-test reading measures in both conditions and will not decrease as a trade-off to faster reading speeds. The third hypothesis will also explore whether reading speed performance on the pre-test is correlated with how many hours participants report playing AVGs per week; those who report playing more hours will demonstrate faster reading speed on the pre-test compared to those who report fewer hours.

Action Video Games and Visual Perception

Video games were once simple designs with simple shapes. Now they consist of high-definition characters, architectures, and environments with which players must interact and navigate. AVGs often involve high visual attention and processing demands since a game may involve dozens of allies and enemies that the player must scan, identify, and react to amidst swift motions and quick movements all while simultaneously attending to many peripheral displays (health bars, maps, ammunition counts, etc.; Hubert-Wallander, Green, & Bavelier, 2010). It has been suggested that the multiple simultaneous visual tasks in AVGs are responsible for the improved perceptual span and processing speed associations that NAVGs have not been found to influence (Hubert-Wallander, Green, & Bavelier, 2010). Among this array of visual benefits, researchers have found the most consistent results for perceptual span, visual attention, and visual processing speed.

One benefit which seems the most supported by current research literature is a widened perceptual span for processing information. Green and Bavelier (2006a) conducted a study in which they compared AVG players (participants who reported playing AVGs for three days a week or more) to novice gamers (participants who reported playing AVGs two days or less per week) on the *useful field-of-view task* (UFOV). The UFOV task requires participants to view a screen filled with a variety of distracters (triangles, trapezoids, house-shapes, and more) and locate one pre-established target shape (a diamond or square) as quickly as possible. Participants stared at a focal point and all stimuli, including distracters and the predetermined target, flashed simultaneously for 100 ms. Participants indicated which shape (diamond or square) had appeared in the cluster. Shapes were broken into two display styles: central (shapes which appeared close together by the focal point) and peripheral (shapes spread out across the screen away from focal point). Experienced gamers performed significantly better than novice gamers in both reaction time and accuracy for both central and peripheral display styles. Green and Bavelier suggested that gamers not only able to process the stimuli more quickly, but that they were also better able to process stimuli presented across their perceptual span as the gamers were more accurate across display distances (both centrally and peripherally).

To further test the peripheral differences, Green and Bavelier (2006a) conducted a follow-up study with a new pool of participants. Criteria for both the AVG group and the control group were the same as the previous study. Participants completed the UFOV task again, but this time participants had to correctly identify which of the eight possible sections of the screen the target stimuli had appeared. Researchers compared AVG players and novice players in reaction time and accuracy in three distractor conditions; one with no distractor shapes, one with 23 distractors, and one with 47 distractors. All shapes flashed simultaneously and participants identified the shape and location of the given target. A second phase of the experiment duplicated these three levels of distraction (no distractors, 23 distractors, 47 distractors) while simultaneously presenting a central target in the middle of the screen. In this phase, participants reported the shape the central figure as well as the location of the target shape presented peripherally.

Results showed that AVG players were more accurate in identifying target locations across all three distractor levels than novice players (Green & Bavalier, 2006a). AVG players also had higher accuracy on the center-target identification compared to the novice gamers. Furthermore, AVG players showed no significant drop in overall performance when simultaneously attending to a center and peripheral target. Meanwhile, novice gamers experienced a significant drop in performance when attempting to attend to both visual areas. These results suggest that video game players were capable of processing peripheral stimuli more effectively than novice players, even when their eyes were focused on the screen's center. For this to occur, AVG players must have both a wider perceptual span window with which they are capable of processing incoming stimuli across central and peripheral visual fields as well as improved visual attention to demonstrate higher accuracy for target identifications across conditions.

However, the perceptual span window may not simply widen; processing time is faster for stimuli presented within the window in those who play more hours of AVGs compared to novice gamers. Castel, Pratt, and Drummond (2005) conducted a study in which a group of video-game players and a group of non-video game players completed a cued-reaction time task. Castel et al. hypothesized that gamers would display faster reaction times due to a more effective attentional control over their *inhibition of return* (IOR). IOR is a known attentional pattern in which a cue tends to evoke a faster response time for a target that appears in the same location for a brief window of time, but if the target's appearance is delayed more than 200 ms, it can actually *inhibit* response times. This is due to the participant's visual attention drifting to scan other areas of the perceptual span to ensure the target has not appeared in the incongruent location and is unprepared when the target suddenly flashes in the congruent location after the delay. Researchers displayed a focal point in the center of the screen to prevent eye movement prior to each trial. Then a cue square would appear in either the left or right side of the screen. A delay would then occur (between 50 ms and 950 ms) before the actual target, a circle, would appear on either the left or right side of the screen.

Castel et al. (2005) found that both gamers and non-gamers demonstrated similar IOR patterns, with longer reaction times following matched cue-target placement with extended delays. This means that both experienced and novice gamers had faster response times if the cue and the target were congruent in location, but only if the delay was brief. Longer delays from cue to target appearance led to inhibited response times in both groups even if the locations of both shapes were consistent. Yet experienced players were faster with both cued and non-cued targets. Results indicated that both players and novice players demonstrated similar IOR patterns, but players were still faster in all conditions. These faster reactions suggest that when the cue and target were congruent with no delay, gamers were capable of reacting faster to the congruent appearance. However, even if the cue and the target were incongruent and the participants' visual attention had wandered, gamers were capable of reacting more quickly once their attention had been correctly re-oriented to the target shape's location than non-gamers. Castel et al. (2005) concluded that to have a faster reaction time in all conditions despite a similar visual attention pattern, gamers must have faster visual processing speed to facilitate faster responses once the target shape appears.

Other researchers have replicated this support of increased visual processing speed while also testing other cognitive factors. Video game players have not demonstrated an ability to hold visual information in working memory longer than non-gamers (Appelbaum, Cain, Darling, & Mitroff, 2013), nor indicated an improved overall working memory capacity (Wilms, Petterson, & Vangkilde, 2013). In other words, there is no difference in how much information gamers are capable of holding in short-term visual working memory or how long gamers are capable of maintaining the information in their short-term memory. The differences lie with how quickly AVG players are capable of putting the incoming information into their visual working memory for use (Wilms et al., 2013).

In a follow up study to their original study, Castel et al. (2005) found a correlation between visual selective attention and AVG gameplay as well. Researchers asked participants to conduct a visual search task in which participants identified target letter amongst a cloud of distractors. There were two levels of difficulty: easy, which consisted of finding either a letter ‘b’ or a letter ‘d’ letter hidden in a cluster of similar distractors (such as ‘k’s), and difficult, which consisted of finding a letter ‘d’ or a letter ‘b’ in a cluster of random letters (such as ‘h’, ‘l’, ‘a’). Video game players were significantly faster than novice gamers in both categories (Castel et al., 2005), indicating a more efficient selective visual search ability. Taken in conjunction with Green and Bavelier (2006a), these studies indicate that AVG gameplay widens the area in which visual attention may be focused and also makes visual attention within this window more effective; improvement in both types of attention indicates that visual attention may undergo multiple enhancements during AVG exposure.

However, visual tasks do not always require scanning objects individually to locate a target; sometimes visual attention must be spread to attend to multiple objects simultaneously. Green and Bavelier (2006b) tested AVG players (those who reported playing AVGs for at least 3 days a week) and novice gamers on the *Multiple Object Tracking* (MOT) task, which requires participants to correctly identify how many objects are displayed on a screen as quickly as possible. The selection criteria for the AVG group and the novice gamer group was the same as Green and Bavelier (2006a). Participants viewed a focal point on the center of a computer screen and a random number of squares (ranging from one square to 12 squares) flashed for 50ms. Squares could be clustered centrally (close to the fixation point) or presented in a wide spread (peripherally). Once the shapes had disappeared, participants then used a keypad to enter the number of squares they believed had appeared. Participants in the AVG group were able to more accurately report the number of squares in both clustered and spread displays, and were overall accurate up to 11 shapes; their accuracy only decreased when a full 12 shapes had appeared. Novice gamers demonstrated overall accuracy up to nine shapes, with accuracy decreasing after 10 or more shapes had appeared (Green & Bavelier, 2006b). These results indicate that AVG players are capable of visually attending to more objects within their perceptual span than novice gamers.

Green and Bavelier (2006b) were interested in whether or not this gap could be closed with video game training, so more novice gamers were recruited and assigned to a control group and an experimental group. Both groups completed an MOT task pre-test, then those in the experimental group played one hour of AVGs per day for 10 days while the control group played an NAVG for the same timeframe. Both groups then completed an MOT task post-test. Results indicated that participants in the experimental group were able to demonstrate higher object tracking accuracy on the post-test than those in the control group, approaching that of the previous experienced AVG player sample (Green & Bavelier, 2006b). Green and Bavelier then replicated the study, this time with moving circles in place of stationary squares. During this task, some circles would be cued (e.g. two of seven circles would be highlighted when they first appear), then the circles would move in random patterns. When the movement stopped, one shape would be highlighted and participants would have to report if that shape was one of the shapes cued in the beginning.

AVG players demonstrated higher accuracy than novice gamers once again. Furthermore, researchers were able to use AVG training to once again improve a new pool of novice gamers to demonstrate higher tracking accuracy than a control training condition (Green & Bavelier, 2006b). The results of their studies indicate that not only are gamers able to attend to more objects within their visual field (stationary or moving), but that relatively brief AVG training can causally enhance the visual attention of novice gamers and increase their object tracking capabilities as well.

Furthermore, the perceptual span and processing speed differences may be accompanied by differences in saccadic eye movements as well. Video game players were found to respond significantly faster to *anti-saccadic eye movement tasks* in which they are told to look *away* from an object when it appears, not shift attention to the object (Mack & Ilg, 2014). Video game players demonstrated faster reaction times from object appearance to saccadic eye responses, had faster saccadic movements overall, and, while not significantly different, the video game players also had slightly lower error rates than non-gamers indicating more control of their visual attention shifts, according to Mack and Ilg. All of these studies help to demonstrate the consistent finding that AVGs help to enhance visual performance and that those enhancements transfer beyond the AVG itself. But even more importantly, the possibility of AVG enhancement transferring to tasks outside of video games themselves opens the possibility that these benefits may facilitate real-world visual tasks such as reading as these skills require visual attention and efficient processing of information within the perceptual span to efficiently develop.

Visual Perception and Reading

Action video games have been found to be associated with enhancements to visual attention, information processing speed for visual stimuli, saccadic eye movement speed, and saccadic eye movement control; and these enhancements have also been found to facilitate performance on experimental tasks outside of video game play, such as reading tasks. This could indicate that AVGs may be an effective method to improve reading skills with controlled exposure as the same visual skills AVGs have been found to enhance have also been associated with reading.

Firstly, performance on a selective visual search tasks have been correlated with reading performance. Casco, Tressoldi, and Dellantonio (1998) gave young participants (M_{age} = 11.28 years) a selective visual attention test of finding target letters among a row of distractor letters as well as a reading speed test in which participants' reading speed and total reading errors were recorded. Analysis of the data showed that there was a correlation between visual search and reading; the higher the score on the letter search task, the higher the quality of performance on the reading test (Casco et al., 1998). Researchers concluded that selective visual attention is influential over reading skill; the less controlled the selective attention, the more reading errors there are and the slower the reading speed output. Additional studies have found that performance on a visual search task could be used to accurately predict the future reading performance for young children who have not yet begun to read (Franceschini et al., 2012). If this is the case, then improving selective visual attention via AVG play may also enhance these reading outcomes.

Secondly, a wider perceptual span has been found to coincide with faster reading speed. Haikio, Bertram, Hyona, and Neimi (2009) tested three groups of children of different ages: eight year olds, 10 year olds, and 12 year olds. The children completed a moving window task in which a screen is entirely covered (masked) except for a small portion of text immediately where the eyes are fixated. The window then moves across the text as the eye moves. Researchers found that the eight year old children averaged a five letter-wide window, 10 year olds averaged a seven letter-wide window, and 12 years olds averaged a nine letter-wide window. Researchers attributed the increase in reading speed to this widening of the perceptual span. Furthermore, participants who demonstrated above-average perceptual span out-performed those in their same age group who had average or below-average span (Haikio et al., 2009). This may be explained by the theory of *parafoveal processing*, which states that although the bulk of visual information from reading is obtained from the text that is currently falling on the fovea (the text which the eyes are currently looking directly at), some information is pulled from text in a reader's peripheral vision to cue or essentially 'pre-analyze' upcoming text the fovea has not yet reached (Rayner, McConkie, & Ehrlich, 1978). The pre-analysis of upcoming text information allows the text to be more quickly processed by the fovea when it is reached since it has already undergone some degree of processing.

The importance of peripheral processing during a moving-window task has also been found in a later study by Belanger, Slattery, Mayberry, and Rayner (2012). Belanger et al. (2012) conducted a study in which they used eye-tracking technology to compare hearing readers and deaf readers in a *moving-window* task. This window grew steadily from being 6 characters wide to 18 characters wide. Results indicated that, while the difference was not statistically significant, deaf readers were able to reach a mean plateau rate of 350 words per minute while hearing participants plateaued around 320 words per minute (Belanger et al., 2012). This difference was due to the skilled deaf readers' ability to continue improving all the way up to the 18 character window; meanwhile, skilled hearing readers were not able to speed up past the 14 character window.

Belanger et al. (2012) argued that by relying more on visual information, deaf readers developed a wider perceptual span to process stimuli and had better developed peripheral processing. This peripheral processing would allow a reader to extract information from more upcoming letters or words and enhance the amount of information that can be pre-analyzed parafoveally. These findings suggest that wider perceptual span can allow for faster reading by increasing the amount of parafoveal reading processing. If video games can widen perceptual span and increase the processing speed of the information within the span, this may allow video games to serve as a reading training task by increasing parafoveal processing capabilities.

Video Games as a Potential Training Method for Reading Skills

Previous literature has found consistent links between AVG play and visual benefits, and those same benefits have been found to contribute to enhanced reading skills in other contexts. It is important to note that visual search tasks may be capable of predicting reading capabilities as a reflection of selective visual attention (Franceschini et al., 2012), and more AVG gameplay has been correlated with heightened selective visual attention and visual search task performance (Castel et al., 2005). Furthermore, a wider perceptual span and heightened peripheral processing has been found to coincide with higher reading rates (Belanger et al., 2012; Haikio et al., 2009), and AVG play has been found to increase peripheral processing accuracy and widen the perceptual span window (Green & Bavalier, 2006a) as well as increase the number of stimuli that may be visually attended to within the wider window (Green & Bavelier, 2006b). This means that AVG play may enhance multiple fundamental functions of vision to facilitate reading speed and comprehension development.

Despite the overlap of study results concerning AVGs, visual factors, and reading, there is a lack of research examining whether there is a direct link between AVGs and reading capabilities. This is because the few studies that have been published examining video games' influence on reading skills do not capture the typical gaming audience. Schwartz (1988) conducted an early study to test the efficacy of video games as literacy training. He found that elementary school students with below-average reading skills improved more when trained with educational reading video games for 10 weeks than teacher-lead lectures for 10 weeks (Schwartz, 1988).

While the improvement of the video-game based learners indicates that video games are an adequate method of reading skill development, the particular game used was specifically designed for reading tasks; an example activity involved participants being shown two words and pressing 'yes' or 'no' if the words shared a similar pronunciation (e.g., "deer" and "dear" would solicit a 'yes' response, as would "sweet" and "suite"). Games like these do exist and are used in classrooms, such as the *Reading Rabbit* franchise. But these reading-specialized games are not necessarily what gamers play recreationally. According to the Entertainment Software Association, which works with video game developers for a variety of business goals such as sales, research, and the yearly gaming convention *E3,* the top-selling game genres of 2014 were the "Action" game and "Shooter" game genres which together accounted for approximately 52% of all console games sold that year (Entertainment Software Association, 2014). Therefore, the study of whether or not action-orientated games can produce a similar result as specialized games is also an important question to answer since this category of games has a larger audience.

It was only in 2013 that AVGs were tested as a method of reading skill training. Franceschini et al. (2013) conducted a longitudinal study in which elementary school students with dyslexia (M_{age} = 10.12 years) performed a pre-test in word and pseudo-word speed reading tasks, noting both their reading speed and number of errors. The students were then assigned to two groups; one group played AVGs while the second group played non-action video games (NAVGs) for a total of 12 hours over the course of one month. Students in the AVG group showed significant reading speed increases in their post-test (for both word and pseudo-word reading) and did not suffer any accuracy loss as a result of the speed increase. Meanwhile, the NAVG players did not improve from pre- to post-test on either words or pseudo-words. Furthermore, Franceschini et al. (2013) argued that reading speed, which was measured in syllables per second (syll/s), improved more as a result of 12 hours of AVG exposure (0.18 syll/s) than the average improvement students with dyslexia typically experience over the course of a full year with no reading training (0.15 syll/s). However, this study only encompasses a very select sample of the gaming population. To be precise, it only applies to children with dyslexia. These findings do not necessarily indicate that students without reading disorders will benefit from AVGs in the same way.

Statement of the Problem

Given the limited research, questions regarding the connection between AVGs and literacy remain. It is still unclear whether or not AVGs can produce the same reading enhancements that reading-specific activity games have been shown to elicit in students. It is also unclear whether or not AVG exposure will facilitate visual skills enough to increase reading speed in non-clinical gamers as only participants with dyslexia have been observed thus far.

The purpose of the current study is to expand the existing literature by testing whether or not AVGs may serve as a strategy to improve reading performance. To accomplish this, the method used by Franceschini et al. (2013) will be adapted. Two groups of participants will undergo video game training; one will play AVGs and one will play non-action video games (NAVG). Reading speed and comprehension will be assessed before and after training to observe any changes in performance. However, due to research limitations, gameplay time will be reduced to 2 hours to test for immediate, short-term reading enhancements from AVG play.

The current study will test three hypotheses. 1.) Consistent with Franceschini et al. (2013), it is predicted that word per minute reading rates for the AVG training condition will increase. Since research has not supported NAVGs in reading speed increase or visual benefits, it is predicted that the NAVG group will not increase. As such, an interaction effect between game condition and time (pre-test to post-test) is predicted. Specifically, there will be a simple main effect of AVG training from pre-test to post-test but no simple main effect of NAVGs from pre-test to post-test. 2.) Reading comprehension scores will remain consistent in both groups from pre-test to post-test; that is to say that video game exposure will not have an effect on reading comprehension. 3.) The third hypothesis will explore if self-reported AVG gameplay is correlated with baseline reading speed performance on the pre-test. In other words, participants that reported playing more hours of AVG per week started off with higher reading speed by being faster on the pre-test than participants who reported low gameplay hours. This research would add to our understanding of how video game exposure may be influencing short-term literacy performance of players after gameplay has finished.

Proposed Analyses

Two 2x2 Mixed Analyses of Variance (ANOVAs) will be performed on the data to explore interaction effects of game condition and testing time (pre-test vs. post-test); one for reading speed and one for reading comprehension.

Chapter Two:

Method

Participants

Prior to participation, students completed a prescreen questionnaire on Towson University Research Pool to report how many hours per week they typically play console video games as well as any medical conditions they may have that would affect tasks in the experiment (See Appendix A). Students who reported playing console-based games for less than one hour per week were excluded to prevent extended learning curves (e.g. learning how to operate a PlayStation 3 controller). Students who reported playing more than 10 hours per week were excluded to avoid ceiling effects as their reading rates may have already been influenced by the extensive exposure and leave less room for observable improvement. Students were excluded if they have previously played the games designated as the training tasks (*Little Big Planet II* and *Ultimate Marvel vs. Capcom 3)* to ensure all participants begin the tasks with an equal level of expertise. Students were also excluded if they had a history of epilepsy, seizures, or motion sickness as these could have led to health risks during the training tasks. Lastly, students with reading disabilities (e.g. dyslexia) were excluded as the focus of the study is whether or not AVGs influence the reading rates of non-clinical gamers. Students were not excluded due to gender, age, sexual orientation, political affiliation, financial status, or any other demographic.

A total of 63 undergraduate students (32 men, 31 women; $M_{\text{age}} = 20.54$) were recruited. Due to various reasons, three participants were later omitted: one participant was not wearing corrective eyewear and could not see the text during the reading tasks;

one participant reported an inability to complete comprehension questions due to an unmedicated attention deficit disorder; and one participant admitted to incorrectly answering pre-screen questions. As such, the final participant sample included 60 students (30 men, 30 women; M_{age} = 20.55). Of these participants, 39 identified as Caucasian (65%), 12 as African-American (20%), one as Asian-American (1.7%), two as Hispanic (3.3%), five as Biracial (8.3%), and one as Undisclosed (1.7%). All participants were students at Towson University and received course credit towards a psychology class as compensation for their participation.

Materials

Pre-Screen questionnaire. A questionnaire was utilized that asked prospective participants questions about their typical gameplay habits, including questions regarding how often they play video games and their attitudes towards playing action video games which depict violence. The pre-screen questionnaire was used to ensure all participants met the required inclusion criteria and may be found in Appendix A. Due to an error in wording on the pre-screen survey, participants were then verbally asked to report a simple number between one and ten to report how many hours per week they played action-oriented video games. This reported number was later used to test the correlational baseline performance with pre-test scores.

Informed consent. The informed consent sheet contained all necessary information, including participant expectations and requirements, a procedure overview, potential risks, voluntary participation / withdrawal rights, and confidentiality measures (See Appendix B). Informed consent forms were stored separate from any and all collected data; only a randomly assigned participant number was used to identify specific data.

Reading speed & comprehension measures. In order to assess whether or not reading speed was affected during the gameplay training, a reading speed task was given before and after gameplay. Passages were borrowed from the Kaufman Test of Educational Achievement, Second Edition (KTEA-II). The KTEA-II is an established, standardized test intended to assess a battery of cognitive tasks (including reading comprehension) in individuals of all age groups from childhood to adulthood. The reading subsection has been found to have sufficient reliability (with ‘sufficient’ defined as reliability of .90 or higher; Vladescu, 2007). Concurrent validity measures have found the KTEA-II correlates well with other educational achievement tests, including the original Kaufman Test of Educational Achievement (K-TEA), the Wechsler Individual Achievement Test II (WIAT-II), and the Woodcock-Johnson Tests of Achievement III (correlations ranging from .84 to .94; Vladescu, 2007). The last group of passages in the KTEA-II’s reading comprehension section (group K) is composed of nine reading passages that participants read at their own pace. Following each passage, comprehension questions are asked to assess whether or not the information is also being successfully retained (For a sample passage, please see Appendix C). There are a total of 20 comprehension questions asked throughout the test.

While the KTEA-II is capable of producing standardized reading scores for a given age group, the current study only assessed reading speed (in WPM) and comprehension (via accuracy in post-passage questions) by using the passages in section K of the KTEA-II’s reading comprehension section. Therefore, standardized scores were not computed. Rather, the controlled, established passages of the KTEA-II were only used to create two parallel tasks for pre- and post-test reading speed and comprehension measures. A Latin Square design was used to administer the reading passages with four passages in the pre-test and five passages in the post-test (e.g., Participant 4 read Passages 4, 5, 6, and 7 for their pre-test, then read Passages 8, 9, 1, 2, and 3 as their post-test).

The pre-test served to calculate a participant's reading rate in words per minute (WPM) by averaging their WPM speed across four passages. Each passage was followed by a few questions regarding the passage's content to assess how much of the passage participants maintained. As previously mentioned, participants read the passages at their own pace. The amount of time taken to read each passage was also recorded. After all four or five passages were complete, the time taken to read each passage was computed into WPM rates; all WPM rates for the pre-test passages were averaged together to yield an overall pre-test WPM reading rate. A similar computation was conducted for an overall post-test WPM reading rate. Reading comprehension was represented by a percentage of correct responses to post-passage questions. For example, if the pre-test reading task had 10 questions and the participant answered 9 correctly, their pre-test comprehension percentage was 90%. The same calculation was performed for the post-test comprehension questions. The pre- and post-test outcomes for participants were compared during analysis to observe changes.

The passages were presented via individual pieces of paper; a reading passage was printed on the front of the paper and the comprehension questions associated with that passage were printed on the back. Participants were not able to look back to the passage once they had begun reading the questions. Participants were told that a stop-watch timer was in use to prevent the pre-test from going over an allotted amount of time for the task. However, the stop-watch was concealed from the participants' sight and participants were unaware until debriefing that the stop watch had been used to obtain reading times for each passage. The pre-test and post-test required roughly 10 minutes each for participants to complete.

Training tasks. Participants were randomly assigned to one of two groups for the training conditions between reading tasks; one group played a non-action video game (NAVG) and one group played an action video game (AVG). Only action video games have been associated with visual benefits. Therefore, the AVG group served as the experimental condition while the NAVG group served as the control group.

Action video game training. The video game *Ultimate Marvel vs. Capcom 3 (UMvC3)* was chosen as the training task. Previous studies have deemed UMvC3 a sufficient AVG (Green & Bavelier, 2006). For a screenshot of gameplay and displays, please see Appendix E. The AVG training task consisted of players advancing through the arcade mode as many times as possible. Arcade mode allows players to select a team of three characters with which they must challenge a sequence of battles. The difficulty increases with each battle as the player progresses. Players were able to freely select their battle team each time. The total score (Cumulative score for all fights in the playthrough) was recorded after each arcade mode completion. For a comparison of the NAVG and AVG conditions, please see *Table 1*.

Non-action video game control. The video game *Little Big Planet II* was chosen as the control task. *Little Big Planet II* is a non-action video game oriented toward a puzzle-solving / platforming style gameplay experience. For a screenshot of gameplay, see Appendix D. The control task consisted of starting a new game in story mode and playing through levels at the player's pace. Players were asked to use only default character avatars so that no gameplay time is lost due to character customization. The player's score was recorded following the completion of each level.

Debriefing form. A debriefing form was provided for participants to review. The sheet explained the study's hypothesis after participants had completed all tasks and reminded participants of the researchers' contact information for questions or concerns. It also reminded participants of the Towson Counseling Center's contact information in case of distress caused as a direct result of participating in the current study (See Appendix D). After reading the debriefing form, participants were free to ask any questions of the researcher.

Procedure

Upon arrival, participants who met the criteria for participation were presented the informed consent form for review. Once the informed consent was signed, participants were assigned a randomized participant number and asked to sit at a computer desk in the gaming lab. The participant was then asked to read aloud the pre-test passages associated with their Latin square condition and answer all post-passage questions. The research used a concealed timer to capture how long it took for participants to read each passage and recorded those times on a participant grading sheet. The pre-test took 10 minutes to complete.

Once the pre-test was finished, participants moved to the PlayStation 4 which was set up within the same lab room. Participants then began playing the video game assigned to their particular condition. Control participants began a new story mode in *Little Big Planet II*. Participants in the training task began playing 'Arcade Mode' of *Ultimate Marvel vs. Capcom 3*. After the completion of each level in *Little Big Planet II*, as well as each arcade mode completion in *UMvC3*, participants' scores for the playthroughs were recorded. After a 55 min duration, a 10 min break was provided to all participants to avoid strain or boredom effects for novice players. Upon returning, participants in both groups picked up where they left off and continued playing from the level they were on prior to the break. Participants continued playing for a second 55 min duration.

Following the full two hours of gameplay, all participants moved back to the computer desk where they completed the reading post-test comprised of the remaining 5 Passages of their Latin square condition. This took approximately 10 min to complete. Upon completion of the post-tests, participants answered a self-report question assessing how many hours they *specifically* play action-oriented video games. Participants then reviewed the debriefing form. Once the debriefing form was fully read, participants had completed the study and were free to leave. The researcher then submitted an on-line confirmation of their participation to the Research Pool website to award course credit.

Once all data was collected, reading times were converted from seconds to a WPM score. Each participant had two averaged WPM scores; one for the pre-test and one for the post-test. A comprehension percentage was also calculated for each participant's pre-test and post-test. The pre-test and post-test values for speed and comprehension were compared for changes during data analysis.

Chapter Three:

Results

Reading Speed

Using pre-test and post-test scores, a 2 (AVG training vs NAVG training) x 2 (pre-test WPM rate vs. post-test WPM rate) Mixed Design ANOVA was performed on the data. The analysis indicated there was no significant difference between gaming conditions, $F(1,58) = .362$, $p > .05$; $\eta^2_p = .006$, observed power = .091. There was no significant main effect of time (pre-test vs. post-test), $F(1,58) = .979$, $p > .05$; $\eta^2_p = .017$, observed power = .164. There was also no significant interaction effect of condition and WPM changes from pre-test to post-test, $F(1,58) = .299$, $p > .05$; $\eta^2_p = .005$, observed power = .084. Graphing the data shows that those in the AVG condition experienced a slight increase from pre-test (*M* = 168.56, *SD* = 21.91) to post-test (*M* = 171.77, *SD* = 24.26). Those in the NAVG group also experienced a slight increase in reading speed from pre-test (*M* = 166.68, *SD* = 20.46) to post-test (*M* = 167.60, *SD* = 17.08). A graph of the data is presented in *Figure 1* below.

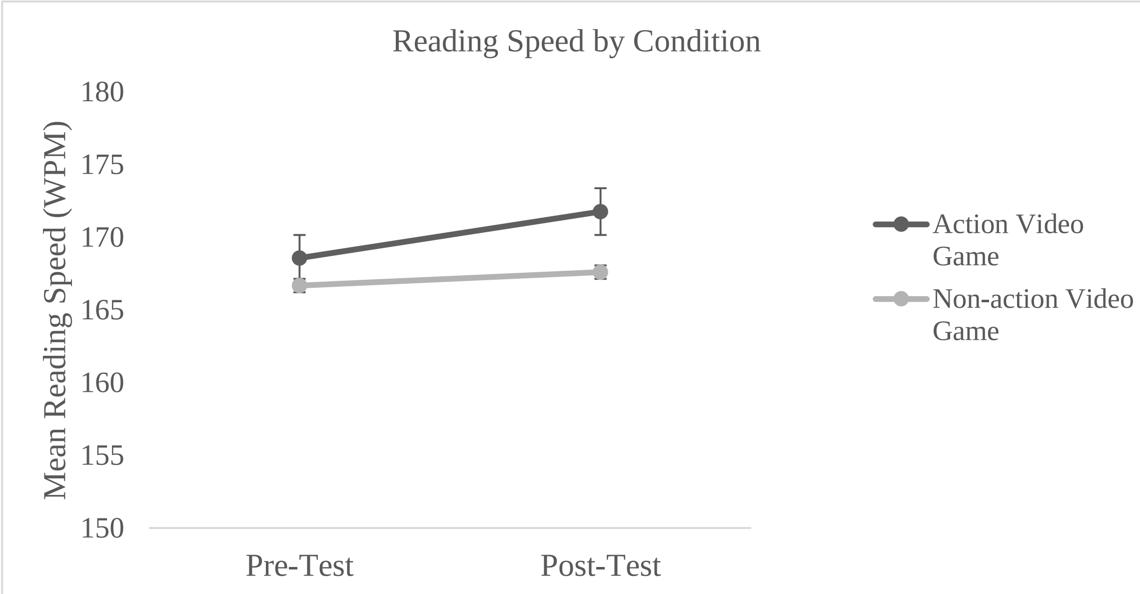

Figure 1. A graph of the reading speed data for both conditions. Although both groups indicated slightly faster reading rates on the post-test compared to the pre-test, neither group's improvement was significant.

Reading Comprehension

A second 2 (AVG training vs NAVG training) x 2 (pre-test comprehension percentage vs. post-test comprehension percentage) Mixed Design ANOVA was performed on the data. The analysis indicated no significant main effect of gaming condition, $F(1,58) = 2.131$, $p > .05$; $\eta^2_p = .035$, observed power = .300. There was no significant main effect of time (pre-test vs. post-test), $F(1,58) = 3.162$, $p > .05$; $\eta^2_p = .052$, observed power = .416. There was also no significant interaction effect of condition and WPM changes from pre-test to post-test, $F(1,58) = .003$, $p > .05$; $\eta^2_p = .000$, observed power = .050. Graphing of the data indicates that those in the AVG condition slightly increased comprehension scores from pre-test ($M = 60.88$, $SD = 17.85$) to post-test ($M = 65.77$, $SD = 17.45$). Those in the NAVG conditions also indicated a slight increase in comprehension scores from pre-test (*M* = 65.77, *SD* = 16.23) to post-test (*M* = 70.37, *SD* = 13.24). A graph of the data is presented in *Figure 2* below.

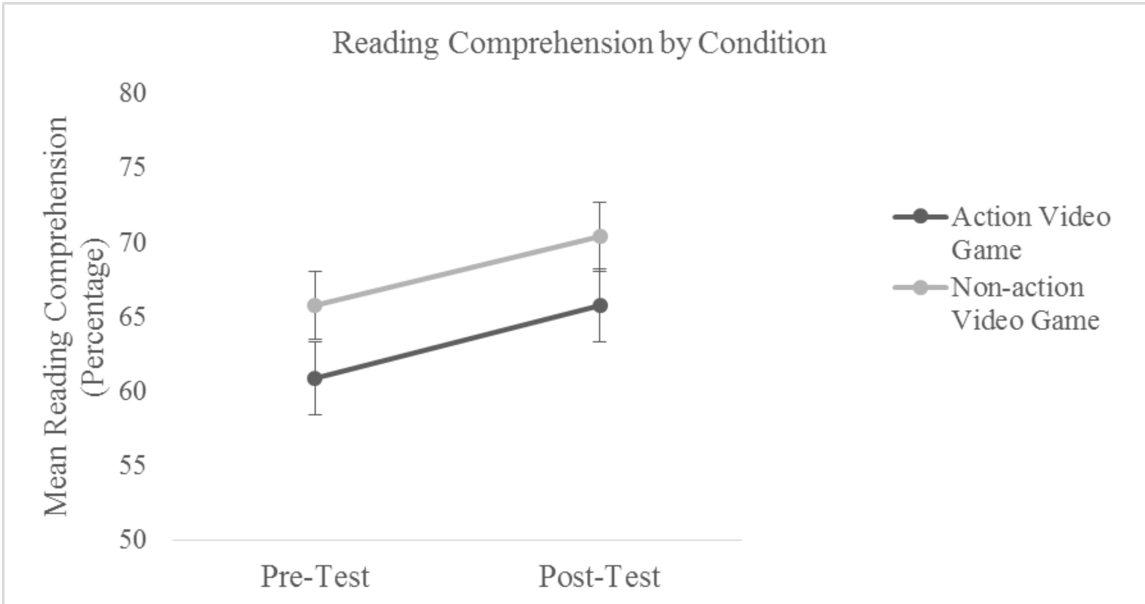

Figure 2. A graph of the reading comprehension scores for both conditions. Although both groups indicated a slight increase in comprehension scores, the increases were not significant.

Self-Report Gameplay Hours and Reading Speed

A linear regression analysis was performed using participants' pre-test reading speed and the number of hours they reported playing AVGs in a typical week to see if higher action video game experience is correlated with a higher baseline of reading performance. The regression was performed using participants' typical gameplay hours and their overall WPM score obtained from their pre-test. The linear regression analysis indicated no significant correlation between pre-test reading speed and average number of gameplay hours per week; $R^2 = .04$, $p > .05$.

Additional Analyses

In order to assess whether or not any biases within the reading measures may have influenced results, a second dataset file was created and all participants' passages were aligned such that Passage 1 for all participants was first regardless of Latin square order. That is to say that the passages were arranged in the order they appear in the KTEA-II regardless of each participants' reading order. Reading speed and comprehension scores for each individual passage were compared to observe whether or not any performance biases existed with the assessment measures. A One-Way ANOVA (9 levels, one for each passage) with WPM reading speed as a dependent variable was performed. Mauchly's Test of Sphericity was significant ($p < .01$), so Greenhouse- Geisser results were used. Analysis indicated a significant effect of passage number on reading speed, $F(6.384/376.683) = 108.012$, $p < .01$; $\eta^2_p = .647$, observed power = 1.000. A graph of the data is shown below in *Figure 3.*

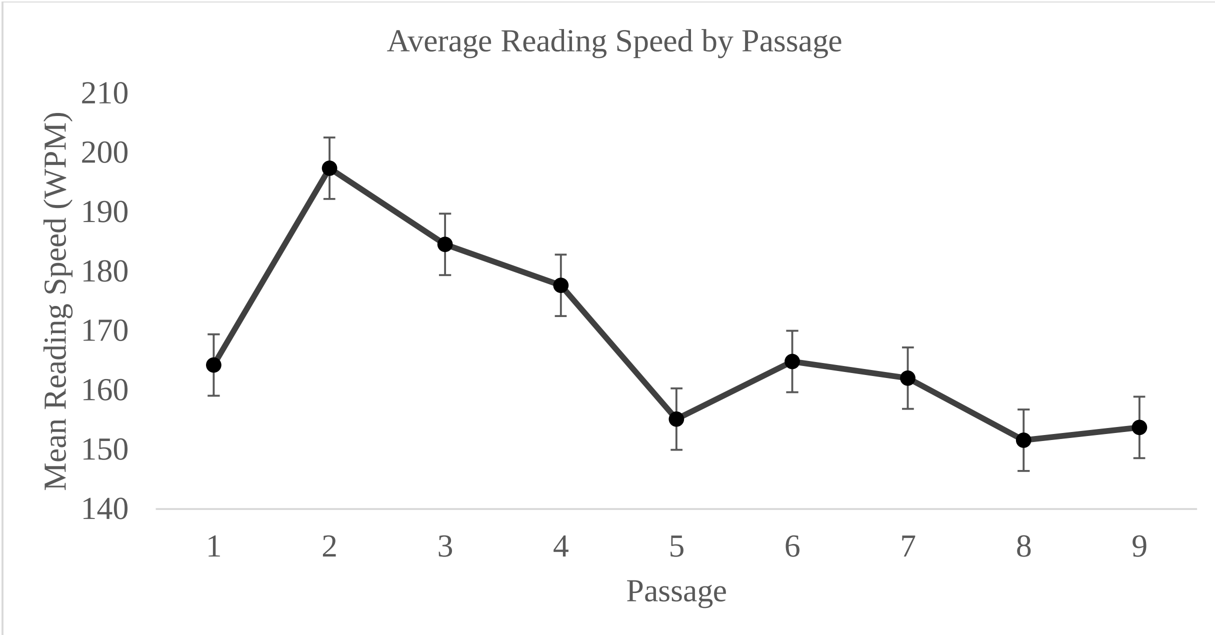

Figure 3. A graph displaying the mean reading speed for all participants on each reading passage. The graph indicates that Passage 2 was read observably faster than other passages, while passages 5, 8, and 9 produced slower reading speeds overall. This may have introduced confounds as participants who began on Passage 1 and had Passages 1-4 on their pre-test may experience a drop in reading speed since the post-test passages, Passages 5-9, had slower reading rates overall. Likewise, participants who began on Passage 5 may experience a reading rate increase on the post-test as their pre-test consisted of Passages 5-8, which were slower, and Passages 9-4 would comprise the post-test which would have the three fastest passages. Due to this bias, it is unclear what reading rate changes were due to Passage difficulty and what was due to reading speed improvement.

A second One-Way ANOVA (9 levels, one for each passage) was performed with reading comprehension percentages as a dependent variable. Mauchly's Test of

Sphericity was significant (*p* < .01), so Greenhouse- Geisser results were used. The analysis revealed a significant main effect of passage number on reading comprehension, $F(5.467/333.481) = 27.390$, $p < .01$; $\eta^2_p = .310$, observed power = 1.000. A graph of the data is shown below in *Figure 4.*

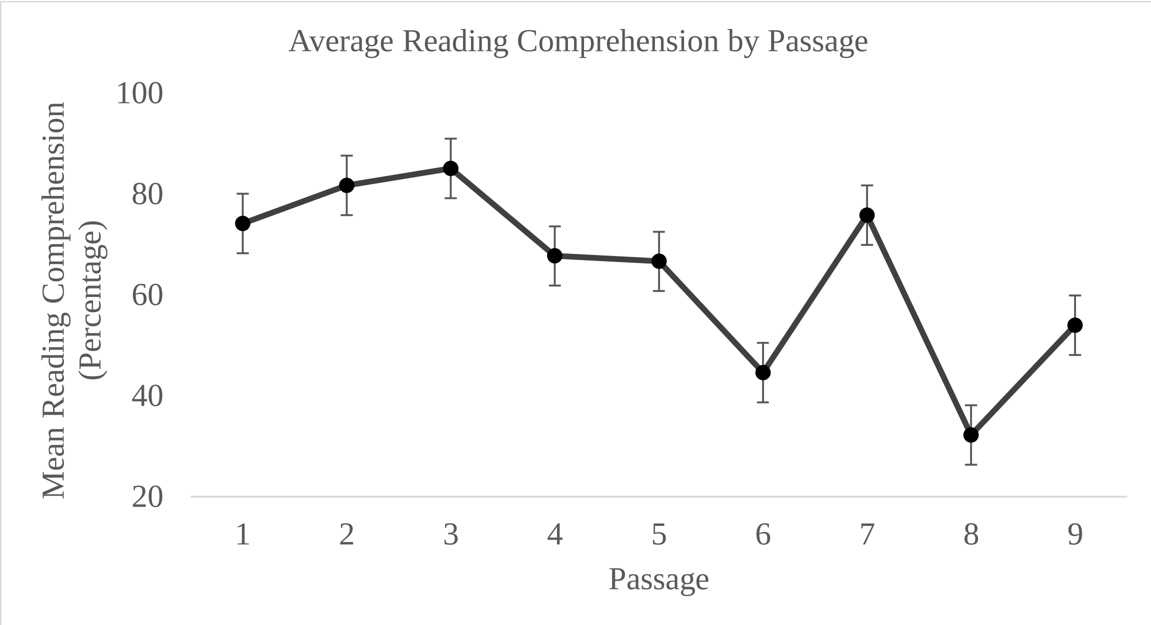

Figure 4. A graph displaying the mean reading comprehension percentages for all participants on each reading passage. The graph indicates that Passages 6 and 8 produced observably lower comprehension scores than other Passages, with scores as low as 44.62% and 32.25% respectively.

Chapter Four:

Discussion

Results of the data analysis do not support the original hypotheses. Although participants in the AVG condition experienced a slight increase in reading speed, there was no interaction effect of gaming condition and time (pre- vs. post-test) on reading speed. This suggests that although the AVG group experienced a small reading speed increase, the WPM increases were too small to be significant. However, analysis of reading comprehension indicated that neither video game group experienced a decrease in reading comprehension as a result of prolonged video game play. There was also no correlation found between self-report gameplay hours and base-line reading speed. It is important to note, however, that methodological limitations may have influenced the findings of the current study.

Limitations

The primary limitations to the current study lie in the exposure duration and the assessment measures used. The current study invited participants to play a designated video game based on their condition for a total of 110 min (55 min gameplay, 10 min break, 55 min gameplay). However, the methodology used in Franceschini et al. (2013) utilized a longitudinal design consisting of 12 hrs of gameplay spread across a one month timeframe. As such, it may be possible that a link exists between video game play and reading capabilities since both reading speed and comprehension increased for both conditions, but a 2 hr gameplay session was not enough to elicit a significant difference. Furthermore, Franceschini et al. only observed participants with dyslexia, thus the participant sample may have been more sensitive to intervention than non-clinical participants and the non-clinical participants may have been reading efficiently enough in the beginning that a ceiling effect occurred.

Additionally, the measures used may have created biases during analysis. The pre-screen questionnaire asked participants to give a self-report of how many hours a week they typically play action-oriented video games. However, the pre-screen did not ask participants to give a self-report on typical reading habits (e.g. “How many hours per week do you read book for leisure?” or “How many hours a week do you typically read course materials, such as textbooks, for class?”). Had reading habits been assessed, differences in reading rates that are due to practice in the specific task of reading could have been accounted for to better isolate the impact of action-oriented games.

It is important to note, however, that the studies which have found correlations between extended video game play and visual benefits often used ‘extreme groups’ samples by comparing participants who report several hours of gameplay per week to participants who do not play games at all. The present study used all participants in the regression analysis; some reported no gameplay, some reported a little gameplay (one to three hours per week), and others reported extended gameplay (nine or ten hours per week). Perhaps the use of all participants rather than only using the extreme ends affected the correlation findings. Other studies have also found little or no correlation between visual performance and video games when using non-extreme samples (Unsworth et al., 2015). It is possible that the association of visual performance and video game play is therefore exaggerated by the extreme-samples paradigm, but the empirical findings of Green and Bavelier (2006b) and Franceschini et al. (2012) suggest that this association requires more testing before any conclusions can be made.

The pre-screen was not the only measure which may have failed to capture adequate data. The KTEA-II was chosen due to controlled vocabulary and difficulty level. However, analysis of the reading passages themselves indicated bias in reading speed and comprehension rates. As shown in the results, there was a large discrepancy of reading rates between passages, with Passage 2 reaching a mean WPM rate of 196.79 WPM, and Passage 8 being as low as 149.91 WPM. In other words, participants read Passage 2 roughly 45 WPM faster than Passage 8. This may be due to unforeseen vocabulary or difficulty confounds. Similarly, analysis of reading comprehension showed that Passages 6 and 8 had post-passage questions that were noticeably less consistent for participants to answer correctly. These analyses indicate that the KTEA-II was not an appropriate choice for reading assessment.

Furthermore, participants were required to read aloud for the pre- and post-test reading assessments. However, reading aloud may have hindered current study results. Previous research has found fundamental eye movement differences between silent and oral reading; specifically, oral reading requires longer eye fixations (Ashby, Yang, Evans, & Rayner, 2012; Vorstius, Radach, & Lonigan, 2014) and may forcibly limit reading speed due to other processes, such as muscle coordination and control (Ashby et al., 2012). Furthermore, silent reading better utilizes perceptual span during reading tasks; those who read silently used significantly more parafoveal information than those who read aloud, indicating they were able to make better use of a wider visual perception span (Ashby et al., 2012). This effect of oral reading may have skewed study findings since the current study aimed to test reading improvement from an improvement in factors such as visual attention and perceptual span – but oral reading hinders perceptual span. This means that even if participants in the AVG condition were attaining improved / widened perceptual spans as hypothesized, the reading task methodology may have unintentionally capped their performance by hindering the use of the newly widened perceptual span.

Lastly, the games themselves elicited a different level of enjoyment from participants. While no data was recorded for significance testing, participants in the *Little Big Planet II* condition often reported enjoying the game, while participants in the *Ultimate Marvel vs. Capcom 3* condition often reported feeling bored and fatigued from ‘repetitive gameplay’. This difference in engagement / motivation may be due to the fact that *Little Big Planet II* have an overall story narrative while *UMvC3* does not, and this difference in engagement may have influenced findings due to fatigue or boredom effects.

Future Directions

The current study had some limitations: a relatively brief gameplay duration, uncollected self-report data for participants’ reading habits, the reading passages were not consistent in reading speed performance, the reading task required oral reading, and the games were not equivalent in overall engagement. Therefore, the present methodology should be adapted in future studies to address these issues.

First, at least one question should be added to the pre-screen questionnaire regarding how many hours participants read per week, such as reading textbooks for classwork or novels for leisure reading. This data may then be applied as a covariate to future analyses to eliminate any variance caused by practice on reading-specific tasks. Next, a longitudinal study with a total of at least 10 hours should be implemented to better reflect a 'gaming' experience. Few players play a game in one short duration; the average gamer plays roughly 8 hours through the course of a week (Entertainment Software Rating Board, 2010). Therefore, a longitudinal study would capture a more realistic gameplay experience and allow for more exposure to observe visual / reading differences.

Most importantly, however, it would be best to incorporate eye-tracking technology into the methodology to greatly expand upon the amount of data possible (e.g. eye fixations, fixation durations, saccade speed / length) as well as enable silent reading. This would allow for the examination of individual visual factors (e.g. attention, processing speed) and remove the visual restraints that oral reading imposes to more accurate observation.

Lastly, different games should be considered for training tasks. For example, *Portal*, a game which focuses on slow-paced puzzle-solving gameplay, and *Call of Duty*, a fast-paced AVG, may be used in place of *LBP2* and *UMvC3*. *Portal* and *Call of Duty* both use a first-person perspective camera, have similar controls, similar graphics, and an over-arching narrative to motivate players, but differ in the level of action and visual load. Incorporating a measure to objectively measure and test participants' enjoyment / engagement would also allow future studies to test whether or not engagement during gameplay can influence the visual results. Since the present study also found a slight reading speed increase even in a non-action game, it may also be best to incorporate a non-video game condition as an additional control such as watching an animated movie.

Conclusions

While the present study did not find any significant results, both reading speed and reading comprehension displayed a slight increase between pre-test and post-test tasks. This may indicate a promising area of research to understand how prolonged gameplay may be influencing visual tasks, such as reading, for gamers. Should future studies find that video games are an adequate method of increasing reading speed or comprehension in non-clinical samples, perhaps a reading training task may be developed to assist children and young adults who are experiencing slow reading development with video games.

APPENDICES

Appendix A

Pre-Screen Questionnaire

Participants will be screened based on gaming experience to exclude hardcore gamers and no gaming experience individuals. Occasional gamers will be used in the study. Participants with a history of seizures, epilepsy, repetitive motion injuries, or extreme motion sickness will also be excluded.

X indicates an exclusion answer

Attention: If you have a history of seizures, epilepsy, repetitive motion injuries, or extreme motion sickness you will not be able to participate in this study. Thank you for your interest.

1. Do you have a known history of motion sickness, epilepsy, or seizures?

   - Yes **X**
   - No

2. Do you have any known reading disabilities (such as dyslexia)?

   - Yes **X**
   - No

2. Are you opposed to playing violent video games?

   - Yes **X**
   - No

3. How often do you typically play console-based (PlayStation, Xbox, Wii) video games?

   - Never **X**
   - Annually
   - Monthly
   - Weekly
   - Everyday **X**

4. How many hours a week do you typically play console-style video games?

   - 0 **X**
   - 1 to 2
   - 3 to 4
   - 5 to 6
   - 7 to 8
   - 9 to 10

- 11 or more **X**

5. Please select all of the following games that you have played before.

- Call of Duty: Black Ops II
- Little Big Planet II **X**
- Halo: Reach
- Super Smash Bros. Brawl
- Marvel vs. Capcom 3 **X**
- Tekken Tag Tournament II
- Super Mario Bros. (Wii)
- Elder Scrolls: Skyrim

"THIS STUDY HAS BEEN APPROVED BY THE TOWSON UNIVERSITY INSTITUTIONAL REVIEW BOARD FOR THE PROTECTION OF HUMAN SUBJECTS"

Appendix B

INFORMED CONSENT FORM

PRINCIPAL INVESTIGATOR: **Peter Shlanta** PHONE: **(570) 225-5349** EMAIL: **pshlan1@students.towson.edu**

Purpose of The Study

The purpose of the study is to test whether or not a link exists between video games and reading capabilities in gamers since some games have been associated with changes to the visual system. While participating in the study may not benefit you directly, it will help psychologists better understand how video games may be influencing the gaming population and what particular influences they may have on reading abilities.

Participation

Participants will be asked to read a few passages and answer questions regarding said passages at the start of the study. Afterward, there will be a 2 hr video game session with a 10 min break provided after the first hour. Finally, participants will complete a second set of reading passages and follow up questions. The total duration of the study is estimated at 2.5 hours. Please note that you must be 18 years of age or older to participate.

Risks/Discomfort:

There are minimal risks involved with participating in this study. It is possible that you may feel discomfort due to the depictions of violence during gameplay or feel fatigue from extended play. If you become distressed as a result of participating in this study, we recommend that you contact the Towson University Counseling Center at (410) 704-2512.

Voluntary Participation:

Your participation in this study is voluntary, and you may withdraw participation at any time. You will not be penalized if you choose to discontinue or withdraw your participation. Should you withdraw your participation, any and all data you have contributed will remain anonymous and confidential.

Confidentiality:

All information you provide during this study will be kept anonymous and confidential. Any and all data you provide can only be identified through identification numbers, which are randomly assigned and thus cannot be traced back to you. Your name will never be associated with the data you have provided.

If you understand everything in this document, and agree to participate in this study, please *INITIAL* the statements and sign your name below.

_____ I am at least 18 years of age.
_____ I understand all data will be kept confidential.
_____ I have read the information on this form and I understand it.

_____ All questions have been answered to my satisfaction and understanding.

______________________________________ ____________________
Participant Signature Date

______________________________________ ____________________
Witness to Consent Procedures Date

Please be aware that the Institutional Review Board for the Protection of Human Participants at Towson University has approved this study. If you have any questions concerning this study, please contact Dr. Paz Galupo at pgalupo@towson.edu. Questions may also be directed to the Towson University Institutional Review Board Chairperson, Dr. Debi Gartland, at the Office of University Research Services, 8000 York Road, Towson University, Towson, Maryland 21252; Dr. Debi Gartland can also be reached by phone at (410) 704-2236.

Appendix C

Sample KTEA-II Passage

The term “motion picture” is a misnomer, for these pictures don’t move at all. Instead, a series of still pictures is flashed on the screen at the rate of about 20 per second. When we see a car crossing a movie screen, we are actually seeing a stationary image at one spot on the screen for less than one-twentieth of a second, then another still image for a split second a little further on, and so on. Our eyes never see the car in motion, but our brain puts these motionless pictures together, fills in the gaps, and tells us that it is moving. This phenomenon is called “stroboscopic motion” – apparent motion produced by a rapid succession of images that are stationary.

---

1. In what way is “motion picture” a misleading name?

2. How long does a person see each image in a motion picture?

3. What phrase best describes “stroboscopic motion”?

   a. The movement of a car across a screen

   b. A series of still pictures that seem to move

   c. A single picture of an object in motion

   d. The movement of film through a projector

Appendix D

NAVG Screenshot

A screenshot of Little Big Planet II during typical gameplay. The game incorporates a 3D side-view experience, but omits peripheral displays. The game is also slower due to its non-action platform style gameplay, focusing more on solving puzzles and jumping across platforms.

Appendix E

AVG Screenshot

Figure 2. A screenshot of typical gameplay during *Ultimate Marvel vs. Capcom 3*. UMvC3 has several peripheral displays: three ‘Health Meters’ (one for each of the player’s fighters) on the top left of the screen, an ‘X Meter’ in the top center-left of the screen, and a ‘Super Meter’ in the bottom-left of the screen. All of these displays then appear again, mirrored on the right side of the screen; this represents the ‘Health Meters’, ‘X Meter’, and ‘Super Meter’ of the opponents. A count-down clock is also featured in the top-center of the screen and other characters can jump onto the screen to attack the player at any time. A player must be simultaneously aware of all of the peripheral displays and enemies to be successful within the game. Quick, flashing animations also appear during attacks as seen above.

Appendix F

Debriefing Form

The purpose of the current study is to examine the relationship between action video game play and reading capabilities. Action video games have been linked to enhanced visual skills, such as selective attention and processing speed – all of which have been found to contribute to reading. The study is specifically studying whether or not playing action video games can improve a person's reading speed without causing a reduction in comprehension of the material. It also expects that participants completing *Little Big Planet II* will not increase their reading speed since it is not an action-oriented game.

Participants in the action game condition may experience a potential increase in reading speed from completing the study. Even if participants do not necessarily benefit personally, the overall goal is to contribute to our current knowledge of how popular games such as *Call of Duty* or *Halo* are affecting the reading skills of the players (if at all).

If there are any questions, comments, or concerns regarding the study, please contact Peter Shlanta at pshlan1@students.towson.edu or Dr. Galupo at pgalupo@towson.edu. If any distress or discomfort arose as a result of the study, please contact the Towson University Counseling Center at (410) 704-2512.

Appendix G

IRB Approval

TOWSON UNIVERSITY

EXEMPTION NUMBER: 15-X030

To: Peter Shlanta
From: Institutional Review Board for the Protection of Human Subjects, Peggy Korczak, Member (VS)
Date: Monday, November 24, 2014
RE: Application for Approval of Research Involving the Use of Human Participants

Office of Sponsored Programs
& Research

Towson University
8000 York Road
Towson, MD 21252-0001

t. 410 704-2236
f. 410 704-4494

Thank you for submitting an application for approval of the research titled,

Action Video Games as a Reading Training Task

to the Institutional Review Board for the Protection of Human Participants (IRB) at Towson University.

Your research is exempt from general Human Participants requirements according to 45 CFR 46.101(b)(2). No further review of this project is required from year to year provided it does not deviate from the submitted research design.

If you substantially change your research project or your survey instrument, please notify the Board immediately.

We wish you every success in your research project.

CC: Paz Galupo
File

	Little Big Planet II (NAVG)	***Ultimate Marvel vs. Capcom 3 (AVG)***
3D Graphics	**X**	**X**
Side-View Camera	**X**	**X**
Left, Right, Jump only movement	**X**	**X**
Fast-Paced Gameplay		**X**
Peripheral Displays		**X**
Flashing Attack Animations		**X**
Multiple On-Screen Enemies / Allies		**X**

Table 1. A comparison of the visual information between the NAVG and the AVG conditions. The fast-paced gameplay, multiple on-screen characters, and multiple peripheral displays provide a greater deal of visual information in the AVG condition than the NAVG condition. However, the core visuals, such as angles, graphics, and movement directions are similar between conditions. Therefore, the main difference between game conditions is the amount and speed of visual information, which has previously been associated with visual benefits.

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Education

Current	**M.A., Experimental Psychology**, Towson University Current GPA: 3.951 Expected Graduation Date: May 2015 Thesis: *Learning to read on the battlefield: Action video games as a visual training task to improve reading capabilities.* Committee: Dr.Paz Galupo, Dr. Kerri Goodwin, Prof. Jessica Stansbury
May 2013	**B.A., Psychology**, Bloomsburg University Overall GPA: 3.49 (3.56 Psychology) Undergraduate Thesis: *Influence of Musical Training on* Advisor: Dr. Jennifer Johnson
May 2011	**A.A., Psychology**, Lehigh Carbon Community College Overall GPA: 3.56, *cum laude*

Academic Honors

2014	Omicron Delta Kappa National Leadership Society
2014	Psi Chi, International Honors Society in Psychology *Towson University Chapter*
2011	Phi Theta Kappa National Honors Society

Research Interests

Visual attention; Visual system physiology; Influence of prolonged multimedia exposure on visual performance (e.g. video games); Reading & Literacy

Research Experience

Current	Towson University Psychology Department, Gaming Lab *Research Assistant, Supervisor: Prof. Jessica Stansbury* Towson University Psychology Department, Gender & Sexual Identity Lab *Research Assistant, Supervisor: Dr. Paz Galupo*
2012-13	Bloomsburg University Psychology Department, Johnson Lab *Research Assistant*

Acquired Research Skills

Extensive SPSS program experience; Basic E-Prime programming; Univariate and multivariate statistical analysis; Meta-analysis experience; Survey and experimental research designs; Analysis of large datasets; Poster presentation; Use of G*Power program; Literature Reviews

Conferences & Manuscripts

Shlanta, P.C. (Under Review) *Learning to read on the battlefield: Action video games as a visual training task to improve reading capabilities*. Poster submitted to the 2015 annual conference of the Association for Psychological Science (APS), New York, NY, USA.

Shlanta, P.C., Dr. Galupo, M.P. (MS in prep). *Social and cognitive predictors of rumination in sexual minorities.* Poster presented at 2014 Towson University Graduate Research Conference, Towson, MD, USA.

Teaching Interests

Intro to Psychology; Experimental Psychology: Methodology; Experimental Psychology: Applications; Cognitive Psychology; Sensation & Perception

Teaching Experience

2014 Teaching Assistant, Sensation & Perception, Towson University (PSYC 317)

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