AN ABSTRACT OF THE THESIS OF

Amanda L. Martens for the Master of Science

in Psychology presented June 24, 2013

Title: Exaggerated Gender Differences? Malleability of Gender Identity With Video Games

Abstract approved: _____

According to Baron-Cohen (2003), three brain types exist (Types E, S, & B), caused by biological differences in the brains of females and males. Contrary to Baron-Cohen's hypothesis, the similarities hypothesis proposes that differences are a consequence of social construction. To examine these competing hypotheses, this study measured the effect of assigning different identities in the form of a video game avatar (woman, man, and genderless) to men and women participants on measures of empathizing with brain type E, systemizing with brain type S, and balanced brain Type B (equivalent parts E & S). My participants were 124 undergraduate students from Emporia State University with 68 women and 56 men. I predicted participants would adopt the gender of the avatar by interacting with (video) and choosing items (survey) pertaining to empathizing or systemizing. Overall, the results supported my hypotheses and participants adopted the gendered behavior of the avatar regardless of their own. When participants' gender matched the avatar's gender, participants' results coincided with what Baron-Cohen's hypothesis. However, when participants' gender and the avatar's gender were miss-matched, results supported the similarities hypothesis and providing strong evidence that social construction plays a strong role in gendered behavioral differences.

EXAGGERATED GENDER DIFFERENCES? MALLEABILITY OF GENDER IDENTITY WITH VIDEO GAMES

_____

A Thesis

Presented to the Department of Psychology

EMPORIA STATE UNIVERSITY

_____

In Partial Fulfillment

of the Requirements for the Degree

Master of Science

_____

by

Amanda L. Martens

June 2013

Approved for the Department of Psychology

Approved by the Dean of the Graduate School and Distance Education

ACKNOWLEDGEMENTS

I would first like to thank my parents for their never-ending love, guidance, and support. Thank you, mom and dad, for teaching me to believe in myself: "No hill for a climber." Although a poor graduate student, I am rich in love and support of my family. I would also like to thank my friends as they have kept me sane. Particularly, I would like to thank my Kansas family: Whitney, Andrea, Thomas, Myles and Josh. Without them, I do not think I would have made it through the first semester of graduate school. I will always reflect fondly on our adventures and pranks (even when pulled on me). To Tausha, Mallory, Alena, and Danny, thank you for pushing me outside of my comfort zone, not only in time spent together, but also in the way I view the world. You were all instrumental in my growth and learning and never short on laughter and entertainment. Finally, I would like to thank Kyle Chamberland, without his patience, understanding, and support the last part of ESU would not have been as bearable.

Great thanks go to my colleagues Breanna Morrison and Caitlin Burk for their help on the pilot study and their invaluable input on my thesis. Special thanks go to Cathy Grover, my thesis chair, advisor, GTA advisor, and mentor for all of her guidance during my time at ESU. She has been an essential part of my growth and learning. I feel prepared for my next step in academia and I know that I would not be without her influence and instruction. I can only hope that I may repay and honor all she has done for me by passing on what I have learned to future students of my own. I would also like to thank the other committee members, Dr. John Wade and Dr. Pamelyn MacDonald for their feedback and guidance on this thesis. Additional thanks to Dr. Wade for adding balance, insight, and support to my ESU career.

TABLE OF CONTENTS

LIST OF FIGURES

FIGURE PAGE

CHAPTER 1

INTRODUCTION

Despite exhaustive efforts put forth by both men and women toward gender equality, sexism still exists. More importantly, women face the negative consequences of a sexist society caused by gender biases and stereotypes. Current research found that in academia, in which employees are to be objective and aware of gender biases, negative effects from gender bias is still a problem (Racusin, Dovidio, Brescoll, Graham, & Handelsman, 2012). Both men and women professors with identical fictitious graduate student applications (the only difference being the gender of the applicant one woman, one man), unfortunately succumbed to a gender bias and judged the woman applicant to be less competent, offered her lesser monetary funding, and offered less mentoring (Racusin et al., 2012).

The problem is not only for women in academia. According to the Bureau of Labor statistics, in 2011, women earned only 81 cents to every dollar men earned in 2010 (Bureau of Labor Statistics, 2011). This discrepancy transcends numerous job titles, positions and careers. Awareness of these biases is crucial considering they can directly transfer to real life disadvantages, such as the aforementioned example of significant salary discrepancies. Furthermore, there is a severe underrepresentation of women in academic jobs, the political sphere, and other high profile careers (National Foundation, 2009). This underrepresentation and discrepancy in pay is likely associated with a gender bias and its consequences (Zhang, Schmader, & Forbes, 2009). Past research has indicated that cultural stereotypes that portray women as less competent affect and shape people's biases (Devies, 1989). In a literature review, Zhang et al. (2009) thoroughly discuss how stereotypes diminish women's interest in certain fields and affect their

performance in men-dominate domains. Even more troublesome, problems associated with stereotypes do not end at work; other areas affected include parenting and relationships (Barnett & Rivers, 2004). Zhang et al. (2009) further their argument, by attesting these negative psychological and social effects may stem from the argument that there is underlying sex differences in ability. In Hyde's (2005) meta-analysis on gender "difference," she attested that the differences hypothesis (sex differences) dominates popular media. Additionally, she contends that by arguing for gender differences, theorists and researchers are essentially promoting people's stereotypes. Thus, a gender differences paradigm encourages gender stereotypes leading to gender biases and eventually a disadvantaged gender.

Hyde (2005) is not the only researcher arguing against the differences paradigm. In 11 different essays, feminist authors argue this belief in sex differences is leading to a belief that biology is destiny (Bluhm, Jaap, & Maibom, 2011). The belief that biology is destiny and abilities are innate may lead to serious disadvantages for both women and men (Bluhm et al., 2011). However, despite arguments that society constructs gender difference (Bluhm et al., 2011; Zhang et al., 2009) and data that support a similarities hypothesis (Hyde, 2005), the differences hypothesis dominates both popular culture and research. The book *The Essential Differences: The Truth about the Male and Female Brain* (Baron-Cohen, 2003) is an example of research and popular media consumed with the differences hypothesis. Baron-Cohen (2003) wastes no time in asserting the following: "The female brain is predominantly hard-wired for empathy. The male brain is predominantly hard-wired for understanding and building systems" (p. 1). As previously mentioned this type of statement can have serious social and psychological problems for both women and men. Fortunately, in *Hardwired for Sexism? Approaches*

to Sex/Gender in Neuroscience, authors Jordan-Young and Rumiati (2011) suggest a solution to the problem related to stereotypes and a hardwired paradigm. They conclude that researchers can combat this paradigm by designing experiments that show how invoking stereotypes can stimulate sex/gender differences that people usually accept as innate.

Review of the Literature

Differences Hypothesis

Specifically, the difference hypothesis argues that in terms of psychological, intellectual, and social skills men and women are very different (Hyde, 2005; Matlin, 1999). More importantly, according to Matlin (1999) this model calls for gender essentialism: Gender essentialism asserts that gender is a characteristic that resides within the individual. Therefore, all women innately share the same psychological, intellectual, and social skills or characteristics. Furthermore, this female innateness is then very different from male innateness. Innateness, or biological hardwiring, is not a novel idea. In the past, it was common to argue that women were the weaker sex/gender because of their biological make-up, for example; women, during menstruation, become intellectually incapacitated, a "phenomenon" called periodic function (Goodwin, 2008). Currently, there is a popular trend toward research on brain difference between the sexes (Bluhm et al., 2011). This occurs in popular culture with books such as *The Female Brain* (Brizendine, 2006), *Biology at Work* (Browne, 2002), and *Why Men Don't Listen and Women Can't Read Maps* (Pease & Pease, 2001) in which the authors argue that science *confirms* female brains are drastically different from those of male brains. Note that these are just a few examples; this is in no way an exhaustive list of popular culture examples.

Another aforementioned example of this science includes Baron-Cohen's (2005) extreme male brain hypothesis, in which he argues that the reason for a rising number of males with autism is that they suffer from an extreme male brain. Furthermore, also based on his work, he argues that because of cerebral difference, females are better able to empathize and men are better able to systematize (Baron-Cohen, 2003). Empathizing, according to Baron-Cohen, is the drive to understand another person's emotion and respond to him or her accordingly, whereas systemizing is a drive to construct a system, analyze and explore. To support his claim, Baron-Cohen sets aside entire chapters of examples such as communication style, pretend play, building and coping systems, and attention to detail. A notable example he references is a study in which researchers recorded how long newborn infants looked at a mobile compared to a face. However, it is difficult to verify Baron-Cohen's interpretation of the study, as he does not provide a citation or reference. Researchers in this study, according to Baron-Cohen (as he states on p. 54 that it is hard to get the actual data), found that infant males look at the mobile longer than the face and infant females look at the face longer than the mobile. This example is noteworthy because he uses the study to refute gender as social construction and support his theory of brain types. There is an immediate draw for boys to the non-personal and they therefore, innately have a systemizing brain. Girls spend more time looking at the face and are therefore, innately drawn to the personal, or are hardwired for empathy. Furthermore, he uses it to argue that from the beginning, individuals are paying attention to different aspects of their environment as consequence to their gender. This attention to different aspects of the environment is evidence for Baron-Cohen that different brain types exist. This is the only study Baron-Cohen uses as evidence in which

an actual experiment tried to control for environmental variables; other evidence Baron-Cohen presents is predominantly anecdotal in nature.

In another example of attention to the environment, Baron-Cohen (2003) references that as children grow, boys play with building blocks and put things together; conversely, girls play with "dolls, jewelry, and dressing up" (p. 29-30). To test this empirically, the researcher makes a choice of toys available, and watches to see which toys a child picks. According to Baron-Cohen's uncited reference to research, boys are spontaneously more likely to pick toys that have to do with systemizing, such as building blocks and girls are spontaneously more likely to choose toys that have to do with empathizing, such as dolls. He uses these examples and many others as evidence to support his central claim: On average, more males than females have a systemizing brain, or brain type S, and more females than males have an empathizing brain, or brain type E. Additionally, he argues that you can measure the differences between individual's skills of empathizing and systemizing the same way you can measure someone's height. He gives formulas for this measurement and brain categorization. There are three brain types according to Baron-Cohen: Type E, Type S, and Type B. For those in which empathizing is stronger than systemizing, E > S, or a female brain equals a brain type of E. For those in which systemizing is stronger than empathizing, S > E, or a male brain equals a brain type of S. Finally, for those in which systemizing and empathizing are equal, S = E, or a balanced brain equals a brain type of B.

To summarize, according to Baron-Cohen, there are three brain types based on different abilities. These abilities are due to biology or innateness and evidence for these different brain types is in what an individual spontaneously pays attention too and how

they act. I have not covered all of the evidence presented or research done by Baron-Cohen, only that which is pertinent to this experimental study.

Similarities Hypothesis

Contrary to the differences hypothesis, the similarities hypothesis states that women and men are more alike than they are different (Hyde, 2005; Matlin, 1999). To evaluate the gender similarities hypothesis, Hyde (2005) collected previous major research studies on psychological gender differences and conducted a meta-analysis. She found that the effect sizes were extremely small in past studies evaluating gender differences. Furthermore, she found evidence that supported the similarities hypothesis; women and men were more alike than they were different.

Researchers who follow the similarities hypothesis argue that social forces are creating differences, not biological innateness or destiny (e.g., Bluhm et al., 2011; Hyde, 2005). Matlin (1999) attests there are three scenarios in which gender differences are most likely to occur: (a) When people evaluate themselves over an objective evaluation, (b) in real-life situations over laboratory settings, (c) when people are aware that others are evaluating them. Moreover in these situations, Matlin argues that woman tend to behave in a way woman are *supposed* to behave; men tend to behave in a way men are *supposed* to behave. According to Matlin, people behave in a stereotypical manner.

Recently, researchers have identified negative effects that accompany stereotypes, or as they identify it, stereotype threat (Spencer, Steele, & Quinn, 1999). Stereotype threat refers to the uncomfortable experience of being in a situation in which one faces the judgment associated with one's socially constructed group (Spencer et al., 1999). When emphasizing men and women's commonalities rather than their differences, the previous negative effects of stereotype threat disappeared (Rosenthal & Crisp, 2005).

Women did just as well as men on a performance task (e.g., math tests) when not under stereotype threat. Similar to Hyde's meta-analysis, this finding disputes the argument of the differences hypothesis and supports that of the similarities hypothesis.

Identity, Deidentification, & Stereotypes

As stated previously, in social situations, people tend toward stereotypical behavior. Rather they act how people expect them to act (Matlin, 1999); however, it does not infer they actually associate with that social identity. Research found that women perform worse than men when they consider their socialized gender to be important to their identity or social-definition (Schmader, 2002). Furthermore, Hoffman (2006) found that individuals with strong gender identity, meaning they identify strongly with either the feminine or the masculine gender, believe that their gender is of great importance to their identity. Additionally, research found that under stereotype threat, women with a strong gender identity performed far worse in mathematics compared to their female counterparts who did not identify strongly with their corresponding gender (Keller & Molix, 2008). Although this offers important evidence to the similarities hypothesis, it also promotes a new way in which to counter stereotype theat. Detach the person's gender identity from what society deems as their appropriate gender and the differences should disappear.

Lightdale and Prentice (1994) attempted and accomplished this feat. They essentially detached the people from their socially constructed gender identity using a process called deindividuation. According to Zimbardo (1969), deindividuation occurs when people lose their individual identity or become anonymous. This gives the person the freedom to act without conforming to social expectations or norms. In Lightdale and Prentice (1994) research, half of the participants were in an individuation condition in

which they identified themselves by name, wore large nametags, answered personal questions, and sat physically near the researcher. The purpose of the procedure was to make the person blatantly aware of their identity and gender. The other half of the participants were in a deindividuation condition in which they did not identify themselves by name, did not wear a nametag, did not answer any personal questions, and were physically distant from the researcher. Participants were aware that the experiment only required half of them in a monitored situation and the other half in an anonymous situation. In the group in which the participants were blatantly aware of their identity, women performed significantly less aggressively than men did, suggesting awareness of anonymity was very influential. The researchers operationally defined aggression as the number of bombs dropped in a video game. When the participants believed that their behavior was anonymous, women behaved more aggressively (i.e., they dropped more bombs) than the woman not in an anonymous situation. However, the women in the anonymous situation did not drop significantly more bombs than men in either condition; therefore, according to the operational definition set by the researchers, there were no significant differences in aggression between the genders (Lightdale & Prentice, 1994). Anonymity seems to be the major component of deindividuation (Silke, 2003). Schmader (2002) hypothesizes the unlinking of personal identity from performance reduces the effects of stereotype threat.

Virtual Reality & Avatars

With advances in technology, new ways of unlinking a personal identity from performance may be possible. Virtual environments are providing a new arena in which social research can occur, allowing researchers to cross boundaries that were impossible before such technology existed. Furthermore, in virtual realities people can create virtual

representations of themselves called avatars. In 2007, Yee and Bailenson found the visual appearance of an avatar alters the behavior of the controller/player. When researchers assigned participants taller avatars, players behaved more confidently in a negotiation task than those with shorter avatars (Yee & Beilenson, 2007). In a different study, the same researches used immersive virtual reality to test if placing a participant in a body of an elderly person would affect their attitudes toward the elderly (Yee & Bailenson, 2006). They did this by having participants view themselves as an avatar with elderly features in a virtual mirror. After the immersion in an avatar, participants completed a word association task, indirect attitude questionnaire, and an ambiguous story test. Participants immersed in the elderly avatar performed significantly better in the word association test, and the researchers were pleased that some aspects of attitudes toward the elderly changed due to the immersion in an elderly avatar.

When Guadagno, Muscanell, Okdie, Burk, and Ward (2011) used Second Life (a fictional 3-D virtual world created entirely by its users; Linden Research, Inc., 2003) men and women using avatars reported behaving in a way that was consistent with traditional gender role expectations. Women reported meeting more people and men reported building more. Guadagno et al. concluded that even when participants had the freedom to act anonymously in an unusual environment, men and women still behave in a way that appears to confirm social expectations. It is important to note that the gender of the avatar predominantly matched the gender of the participant and all data was self-reported.

Another study concerned with avatar behavior found that men overcame their inhibition for help seeking by using online, women avatars (Lehdonvirta, Nagashima, Lehdovirta, & Baba, 2012). Essentially, under the guise of women avatars the men participants did not have to abide by the expectations of their gender and were able to

seek needed help. Taking a step further, Palomares and Lee (2010) tested if men and women would alter their use of gender-based language if researchers randomly assigned gendered avatars. When the participants' gender matched that of the avatars gender, the participants used gender typical language. However, when the participants' gender did not match the avatars, the participants used the gendered avatars typical language.

Pilot Study

The purpose of my Emporia State University IRB approved pilot study (Appendix A) was to measure the effect of assigning identities in the form of video game avatars to participants on measures of aggression. More specifically, the purpose was to test the malleability of gender when participants designed their own avatar. Past research has indicated that aggression can be measured using video games (Lightdale & Prentice, 1994). Although Yee and Bailenson (2006) have shown gender malleability with an avatar and Lightdale and Prentice (1994) have shown gender differences measuring aggression, this pilot was unique in that it combined the independent variable of avatars and the dependent variable of aggression. By using this particular method, I expected to show that gender differences (i.e. men are aggressive, women are not aggressive) are more associated with social construction than biological factors. This is crucial when considering the negative consequences associated with a biological model.

My participants were 45 students (24 men, 21 women) enrolled in undergraduate psychology courses at a small Midwestern public state university. Students, ages roughly ranging from 18 years old to 22 years old, voluntarily signed-up to participate in the Psychology Research Participant Pool in Blackboard. The class status of the participants was primarily freshmen and sophomore students. They received one course research credit for every hour they participated.

The materials included three mission statements, character sheet(s), coloring and drawing utensils, modified Half-Life 2 computer video game, Camtasia software, headphones, and a Curved Desktop Copy Holder. The headphones were ED1TC Stereophone's with adjustable headband and plastic ear cushions for multiple user environments made by Koss Corporation. The Curved Desktop Copy Holder, designed for letters-and legal-size documents, is a Staples product. Camtasia is a screen capturing and recording device for Windows PC (1 for ALL Software GmbH, 2012).

My pilot design was a 2 Participants Gender (WP, MP) x 3 Avatar Gender (WA, MA, & GA) factorial experiment with the dependent variable of aggression (how many times they shot a creature after it was dead). My colleagues or I read and gave each student an informed consent form (Appendix B), then randomly assigned the men and women participants to individual small rooms with a computer with one of the following three avatar conditions: woman avatar (WA), man avatar (MA), genderless alien (GA). The character sheet (Appendix C) required drawing the assigned avatar (WA, MA, GA) and describing the avatar's characteristics (e.g., height, age). The modified Half-Life 2 computer video game involved navigating through an unfamiliar environment, jumping or taking a ladder down to a separate floor, shooting a monster with a gun, and collecting the mission number. Based off Lightdale and Prentice's (1995) study in which the number of bombs dropped equaled the measure of aggression, for my pilot study I operationally defined aggression as the number of bullets shot into a monster after it was dead. Once participants turned in the mission number, we debriefed them (Appendix D). The purpose of the mission number was to make sure the participants and the researchers knew the task was completed.

Statistical analyses revealed there was a non-significant effect of Participant Gender on the measure of aggression, $F(1, 39) = .03$, $p = .87$ (men: $M = 3.79$, $SD = 4.53$, $n = 22$; women: $M = 3.33$, $SD = 4.96$, $n = 23$; see Figure 1). The main effect of the Avatar Gender was not significant, $F(2, 42) = .43$, $p = .66$ (WA: $M = 3.67$, $SD = 4.17$, $n = 15$; MA: $M = 2.46$, $SD = 2.9$, $n = 13$; GA: $M = 2.82$, $SD = 3.50$, $n = 17$). Additionally, there was not a significant interaction between Avatar Gender and Participant Gender, $F(2, 39) = .46$, $p = .63$. Therefore, the data did not support my pilot study hypothesis. For exploratory purposes, I analyzed other measures of aggression. Many participants continued shooting after their ammo was gone and shot inanimate objects. However, all exploratory analyses were non-significant (all ps > .05).

In this preliminary study, I concluded that drawing an assigned avatar (WA, MA, GA) and playing as a first person was not salient enough to cause the participant to adopt the randomly assigned identity with our small sample. Nevertheless, aggression did not differ significantly between women and men participants. If there is a difference in aggression levels, it was not strong enough to appear in this study, showing that gender stereotypes, such as men being more aggressive than women may be over-exaggerated. Because there were no differences between women and men participants in aggression, I concluded that the effect of being anonymous (in an individualized room with no one watching) might have allowed women to act without social constraints permitting for minimal behavioral differences between the genders.

Based upon this preliminary study and participants' interviews my subsequent thesis examined a more salient independent variable, included more participants and took place in a group environment (all computers were in the same room). Because the participants played Half-Life as a first-person character (could not see their avatar on

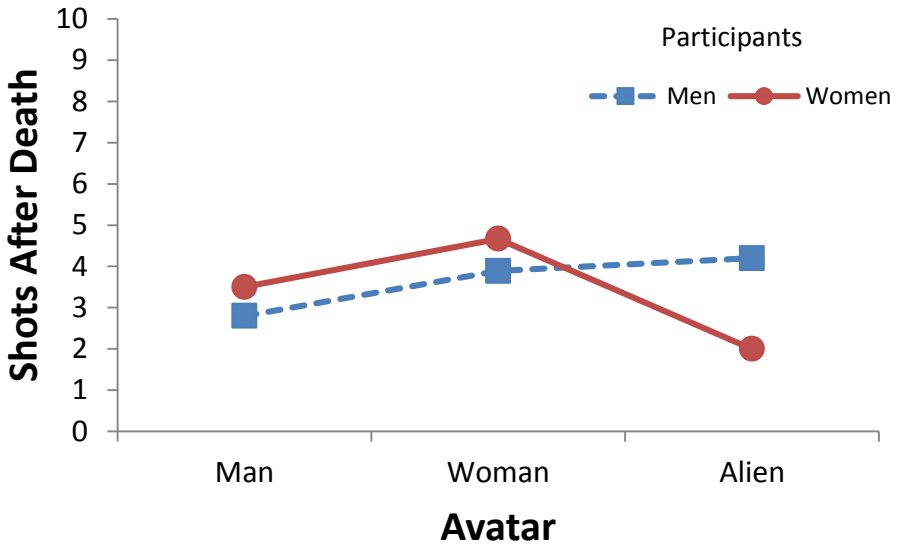

Figure 1. Mean number of shots fired at the monster by men who assume the role of man avatar (n = 5), men who assume the role of woman avatar (n = 8), men who assume the role of alien avatar (n = 9), women who assume the role of man avatar (n = 6), women who assume the role of woman avatar (n = 10), and women who assume the role of alien avatar (n = 7).

screen); I utilized a third person avatar. Meaning, the participant used the avatar in the game rather than drawing their own.

Summary

According to Baron-Cohen (2003), three brain types exist (Type E, S, & B), caused by biological differences in the brains of females and males. Researchers who support a similarities hypothesis, argue that Baron-Cohen's differences or innateness paradigm has severe consequence for both women and men, and find fault with his evidence and reasoning (e.g.,Bluhm, Jaap, & Maibom, 2011; Hyde, 2005). Jordan-Young and Rumaiti (2011) suggest that to combat these consequences, researchers must design studies that invoke stereotypes to simulate sex/gender differences the public accepts as innate. Past research found that identifying with the feminine gender is enough to invoke negative consequences such as poor performance on a math task, caused by stereotypes, or stereotype threat (Hoffman, 2006). Furthermore, when researchers emphasize commonalities between men and women (Rosenthal & Crisp, 2005) or do not associate the participants' gender with performance (Lightdale & Prentice, 1994) no differences occur between men and women. A newer way in which to research gender and gender roles is using virtual reality and avatars. Some research has found that participants will behave in a gender typical way in a virtual reality environment (Guadagno et al., 2011). Additionally, participants will behave in a manner typical of the avatars' gender even when the researchers have assigned an avatar opposite of the participants' gender (Palomares & Lee, 2010).

To provide additional evidence consistent with the similarities hypothesis and contrary to Baron-Cohen's innate brain types, I measured the effect of assigning different identities in the form of a video game avatar (WA, MA, & GA) to participants on

measures of empathizing (e.g., shopping, communicating, playing with dolls, & putting on make-up) and systemizing (e.g., building, blocks, playing sports, & violence). As the pilot study avatars were not salient enough, I utilized a different online, computer video game Second Life, (Linden Research Inc., 2012) in which the participant could actually see the avatar. In support of the similarities hypothesis, I predicted that all participants would adopt the gender of the avatar regardless of their own gender and the display the behavior associated with that gender. More specifically, the following were my predictions:

Hypothesis 1: Women participants (WP) as a woman avatar (WA) will result in a percentage that indicates brain Type E.

Hypothesis 2: Women participants (WP) as a man avatar (MA) will result in a percentage that is indicates brain Type S.

Hypothesis 3: Women participants (WP) as a genderless avatar (GA) will result in a percentage that is most closely associated with brain Type B.

Hypothesis 4: Men participants (MP) as a woman avatar (WA) will result in a percentage that indicates brain Type E.

Hypothesis 5: Men participants (MP) as a man avatar (MA) will result in a percentage that indicates brain Type S.

Hypothesis 6*:* Men participants (MP) as a genderless avatar (GA) will result in a percentage that is most closely associated with brain Type B.

CHAPTER 2

METHOD

The purpose of this study was to measure the effect of assigning different identities in the form of a video game avatar [woman (WA), men (MA), genderless (GA)] to participants on measures of empathizing with brain type E, systemizing with brain type S, and balanced brain Type B (equivalent parts E & S). In this study, I utilized an online computer video game, Second Life that I constructed to have equal components of the evidence for Baron-Cohen's (2003) empathizing (Type E) and systemizing (Type S).

Participants

My 146 student participants enrolled in undergraduate psychology courses at a small Midwestern public state university voluntarily signed-up in the Psychology Research Participant Pool in Blackboard. They received one credit for every hour they participated. However, out of the 146 participants, I only had viable data from 124 participants with 68 women and 65 men. Reasons for not including participants' data include not completing the game, not following directions, changing the gender of the avatar, or having incomplete screen recordings.

The average age of the participants was 20.61 years (SD = 3.26, N = 124). The participants' class status comprised of 58 freshman, 30 sophomores, 18 juniors, and 15 seniors. The sample consisted of people of Caucasian (67.74%, n = 84), African American (10.48 %, n = 13), Hispanic/ Latino (7.26 %, n = 9), Mixed (5.65 %, n = 7), Asian (5.65%, n = 7), Native American (0.81 %, n = 1), Romanian (0.81 %, n = 1), Arabian (0.81%, n = 1) and a participant reported other (0.81 %, n = 1) descent.

Materials

This study utilized Second Life (Linden Research Inc., 2012) and Camtasia (1 for ALL Software GmbH, 2012). Second Life is an online 3-dimensional, virtual world in which the user designs avatars and the environment. Rather than the participants, I designed three avatars (WA, MA, & GA) and the environment. Because this university consists primarily of Caucasian students, I designed the man and woman as Caucasian. The genderless alien resembled no race (Appendix E). I used the evidence Baron-Cohen (2003) referenced to construct the environment in Second Life with equal parts evidence for brain Type E (doll and crib, vanity with make-up and jewelry, telephone, options for shopping, options for changing the avatars clothing) and brain Type S (soccer ball and net, instrument, blocks, weapons, and options for building objects) in a virtual reality house. All nine computers had exactly the same house with the exact same items in each house. I placed each item in the same place in each house. The only thing different in the house was the avatar. Similarly, all participants' avatars started in the same place in each house. As Baron-Cohen noted, evidence for the brain types is in what the person spontaneously pays attention too, this study operationally defined "paying attention too" as the attempt to interact with objects in the environment by clicking the object with the mouse**.** This study used Camtasia, the screen-capturing tool, to record data. Note, I locked each house to prevent other online users from entering and blocked each door to try to prevent participants from leaving.

Packet 1 (Appendix F) served as a deception in the experiment and familiarized the participant with the controls and their avatar identity. The packet indicated participants were helping to improve the game by playing and providing information (writing about the avatar and describing its characteristics), and the packet served as a

manipulation check. As the gender identity is crucial, Packet 1 made sure the participants were paying attention to the gender of the avatar. Packet 2 (Appendix G) had 14 multiple-choice questions ["Currently, your (avatar) career is (Circle One): Counselor, Lawyer, Nurse, Engineer"]. I constructed the multiple-choice answers from equal parts brain Type E (e.g., doll, tea set, shopping, secretary, nurse, fiction) and brain Type S (e.g., legos, trucks, playing sports, technicians, lawyer, nonfiction), 4 open-ended questions about improving the game and a page for writing a story about him or herself as the avatar for filler. The packet informed participants that there was not enough time to improve the environment while they were there, but that the information they gave on the survey would help improve the game. The demographic survey (Appendix H) included gender, age, race, class status items, and 4 questions about participants' experiences with video games ("About how many hours a week do you play video games?") and SecondLife ("Have you ever had experience with SecondLife?").

Design

My design was a 2 Participants Gender (WP, MP) x 3 Avatar Gender (WA, MA, & GA) factorial experiment. The truly independent variable was the gender of the avatar and the categorical (measured) independent variable was the gender of the participant. The dependent variables were the percent time interacting with Type E objects and the percent time interacting with Type S objects in the game and the summation of answers on the survey indicative of empathizing (brain Type E) or systemizing (brain Type S).

Procedures

Before proceeding with the study, I gained IRB approval (Appendix I). After participants arrived, I read and gave each student an informed consent form (Appendix J) and collected the signed forms prior to beginning any experimental procedures to ensure

confidentiality. Then I randomly assigned the participants to one of three avatar conditions (WA, MA, & GA) and assigned each to one of nine computers. I told participants to read the instructions on the screen (NOTE: For the duration of this research, it is important that you do NOT leave this program. MORE IMPORTANTLY, it is important that you DO NOT leave your virtual reality world) and handed them Packet 1. The instruction's primary purpose was to protect participants from online predators and keep participants in the house for measurable data (interacting with objects). Participants had an hour to participate in the world of Second Life and finish the packets. After half an hour, I distributed Packet 2 and instructed them to read the directions. After participants finished Packet 2, they received and completed the demographic sheet. Finally, I debriefed the participants (Appendix K).

CHAPTER 3

RESULTS

Baron-Cohen (2003) stated that on average, more males than females have a systemizing brain, or brain type S and more females than males have an empathizing brain, or brain type E. Additionally, he argued that the differences can be measured between individual's skills of empathizing and systemizing the same way a person can measure someone's height. He gave a formula for this measurement and brain categorization. There are three brain types according to Baron-Cohen: Type E, Type S, and Type B. For those in which empathizing is stronger than systemizing, E > S and a female brain equals a brain type of E. For those in which systemizing is stronger than empathizing, S > E and a male brain equals a brain type of S. Finally, for those in which systemizing and empathizing are equal, S = E and a balanced brain equals a brain type of B. Therefore, to test his overall hypothesis that there are men and women differences for Type E, Type S, and Type B with how the use of different gendered avatars might affect participants, I ran separate factorial ANOVA's on both the percentage of time spent with objects in the video game and items selected on the survey.

Empathizing Brain Type E

To test his overall hypothesis that there are men and women differences for Type E with the use of different gendered avatars, I performed a 2 Participants Gender (WP, MP) x 3 Avatar Gender (WA, MA, & GA) factorial ANOVA on percent of time participants spent interacting with objects in the video game using SPSS. The interaction between participant gender and avatar gender resulted in non-significance, $F(2, 118) = .39$, $p = .68$. However, the main effect of avatar gender, $F(2, 118) = 56.40$, $p < .001$, with a large effect size partial $\eta^2 = .50$, and the main effect of participant gender, $F(1, 118) =$

14.25, $p < .001$, with a medium effect size partial $\eta^2 = .11$ were significant (see Figure 2 Top).

Similarly, for the survey, the interaction between participant gender and avatar gender resulted in non-significance, $F(2, 118) = .2.35$, $p = .10$. However, the main effect of avatar gender, $F(2, 118) = 1.07$, $p < .001$, with a large effect size partial $\eta^2 = .35$, and the main effect of participant gender, $F(1, 118) = 24.66$, $p < .001$, with a large effect size partial $\eta^2 = .17$ were significant (see Figure 2 Bottom).

In other words, women spent a greater percentage of time with and selected a greater percent of empathizing objects. Additionally, regardless of participant gender, participants spent a different percent of time interacting with and selected a different percent of empathizing items as the different types of avatars. Participants spent more time with empathizing objects and selected more empathizing items as the woman avatar.

To address each specific hypothesis, I ran separate One-Way ANOVAs on percent time spent interacting (attempt to use objects) with Type E objects and percent items selected on the survey by participants (WP) and men participants (MP) in the three avatar conditions: woman avatar (WA), man avatar (MA), genderless alien (GA). To eliminate researcher bias, I coded Camtasia in such a way that while recording data I did not know if the participant was a woman or a man.

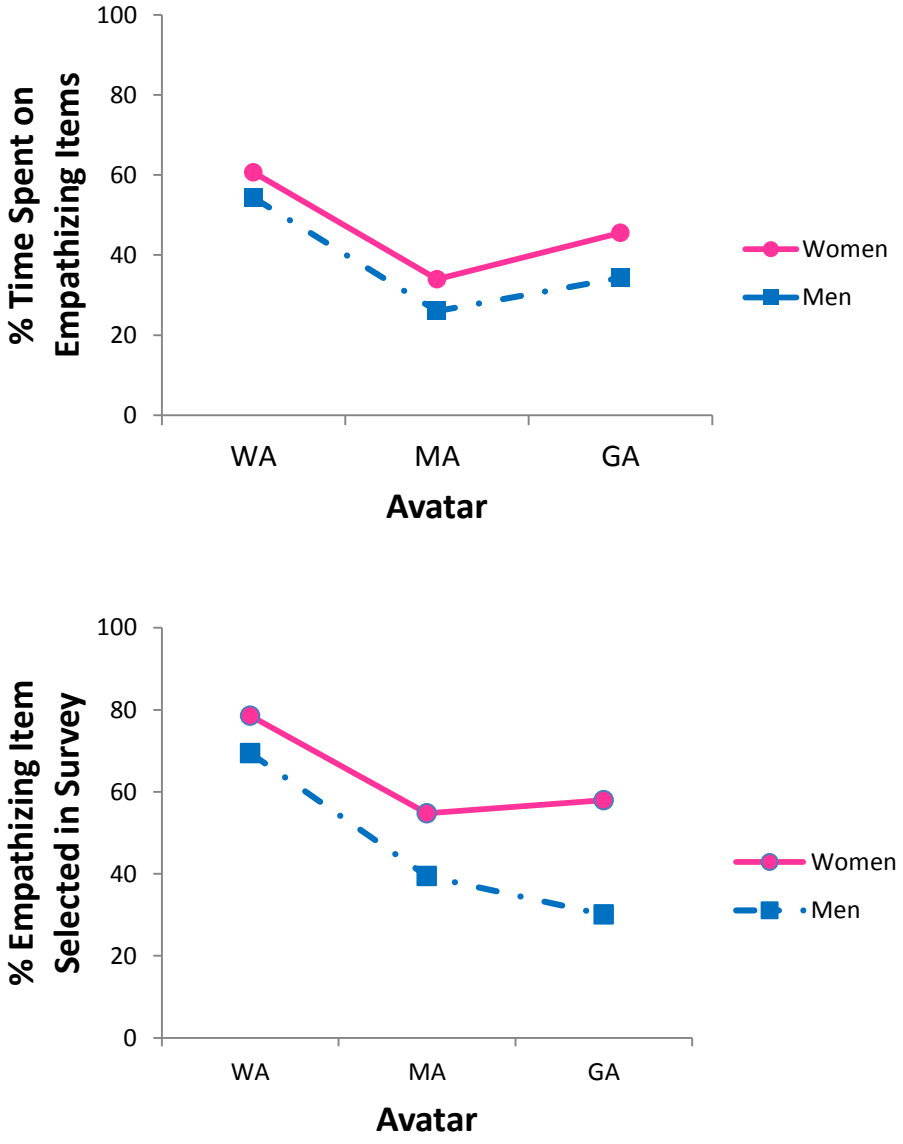

Figure 2. Top: Mean percent of time participants interacted with empathizing objects in video game. Bottom: Mean percent of items selected in the survey. WP as WA (n = 27), WP as MA (n = 15), WP as GA (n = 26), MP as WA (n = 18), MP as MA (n = 27), and MP as GA (n = 11).

Hypothesis 1: WP as WA will result in percentages that indicates brain Type E

The effect of avatar gender on women participants' percentage of time interacting with empathizing (Type E) items was significant, $F(2, 65) = 24.37$, $p < .001$, with a large effect size, partial $\eta^2 = .43$. Post hoc tests indicated (Tukey; *ps* < .05) WP playing WA spent more time ($M = 60.68\%$, $SD = 13.86\ \%$, $n = 27$) on empathizing items than both WP playing MA ($M = 33.95\%$, $SD = 11.71\%$, $n = 15$) and WP playing GA ($M = 45.55\%$, $SD = 10.84\%$, $n = 26$). Additionally, WP as GA spent significantly more time on empathizing items than WP as MA (see Figure 3).

The effect of avatar gender on percentage of empathizing items WP selected on the survey was significant, $F(2, 65) = 10.83$, $p < .001$, with a large effect size, partial $\eta^2 = .25$. Post hoc tests indicated (Tukey; *p*s < .05) WP playing WA chose more empathizing items ($M = 78.57\%$, $SD = 15.72\%$, $n = 27$) than both WP playing MA ($M = 54.76\%$, $SD = 19.4\%$, $n = 15$) and WP playing GA ($M = 57.97\%$, $SD = 21.70$, $n = 26$), with the latter two not being different (see Figure 4).

Again, Baron-Cohen (2003) notes for those in which empathizing is stronger than systemizing E > S, and a female brain equals a brain type of E. As analysis looked at percentage of time spent on empathizing items verse systemaizing items, the scores will always be the formula *n %* E + *n %* S = 100%. When WP played WA the mean of the empathizing score in video game was 60.68% and on the survey with WP playing WA was 78.57%, therefore E > S. As both measures (recorded video and survey) of empathizing for WP as WA resulted in scores that indicated brain Type E, results support Hypothesis 1.

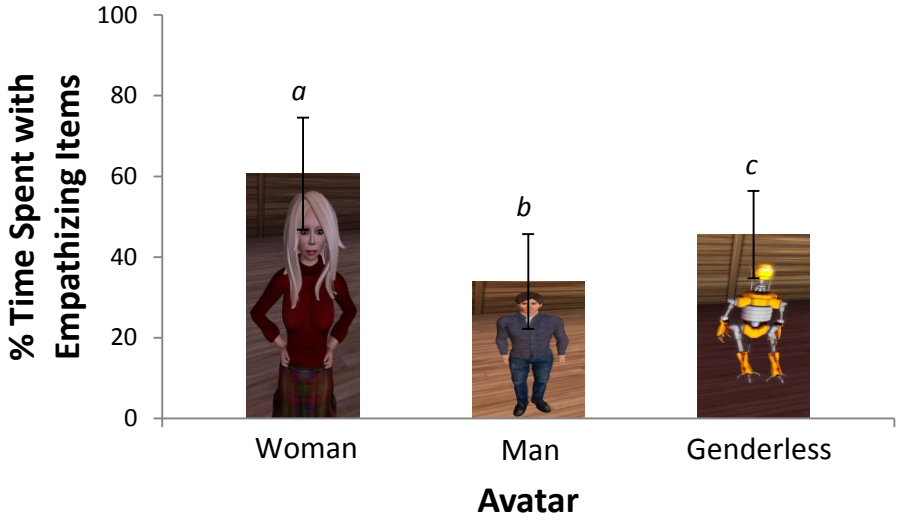

Figure 3. Mean time spent on empathizing items in the video game by women participants as woman avatars (n = 27), man avatars (n = 15), and genderless avatar (n = 26). Error bars depict standard deviations. Different lowercase italicized letter indicate significant differences (Tukey; ps < .05).

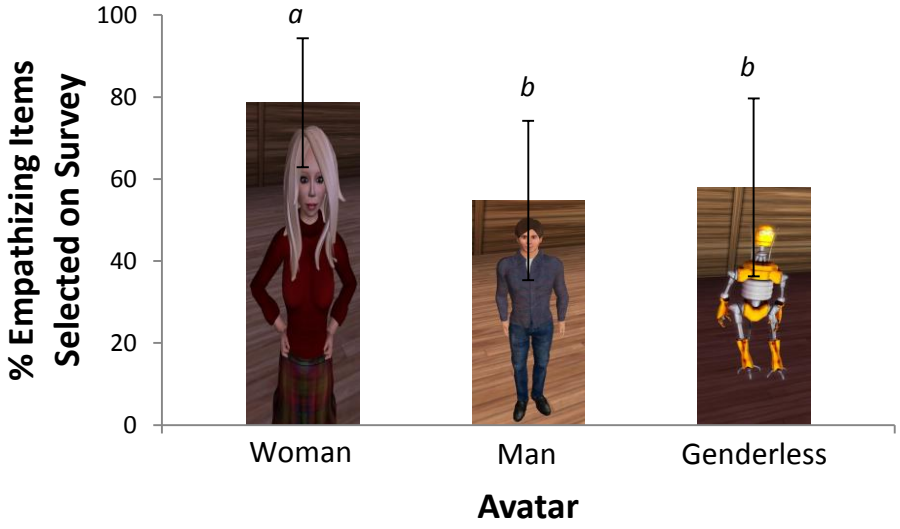

Figure 4. Mean empathizing items answered in survey by women participants as woman avatars (n = 27), man avatars (n = 15), and genderless avatar (n = 26). Error bars depict standard deviations. Different lowercase italicized letter indicate significant differences (Tukey; ps < .05).

Hypothesis 2: WP as MA will result in a percentages that indicates brain Type S

The effect of avatar gender on women participants' percentage of time paying attention to systemizing items was significant, $F(2, 65) = 23.83$, $p < .001$, with a large effect size, partial $\eta^2 = .42$. Post hoc tests indicated (Tukey; *ps* < .05) WP playing MA spent more time (*M* =65.98%, *SD* = 10.83%, *n* = 15) on systemizing items than both WP playing woman WA (*M* = 39.52%, *SD* = 13.86%, *n* = 27) and WP playing GA (*M* = 54.45%, *SD* = 10. 83%, *n* = 26; see Figure 5).

The effect of avatar gender on women participants' percentage of systemizing items selected in a survey was significant, $F(2, 65) = 10.83$, $p < .001$, with a large effect size, partial $\eta^2 = .25$. Post hoc tests indicated (Tukey; *p*s < .05) WP playing MA answered more systemizing items (*M* =45.24%, *SD* =19.41 %, *n* =15) than WP playing WA (*M* = 21.43%, *SD* =15.72%, *n* = 27). WP as GA (*M* =42.03%, *SD* = 21.70%, *n* = 26) did not select significantly different systemizing items than WP as MA (see Figure 6). WP playing WA and WP as GA were significantly different.

For those in which systemizing is stronger than empathizing S > E, and a male brain equals a brain type of S. The mean of the systemizing score in video games of WP playing MA was 65.98%, therefore; S > E and WP as MA indicates brain Type S on this measure. However, the mean of the systemizing score on the survey was 45.24%, therefore; S < E and WP playing WA indicates brain Type E. As noted in the previous paragraph, WP as MA (*M* = 45.24%) answered significantly more systematizing items than WP as WA (*M* = 21.70%), the WP as MA was approaching brain Type S. As the video game's measure of systemizing resulted in a brain Type S and the survey resulted in a brain Type E that was approaching brain Type S, results partially support Hypothesis 2.

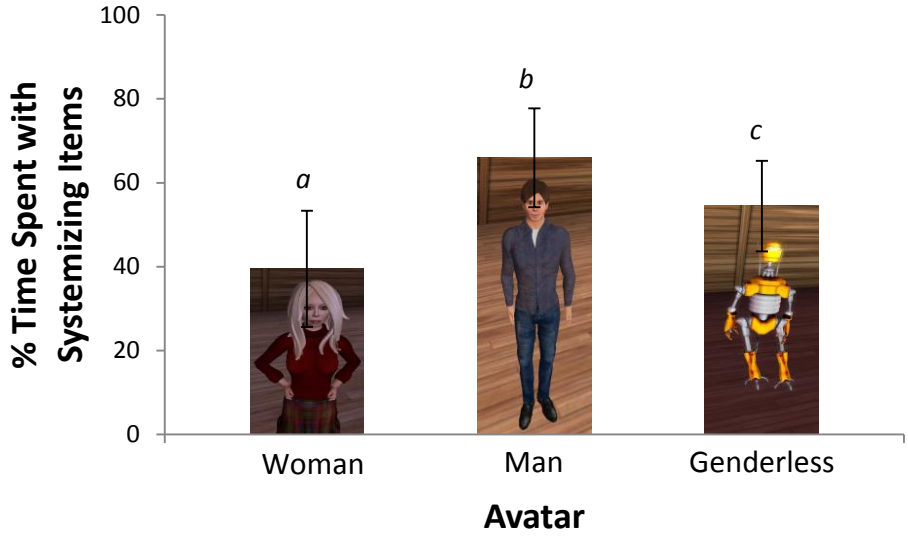

Figure 5. Mean time spent with systemizing items by women participants as woman avatars (n = 27), man avatars (n = 15), and genderless avatar (n = 26). Error bars depict standard deviations. Different lowercase italicized letter indicate significant differences (Tukey; ps < .05).

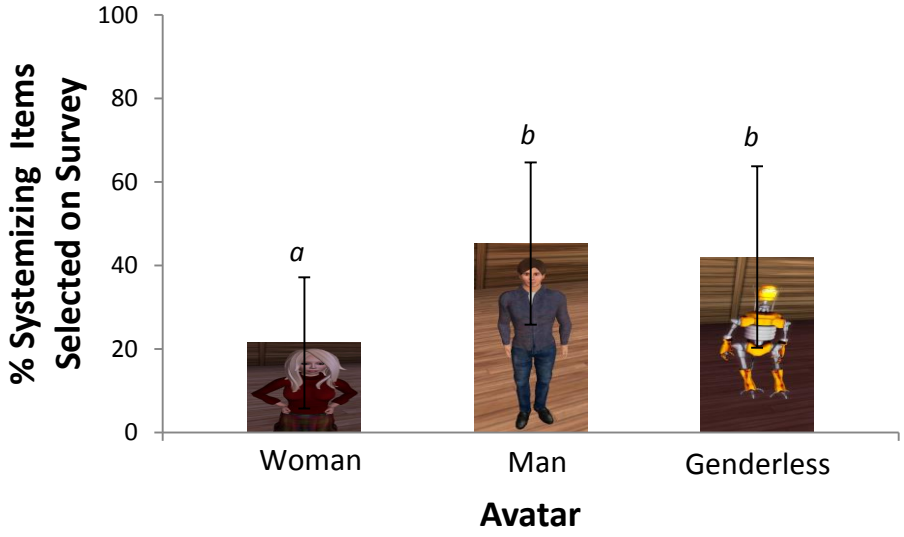

Figure 6. Mean systemizing items answered on survey by women participants as woman avatars (n = 27) man avatars (n = 15), and genderless avatar (n = 26). Error bars depict standard deviations. Different lowercase italicized letter indicate significant differences (Tukey; ps < .05).

Hypothesis 3: WP as GA will result in percentages that are most closely associated with brain Type B

For those in which systemizing and empathizing are equal, S = E, or a balanced brain equals a brain type of B. Therefore, the genderless alien avatars would have had to result in 50%/50% ratio with both women and men participants. Women participants as genderless aliens in the video game on empathizing items (M = 45.59%) and systemizing items (M = 54.45%) did not equal a perfect 50/50 ratio. Women participants as GA on the survey for empathizing items (M = 57.96%) and systemizing items (M = 42.03%) did not equal a perfect 50/50 ratio either (see Figure 7). Using a pure 50/50 ratio, results do not support Hypothesis 3.

Systemizing Brain Type S

To test his overall hypothesis that there are men and women differences for Type S with the use of different gendered avatars, I performed a 2 Participants Gender (WP, MP) x 3 Avatar Gender (WA, MA, & GA) factorial ANOVA on percent of time participants spent interacting with objects in the video game using SPSS. The interaction between participant gender and avatar gender resulted in non-significance, $F(2, 118) = .41$, $p = .66$. However, the main effect of avatar gender, $F(2, 118) = 55.79$, $p < .001$, with a large effect size partial $\eta^2 = .48$, and the main effect of participant gender, $F(1, 118) = 14.09$, $p < .001$, with a medium effect size partial $\eta^2 = .11$ were significant (see Figure 8 Top). Similarly, for the survey, the interaction between participant gender and avatar gender resulted in non-significance, $F(2, 118) = .2.23$, $p = .11$. However, the main effect of avatar gender, $F(2, 118) = 31.16$, $p < .001$, with a large effect size partial $\eta^2 = .35$, and the main effect of participant gender, $F(1, 118) = 24.22$, $p < .001$, with a

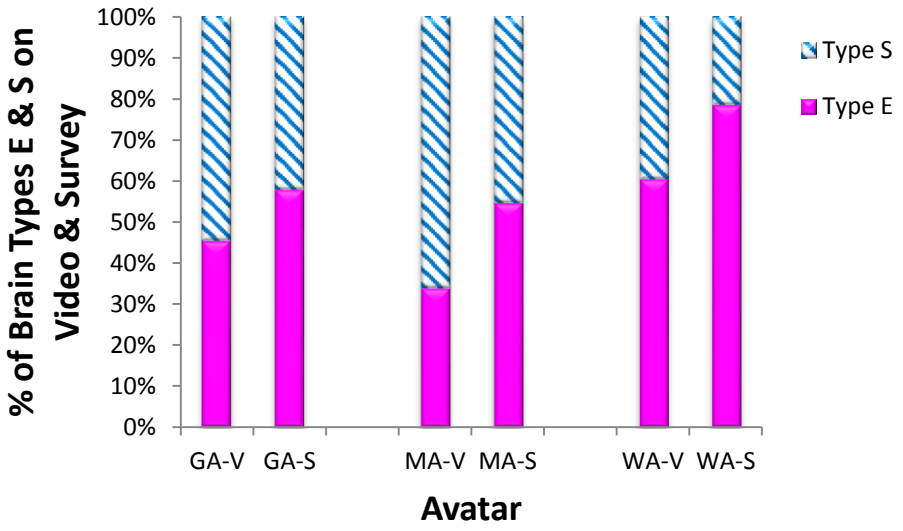

Figure 7. Mean time spent on empathizing and systemizing items in video game and empathizing and systemizing items answered on survey by woman participants.

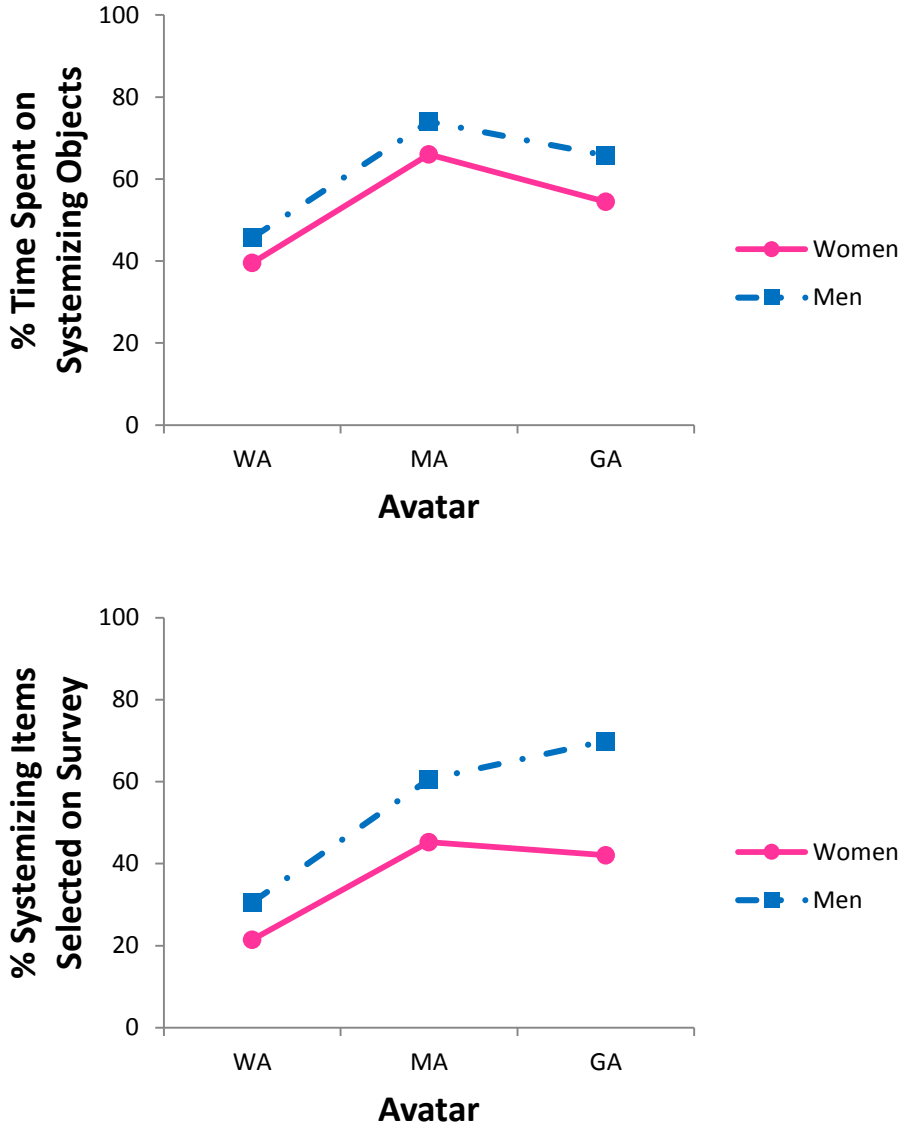

Figure 8. Top: Mean percent of time participants interacted with systemizing objects in video game. Bottom: Mean percent of items selected in the survey. WP as WA (n = 27), WP as MA (n = 15), WP as GA (n = 26), MP as WA (n = 18), MP as MA (n = 27), and MP as GA (n = 11).

large effect size partial $\eta^2 = .17$ were significant (see Figure 8 Bottom). This is not surprising as this data is the other half of the percentage data from empathizing items.

Once again, to address each specific hypothesis, I ran separate One-Way ANOVA's on percent time spent interacting (attempt to use objects) with Type S objects and percent items selected on the survey by MP in the three avatar conditions: WA, MA, GA.

Hypothesis 4: MP as WA will result in a percentages that indicate brain Type E

The effect of avatar gender on men participants' percentage of time paying attention to empathizing items was significant, $F(2, 53) = 34.13$, $p < .001$, with a large effect size, partial $\eta^2 = .56$. Post hoc tests indicated (Tukey, ps $< .05$) MP playing WA spent more time ($M = 54.30\%$, $SD = 14.07\%$, $n = 18$) on empathizing items than both MP playing MA ($M = 26.03\%$, $SD = 9.84\%$, $n = 27$) and MP playing GA ($M = 34.29\%$, $SD = 9.40\%$, $n = 11$) with the latter two not being different (see Figure 9).

The effect of avatar gender on men participants' percentage of empathizing items selected in a survey was significant, $F(2, 53) = 21.68$, $p < .001$, with a large effect size, partial $\eta^2 = .45$. Post hoc tests indicated (Tukey, ps $< .05$) MP playing WA answered more empathizing items ($M = 69.44\%$, $SD = 23.09\%$, $n = 18$) than MP playing MA ($M = 39.42\%$, $SD = 14.61\%$, $n = 27$ and MP playing GA ($M = 30.07\%$, $SD = 14.92\%$, $n = 11$) with the latter two not being different (see Figure 10).

For those in which empathizing is stronger than systemizing E > S, and a female brain equals a brain type of E. The mean of the empathizing score in video games of MP playing WA was 54.30%, therefore; E > S and MP as WA indicates brain Type E on this measure. Note that 54.30% is very close to 50% or brain Type B. However, as noted

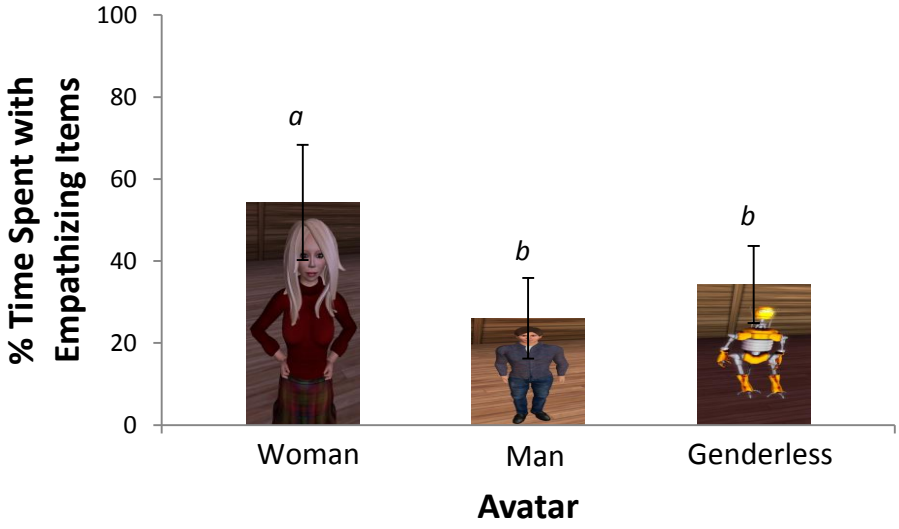

Figure 9. Mean time spent on empathizing items in the video game by men participants as woman avatars (n = 18), man avatars (n = 27), and genderless avatar (n = 11). Error bars depict standard deviations. Different lowercase italicized letter indicate significant differences (Tukey; ps < .05).

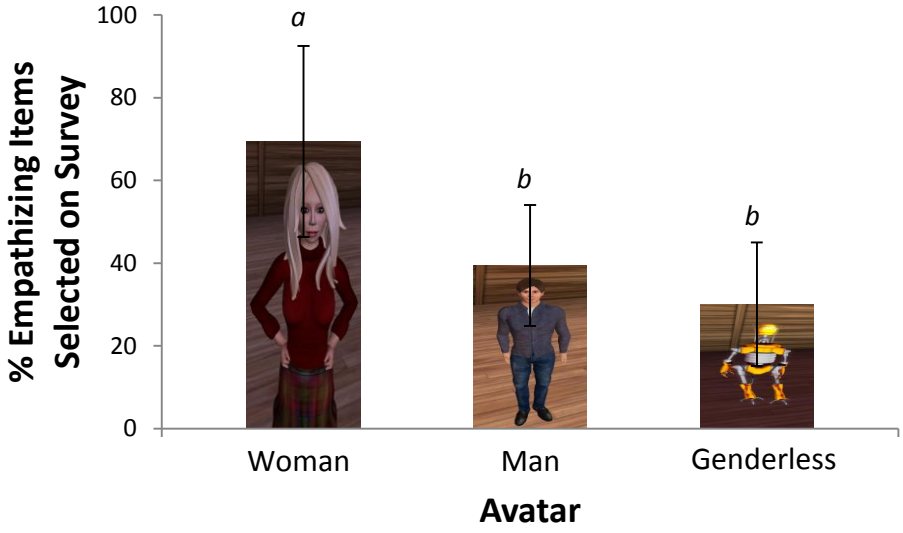

Figure 10. Mean empathizing items answered on survey by men participants as woman avatars (n = 18), man avatars (n = 27), and genderless avatar (n = 11). Error bars depict standard deviations. Different lowercase italicized letter indicate significant differences (Tukey; ps < .05).

previously MP playing WA spent significantly more time on empathizing items than both MP playing MA and MP playing GA and is therefore the largest empathizing score. The mean empathizing score on the survey with MP playing as a WA was 69.44%, therefore E > S. MP as WA also indicates brain Type E on this measure. As both measures (recorded video and survey) of empathizing for MP as WA resulted in scores that indicated brain Type E, results supported Hypothesis 4.

Hypothesis 5: MP as MA will result in percentages that indicate brain Type S

The effect of avatar gender on men participants' percentage of time paying attention to systemizing items was significant, $F(2, 53) = 34.13$, $p < .001$, with a large effect size, partial $\eta^2 = .56$. Post hoc tests indicated (Tukey; ps < .05) MP playing MA spent more time (M = 74.00%, SD = 9.88%, n = 27) on systemizing items than MP playing WA (M = 45.69%, SD = 14.07%, n = 27). MP playing GA (M = 65.69%, SD = 9.37%, n = 11) spent significantly more time on systemizing items than MP playing WA, however; there was no significant difference between MP playing as MA and MP playing as GA (see Figure 11).

The effect of avatar gender on men participants' percentage of systemizing items selected in a survey was significant, $F(2, 53) = 21.68$, $p < .001$, with a large effect size, partial $\eta^2 = .45$. Post hoc tests indicated (Tukey; ps < .05) MP playing MA answered more systemizing items (M = 60.58%, SD = 14.61%, n = 27) than MP playing WA (M = 30.55%, SD = 23.09%, n = 18). Men participants playing GA (M = 69.93%, SD =14.92%, n = 11) answered significantly more systemizing items than MP playing WA,

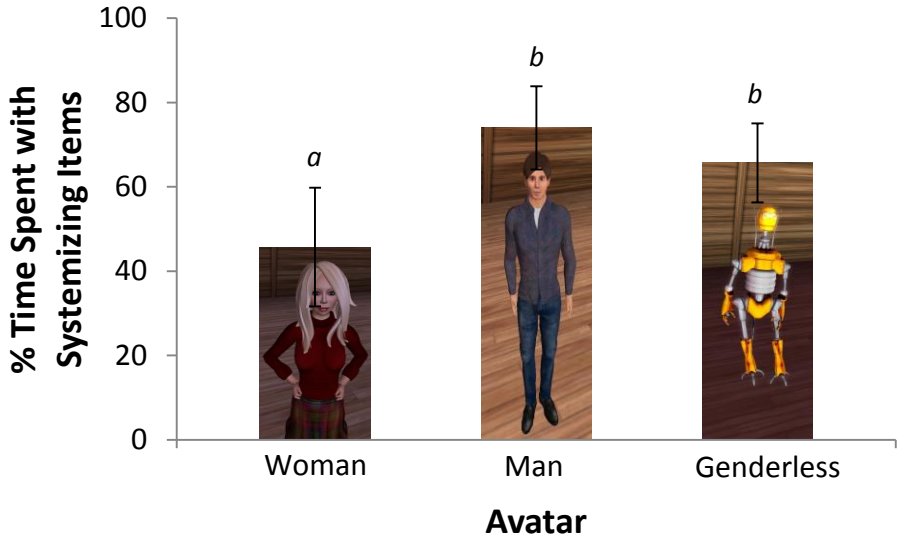

Figure 11. Mean time spent on systemizing items in the video game by men participants as woman avatars (n = 18), man avatars (n = 27), and genderless avatar (n = 11). Error bars depict standard deviations. Different lowercase italicized letter indicate significant differences (Tukey; ps < .05).

however; there was no significant difference between MP playing MA and MP playing GA (see Figure 12).

For those in which systemizing is stronger than empathizing S > E, and a male brain equals a brain type of S. The mean of the systemizing score in video games of MP playing MA was 74.00%, therefore; S > E and MP as MA indicates brain Type S on this measure. The mean of the systemizing score on the survey was 60.58%, therefore; S > E and MP playing MA indicates brain Type S. As the video game's measure of systemizing and the survey resulted in brain Type S, results support Hypothesis 5.

Hypothesis 6*:* MP as GA will result in percentages that are most closely associated with brain Type B

Finally, for those in which systemizing and empathizing are equal S = E, and a balanced brain equals a brain type of B. Therefore, the genderless avatars would have had to result in 50%/50% ratio with both women and men participants. Men participants as genderless aliens in the video game on empathizing items (*M* = 30.07%) and systemizing items (*M* = 69.93) did not equal a perfect 50/50 ratio. Men participants as GA on the survey for empathizing items (*M* = 34.29) and systemizing items (*M* = 65.69) did not equal the perfect 50/50 ratio either (see Figure 13). In fact, in all conditions [Video (E & S) & Survey (E & S)] MP playing as GA were never significantly different from MP as MA, therefore; results did not support Hypothesis 6.

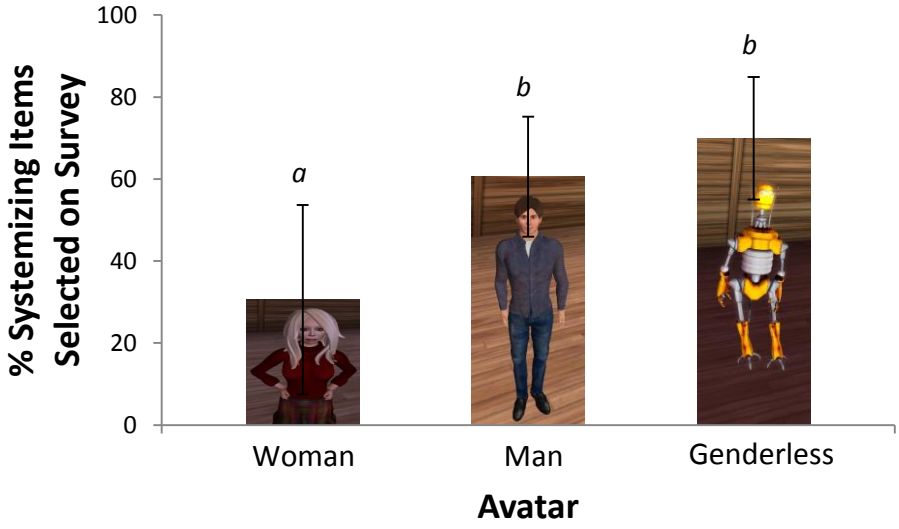

Figure 12. Mean systemizing items answered on survey by men participants as woman avatars (n = 18), man avatars (n = 27), and genderless avatar (n = 11). Error bars depict standard deviations. Different lowercase italicized letter indicate significant differences (Tukey; ps < .05).

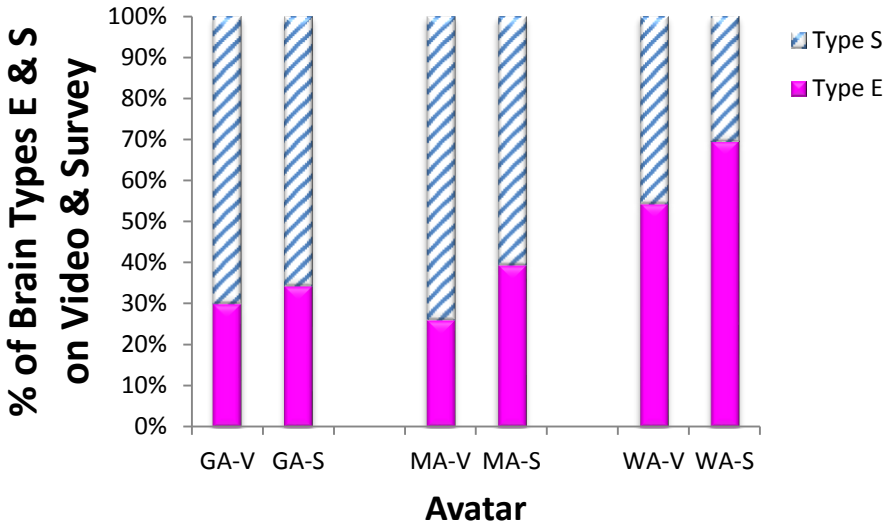

Figure 13. Mean time spent on empathizing and systemizing items in video game and empathizing and systemizing items answered on survey by men participants.

CHAPTER 4

DISCUSSION

According to Baron-Cohen (2003), based on different abilities between the sexes there are three brain types (Type E, S, & B). He argues that because of cerebral difference, females are better able to empathize (Type E) and males are better able to systemize (Type S). Empathizing, according to Baron-Cohen, is the drive to understand another person's emotion and respond accordingly, whereas systemizing is a drive to construct a system, analyze and explore. On average, more females than males have a brain Type E and therefore he calls it a female brain. More males, on average have a brain type S and therefore he calls it a male brain. Brain Type B exists in a person who has equal abilities to empathize and systemize. To support his claim, Baron-Cohen provides entire chapters for the anecdotal and uncited evidence associated with both empathizing and systemizing. He argues that from birth, individuals are paying attention to different aspects of their environment (i.e., mobiles & faces) as consequence to their gender. This attention to different aspects of the environment (e.g., E: dolls, jewelry, & make-up; S: blocks, sports, & games) is evidence for Baron-Cohen that different brain types exist. Moreover, Baron- Cohen uses this evidence to refute gender as social construction and support his theory of brain types. However, other researchers (e.g., Bluhm et al., 2011; Hyde, 2005; Jordan-Young & Rumaiti, 2011) argue for social construction as opposed to biology or hardwired paradigm as associated with gender and behavior; social expectations rather than biologically occurring cause gender differences. More specifically, women behave as a woman is supposed to behave and men behave as a man is supposed to behave, as socially developed stereotypes dictate (Matlin,

1999).The latter theory suggests differences between men and women may be malleable, whereas the former suggests rigidity.

To test these opposing theories, I wanted to examine if assigning a different gender to a participant would result in different behaviors. More specifically, if assigning a participant a different gender in a video game would result in behavior typical of his or her own gender or the gender of the assigned avatar. I predicted that all participants would adopt the gender of the avatar regardless of their own gender and display the behavior associated with that gender.

Prior researchers have examined the visual appearance of an avatar in association with behavior (Gudagno et al., 2011; Lehdonvirta et al., 2012; Palomares & Lee, 2010; Yee & Beilenson, 2007). Most notably, Palomares and Lee (2010) found that when participants' gender matched that of the avatars' gender, the participants used gender typical language. However when the participants' gender did not match the avatar's, the participants used the gendered avatar typical language. Similarly, my thesis found that participants performed in accordance with the avatars gender regardless of their actual gender.

My pilot study using Half-Life 2 was simplistic in nature as it only looked at the stereotypical behavior aggression and had participants design their avatars. However, as previously mentioned, men and women did not differ in my pilot study. Additionally, Half-Life 2 did not allow me to examine multiple behaviors specifically associated with Baron-Cohen's (2003) brain types. Therefore, I used SecondLife, an online computer game in which I could design an environment for the avatars based upon the evidence Baron-Cohen utilized in his book. I used 9 computers with 3 different avatars: woman avatar (WA), man avatar (MA), and genderless avatar (GA). Unlike the pilot,

participants could see this avatar on screen and used it to interact with objects as a third-person player. The avatars resembled people of Caucasian decent and the genderless avatar resembled no race. Each computer had a SecondLife account in which I predesigned the avatar and the environment with equal parts empathizing and systemizing objects. Baron-Cohen's evidence for different brain types is the different objects a person pays attention to in the environment. Therefore, I recorded the different objects they were paying attention to (attempting to interact by clicking the mouse). As this was an implicit measure of behavior, I also designed a survey to look at explicit choices concerning one's avatar. Once again, my overall results supported my hypothesis that participants would adopt the behavior of the avatars I assigned regardless of the participants' actual gender.

Empathizing Brain Type E

Hypothesis 1 and 4 state that women participants (WP) and men participants (MP) respectively playing as a WA will result in a percentage that indicates brain type E. Rather, regardless of participant gender, participants playing a WA would pay more attention to and therefore interact more with empathizing items than with systemizing items in the video game and would choose more empathizing items than systemizing items on the survey. Analyses of the data collected revealed support for both Hypotheses (1 & 4) with both the video game and the survey.

Again, Baron-Cohen (2003) notes for those in which empathizing is stronger than systemizing (E > S) a person is assigned brain Type E. It would not be surprising to Baron- Cohen that both measures (recorded video and survey) of empathizing for WP as WA resulted in scores that indicated brain Type E as it coincides with what he predicted. However, the data also supported Hypothesis 4, men playing as a WA. Therefore, the

appearance of a woman avatar was so salient that men's behavior and choices resulted in a brain type Baron-Cohen associates with females. Support of hypothesis 1 and 4 implies social construction, or social expectations and stereotypes of the woman gender, was more important than participants' actual gender on these two measures.

Systemizing Brain Type S

Hypothesis 2 and 5 state MP and WP playing as a MA will result in a percentage that indicates brain Type S. Rather, regardless of participant gender, participants playing a MA will pay more attention to systemizing items than to empathizing items in the video game and will choose more systemizing items than empathizing items on the survey. Baron-Cohen (2003) notes for those in which systemizing is stronger than empathizing (S > E) a person is assigned brain Type S. Analyses of the data collected reveal partial support for Hypothesis 2 as the video resulted in a brain Type S, however; the survey resulted in a brain type E. Women on the survey did not report more systemizing items than empathizing items. Although, it should be noted that WP as a MA was still the highest systemizing score for WP and was therefore moving in the direction I predicted. The data fully supported Hypothesis 5 as both the video and the survey resulted in brain Type S.

It would not be surprising to Baron-Cohen (2003) that both measures (recorded video and survey) of systemizing for MP as MA resulted in scores that indicated brain Type S as it coincides with what he predicted. However, the data also partially supported Hypothesis 2, women playing as a MA. Therefore, the appearance of a man avatar was so salient that women's behavior resulted in a brain type Baron-Cohen associates with males. Akin to Hypothesis 1 and 4, support for Hypothesis 2 and 5 would imply social

construction, or social expectations and stereotypes of the man gender, was more important than participants' actual gender on these two measures.

Balanced Brain Type B

For those in which systemizing and empathizing are equal, S = E, and a balanced brain equals a brain type of B. Therefore, the genderless avatars would have had to result in 50%/50 % ratio with both women and men participants for both Hypothesis 3 and 6. Women and men participants as genderless avatars in the video game and the survey on empathizing items and systemizing items did not equal a perfect 50/50 ratio. As I want to stick as closely to the formula Baron-Cohen (2003) provided, a pure 50/50 ratio, results do not support Hypothesis 3 or 6. Nevertheless, by appearance alone, WA as GA appear closest to the desired 50/50 ratio (see Figure 7), however; MP as GA appear to reflect the MP as MAs (see Figure 11). This could be because men applied their own gender to the "genderless" being and women used the avatar to overcome debilitating stereotypes. It could also be that the participants interpreted the genderless avatar as masculine. Either way, I need further experimentation before making an accurate and appropriate conclusion.

Implications and Future Research

It is essential to note that the highest empathizing scores occurred on the survey with WP as WA (M = 78.57%). The lowest empathizing scores occurred on the video game with MP as MA (M = 26.0%). The highest systemizing score occurred in the video with MP as MA (M = 74.00%). The lowest systemizing scores occurred on the survey with WP as WA (M = 21. 43%). Therefore, the highest and lowest scores occurred, when

the avatars gender matched the participants' actual gender. This makes sense in that researchers may never be able to fully detach people from their actual gender.

In general, behavior in the video game and the choices in the survey supported each other. Rather, implicit behavior on the video matched the explicit choices participants made on the survey. This could be because participants were instructed to answer as the avatar (e.g., As the avatar, what would you prefer?). Because I instructed participants to answer as the avatar in the survey, they may have answered in a way stereotypical of the avatar gender rather than their actual preferences. Alternatively, the avatar could have allowed them the freedom to have preferences not respective of their actual gender, as the implicit behavior on the video game would suggest.

Similar to Guadagnoet al.'s (2011) study in which men and women reported behaving in a way that was consistent with traditional gender expectations, participants in this study behaved in a way associated with the avatar in the video game. A mismatched gendered avatar may have given my participants the freedom to act in a way opposite of their actual gender constraints. However, with the adoption of the avatar gender, comes the adoption of the social expectations, stereotypes, and constraints of the gender. Overall, this study would suggest that behavior, perceived abilities, and preferences are more a consequence of social expectations and stereotypes than a biological difference between men and women as Baron-Cohen (2003) theorize. Moreover, it suggests that sexed/gendered brain types are a fabrication of pseudo-science. Humans may indeed have different brains, however; associating them with sex/genders, is in this researcher's opinion may be misguided and certainly dangerous. There are many serious consequences (e.g., discrepancy in pay, diminished interested in certain fields, and stereotype threat) when theorists suggest hardwired differences between men and women,

and this study's purpose included testing the similarities hypothesis and combating these detrimental consequences.

Future research could examine stereotype threat and performance, such as math with the use of different avatars. Would men as a woman avatar perform more poorly on a math test than men with a man avatar? Would women as a man avatar perform better on a math test than women with a woman avatar? In addition to examining gender with avatars, future research could explore other stereotyped groups. Similar to Yee and Bailenson's (2006) study were the researchers' utilized immersive virtual reality to test if placing a participant in a body of an elderly person would affect their attitudes toward the elderly, future researchers could examine attitude change with a variety of different groups. Researchers could examine culture, race, and their associated stereotypes in a virtual reality environment. As virtual realities' environments can be manipulated and controlled and are flexible and adaptive to the researchers needs, many future studies are possible.

Limitations

As this was a synthetic environment (video game) in a laboratory setting, actual environments and everyday behavior may sanction different results. Additionally, as noted with the pilot study, participants designing their own avatar may not have been a salient enough independent variable. Although seeing a third-person avatar on screen showed to be a salient independent variable in the SecondLife experiment, I believe immersive technology would result in better studies with more complicated behavior (interactions, relationships, etc). As we used SecondLife, an online video game, behavior was restricted to recorded behavior in a house. This is a start, however; researchers could examine behaviors that are more complicated with advances in technology that have

more real-life application. Finally, this is only one study, as Jordan-Young and Rumiati (2011) suggest, more researchers need to design studies to show how invoking stereotypes can stimulate sex/gender differences that people usually accept as innate for a stronger evidence base.

REFERENCES

1 for ALL Software GmbH (2012) [Computer software]. Switzerland. Retrieved from http://www.camtasiasoftware.com/camtasia/index.htm

Baron-Cohen, S. (2003) *The essential difference: Men, women and the extreme male brain*. London: Allen Lane.

Barnett, R., & Rivers, C. (2004). *Same difference: How gender myths are hurting our relationships, our children, and our jobs*. New York, NY, US: Basic Books, New York, NY.

Bluhm, D. R., Jaap, J. P. A., & Maibom, P. H. L. (2011). *Neurofeminism: Issues at the Intersection of Feminist Theory and Cognitive Science*. Houndmills, Basingstoke, Hampshire; New York: Palgrave Macmillan

Brizendine, L. (2006) *The Female Brain*. New York: Broadway.

Browne, R. K. (2002) *Biology at Work: Rethinking Sexual Equality*. Rutgers University Press, New Brunwick, New Jersey.

Bureau of Labor Statistics. (2011). *Women in the labor force: A databook*. Retrieved from http://www.bls.gov/cps/wlf-databook2011.htm

Devies, P. G. (1989) Stereotypes and prejudice: Their automatic and controlled components. *Journal of Personality and Social Psychology*, *56*(1):5-18

Goodwin, C. J. (2008). *A history of modern psychology (3rd ed.)*. Hoboken, NJ, US: John Wiley & Sons Inc, Hoboken, NJ.

Guadagno, R. E., Muscanell, N. L., Okdie, B. M., Burk, N. M., & Ward, T. B. (2011). Even In virtual environments women shop and men build: A social role perspective on second life. *Computers in Human Behavior*, *27*(1), 304-308. doi:http://dx.doi.org/10.1016/j.chb.2010.08.008

Hoffman, R.M. (2006). Gender self-definition and gender self-acceptance in women: Interception with feminist, womanist and ethnic identities. *Journal of Counseling and Development*, *84*, 358-372.

Hyde, J. S. (2005). The gender similarities hypothesis. *American Psychologist, 60*(6), 581-592. doi: http://dx.doi.org/10.1037/0003-066X.60.6.581

Jordan-Young, Rebecca & Rumiati, Raffaella (2012). Hardwired for sexism?: Approaches to sex/gender in neuroscience. In Bluhm, Jacobson & Maibom (Eds.), *Neurofeminism: Issues at the Intersection of Feminist Theory and Cognitive Science*.

Keller, J., & Molix, L. (2008). When women can't do math: The interplay of self-construal, gender identification, and stereotypical performance standards. *Journal of Experimental Social Psychology, 44*, 437-444.

Lehdonvirta, M., Nagashima, Y., Lehdonvirta, V., & Baba, A. (2012). The stoic male: How avatar gender affects help-seeking behavior in an online game. *Games and Culture: A Journal of Interactive Media*, *7*(1), 29-47. doi:http://dx.doi.org/10.1177/1555412012440307

Linden Research, Inc. (2012). Second Life (Version 1.20.15) [Computer software]. Retrieved March, 2013, from http://secondlife.com

Lightdale, J. R., & Prentice, D. A. (1994). Rethinking sex differences in aggression: Aggressive behavior in the absence of social roles. *Personality and Social Psychology Bulletin, 20*(1), 34-44. doi: http://dx.doi.org/10.1177/0146167294201003

Matlin, M. W. (1999). *The psychology of women (4th ed.)*. Orlando, FL, US: Harcourt Brace College Publishers.

National Science Foundation (2009) *Women, minorities, and persons with disabilities in science and engineering.* National Science Foundation, Arlington.

Pease, A., & Pease, B. (2000). *Why men don't listen, and women don't read maps: How we're different and what to do about it.* New York: Broadway Books.

Palomares, N. A., & Lee, E. (2010). Virtual gender identity: The linguistic assimilation to gendered avatars in computer-mediated communication. *Journal of Language and Social Psychology, 29*(1), 5-23. doi:http://dx.doi.org/10.1177/0261927X09351675

Rosenthal, H.E.S., & Crsip, R. J. (2006). Reducing stereotype threat by blurring intergroup boundaries. *Personality and Social Psychology Bulletin*, *32*, 501-511

Rucusin, C. A., Dovidio, J. F., Brescoll, V. L., Graham, M. J., & Handelsman, J. (2012). Science faculty's subtle gender biases favor male students. *Proceedings of the National Academy of Sciences*.

Schmader, T. (2002). Gender identification moderates stereotype threat effects on women's math performance. *Journal of Experimental Social Psychology, 38*, 194-201.

Silke, A. (2003). Deindividuation, anonymity and violence. Findings from Northern Ireland. *Journal of Social Psychology*, *143*, 493-499.

Spencer, S. J., Steele, C. M., & Quinn, D. M. (1999). Steroetype threat and woman's math performance. *Journal of Experimental Social Psychology*, *35*(1), 4-20.

Yee, N., & Bailenson, J. (2006). *Walk a mile in digital shoes: The impact of embodied perspective-taking on the reduction of negative stereotyping in immersive virtual environments.* Proceedings of PRESENCE 2006: The 9th Annual International Workshop on Presence. August 24-26, Cleveland, Ohio, USA.

Yee, N., & Bailenson, J. (2007). The Proteus effect: The effect of transformed self-representation on behavior. *Human Communication* Research, *33*, 271-290.

Zhang, S., Schmader, T., & Forbes, C. (2009). Gender stereotypes and the choice of career paths. In M. Barreto, M. Ryan, & M. Schmitt (Eds.),*The Glass Ceiling in the 21st Century: Understanding Barriers to Gender Equality* (pp. 125-150).

Zimbardo, P.G. (1969) *The human choice: Individuation, reason, and order verses deindividuation, impulse and chaos.* In W.D. Arnold and D. Levine (Eds), Nebraska Symposium on Motivation (pp. 237-307). Lincoln: University of Nebraska.

Appendix A

IRB Pilot

EMPORIA STATE UNIVERSITY™

1200 Commercial
Emporia, Kansas
66801-5087

620-341-5351
620-341-5909 fax
www.emporia.edu

GRADUATE STUDIES AND RESEARCH
RESEARCH AND GRANTS CENTER
Campus Box 4003

November 1, 2012

Amanda Martens
Psychology
Campus Box 4031
Emporia State University
Emporia, KS 66801

Dear Ms. Martens:

Your application for approval to use human subjects has been reviewed. I am pleased to inform you that your application was approved and you may begin your research as outlined in your application materials. Please reference the protocol number below when corresponding about this research study.

Title:	Monsters and Mannerisms
Protocol ID Number:	13041
Type of Review:	Expedited
Time Period:	10/20/2012-10/20/2013

If it is necessary to conduct research with subjects past this expiration date, it will be necessary to submit a request for a time extension. If the time period is longer than one year, you must submit an annual update. If there are any modifications to the original approved protocol, such as changes in survey instruments, changes in procedures, or changes to possible risks to subjects, you must submit a request for approval for modifications. The above requests should be submitted on the form Request for Time Extension, Annual Update, or Modification to Research Protocol. This form is available at www.emporia.edu/research/irb.html.

Requests for extensions should be submitted at least 30 days before the expiration date. Annual updates should be submitted within 30 days after each 12-month period. Modifications should be submitted as soon as it becomes evident that changes have occurred or will need to be made.

On behalf of the Institutional Review Board, I wish you success with your research project. If I can help you in any way, do not hesitate to contact me.

Sincerely,

Michael Butler pf

Michael Butler
Chair, Institutional Review Board

pf

cc: Cathy Grover

Appendix B

Informed Consent Pilot

Informed Consent

Study Name: Monsters and Mannerisms
Faculty Researcher(s): Dr. Cathy Grover
Student Researcher(s): Amanda Martens
Telephone Number(s): (620) 341-5813; (620) 341-5802
E-mail(s): cgrover@emporia.edu, amartens@emporia.edu

The Department of Psychology supports the practice of protection for people participating in research and related activities. This study has been reviewed to determine that it poses little or no risk of harm to you. Any information obtained from you will be kept strictly confidential. Although you may be assigned an arbitrary participant number to assist in data collection, we assure you that neither your name nor participant number will be associated in any way with any reportable results. The following information is provided so that you can decide whether you wish to participate in the present study.

The purpose of this study is to measure your performance on a video game. Your participation should take approximately 30 minutes. The video game is somewhat violent in nature in that you must kill a monster. **You should be aware that even if you agree to participate, you are free to withdraw at any time, and that if you do withdraw from the study, you may do so without penalty.**

You will gain no benefits by participating in this study other than educational (or credit if it is offered by your instructor), and other options are available from your instructor. The researchers are obligated to tell you as much as you care to know about the study after your part in the study is complete. If you would like a written summary of the results, please include your name and address in the space provided, and the researchers will send you a copy when it is available.

All persons who take part in this study must sign this consent form. In addition, person's under the age of 18 also must include the signature of a parent or legal guardian. Your signature in the space provided indicates that you have been informed of your rights as a participant, and you have agreed to volunteer on that basis.

"I have read the above statement and have been fully advised of the procedures to be used in this project. I have been given sufficient opportunity to ask any questions I had concerning the procedures and possible risks involved. I understand the potential risks involved and I assume them voluntarily. I likewise understand that I can withdraw from the study at any time without being subjected to reproach."

Signature of Participant: Date:

For persons under the age of 18:
"With my signature, I affirm that I have read and understand my child's rights and the study described on the other side of this page, and voluntarily agree to allow my child (or legal guardian)to participate in this research study."

_____
Signature of Parent or Guardian (if participant is a minor) Date

For written summary of results:
Printed Name
_____

ESU student e-mail _____

Appendix C

Character Sheet

Gender

Character Name

DUNGEONS & DRAGONS
Character Sheet

Age	5'4" Height	. Weight	Medium Size

Basic Character Information

Additional Character Details (Optional)

Appendix D

Avatars

Appendix E

Debriefing Statement

Debriefing Statement
Monsters and Mannerism
Fall 2012

Thank you for participating in this study. The purpose of this study was to determine the effects of an assigned avatar (woman, man, genderless alien) on performance in the modified version of Half Life 2. We expect that when assigned the same or opposite gender, performance will be stereotypical in nature (The participant will conform to gender stereotypes and differences will be found between men and women). However, we expect that when assigned the genderless alien, no gender differences will occur. All information obtained from you will be strictly confidential. We ask that you do not talk about this experiment or reveal the true nature as it could alter or influence the behaviors of the other student participants in the study. Do you have any questions? If questions arise later, you may contact Amanda Martens in her office (VH310), by office phone (341-5803), or via email (amartens@emporia.edu). Again, we appreciate your time and thank you for your participation.

Appendix F

Packet 1

READ & FILL OUT

Testing Reality

Survey Packet 1

WELCOME and thank you for helping with the improvement of the virtual reality world. You will be asked to follow directions and fill out the following packet in its entirety. Note that while you are not being recorded, your screen and the avatar will be recorded for research purposes.

- The **arrow keys** and **mouse** will help you navigate around this virtual reality.
- Take a good look at your avatar: This will serve as **your identity** in the virtual realm

Directions:

1. Flip the "FLIP To START" paper over your screen.

2. Take a good look at your avatar.

3. **PUSH** the "*Camera Controls*" button at the bottom of your screen. Click the button that looks like an eye (bottom left, under camera controls)

4. **PUSH** the "*Front View*" button. Look at your avatar. Move the mouse back and forth and up and down.

5. **PUSH** the "*Side View*" button. Look at your avatar. Move the mouse back and forth and up and down.

6. Return your avatar to the Rear View by pushing the "*Rear View*" button

IDENTITY

READ CAREFULLY: Your identity in this online virtual reality is the avatar that appears on screen. As the avatar, you may do whatever you wish inside your vitural reality home. Also, please note that the following questions are about YOU AS YOUR AVATAR. As it is YOUR IDENTITY in this realm, answer questions about **you as your** avatar. Before exploring your virtual reality home, please answer the following:

DESCRIBE YOURSELF (AVATAR'S CHARACTERISTICS)

_____
_____
_____
_____
_____

AS YOUR AVATAR, YOU ARE A

OTHER OBSERVATIONS ABOUT YOUR IDENTITY:

_____
_____
_____
_____
_____
_____
_____
_____

ONCE YOU HAVE COMPLETED THIS PAGE:

DIRECTIONS:

1. PUSH the button "Walk/Run/Fly"
2. Set to Walk (The farthest button to the left)

EXPLORE your virtual reality home. Do so until the researcher gives you further instructions.

While waiting for further instructions/ exploring your environment, fill out the following:

As your avatar, what is your favorite item in your home:

_____

What is your least favorite item:

_____

If you could add one item, what would it be:

_____

Appendix G

Packet 2

READ & FILL OUT

Testing Reality

Survey Packet 2

CONGRATS! You have completed the first part of this research. As we do not have time to have you add information, items, and activities to this virtual world, the following questions will be used in assessing and improving the virtual reality:

MAKE A BACKSTORY:

Now that you have taken a close look at your identity (avatar) and spent time in this virtual reality world, please make a "Backstory" for yourself by answer the following:

- REMEMBER: The following questions are about YOU AS YOUR AVATAR. As it is YOUR IDENTITY in this realm, answer questions about YOU AS YOUR avatar:

Name Yourself (avatar):

_____

MAKE A BACKSTORY TO YOUR VIRTUAL IDENTITY:

ACTIVITIES:

As a child, what would you (avatar) rather play with (Circle One):

Doll Legos Tea Set Trucks

What kind of activity would you (avatar) most enjoy (Circle One):

Hunting Hanging out with friends Sports Drawing

As your avatar, would you rather (Circle One):

Ride a Horse Bird Watch

On the weekend, would you (avatar) be (Circle One):

On the computer Shopping Playing Sports At a coffee shop with friends

JOBS/CAREERS:

Before starting your career, your (avatar) job was (Circle One):

Secretary Construction Worker Babysitter Technicians

In college, you (avatar) would have liked to major in (Circle One):

Mathematics English Chemistry Family Therapy

Currently, your (avatar) career is (Circle One):

Counselor Lawyer Nurse Engineer

ADDITIONS/CHANGES TO VITRUAL HOME:

What kind of vehicle do you (avatar) drive (FILL IN)

_____

What would you add to your virtual reality home (FILL IN)

_____
_____
_____
_____

What would you NOT include in your virtual reality home (FILL IN)

_____
_____
_____
___

PREFERENCES:

What would typically be found in your kitchen at your virtual reality home (Circle one from each category):

Food:

Steak Yogurt Pizza Veggies

Drinks:

Diet Soda Beer Wine Protein Shakes

Snacks:

Beef Jerky Fruit Rice Cakes Burrito

In your virtual reality living room, what would typically be on TV (Circle One)

Sports Center Soap Operas Documentaries Shopping Network

Teen Mom History Channel Say Yes to the Dress Myth Busters

What books would be found in your home (Circle One):

Fiction (Story) Nonfiction (Fact)

On a typical night, what would you (avatar) be doing in your virtual reality home (Circle One):

Looking through a telescope at planets Talking on the phone

Playing with your pet Playing video games

Working on your car/boat Playing with your kids

How would you (avatar) spend most of your time (Circle One):

With Friends-Socializing Building and working on your own projects

Martial Arts Volunteering

Use this page to write about yourself (Avatar). You can include anything you wish (Childhood, Goals, Career, Family Life, etc):

You are finished with the virtual reality research. Flip the "FLIP TO START" paper back over the computer screen and give the researcher both survey packets.

Appendix H

Demographic Survey

Demographics:

Gender (Circle) Woman Man Other _____

Age: _____

Race:_____

Circle: Freshman Sophomore Junior Senior Other _____

About how many hours a week do you play video games: _____

What kind of video games do you play (List):

_____
_____
_____
_____
_____

Have you ever had experience with SecondLife before this game (Circle): Yes or No

If yes, describe your experience with SecondLife:

_____
_____
_____
_____
_____
_____

Additional Comments:

_____
_____
_____
_____
_____

Appendix I

IRB Thesis Approval Letter

EMPORIA STATE UNIVERSITY™

1200 Commercial
Emporia, Kansas
66801-5087

620-341-5351
620-341-5909 fax
www.emporia.edu

GRADUATE STUDIES AND RESEARCH
RESEARCH AND GRANTS CENTER
Campus Box 4003

March 19, 2013

Amanda Martens
Department of Psychology
Campus Box 4031
Emporia, KS 66801

Dear Ms. Martens:

Your application for approval to use human subjects has been reviewed. I am pleased to inform you that your application was approved and you may begin your research as outlined in your application materials. Please reference the protocol number below when corresponding about this research study.

Title:	**Testing Reality with Video Games**
Protocol ID Number:	**13083**
Type of Review:	**Expedited**
Time Period:	**03/20/2013 - 03/20/2014**

If it is necessary to conduct research with subjects past this expiration date, it will be necessary to submit a request for a time extension. If the time period is longer than one year, you must submit an annual update. If there are any modifications to the original approved protocol, such as changes in survey instruments, changes in procedures, or changes to possible risks to subjects, you must submit a request for approval for modifications. The above requests should be submitted on the form Request for Time Extension, Annual Update, or Modification to Research Protocol. This form is available at www.emporia.edu/research/irb.html.

Requests for extensions should be submitted at least 30 days before the expiration date. Annual updates should be submitted within 30 days after each 12-month period. Modifications should be submitted as soon as it becomes evident that changes have occurred or will need to be made.

On behalf of the Institutional Review Board, I wish you success with your research project. If I can help you in any way, do not hesitate to contact me.

Sincerely,

Michael Butler

Michael Butler
Chair, Institutional Review Board

pf

cc: Dr. Cathy Grover

Appendix J

Informed Consent

Informed Consent

Study Name: Testing Reality with Video Games
Telephone Number(s): (620) 341-5813; (620) 341-5802
Student Researcher: Amanda Martens
Faculty Researcher: Cathy Grover
E-mail(s): cgrover@emporia.edu, amartens@emporia.edu

The Department of Psychology supports the practice of protection for people participating in research and related activities. This study has been reviewed to determine that it poses little or no risk of harm to you. Any information obtained from you will be kept strictly confidential. Although you may be assigned an arbitrary participant number to assist in data collection, we assure you that neither your name nor participant number will be associated in any way with any reportable results. The following information is provided so that you can decide whether you wish to participate in the present study.

The purpose of this study is to improve a video game. Your participation should take approximately 1 hour. **You should be aware that even if you agree to participate, you are free to withdraw at any time, and that if you do withdraw from the study, you may do so without penalty.**You will gain no benefits by participating in this study other than educational (or credit if it is offered by your instructor), and other options are available from your instructor. The researchers are obligated to tell you as much as you care to know about the study after your part in the study is complete. If you would like a written summary of the results, please include your name and address in the space provided, and the researchers will send you a copy when it is available.

All persons who take part in this study must sign this consent form. In addition, person's under the age of 18 also must include the signature of a parent or legal guardian. Your signature in the space provided indicates that you have been informed of your rights as a participant, and you have agreed to volunteer on that basis.

"I have read the above statement and have been fully advised of the procedures to be used in this project. I have been given sufficient opportunity to ask any questions I had concerning the procedures and possible risks involved. I understand the potential risks involved and I assume them voluntarily. I likewise understand that I can withdraw from the study at any time without being subjected to reproach."

Signature of Participant: Date:

For persons under the age of 18:
"With my signature, I affirm that I have read and understand my child's rights and the study described on the other side of this page, and voluntarily agree to allow my child (or legal guardian)to participate in this research study."

_____
_____
Signature of Parent or Guardian (if participant is a minor) Date
For written summary of results:
Printed Name
_____
__

ESU student e-mail _____

Appendix K

Debriefing Statement

Testing Reality

Spring 2013

Thank you for participating in this study. The purpose of this study was to determine the effect of an assigned avatar on performance in SecondLife. I expect that when assigned the same gendered avatar performance will be stereotypical in nature. When assigned a different gender, performance will be stereotypical of the assigned gender instead of the actual gender. All information obtained from you will be strictly confidential. I ask that you do not talk about this experiment or reveal the true nature as it could alter or influence the behaviors of the other student participants in the study. Do you have any questions? If questions arise later, you may contact Amanda Martens in her office (VH310), by office phone (341-5803) , or via email (amartens@emporia.edu). Again, we appreciate your time and thank you for your participation

I, Amanda Martens, hereby submit this thesis to Emporia State University as partial fulfillment of the requirements for an advanced degree. I agree that the Library of the University may make it available for use in accordance with its regulations governing materials of this type. I further agree that quoting, photocopying, digitizing or other reproduction of this document is allowed for private study, scholarship (including teaching) and research purposes of a nonprofit nature. No copying which involves potential financial gain will be allowed without written permission of the author. I also permit the Graduate School at Emporia State University to digitize and place this thesis in the ESU institutional repository.

_____

Signature of Author

_____

Date

Exaggerated Gender Differences? Malleability of Gender Identity with Video Games Effects

_____

Title of Thesis

_____

Signature of Graduate Office Staff Member

_____

Date Received