Massively Multiplayer Online Roleplaying Gaming:
Motivation to Play, Player Typologies, and Addiction

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By
Michael Scott Lewis
Graduate Program in Education – Physical Activity and Education Services

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Dissertation Committee
Paul F. Granello, Ph.D., Advisor
Darcy Haag-Granello, Ph.D.
Jerome D’Agostino, Ph.D.
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Abstract

Massively Multiplayer Role-Playing Games (MMORPG’s) have become increasingly common in the video gaming marketplace with conservative estimates of 19 million players worldwide. These games allow players to engage in a virtual world with hundreds of thousands of other players at the same time. The games have no definitive end and the game content continually grows by giving players more virtual world to explore creating an expanding alternate reality. For most, these games are a leisure activity or hobby, but for approximately 8-12% of MMORPG players the experience becomes problematic. As a result, online gaming addiction has become the fastest growing process addiction over the past two decades. Continued play creates real life problems such as relationship difficulties, vocational issues, health related complications, and in extreme cases, legal troubles or death from exhaustion or dehydration. Online gaming addiction is similar to chemical addiction in symptomology in areas of tolerance, withdrawal, difficulty stopping or controlling use, and negative consequences. Therefore, it is critical to more clearly understand the nature of online gaming, links to addiction, and possible underlying factors that contribute to addiction. There were several purposes underlying this study including an attempt to better understand the average MMORPG player profile, examine possible motivational factors that contribute to continued game play, and to recognize what aspects may predict online gaming addiction. Prior research conducted on understanding online gaming motivational factors includes a desire to be
the best player (achievement), engaging with other players (social), and exploring the virtual world (immersion). Additionally, the model of dualistic passion is believed to help explain gaming motivation using the concepts of harmonious passion (controlled game play which does not interfere with life responsibilities) and obsessive passion (uncontrolled gameplay, linked to personal identity, often resulting in negative consequences). These five motivational components were the independent variables and the dependent variable was online gaming addiction. A sample of MMORPG players ($N = 246$) was surveyed using online portals and social media. Results indicate that the average MMORPG gamer in the sample was 28.69 years old ($SD = 7.31$), male (80.9%), educated with at least some college credit, and had an average income of approximately $30,000. These findings match previous research and challenges the many myths of the video gamer profile. All independent variables had a strong positive relationship with the dependent variable. A regression analysis model was significant and indicated that obsessive passion, achievement, and social were significant predictors ($F(5, 240) = 63.977$, $p < .001; R^2 = .66$). Specifically, obsessive passion demonstrated the strongest correlation and prediction of online gaming addiction. Post hoc analyses highlighted gender differences and evaluated subcomponents of the independent variables. The significance of this study is that it extended the body of knowledge on motivational factors contributing to online gaming addiction and provided a significant model of predictors. Limitations of the study include generalizability, a small sample size, and potential sample bias towards more fanatical players. Future studies may benefit from expanding the sample size and including adolescents and children as participants.
Dedication

This manuscript is dedicated to three distinct entities: 1) My Mom and Dad who bought me my first video game system at age eight; 2) Nintendo for creating The Legend of Zelda, assuring I’d be lovingly hooked on video games forever; and 3) Laura who allows me to indulge my inner gamer.
Acknowledgments

I humbly acknowledge my dissertation committee for helping to support this process, first explored 14 years ago, come to fruition. Thanks to my advisor, Dr. Paul Granello, for encouraging me; to Dr. Darcy Granello for helping me find my writer’s voice; and to Dr. Jerome D’Agostino for giving me tools to execute this study. I want to give gratitude to my parents for always believing in me from a young age and giving me the freedom to fail so that I could learn how to succeed. I am appreciative of my friends and family for offering unwavering support and forcing me to have fun. I’d like to thank Team Ph.D. who continuously grounded and inspired me throughout this process. Lastly, and most importantly, I sincerely thank my wife Laura for being my center. She grounds me, moves me, and makes me the best version of myself I can hope to be. She has never doubted the completion of this manuscript, even if I silently did. With love, I appreciate her efforts.
Vita

May 1995………………………Greenon High School

May 1999………………………B.A. Psychology, Ohio Dominican University

May 2003………………………M.A. Counselor Education, The Ohio State University

2010 – Present…………………Ph.D. Counselor Education, The Ohio State University

Publications


Fields of Study

Major Field: Counselor Education
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2.1 Problematic Online Game Use Scale Model: 5 Factors and One Second Order Factor
Chapter 1

Introduction

Research on addiction has traditionally been focused on understanding the characteristics of chemical addiction, such as dependence on a substance like heroin or alcohol (Walters & Gilbert, 2000). Recent studies, however, are attempting to understand a set of behaviors that have similar characteristics to chemical addiction but do not involve the ingestion of a substance (Smith, 2012). These behaviors, commonly known as process addictions, are activities that are at first enjoyable but eventually lead to symptomology such as tolerance, withdrawal, lack of control, and a pattern of remission and relapse, all of which are similar to chemical dependency (Black, 2013).

Although process addictions have increasingly gained attention from addiction and mental health professionals as they become more prevalent in our society (American Society for Addiction Medicine [ASAM], 2011), the body of research in this area continues to be less established around understanding the general characteristics of process addictions, including clinical issues. Online gaming, a relatively new clinical concern within the spectrum of process addictions (Chappell, Eatough, Davies, & Griffiths, 2006), appears to be the fastest growing addiction throughout the past decade (Young, 2009). It has been suggested that online gaming addiction is best understood using research and theory that outlines the concept of process addiction. Therefore, process addiction characteristics, history and assessment, diagnosis, and treatment
considerations all provide essential components for understanding online gaming addiction.

**Statement of the Problem**

Online gaming addiction is one of the fastest growing addictions in the past decade largely due to the increasing availability of computer technology and Internet access (Young, 2009). Massively multiplayer online roleplaying games (MMORPG’s) most rapidly evolved in the late 1990’s. Frequent reports of problems began to emerge such as lost relationships, loss of employment, and mental health diagnoses (Hussain & Griffiths, 2009), and mental health professionals began to relate these problems to addiction (ASAM, 2011). Websites devoted to discussing and treating the issue, such as Online Gamers Anonymous (olganon.org, 2012), and Everquest Widows (groups.yahoo.com, 2013), began to give people a place in which to speak about how MMORPG’s had impacted their lives or the lives of their loved ones. *Everquest*, one of the first popular MMORPG’s, earned the nickname “EverCrack” in reference to its immersive and addictive nature (Hussain & Griffiths, 2009; Ng & Weimer-Hastings, 2004).

Given the rapid growth of the games, as well as the concerning consequences that have become associated with them, it has become clear that online gaming has the potential to cause significant harm to game players. For example, the difficulties associated with online gaming has reached near pandemic levels in South Korea and other Asian countries, resulting in legislation that governs use of online games, hours played, and time in Internet cafes where most players play (Seok & DaCosta, 2012). There have been many documented consequences associated with online gaming ranging
from personal physical and mental health issues, player death due to exhaustion, real
world violence between gamers, and lawsuits between players regarding in-game
property and disputes (Parks, 2012). In 2005, there were seven documented deaths in
South Korea that were linked to online gaming primarily from exhaustion or fights
between players (Freddolino & Blaschke, 2008). The South Korean government
specifically notes that online gaming may be the current largest health threat in their
country (Parks, 2012).

There are many anecdotal stories of loss and tragedy related to online gaming.
For example, in Las Vegas, a couple was indicted for child neglect after ignoring their
one- and two-year old children in lieu of playing games online (reviewjournal.com,
2013). In Illinois, an obsessed player squeezed his son to keep him quiet and police
found him dead 24-hours later (ign.com, 2013). Another story, and perhaps one of the
most well-documented cases, involves Shawn Woolley, a young adult who became
infatuated with the game Everquest in the early 2000’s (Spain & Vega, 2005; wired.com,
2002). Woolley was living on his own, had a full-time job, and was closely connected to
his mother before playing Everquest. His mother confronted him about his obsessive
play after witnessing the deterioration of her son’s work, family, and social life and
disconnected his home Internet use. Woolley’s compulsion to play eventually
overwhelmed him; he broke into his mother’s home to install the game on his mother’s
computer and continued playing. His mother relented and allowed him to begin playing
at his home again. His mother, suspicious of not having heard from him for several days,
grew to his home. When he did not answer the door she broke through a window and
entered the house to find him dead from a self-inflicted gunshot. Evidence supported
that he had been playing *Everquest* moments before he committed suicide and his computer screen was on the *Everquest* load screen. In addition, there may have been other contributing factors leading to Woolley’s death, perhaps the most interesting notes an in-game love interest that declined his affection (wired.com, 2002) and several mental health diagnoses (Doan & Strickland, 2012). Woolley’s mother believes that online gaming became the ultimate outlet and contributing source for his dysfunction.

As in the case with Shawn Woolley, clinicians are striving to better understand this addiction and how to treat it (Young, 2009). Recently, the American Psychiatric Association encouraged more clinical research on the topic as the organization considers if and how to add Online Gaming to the list of diagnosable disorders in future editions of the Diagnostic and Statistical Manual of Mental Disorders (American Psychiatric Association, 2013). Also, several websites have been designed to offer support to gaming addicts and their “widows” (olganon.org, 2012; groups.yahoo.com, 2013).

Research has attempted to better understand what motivates players of MMORPG’s to continue playing the game when there are negative consequences associated with its persistence. Yee (2006) described three primary motivators that kept players engaged. He indicated that some players play for the social connections they create within the game whereas others play for status or to become the best at some aspect of the game. Still others are more motivated by fantasy aspect of the game and become immersed in the world in which they play. A separate study investigated how much value and interest a player invests in MMORPG game play may impact their continued play (Lafreniere, Vallerand, Donahue, & Lavigne, 2009). Building off the concept of dualistic passion (Vallerand, et al., 203), the researchers conclude that players
who oft define themselves by their gameplay and what the gameplay means for them personally are more apt to continue playing despite negative consequences. Although the concepts of player motivations and dualistic passion lend insight to underlying factors related to MMORPG players they do not fully explain how they relate to or predict addiction to MMORPG games.

In addition, researchers have been attempting to better classify and understand the prevalence of online gaming. There are over 19 million active players documented (mmodata.net, 2012c) and several additional million of players that play “free-to-play” MMORPG’s (which do not require a subscription and therefore are more difficult to track). Between 7% and 12% of people who play online game meet criteria indicative of addiction, such as playing longer than intended, difficulty stopping play over extended periods of time, increased time devoted to play, irritability and anger associated with being unable to play, and real world consequences linked to continued play (Gentile, 2009; Grusser, Thalemann, & Griffiths, 2007; Hussain & Griffiths, 2009). If these statistics are correct, it is possible that over 2 million people meet the criteria for addiction, and numerous family, friends, and peers may also be impacted. Therefore, given that the number of individuals who engage in online gaming is on the rise, both domestically and abroad, there is clear justification to further research to understand online gaming in order to properly diagnose and treat this type of process addiction.

**Purpose of the Study**

The present study seeks to understand the underlying factors that contribute to addiction among online role-playing gamers. Many researchers believe there are psychological and motivational components that differentiate players who become
addicted to online gaming from those who do not (Lafreniere, et al., 2009). The current study intends to combine the above concepts of dualistic passion (Vallerand, et al., 2003; Vallerand, 2010) and player typology (Yee, 2006), and to investigate how they interact and relate to each other. The researcher is also interested in how these constructs may contribute to and predict online gaming addiction through utilizing Kim and Kim’s (2010) Problematic Online Gaming Use Scale. The results will be analyzed first describing demographic statistics, correlations on the independent variables will be reported, and lastly a multiple regression model will explore these constructs and their relevance to online gaming addiction.

**Research Questions**

The researcher posits the following four questions:

1. What are means and distribution of MMORPG player’s age, gender, race, education, personal income, and frequency/duration of game play?

2. To what degree are people motivated by harmonious passion, obsessive passion and the three types of Player Typologies (immersion, socialization, and achievement)?

3. What is the correlation between the independent variables harmonious passion, obsessive passion, immersion, socialization, and achievement?

4. Are there patterns of play and passion according to Vallerand’s Dualistic Model of Passion (IV) and Yee’s player typologies immersion, socialization, and achievement (IVs) that can predict levels of addiction according to Kim & Kim’s Problematic Online Game Use Scale (DV)?
Significance of the Study

The domestic and worldwide impact of MMORPG’s clearly demonstrates the need for an expert understanding of online gaming addiction. There is also a critical need to unify the discussion around online gaming addiction. As such, the results of this study will help provide practicing mental health clinicians and the research community a better understanding as to why players continually play games to the detriment of their quality of life. Second, the present study will contribute to and expand upon the language and definitions related to online gaming addiction. As Seok and DaCosta (2012) have remarked, there is a need to arrive at a common method to assess and measure the ways in which gamers become addicted, yet much of the research on diagnosis and assessment has been conflicting and incomplete (Kim & Kim, 2010). This study also intends to provide insight on how to assess and predict addiction. In general, the present research intends to provide further depth and understanding to the existing body of literature in this topic area and to provide evidence of the need for additional future research opportunities.

Limitations of the Study

As with most research, there are several limitations the researcher can identify within the current study. First, due to the nature of sampling an online community, generalizability is at risk. It can be inherently difficult to work with a sample obtained online as it cannot be predicted who will be attracted to the online portals where the study is housed. Although the sample of this study may be representative, it is also possible that more dedicated players would be likely to visit such online gaming websites and complete the survey, thus skewing the sample towards a more devoted gaming
community. Therefore, although the results of this study are expected to significantly contribute to the body of research surrounding gaming addiction, it should be stated that results might not be easily generalizable.

As previously mentioned, this study will measure two specific constructs related to MMORPG play and potential addiction: motivation and passion. Although the researcher hypothesizes these factors are the most salient, there are other factors that contribute to online gaming play and addiction including mental health diagnoses, chemical addiction comorbidity, history of addiction or substance abuse, and a desire for escapism (Black, 2013; Chappell, et al., 2006; Dauriat, Zermatten, Billieux, Thorens, Bondolfi, Zullino, & Khazall, 2011; Przybylski, Weinstein, Ryan, & Rigby, 2009; Williams, Yee, & Caplan, 2008). There may also be additional factors that contribute to addiction that are not yet identified. Further research will aid in discovering other factors that contribute to online game play and addiction.

Additionally, there are limitations to the current study regarding instrumentation. The Problematic Online Gaming Use Scale devised by Kim & Kim (2010) was selected as a valid and reliable measure for the researcher’s current problem and desired methodology. However, it should be noted that this instrument was tested with children and adolescents as the subjects and therefore raises a concern regarding validity with an adult sample. Also, Kim & Kim (2010) did not explore gender differences which is a factor to be addressed in the current study. In general, similar to the method of the current researcher, future investigators of this topic area will have to decide which potential assessments best fit their study and recognize that utilization of other assessments may yield different results.
Definition of Terms

The following are important terms and language most commonly used in the present exploration of gaming addiction as it pertains to massively multiplayer online roleplaying games.

Gamer

A title people who play games often give themselves or to others who play games. This term denotes that video game play is part of that person’s identity.

Online Gamer

This term is similar to a “gamer” but indicates the person specifically identifies with a genre of games played online, such as massively multiplayer online roleplaying games (MMORPG).

Multi-User Dungeon (MUD)

A Multi-User Dungeon is a predecessor to the modern MMORPG. In this genre multiple users play at the same time in a text based fantasy game (livinginternet.com, 2015). Many important components integral to MMORPG’s, such as player classes and races, group based cooperation, and world exploration, are present. The technology at the time did not allow for graphical representations of the worlds and were instead given to players through text. In MUDs players typically communicate with one another using the game’s dedicated Internet server. MUDs are currently still in existence but are far less populated than MMORPG’s.

Massively Multiplayer Roleplaying Game (MMORPG)

MMORPG’s are a type of online experience that allows the gamer to inhabit a virtual universe that is populated by hundreds to thousands of other players.
The six criteria that make a MMORPG unique to other games are persistence, physicality, social interaction, avatar-mediated play, vertical progression, and perpetuity (Hussain & Giffiths, 2006).

**Ultima Online (UO)**

*Ultima Online (UO)* was one of the first graphically based and widely dispersed MMORPG’s. *UO* was released in 1997 and is still active today (uo.com, 2014). It was also the first MMORPG to reach 100,000 active subscribers and peaked at over 250,000 in 2003.

**World of Warcraft (WoW)**

*World of Warcraft* is one of the most popular MMORPG’s to date boasting over 12 million active users at its peak (mmodata.net, 2012b). *Wow* was released in 2004 and has since become the standard to which big market MMORPG’s are held. The game’s manufacturer, Blizzard Entertainment, has released five expansions, the most recent in 2014. *Wow* has also become the most financially successful MMORPG generating over 10 billion in sales revenue (businessinsider.com, 2012). Over 100 million lifetime subscriber accounts have been created (polygon.com, 2014).

**Guild**

A guild is a collection of players who form a like-minded or purposed group. Guilds often team together in online play and assist in player advancement and socialization. Guilds can function as a team in order to take on particularly challenging parts of the game, commonly known as guild raids. These activities require planning, coordination, and strategy and often require dozens of players to coordinate in order to successfully complete the tasks.
Experience

Experience is a functional part of MMORPG’s as it allows players to measure their progress towards the next level of their avatar. Experience grows through activities such as killing monsters, exploration of the world, crafting items, or other game achievements and moves players to more advanced levels as the game progresses. For example, it may take 500 experience points to advance from Character Level One to Character Level Two or 10,000 points to advance from Character Level 10 to Character Level 11. In essence, advanced achievements often offer more experience, and therefore the game playtime required can significantly increase in order to achieve higher levels.

Avatar

An avatar is a controllable physical representation of the player used to manipulate and interact with the game environment (Yee, 2006). Players create avatars by selecting adjustable features such as gender, body characteristics, and dress. Avatars are also informed by statistics that account for a player’s attributes such as strength, wisdom, luck, and fortitude among other traits. Players are often required to assign their avatars a player class and race, which will further represent how the avatar interacts with the world.

Player Class

Player class refers to professional archetypes and professions that players assume in games such as a fighter, healer, or wizard (Yee, 2006). These roles inform how the player will play the game. For example, a fighter might play in close combat with enemies whereas a wizard is more proficient at fighting from afar with magic. Typically,
players choose to join with other players to form a group of diverse roles that complement one another during game play.

*Player Race*

Player race denotes fantasy roles that players assume in a game such as elves, gnomes, ogres, trolls and hybrids of other races (Yee, 2006). Racial differences can be demonstrated as well as physical appearance and often inform what class the character can choose. For example, an ogre might have more physical strength to begin a game, a gnome would have more wisdom. Therefore, an ogre would be better suited to become a fighter than a wizard. Some games, however, prevent players from making certain class and race combinations.

*Player vs. Environment (PvE)*

Player vs. Environment (PvE) is a style of play common to MMORPG’s in which players play alone or with groups to combat game made creatures in order to gain experience and treasure (alteredgamer.com, 2012). This type of environment often encompasses interaction with towns or large cities, dungeons, and differing overworlds, which can change by region or by what type of inhabitant lives there. For example, northern regions of the game may be snow covered to simulate the change in temperature or an Elvan city may be in the treetops. Players in PvE’s interact with non-player characters such as townspeople in order to obtain quests and seek out new environments in order to complete the quests. Players can team with other players online in order to complete quests together. As the game continues, players are often encouraged to explore more of the game’s environment and new parts of the virtual world.
**Player vs. Player (PvP)**

Player vs. Player (PvP) is a style of play common to MMORPG’s that combines a player versus environment dynamic with a player versus player combat (alteredgamer.com, 2012). In PvP’s, players combat one another one-on-one or in groups or guilds which creates and substantiates a good versus evil archetype. It is common for MMORPG’s to have a backstory that explains good and evil factions within the game, such as elves and humans at war with ogres and trolls. By choosing one faction, a player is additionally choosing to be at war with the other. Some PvP games make these factions integral to the game’s play, such as in the game *Guild Wars*, and others use it as an added feature that can be chosen by the player.

**Non-Player Characters**

Non-player characters are preprogramed MMORPG characters with various dialogues or jobs within the game (alteredgamer.com, 2012). They often give players quests, allow players to buy items such as food or equipment, or give players information about the game’s world. They are not controlled by anyone and have little capacity to influence the gaming world outside of their preprogrammed directives.

**Dualistic Model of Passion**

Passion is a term to denote the desire to engage in a particular activity over another. It is a strong inclination towards a self-defined activity that one likes, highly values, and invests time and energy toward. There are two mutually exclusive types of passion: harmonious passion and obsessive passion (Vallerand, et al., 203). As Vallerand (2010) explains, it is through activity selection, valuation, and internalization that self-selective activities become a passion.
**Harmonious Passion**

Harmonious passions are activities that are freely chosen and engaged in without connection to other needs or extrinsic motivations (Vallerand, et al., 2003). A harmonious passion can also be something the person desires but is willing to let it go of without attached negative feelings or behaviors. People rarely have negative consequences related to harmonious passions. (Vallerand, 2010)

**Obsessive Passion**

Obsessive passion is a specific type of passion. According to Vallerand, et al. (2003), obsessive passion means that an individual’s passion is connected to other values, feelings of self, desires, needs, or other meanings about oneself. With obsessive passion, a person is engaged not only for the pure enjoyment of the activity, but rather for what it personally represents for them externally (reputation, status, credibility, etc.) or for what he/she gains other than personal satisfaction (wealth, a job, a partner, etc.). It should be noted that there are often consequences associated with obsessive passions (Vallerand, 2010).

**Yee’s Player Typology**

Yee’s Player Typology is a theory proposed by Nick Yee, a researcher on video game play and virtual identities, which suggests that online game players are motivated to play MMORPG’s for three major reasons: the desire for socialization, achievement, and immersion (Yee, 2006). He further suggests that these motivations can overlap with one another, but players typically show a preference for one over the others.
**Achievement Player**

An achievement game player is defined as a player who enjoys advancing their avatar to the maximum levels, defeating the most difficult challenges, and receiving the best treasures. These players are likely to be recognized for their accomplishments such as obtaining a rare treasure, reaching high character levels, or asserting leadership roles within guilds (Yee, 2006).

**Exploration Player**

An exploration game player is primarily interested in learning more about the virtual game world and experiencing what it has to offer him/her (Yee, 2006). This player may spend time reading the game’s virtual history and stories, learning about the game’s landscape, and engaging with the game’s lore (i.e. the virtual world’s history, NPC backgrounds, legends of heroes) through role-play.

**Social Player**

A social player is a type of game player who primarily plays MMORPGs in order to interact with and become acquainted with other players online. This often evolves through formed groups, guilds, or one-on-one interaction. Social players often form substantial relationships in the game (Yee, 2006).

**Summary**

Process addictions are on the behaviors that mimic chemical addiction including tolerance, withdrawal, and continued engagement despite consequences. The fastest growing process addiction over the past decade has been online gaming. Online games, specifically Massively Multiplayer Online Roleplaying Games (MMORPG’s), have been linked to significant problems for many users including job loss, relationship strife,
violence, health issues, legal problems, and in more extreme circumstances death. The total number of MMORPG players continues to grow making online gaming addiction a topic worth investigating. This study posits that there are underlying motivations related to the concepts of dualistic passion and player typology that may help explain why players are motivated to play MMORPG’s despite the negative effects and consequences.
Chapter 2

Literature Review

The concept of process addiction is not a completely new domain of clinical research interest. Problematic gambling, for example, was included as a diagnosis in the Diagnostic Statistical Manual of Mental Disorders – Fourth Edition (DSM-IV) (APA, 1994) and since then researchers have written about and explored other behavioral addiction areas such as shopping, sex, exercise, and eating (Young, 1998). Research concentrated specifically on the online world or online games with even less attention to MMORPG’s was slow to follow. In the mid-1990s researchers began to investigate Internet addiction. The attention given to this topic then is likely related to increased access and expansion of Internet services, which has allowed people broader access to different methods in which to engage in addicted behaviors online. As a result, the Internet quickly became a conduit for shopping, sexual, and gambling behaviors.

Video games have also evolved with these technological advancements. In the late 1990’s and early 2000’s, MMORPG’s started to gain popularity among computer game players, and games such as Ultima Online, Everquest, and World of Warcraft emerged. During this time, process addiction concerns began to extend to online gaming, and research on the topic increased throughout the mid 2000’s. This chapter outlines the existing research on process addictions and its relationship to online gaming addiction, explains how MMORPG’s are played, identifies why players engage in these games,
introduces the potential role of passion in the development and maintenance of addiction, and finally, offers how these factors relate to the current study.

**Addiction**

Addiction has generally been associated with substance drug and alcohol abuse and dependency such as with alcoholism, opiate addiction, or marijuana abuse. The most commonly agreed upon definitions describe addiction as a disease characterized by the inability to control one’s use of drugs and alcohol and a failure to recognize one’s consequences related to this use (ASAM, 2011). Addiction tends to be chronic, has patterns of abstinence of use and relapse, is progressive, and, without treatment, may lead to death. Addicts tend to have other indicators such as tolerance to the drug (diminished effect of the drug with the same dosage or increasing dosage to achieve the same effect), withdrawal (physical or mental discomfort due to the absence of the drug in the body), failures or inability to reduce usage or abstain from use, using a drug more often, longer, or in greater dosage than intended, and consequences related to the behavior (APA, 1994). The disease is also linked to changes in brain chemistry (Powerledge, 1999). Dopamine, the principle neurotransmitter in the limbic system, is released when one uses drugs or alcohol, which elicits a feeling of euphoria. Brain chemistry then becomes altered and rewired with sustained use and cravings for the drug of choice begin to occur.

The development of addiction becomes cyclical (Powerledge, 1999). A substance user develops a tolerance for the substance, which no longer produces the desired effect. To accommodate this, the user increases the dosage or amount used to achieve the desired effect. Withdrawal symptoms often accompany increased tolerance. Physical withdrawal symptoms vary depending on the substance and may include cramping,
headaches, nausea, vomiting, sweating, insomnia, or heart palpitations (ASAM, 2011). Typically these symptoms worsen and become more pronounced as dosage and use frequency is increased. As the cycle of increased use and more severe withdrawal continues, an addict begins to use the substance not just for the desired effect, but instead to assuage the withdrawal symptoms (Powerledge, 1999). The brain continues to associate feelings of euphoria and pain reduction with use of the drug, which makes starting the process of remission quite difficult. A pattern of remission and relapse is frequent in the addiction cycle and, according to the Diagnostic Statistical Manual of Mental Disorders – Fifth Edition (DSM-5), is a criterion for diagnosing substance dependence (APA, 2013).

Motivation Models

Although many have been posited, three motivational models have primarily been used to further define addition: hedonism, positive and negative reinforcement, and incentive motivation (Freimuth, 2009). Hedonism suggests that addiction can be understood using the pleasure and pain principle, by which users seek pleasure through the use of alcohol and drugs. However, as tolerance increases and more of the substance is needed in order to achieve the same high, the euphoria of use dissipates and instead becomes pragmatic in order to avoid the pain of withdrawal symptoms.

The positive and negative reinforcement model is similar to the hedonistic model in that individuals experience motivation from the positive feelings they receive from using the chemical (Freimuth, 2009). The transition from use to dependence is differentiated in the hedonistic and the reinforcement models by the nature of the underlying motivation. In the positive and negative model, after tolerance increases,
individuals are motivated through the presence of withdrawal and cravings, which negatively reinforces the continued behavior. Hedonism, however, is motivated by emotional responses and pursuit of pleasurable emotions or retreat from negative ones; motivation from reinforcement is learned through experience and strengthened through repeated measures.

Lastly, chemical dependence can also be understood through incentive motivation theories (Yee, 2006). Incentive motivation suggests that the hedonistic motivators are not sufficient to motivate and continue the behavior. Instead, after repeated usage, the brain becomes rewired to desire the drug, and the brain’s reward center is then altered to view the drug as necessary to survival (Freimuth, 2009; Smith, 2012). In addition, the incentive threshold, the level at which the drug begins to rewire the brain, is variable among drugs (Petri & Govern, 2004). For example, the threshold for heroin is much lower than marijuana as it requires less usage and dosage to create a physiological change. The threshold is also variable among individuals, which explains why some individuals are more prone to developing dependence than others.

**Process Addictions**

In the past, the American Society of Addiction Medicine’s (ASAM) definition of addiction was exclusive to chemical dependency; however, in their most recent Public Policy Statement, process addictions are recognized and included for the first time (ASAM, 2011). As previously mentioned, process addiction is not an entirely new concept; the diagnosis of pathological gambling was first formally recognized in the DSM-IV as an impulse control disorder (APA, 1994) and updated in the latest edition (DSM-5) as the newly added category of behavioral addiction (APA, 2013). Although
the American Psychiatric Association (APA) recognizes gambling addiction as the singular behavioral addiction, further research has been requested by the APA to understand other behavioral addictions, including Internet gaming disorder, which has been listed as a condition warranting further clinical research (dsm5.org, 2013).

Although acceptance of process addictions as a group of disorders has been slow to materialize, there has been substantial growth in research in this area over the past two decades (Smith, 2012). A search for peer-reviewed articles on a university library search engine using the term “process addiction” returned 375 articles published in 1994. In 2004, there were 1099 results discovered and in 2014, 2986 articles were included in the results. These searches indicate a significant growth of 171% from 2004 and 2014 and 696% between 1994 and 2014. In addition, this increase in attention appears most noticeable in the areas of sexual addiction, pathological gambling, compulsive shopping, and Internet-related addictions (Rooij, Schoenmakers, van de Eijnden, & Mheen, 2010).

These results demonstrate a recognized need for continued and focused research in the area of process addictions, especially since chemical and process addictions have many parallel characteristics. To begin, both involve displays of tolerance, withdrawal, negative consequences related to use, a pattern of remission and relapse, and a physiological and/or psychological preoccupation with use (ASAM, 2011; Smith, 2012). Individuals with process addiction report some of the same thought patterns, cravings, and symptomology (i.e. tension, uneasiness, preoccupation, or a “hunger” for use) as chemically dependent individuals (Smith, 2012). The action is simply domain specific (i.e. ingestion or behavioral) (Grant, Potenza, Weinstein, & Gorelick, 2010).
There is also substantial evidence that process addictions stimulate dopamine secretion in similar ways to drugs or alcohol (Grant, et al., 2010; Oberg, Christie, & Tata, 2011; Smith, 2012). The motivational models for continued chemical use outlined above can also be applied to process addictions even if they are manifested in different ways (Grant, et al., 2010). For example, although the withdrawal symptoms for chemical use are typically physical, such as perspiration, cramping, or headaches (Charlton & Danforth, 2007; Griffiths & Meredith, 2009), the withdrawal symptoms for process addiction are often psychological as demonstrated by irritable moods, preoccupation with the behavior, anger, or depression (Freimuth, 2009).

In addition, the consequences resulting from use is another area in which process and chemical addictions are comparable. The results of addictive behavior can take several forms, such as chronic health concerns or maladies, interpersonal relationship strife, illegal acts, vocational or school difficulties, and discipline at school or work (Anand, 2007; Freimuth, 2009). The presence of such negative consequences is one of the key indicators for both types of addiction. Although individuals may experience the consequences differently, the same level of engagement can contribute to such adverse consequences (Charlton & Danforth, 2007).

In sum, it is somewhat perplexing why it has been so challenging for process addictions to gain active research momentum given their similarities between chemical and behavioral addictions. However, Young (2009) notes that the recent growth of research in process addictions is connected to the rise in the accessibility of the Internet. Increased access to pornography, cyber-shopping, and online gambling sites has led to
increased public attention on process addictions, which in turn, has prompted more intense clinical research.

**Early Internet Addiction Research**

The Internet evolved and became widely available for general use in the early 1990’s. It is clear that the Internet has quickly become interwoven into everyday life for the majority of Americans as evidenced by the fact that 78.6% have an active Internet account (theculturist.com, 2013; internetworldstats.com, 2014). There are currently over 2.5 billion users worldwide and on average, eight new users are added every second (theculturist.com, 2013). Thus, Internet use is integrated into nearly every facet of an individual’s life, such as work, research, social connections, and leisure activities.

Early research on Internet problematic use and addiction can be found in a study conducted by Young in 1998. The author remarked on the available research on behavioral addictions such as compulsive eating, pathological gambling, and compulsive sexual activity, but noted a clear gap in the research related to Internet overuse and addiction and thus developed an exploratory study to evaluate the concept of Internet addiction. The participant sample was gathered using national and international newspaper advertisements, advertisements on local college campuses, postings on websites specific for Internet addiction support, and as a top returned search for keywords “Internet” and/or “addiction.”

Young developed an instrument, the Internet Addiction Test (IAT), using adapted criteria for pathological gambling taken from the DSM-IV (APA, 1994) to measure dependency among Internet users (the DSM-IV included ten criteria but Young reduced it to eight) (Young, 1998). The eliminated criteria involved monetary losses and loans,
which did not effectively translate to Internet use. However, the same criteria were kept that matched the classification of addiction. During the study, participants who endorsed five or more of the eight criteria were placed in the dependent category and the remainder of the sample was classified as nondependent.

The IAT included the eight-item diagnostic criteria mentioned above (Young, 1998) and was administered through a telephone or electronic survey. The survey also included questions regarding demographics, length and duration of Internet use on non-essential activities (overall and weekly), the type of application or websites in which the user engaged (i.e. chat rooms, email), what attracted them to using these applications or websites, and problems their Internet use had caused. Lastly, Young had participants rate these problems as mild, moderate, or severe.

A total of 496 valid responses were gathered. The Internet dependent group included 396 subjects (males = 157; females = 239) and the nondependent group numbered 100 (males = 64; females = 36). Mean ages for the various groups were 25 (male/nondependent), 28 (female/nondependent), 29 (male/dependent), and 43 (female/dependent). Young noted the overall unemployment rate for the dependent group was 42% (including homemakers, students, retirees); however, no data on vocational classification was given for the nondependent group. The dependent group averaged 15.5 years of education and the nondependent group had 14 years. Other demographic information such as ethnicity, nationality, income, marital status, or family composition was not reported.

Young (1998) noted comparable significant differences between the dependent and nondependent groups regarding weekly Internet use. The nondependent group
indicated a mean use of 4.9 hours per week ($SD = 4.7$), while the dependent group averaged 38.5 hours of use per week ($SD = 8.04$). Young also noted that the dependent group reported increased use over time, which appeared to be similar to the experience of tolerance.

Most notably, the dependent and nondependent groups differed in what applications they used through the Internet. The dependent group engaged in applications that allowed them to interact more with other individuals or groups than did the nondependent group. The top three applications used by the dependent group were chat rooms (38%), multiuser dungeons (28%), and interactive newsgroup forums (15%). Conversely, these were the three least used applications among the nondependent group at 7%, 5%, and 10% respectively. Instead, the nondependent group more frequently sought information-gathering applications such as online libraries or databases and home pages (www addresses) at 24% and 25% respectively. Comparatively, the dependent group only used such applications 25% and 7% of the time. Finally, email use indicated the highest overlap between the two groups, with 30% of the nondependent group and 17% of the dependent group operating email regularly.

All subjects in the dependent group in Young’s (1998) study reported some negative consequence related to their Internet use. Young categorized the impairments into five categories: academic, relationship, financial, occupational, and physical. Fifty-eight percent of the subjects in the dependent group reported severe problems with academic problems such as late assignments, lowered grades, or academic probation/expulsion. Since the mean age of the dependent group was 29 for males and 43 for females, this finding suggests that almost all of the college students in the group
experienced this consequence. Nighty-eight percent of subjects in this group reported moderate to severe disruption in relationships as described by ignoring personal relationships in lieu of online ones and online infidelity with cybersexual partners. In addition, severe financial concerns were reported by 58% of the subjects in this group related to paying for Internet service. At the time of the study individual internet use was paid for through data use (as opposed to the current format of flat rates), and a bill for online use could reach hundreds of dollars a month depending on how much data was used. Also, severe vocational difficulties were reported by 51% subjects which included tardiness or absenteeism, lack of focus at work (preoccupation with Internet user), and misuse of work time. Physical complaints were the least reported category with 75% reporting no problems and 25% reporting mild or moderate levels of concern. The most common reported complaint was sleep disturbance (attributed to staying up late to engage in online activities) and lack of exercise.

Despite these negative consequences, 54% of subjects in this survey reporting problems indicated no intention to decrease their use of the Internet. The remaining 46% attempted to restrict their use by enforcing time limits or cancelling their Internet service altogether. Many of these participants reported an inability to refrain from continued use (this percentage was not reported by the researcher).

Although this initial study was quite informative, it should be noted that there were several shortcomings and limitations. To begin, Young’s study was conducted nearly in the late 1990’s during the time period in which the Internet was a still very new and growing entity. Young (1998) specifically measured when subjects began using the Internet, and among the dependent group, 81% had been on the Internet for less than a
year. This suggests how original the Internet was at the time of data collection, which may suggest novelty may have played a role. Should Young’s study be replicated in present day it could be hypothesized that results might differ given that the Internet is more familiar to users and integrated into daily living.

Secondly, the method Young used for subject recruitment resulted in a skewed sample. Young (1998) populated and advertised the survey on websites and used search terms that would easily engage individuals who already self-identified as regular users. This may have created data that was more reflective of a higher negative consequence set than the population as a whole. Also, the sample size was relatively small compared to the current three billion Internet users worldwide (liveinternetstats.com, 2015) and therefore generalizability must be applied with caution. Lastly, the instrument itself may not be satisfactory. Young’s use of adapted pathological gambling criteria, although perhaps helpful to use as an initial baseline, may not have been specific and inclusive enough in order to adequately measure broad Internet use and dependency. Young herself noted that addiction is likely domain specific to applications accessed via the Internet rather than the entire Internet itself. More specifically, the dependent group used applications that allow for more frequent interactivity.

In spite of these limitations, Young’s (1998) work provided a helpful foundation for future research on process addictions by finding a link between Internet use and addiction. In the decades that followed, research relevant to the Internet became more specific to the individual aspects of Internet use. Subsequent studies have not only better defined Internet addiction, but also have identified subsets of Internet use such as gaming (Caplan, Williams, & Yee, 2009; Chappell, et al., 2006; Doan & Strickland, 2012),
gambling (Johansson, Grant, Kim, Odlaug, & Gotestom, 2009; Hollander, Buchhalter, & Decaria, 2000), pornography (Carnes, 2003; Schaeffer, 2009), and compulsive buying (Lejoyeux & Weinstein, 2010; Black, 2007). Other studies have examined prevalence rates (Whang, Lee, & Chang, 2003; Young, Yue, & Ying, 2011), assessment (Lortie & Guitton, 2013), factors that may lead to addiction (Yen, Ko, Yen, Chang, & Cheng, 2009), and treatment modalities (Young, 2009; Block, 2008; Young 2007).

Internet Addiction

Exploration of process addictions over the years has helped to offer the mental health research community a more precise idea of what truly constitutes Internet addiction. It should be noted that use of the Internet, in this discussion, is contained to computer Internet use. Access via smartphone and other smartphone activities is a different domain then the current scope. It is currently estimated that 6% to 11% of individuals engaging in online behaviors exhibit symptoms related to Internet addiction (Young, Yue, & Ying, 2011). Internet addiction is characterized by using the Internet impulsively, increasing tolerance and withdrawal, and associated negative consequences. Tolerance is best recognized by the amount of recreational time spent online, and excessive use can often reach over 40 hours per week. Withdrawal is explained similarly to other comparable process addictions and includes mood disturbances, irritability when not online, deceit regarding online use or duration, and preoccupation to engage in online activities.

Negative consequences from online use can vary widely and often span across physical, mental, and interpersonal health domains. Physical health problems may include carpal tunnel syndrome, obesity from lack of exercise, fatigue or exhaustion,
decreased hygiene (Yue, Young, & Ying, 2011) and epileptic-like seizures (Chuang, 2006). Mental health related concerns include increased depression (Whang, Lee, & Chang, 2003; Yen et al., 2008), generalized anxiety (Yen, et al. 2009), suicidal ideation (Kim, et al., 2006), and attention deficient disorder symptoms (Yen, Ko, Yen, Wu, & Yang, 2007). Lastly, interpersonal issues might include isolation, loneliness (Whang, Lee, & Chang, 2003), and communication deficiency (Yen, et al., 2008). Although this is not an all-inclusive list of negative consequences, they have all in fact been correlated with Internet use.

The growth of Internet addictions is reaching noteworthy numbers, which has increased concern among addiction specialists (Young, 2009). There is concern that as the Internet becomes more accessible in remote areas and applications become more sophisticated, addiction rates could reach into the tens of millions in the United States alone (Young, Yue & Ying, 2011). In general, the quick and vast expansiveness of the Internet has opened up a variety of virtual process addictions. For example, pornography sites account for 12% of total websites (toptenreviews.com, 2012) and online companies like eBay (ebay.com, 2012) and Craigslist (craigslist.org, 2012) make compulsive shopping an easily accessible and anonymous activity. In addition, overseas websites make online gambling extremely user-friendly (gamblingsites.org, 2012).

In summary, it is clear that the Internet is currently utilized for a wide variety of individual, often daily, online activities. The functionality of the Internet allows for new innovations to quickly evolve and existing personal hobbies to expand, but that can also produce negative consequences depending on type and frequency of use. One such
addition is the development of online computer video games, which has resulted in the growth of yet another type of process addiction known as online gaming addiction.

**Online Video Gaming**

Online gaming addiction has become the fastest growing process addiction in the past decade (Young, 2009). In 2013, the video game industry was a $21.53 billion dollar industry making it one of the most lucrative entertainment industries (Entertainment Software Association, 2014). Comparatively, major motion pictures produced in 2013 in the U.S. grossed $10.82 billion (the-numbers.com, 2015). Thousands of digital games are produced each year in various formats such as game consoles like the Nintendo Wii or Microsoft Xbox One, computers and laptops, and handheld systems or smartphones. It is estimated 59% of Americans are engaging in some type of a regular digital game play. The average age of a video game player is 31 years, which has been trending upwards for over a decade. Males comprise the majority of the video gaming population but females represent 48% of the total video game market and in certain gaming subsections, such as mobile gaming, are the majority. Also, with the advent of accessible, reliable, and mainstream Internet connections, many of these games can also be played online with people all around the world (Yee, 2006).

Although the online gaming market in general continues to grow steadily, it only represents 11% of the total share of the game software market (Entertainment Software Association, 2014). This may seem small but considering the genre did not exist two decades ago and how varied gaming is in general, 11% of the market is quite significant. This percentage is primarily maintained by one particular type of game – the Massively Multiplayer Online Roleplaying Game (MMORPG). Of the top 20 console or computer
games sold in 2010, six were MMORPG’s, the top of which ranked at numbers two, four, and six (Entertainment Software Association, 2011). In addition, MMORPG’s are often chosen for research on online gaming addiction because of their unique characteristics, variety in play, and other potentially addictive qualities.

**Understanding MMORPG’s**

Massively Multiplayer Online Roleplaying Games (MMORPG’s) are games that are played on the Internet to connect the player to a persistent virtual world. In this type of space, thousands of other players can interact with each other at the same time (Yee, 2006). Players create an account through the game manufacturer’s software and construct an “avatar”, a game character that will represent them in the game. Once a player is connected in the game, he/she can interact with the environment, game characters, and other players using already scripted action buttons, interactive chat lines, or emotive commands (such as waving one’s hand at another person).

MMORPG’s often construct their games around a particular genre (i.e. Tolkien fantasy, space fantasy, old west) to create the setting, creatures, people, and other objects of the universe such as dragons, spaceships, saloons, etc. (Yee, 2006). Initially there are specific tasks a player must complete, but typically the player decides how to begin, which quests to complete and when, and with whom to interact. The gaming world is essentially wide-open for a player to explore at his/her pace.

Players are also forced to create character roles when they choose their avatar, which will partially inform and prompt how their play. These roles or classes typically fall into the categories of fighter, healer, wizard or some variation of all three (Yee, 2006). For example, in the MMORPG *Everquest* a player can choose to belong to the
available classes of warrior, mage, cleric, rogue, wizard, druid, or ranger, among others (everquest.com, 2013). Each profession has strengths and weakness. Warrior roles, for example, are designed to be good at fighting up-close to enemies and can handle a large degree of damage before dying; they cannot, however, usually cast magic spells, heal themselves, or effectively use projectiles. Clerics, on the other hand, can heal themselves or others but are not as proficient at fighting. Such varied and defined roles make it beneficial for players to engage with other players in order to maximize each player’s individual success during the game (Yee, 2006). For example, a team of warriors that can fight enemies alongside a cleric who can heal the warriors when they are hurt is a more formidable and successful team than fighting alone. Additional members can be added over time to better prepare the group for larger tasks, quests, and enemies.

Similar to character roles, players also choose races. Races in MMORPG/s are explained as player archetypes that come with particular benefits and disadvantages, such as humans, elves, gnomes, and dwarfs (Yee, 2006). Racial differences are often important when choosing what type of class the player would like to play. For example, a dwarf character may be considered physically stronger and therefore would make a better warrior than a gnome; however, the gnome may be considered wiser and therefore, make a good wizard. Combinations of race and class vary widely across MMORPG’s.

MMORPG characters also have other various statistics and factors relevant to successful gameplay. These statistics are relatively consistent across MMORPG’s and include components such as strength, fortitude, wisdom, stamina, magic power, and luck. These statistics impact game outcomes such as how much damage the character can cause to an enemy, how well the character can read languages, how many magic spells
the character can learn, or how much treasure the character might find. These statistics are often customizable by the player during the initial character creation and can then be enhanced as the character advances in skill or experience level, or by virtue of obtaining a magic item. For example, it is common for an advanced weapon to add to one of more of these statistics, such as a +2 strength sword.

Players of MMORPG games are also permitted to adjust and change nominal features of their character such as gender, body characteristics, and dress. These features, unlike the statistics, class, and race, usually do not directly impact how an avatar performs during the game (Yee, 2006). However, these features may influence how other players in the game perceive each other (Williams, Consolvo, Caplan, & Yee, 2009). For example, female avatars are generally treated with more kindness and often receive free gifts or favorable treasures from male players.

In general, MMORPG’s often have no definitive end goal or final purpose that marks an ending to the game (Yee, 2006) as opposed to most games that typically have a linear story in which the player controls a hero and he/she works towards a climactic battle with a main villain. In MMORPG’s, there are always more activities to complete, new areas of the game’s landscape to explore, dungeons to conquer, enemies to defeat, and people with whom to socialize and form teams. The gaming world is virtually quite vast and can take months, if not years, for players to fully explore and interact with all the content available. It can take players hours to traverse from one virtual area of the game to another. These games are often marketed as games with no end and no limits, as demonstrated by the MMORPG title *Everquest.*
However, this does not mean that MMORPG’s are not progressive in play. In fact, players get more powerful as they increase their experience level and often receive benefits by doing so. Typically, characters start at level one and by completing quests, killing monsters, and accomplishing tasks and goals, and as they gain more experience, advance to higher levels. As a player’s level increases other statistics also improve and the character learns new skills or proficiencies. In general, the higher a character’s level of expertise the more powerful they are presumed to be (although that may be contingent on the players’ ability to control the character and the equipment they have) (Yee, 2006). In addition, it is not uncommon for characters to receive better equipment, such as an improved sword or more powerful spell, as they win battles or solve puzzles. Players can gain social capital by becoming part of or leading large “guild” groups or become experts in specific areas, such as blacksmithing, dungeons, or realms.

**Characteristics of MMORPG’s**

Six main primary factors or characteristics distinguish MMORPG’s from other online video games and potentially play an important role in the motivation for game play (Hussain & Griffiths, 2009). The first is factor is persistence, which means that the game is online at all times and continues to operate regardless of which players are playing. As a result, players may miss guild missions if they are not playing at the exact time the mission happens. Second, physicality refers to the idea that the game world is made up of a virtually real place where the physics of the virtual world can be expected to adhere to real world expectations, such as with the principles of gravity, mass, and force. This factor may shift depending on the genre the MMORPG has adapted (i.e. magic, laser guns, flying dragons). The third factor, social interaction, denotes that players can
interact with one another in real world ways such as text based messaging or voice interaction. Fourth, MMORPG’s can be characterized as avatar-mediated play, which suggests that players create representations of themselves to interact with the game environment. The fifth factor, vertical game play, means that progression through the game is marked by growth of the avatar. This is typically achieved through character levels or virtual wealth, although some games have other novel ways of character growth and demarcation. Lastly, the sixth characteristic of MMORPG’s is perpetuity, which refers to the idea that the game has no end point, that there are always new goals to achieve and places to explore, and that game makers can always create new content to keep players engaged.

In sum, there are countless ways that players can engage in MMORPG’s games (Yee, 2006). Such experiences can essentially be described as “virtual sandboxes” meaning players can play however, whenever, and with whomever, they please. Players choose their heroes’ defining characteristics such as gender, race, profession, skills, and talents and help their character to develop and grow by gaining experience points and achieving progressive levels. They choose how they want to interact with the environment and with other people by exploring the world, becoming parts of larger groups or guilds, or competing with other players. This is perhaps why MMORPG’s attract a variety of different players from across nearly all demographic categories (Williams, Yee, & Caplan, 2008).

**Players of MMORPG’s**

It can be challenging to obtain the most accurate and recent statistics regarding the prototype of someone who regularly engages in MMORPG play since software
companies do not typically release player demographics to the public (Williams, et al., 2008). The historical stereotype of a person who plays videogames has greatly evolved over the last 20 years and may no longer be accurate (Barnett & Coulson, 2010). As a result of the mainstream popularity of video games, players of MMORPG’s come from nearly every demographic of race, sex, and age (Caplan, et al., 2009; Williams, et al., 2008). However, several large-scale studies conducted on MMORPG gamer demographics have provided some helpful insights (Griffiths, Davies, & Chappell, 2004; Williams, et al., 2008; Williams, et al., 2009).

To begin, Williams et al. (2008) and Caplan et al. (2009) may best demonstrate this population diversity in some of the largest MMORPG studies to date. These two studies evaluated different variables but involved the same researchers and sample. The research team surveyed a total of 7,129 Everquest 2 players recruited with assistance from the game’s manufacturer Sony Entertainment who allowed the researchers to contact players from across four of the games virtual world servers. A final useable sample totaled 4,278 players. It is important to note that the level of cooperation between researcher and manufacturer seen in this study had not been witnessed to this point or since in research on this topic. Participants were incentivized with an in-game item that was created by Sony Entertainment for the purpose of this study. The survey consisted of demographic questions such as age, race, gender, education, length of video game play, and mental and physical health measures. Researchers also asked questions relative to motivation for play as a follow up to an earlier study on the same topic designed by Yee (2006).
The average age of a MMORPG player in this study was 31.16 years of age with a range of 12 to 65 years (Williams, et al., 2008). What many people considered at that time to be the primary demographic of online game players - the teen and college aged population (18-22) - in actuality only accounted for 19% of the total players; most players were in their late twenties (26%) and thirties (36%). There was an approximate 80/20% split between males and females respectively. The mean education and annual income of this sample far exceeded the general population with nearly 74% having obtained a college education with an average household income of over $84,000 (Williams, et al., 2008). In addition, the average player engaged in 25.86 hours of play per week with females ($M = 29.31$) playing more than males ($M = 25.03$). In addition, MMORPG players self-reported a BMI of 25.19 ($SD = 8.19$), which is considered slightly overweight by the American Heart Association (heart.org, 2014) yet healthier than the average American who has a BMI of 28.6 (cdc.gov, 2014).

Players in this sample also reported more mental health issues, particularly depression and anxiety, than what is typically observed in the general population (Williams, et al., 2008). In this study, 22.76% of the sample reported a prior diagnosis of depression and 18.1% reported prior diagnoses of anxiety disorders. These rates were higher than the average U.S. rate at 16.1% for depression and 11.3% ($SD = 37.21\%$, $t = 3.32$, $df = 6776$, $p < .005$) for anxiety disorders (cdc.gov, 2011). Rates of depression were higher for females (36.52%, $SD = 48.17\%$) than males (19.38%, $SD = 39.63\%$) ($t = 13.567$, $df = 6776$, $p < .001$). Conversely, reported substance abuse and dependence rates were lower than the general population ($M = 5.56$; $SD = 22.91\%$, $t = 2.73$, $df = 6798$, $p < .01$; Population = 8.2% (samhsa.gov, 2013).
These early studies by Williams, et al. (2008) and Caplan, et al. (2009) were important in establishing a profile for online gamers, breaking some of the prior beliefs on who was playing these type of games, and giving scale to how inclusive the gamer population is. This research has proved to be foundational in future research particularly as MMORPG’s continue to grow and expand. To say that many people play MMORPG’s would be an understatement. An estimated 65 million people play MMORPG’s worldwide (mmodata.net, 2012a) and Everquest, one of the first MMORPG’s released in 1999, had approximately 550,000 active gamers at its height of popularity (mmodata.net, 2012a). To further elaborate, the total population of these Everquest players would make it the 32nd largest city in the United States, just under the population of Las Vegas, Nevada (census.gov, 2012). World of Warcraft, the largest and most popular MMORPG to date, boasted over 12 million paid accounts at its peak (mmodata.net, 2012b), which would make it the 72nd most populous country in the world in front of Greece (worldatlas.com, 2012).

New MMORPG’s are being created every year and over 40 games were released in 2015 (mmobomb.com, 2015). Williams, et al. (2008) suggests that the size and scale of these virtual worlds will only continue to steadily increase as computer power increases and free-to-play games MMORPGs becomes a more typical norm. As previously mentioned, six of the top 20 computer games in 2008 were MMORPG’s (Entertainment Software Association, 2011), however, five were expansions for World of Warcraft. The original version of this game was still the 13th highest grossing online game in 2008, despite the fact that it was over eight years old.
Why Players Play MMORPG’s

Although MMORPG gamers appear to be loyal and persistent to the games they play, there seems to be less research available pertaining to why MMORPG players persist with the same type of game for long periods of time. It has been suggested that because players can play the game in a variety of ways, they may be attracted to MMORPG’s for many different reasons. To help further understand what motivates online game play, Yee (2006) outlined a player taxonomy that suggests three primary playing components that can motivate play: social, immersion, and achievement.

To begin, Yee’s (2006) research adapted Bartle’s (1996) investigation of multiuser dungeon (MUD) players. MUD’s are similar to MMORPG’s in that they involve players creating an avatar, playing in a fantasy world, and engaging with other people. However, they are also more primitive because they use text-based instruction to advance the action rather than the graphical nature MMORPG’s typically use. Bartle (1996) developed a player-typology with four motivations for play: immersion, achievement, socializing, or imposition on others. Yee (2006) noted a problem in Bartle’s system stating that it was primarily anecdotal and that Bartle presumed that preference for one type of play would suppress others. However, Yee believed that there might be correlations between these components, and that motivations might be more or less pronounced based upon the game play dynamics that are present (i.e. preference for exploration when playing alone and preference for socialization when grouped with other players).

To validate these player-typologies with empirical data Yee (2006) created a 40-item questionnaire to better understand what aspects were most important to players of
MMORPG’s. He posited that the built in nature of variety inherent to a MMORPG might be precisely what appeals to players. Yee hypothesized that players may have differing motivations related directly to styles of play in the game (such as creating relationships or exploring the game’s dungeons) and that these motivations may impact usage patterns or behaviors in the game.

Yee (2006) recruited 3000 participants through online portals relevant to MMORPG’s and other specific popular MMORPG games at the time such as Everquest, Ultima Online, and Dark Age of Camelot to take the questionnaire. The items were generated based on Bartle’s (1996) prior work and updated to more current language. He designed the survey using a 5-point Likert scale ranging from “Not Important at All” to “Very Important”. Additionally, Yee added a qualitative component allowing participants to comment on their motivations for playing MMORPG’s.

Using a factor analysis Yee (2006) noted that three primary components emerged as motivations for play: 1) achievement, 2) immersion, and 3) social interaction. Imposition on others, seen in Bartle’s (1996) typology, was not supported in this factor analysis as a motivation for play. Ten subcomponents that more explicitly define the primary components emerged as well. The achievement motivation suggested that players desire to be the best or to accomplish specific tasks. Subcomponents included advancement (gaining levels, power, wealth and status), mechanics (understanding how to optimize avatars or how to best approach tasks), and competition (competing with others either directly or indirectly). The immersion component referred to players who desired to become deeply involved in the playing experience. Subcomponents to immersion included discovery (exploring new and unique places and experiences), role-
playing (creating a unique avatar with a back-story or playing as through they are the character), customization (making the avatar unique in appearance) and escapism (avoiding real-life stressors by playing). Lastly, the social component addressed how a player wanted to engage with other people within the game. Subcomponents of this theme included socializing (chatting and helping others), relationships (forming meaningful long-term interactions with others), and teamwork (group interactions or being a part of a larger whole). Together the ten subcomponents accounted for 60% of the variance among participants for motivation to play MMORPG’s.

Grouping the subcomponents into the three primary components helped prevent a large amount of cross correlations (Yee, 2006). Correlations among the three components were \( r < .10 \) suggesting that they are unique. Contrary to Bartle, Yee discovered that players could play MMORPG’s for all three of these primary reasons, or in varying combinations, and a preference for one does not suppress another.

Yee (2006) also explored gender differences and found several important distinctions between men and women regarding their play style preferences. Males scored higher on all achievement subcomponents whereas females scored higher on the relationship subcomponent, but the other areas were relatively equal. This seems to support a common gaming stereotype that suggests men want to dominate and women want to play together, but there were equal results for the socialization subcomponent. This indicates that building connections online is important for both genders even though the reasons for socializing may be different.

Additionally, Yee (2006) explored the relationships between motivations to play and problematic usage as defined by Young’s (1998) Internet Addiction Scale (IAS). He
used an adaptation of Young’s survey to determine if any of the motivation typologies were potentially more problematic than others. Yee found that the escapism subcomponent was the best predictor of problematic usage \((b = .31, p < .0001)\) indicating a strong relationship between this component and problematic usage. This was followed by the number of hours played per week \((b = .30, p < .001)\) and the advancement subcomponent \((b = .17, p < .01)\). No other components or subcomponents exceeded a coefficient of \(b = .10\). This potentially outlines factors that may lead to addiction and could also indicate that games serve as a coping technique for other problems or anxieties. Furthermore, this data might suggest that some players play online games as a means to relieve anxiety or delay facing real-world problems. Yee suggested that this connection might support the correlation between problematic game usage and prior mental health issues, such as depression and anxiety disorders.

Yee’s (2006) study provides a firm foundation for future research in the area of gaming motivation and addiction for a few important reasons. First, he created a protocol that can be used for understanding motivations and game play. Second, he grounded the idea that there are multiple motivations that prompt the play of MMORPG’s. Third, he expanded prior ideas and research that gave the concept stronger legitimacy. Lastly, Yee established a connection between motivation for play and problematic consequences.

However, it should be noted that Yee’s (2006) study had a variety of limitations. To begin, the assessment adaptations (Young, 1998) created from DSM-IV criteria (APA, 1994) used to measure Internet addiction may not accurately assess the intended construct, as it does not explicitly address online gameplay. In fact, Young’s survey predates the MMORPG’s used in the study by at least seven years and was published
before the largest MMORPG population growth in 2006 when World of Warcraft was released. Additionally, Yee (2006) obtained his sample through a variety of online portals, which may have skewed the sample towards more devoted MMORPG players.

Overall, millions of players are engaging in MMORPG’s everyday to explore virtual worlds, socialize with other players, and advance their characters to the highest levels. For most of these players MMORPG’s are simply a way to enjoy leisure time, have fun, and connect with friends. However, for a small percentage of players their continued play negatively impacts their lives, and as a result, the symptoms they experience are gaining clinical and research attention, and are slowly becoming identified as online gaming addiction.

**Online Gaming Addiction**

To begin, online gaming addiction is the fastest growing process addictions (Young, 2009). However, because recognition of this problem is relatively new, available research is limited. Some studies have attempted to define the characteristics of the addiction, compared it to other process addictions, or focused on a singular aspect of the addiction. As a result, creating a holistic representation of online gaming addiction can be quite difficult. It appears this problem will continue until additional empirically based data demonstrates a more clear and precise understanding of the addiction.

In general, defining online gaming addiction has been one of the more difficult aspects for researchers, and as such is often inconsistent. Some studies have used criteria from the DSM-IV (APA, 1994) that help identify and treat problematic gambling. Other studies have used assessments designed for other similar type addictions, such as Young’s Internet Addiction Scale (1998) or Caplan’s Generalized Problematic Internet
Use Scale (2002). Others have attempted to create their own assessments specifically written for MMORPG’s (Demetrovics, Urbán, Nagygyörgy, Farkas, & Griffiths, 2012; Zhou & Li 2009).

What can be consistently observed is that online gaming addiction does appear to imitate other process addictions such as sexual addiction, compulsive shopping, and pathological gambling as they mimic the dynamics of tolerance, withdrawal, and negative consequences. Tolerance among MMORPG players is defined by increasing play time, longer singular gaming sessions, buying improved gaming equipment, or engaging in different games (Caplan, et al., 2009; Young, 1998). Tolerance has been demonstrated through several studies, which have identified a strong correlation between the amount of time playing MMORPG’s and online game addiction (Hsu, Wen, & Wu, 2009; Williams, et al., 2008; Yee, 2006).

Withdrawal, another characteristic of process addictions, is often exhibited in MMORPG players as a preoccupation for play, fantasizing about playing, high levels of irritability, and engaging in game related activities that are not play such as researching, writing, or talking with others about gaming (Caplan, et al., 2009; Williams, et al., 2008; Yee, 2006). Research has noted several negative consequences and correlations with withdrawal such as poor grades in school, vocational problems (i.e. absenteeism, job loss), interpersonal relationship problems, and financial concerns. Additionally, mental and physical health concerns including increased depression and anxiety, lack of physical exercise, and exhaustion from continuous game play have been observed (Anand, 2007; Caplan, et al., 2009; Chappell, Eatough, Davies, & Griffith, 2006; Mitchell, Sabrina, Finkelhlookor, & Wells, 2009).
Although it is unclear exactly how many players may be impacted by online gaming addiction, research indicates that prevalence rates range from 7% - 12% of the MMORPG gaming population (Grusser, Thalemann, & Griffiths, 2007; Hussain & Griffiths, 2009; Gentile, 2009). However, what is perhaps even less apparent is why online gaming addiction affects some players and not others. One hypothesis is that personal factors among some players that match gameplay aspects internally motivate them to continue play despite the problems they encounter (Ducheneaut, Nickell, Yee, & Moore, 2006; Charlton & Danforth, 2007). As previously mentioned, Yee (2006) suggested that there are different factors within MMORPG’s that motivate players to continue play, such as the immersion of the gaming universe, a desire to achieve top levels, obtain valuable treasures, or the opportunity to socialize and build relationships with others.

Research on how these motivations correlate with online gaming addiction are mixed. Yee (2006) noted that players who primarily play for immersion are more likely to demonstrate negative consequences over players motivated by different factors. He suggested it could be that these players engage in the game to escape real-life problems; therefore, playing MMORPG’s offers them relief and a way to cope with everyday life. Similarly, Hussain and Griffiths (2009) found that 41% of their subjects from a self-selected adult sample played MMORPG’s as a form of escapism; however, escapism was not necessarily correlated with online gaming addiction.

Yee (2006) found a correlation with the amount of time played and online gaming addiction. Conversely, Kesici and Sahin (2009) suggested that socialization was correlated with extended playing time but did not correlate it with online gaming...
addiction. Additionally, players who play for competition, a subcomponent of the Yee’s (2006) achievement variable, did not show significant problems related to online gaming addiction (Hart, Johnson, Stamm, Angers, Robinson, Lally, Fagley, 2009). Thus, since contrasting information on motivations for play and research limitations exist in the above mentioned studies (i.e. self-selected sample, low number of participants, and differing scales and measures used), it is clear that a comprehensive understanding of these motivations and their impact on online gaming addiction has not yet been fully explored and warrants continued research.

MMORPG play is also related to behavioral learning (Charlton & Danforth, 2007; Doan & Strickland, 2012; Ducheneaut, et al., 2006). For example, the principles of operant conditioning are present in MMORPG’s where the games use an interval-ratio reward system to encourage players to advance (Charlton & Danforth, 2007; Doan & Strickland, 2012; Ducheneaut, et al., 2006). When players first begin playing the rewards are readily available and come quickly; however, as players advance they become much less frequent. There are many rewards players can achieve such as new items, advanced levels, and new world areas to explore, and thus, the next possible reward always appears within the player’s reach. This entices players to keep playing longer than intended or to return to play as soon as possible.

However, operant conditioning may not satisfactorily account for why some players are negatively impacted and others are not. Instead, the concept of dualistic passion (Vallerand, et al., 2003) has been suggested as a way to explain the dichotomy (Wang & Chu, 2007). The dualistic model of passion indicates that individuals are most attracted to hobbies and leisure they find independently interesting (Vallerand, et al.,
Over time these activities become integrated into an individual’s identity in such a way that eventually the player identifies with and may describe him or herself using the label “gamer.”

**The Role of Passion**

The dualistic model of passion (DMP) (Vallerand, et al., 2003) expanded upon the concepts of self-determination theory that were originally developed by Deci & Ryan (2000). Self-determination theory, based on a meta-analysis of motivational studies, hypothesizes that people have an innate motivation to grow and develop themselves. It states that humans are intrinsically motivated by three overarching psychological needs: 1) autonomy or the feelings of independence and control of one’s own choices and behaviors, 2) competence or the ability to learn and master skills, and 3) relatedness or the desire to relate, belong, and connect to others. According to this theory, people self-select activities that feel comfortable and fulfill these psychological needs. Although extrinsic factors may also influence an individual’s behavior, they are still primarily motivated by these three needs.

According to Vallerand, et al. (2003), the DMP suggests that people self-select activities that feel comfortable and fulfill the three basic psychological needs outlined by self-determination theory (Deci & Ryan, 2000). The DMP further conceptualizes that these activities develop into passions and typically become part of the individual’s identity (Vallerand, et al., 2003). For example, DMP theory would state that people do not just simply engage in sports, reading, or strumming a guitar, but rather may become passionate about these activities and eventually become athletes, readers, or guitarists.
The dualistic model of passion consists of two main important parts: the definition of the concept of passion and the differences between the two types of passion (harmonious and obsessive). Vallerand, et al. (2003) defines passion as a strong inclination towards a self-defining activity that one likes, finds important (or highly values), and invests extensive time and energy toward. Through activity selection, valuation, and internalization, self-selective activities then become a passion (Vallerand, 2010). A passion becomes a motivating force when it is perceived to be a high priority with emotionally important outcomes (Frijita, Mesquita, Sonnemans, & Van Goozen, 1991).

The dualistic model of passion also extends ideas related to Csikszentmihalyi’s (1990) idea of “flow.” The concept of “flow” is described as a state of being in which a person is so intensely involved in an activity that nothing else seems to matter and time seems to pass quickly. Furthermore, because the experience is both so rewarding and challenging it becomes self-perpetuating. The activity itself must withstand a balance between being achievable but also challenging. If the activity is too easy a person will tire and become bored, yet if it is too difficult they will become anxious and eventually quit. Most importantly, if a person is experiencing a state of “flow” it is possible the activity they are engaged in may be continued, even at the cost of other responsibilities and negative consequences.

Furthermore, Vallerand’s (2010) DMP can be compared to self-determination theory and flow as it states that individuals are drawn to activities and behaviors that are interesting, challenging, and in which they want to invest time and energy. For most people it is affirmative and experienced freely, and is positively similar to self-
determination theory’s need for autonomy and controlled choices (Deci & Ryan, 2000). Vallerand (2010) more precisely defines this type of experience as harmonious passion. For others, however, the behavior becomes a way to fulfill other needs and becomes compulsive in nature, which Vallerand describes as obsessive passion.

Harmonious passion is explained as autonomous because it is freely chosen and the person willingly engages in it without connection to other needs or extrinsic motivations (Vallerand, et al., 2003). A harmonious passion is seen as desirable but the person is willing to let it go without attached negative feelings or behaviors. For example, an athlete may be passionate about playing a game of baseball but if a rainstorm postpones the game he/she can easily move on to another activity of focus. In general, a motivation to be persistent with the behavior is nonexistent.

Conversely, obsessive passion is characterized as controlled. According to Vallerand, et al. (2003), obsessive passion occurs when an individual’s passion is connected to values, feelings, desires, needs, or other meanings about oneself. In this way, a person is engaged not only for the pure enjoyment of the activity, but rather for what it personally represents for them externally (reputation, status, credibility, etc.) or what they can gain beyond person satisfaction (wealth, a job, a partner, etc.). Personality factors can also impact one’s tendency to engage obsessively, such as overvaluation of activities and a need for exerted control in one’s environment (Vallerand, 2010).

In general, although both obsessive and harmonious passions may produce the same outcomes, someone motivated by harmonious passion would view such external gains as less motivating or as a byproduct of the behavior. Additionally, because an obsessively passionate person’s identity is often tied to the passion, this typically leads to
negative behaviors or effects. This contributes to feeling compelled to engage in a passionate activity even when it is not advisable, may be dangerous, or could have serious consequences. For example, a passionate cyclist may want to ride, but snow and ice have made the terrain dangerous and unsuitable. If this person has internalized this activity as a controlled choice, he/she will feel compelled to find a way to engage in it nonetheless.

Lafrenière et al. (2009) explored how the DMP (Vallerand, 2010) relates to online gaming. They sought to understand how harmonious and obsessive passion could help understand the difference between players who experience positive and negative outcomes. More specifically, they researched how these were linked to the gaming experience, the emotions felt during gameplay, and the overall adjustment, as well as how these variables potentially relate to problematic gaming (Lafrenière, et al., 2009).

Lafrenière et al. (2009) used a sample of 222 participants comprised of 191 males and 31 females who played MMORPG’s. The independent variables were measures of harmonious passion, obsessive passion, age, and gender. The dependent variables consisted of hours played per week, overall life satisfaction, a measure of self-realization, positive and negative affect, physical symptoms, and problematic behaviors. The instrument the researchers used involved shortened versions from the following six different constructs. Passion was measured using the passion scale (Vallerand, 2010) and the positive and negative experiences were assessed using items from an affect scale (Barrett & Russell, 1998). A problematic gaming scale (Tejeiro & Morán, 2002) was used to identify problem behaviors associated with gaming such as tolerance, withdrawal, and preoccupation. An edited life satisfaction scale (Diener, Emmons, Larsen, & Griffin,
1985) measured items related to contentment with current life areas such as family, job/school, and relationships. An overall health questionnaire (Knäuper, Rabiau, Cohen, & Patriciu, 2004) evaluated physical concerns associated with excessive gaming such as sleep disturbance, dry eyes, appetite loss, and dizziness. Self-realization was measured using items asking personal satisfaction, life purpose, personal growth, and positive relationships (Miquelon & Vallerand, 2006). Overall, 40 items were assessed using a 7-point Likert scale (1 = never to 7 = almost always) to gather scores on the various constructs (Lafrenière, et al., 2009).

Lafrenière, et al. (2009) then used canonical correlation to assess the variable relationships, a type of multivariate regression analysis used to measure the relationships between independent and dependent variables. Different loadings of the variables were then input to determine which variables produced high factor loadings resulting in the variable of interest. In this case, the variables of interest measured are harmonious and obsessive passion.

The first significant canonical correlation set was 0.81, $F_{(28, 754)} = 11.68$, $p < 0.001$ (Lafrenière, et al., 2009). The primary independent variable in this set was obsessive passion, which had a loading of 0.99. Dependent variables that had a significant factor loading in this canonical correlation ($> +/- .40$) were problematic behaviors (.91), positive affect (.65), negative affect (.54), hours played per week (.54), physical health symptoms (.40) and self-realization (-.40). The second significant canonical correlation set was 0.45, $F_{(18, 594)} = 3.08$, $p < 0.001$. The primary independent variable in this set was harmonious passion with a factor loading of 0.94. Significant dependent variables in this set included self-realization (.71), life satisfaction (.70) and positive affect (.68).
As hypothesized Lafrenière, et al. (2009) found that harmonious passion was positively correlated with self-realization, life satisfaction, and positive affect while gaming. Conversely, obsessive passion was positively correlated with both negative and positive affective experiences, problematic behavior, health, and hours per week played and negatively correlated to self-realization. Both harmonious and obsessive passions were positively correlated with positive affect while playing, but the researchers suggest the nature of these experiences may differ. They concluded that obsessively passionate players experienced relief (positive affect) from playing after a period of not playing, and that harmoniously passionate players experienced joy (positive affect) from the simple act of playing. However, future research in this area would be needed to further extrapolate these results.

One of the more significant findings in this study was that obsessive passion was positively correlated with problematic behaviors related to play (Lafrenière, et al., 2009). Since Vallerand (2010) suggested that obsessive passion includes a sense of being out of control, it is not surprising that the two are associated. However, what appears less obvious are the underlying factors and motivations, which differentiated the players who identified as harmoniously and obsessively passionate.

It is important to note that although this study provided important information regarding the profiles of harmonious and obsessive passion, it also has several limitations, which may inform similar future research. First, since a correlational study was conducted, causality can only be inferred. A regressional or longitudinal type of study may better inform how predictive these factors are to passion and problematic gaming. Second, the population sample was largely skewed towards men. Third, several
of the adapted scales are currently outdated and revised instruments would be necessary for study replication. For example, the problematic gaming scale was created when MMORPG’s were still very new and was primarily used for research with adolescents, which creates potential problems with generalizability.

Nonetheless, the study gives credence to the idea that the dualistic model of passion can provide further support for more clearly understanding the differences between players who experience negative consequences from play that mirror the characteristics of online gaming addiction from those who do not. When combined with ideas from Yee’s player typology, it appears reasonable to suggest that the primary reasons players continue game play may be related to obsessive and harmonious passion. Further, it is possible these two types of passions and how people choose to play MMORPG’s may be predictive of problematic play.

**MMORPG’s and Addiction**

As a result of the increase in prevalence of online gaming and addiction along with the need to successfully treat people who engage in these behaviors, various researchers have attempted to use existing diagnostic structures and assessments commonly used to treat chemical dependency (Young, 2009), gambling addiction (Schaffer, 1999), and other process addictions (Schaeffer, 2009; Wang & Yang, 2007). However, there is little evidence to support that one can understand and explain addiction and online gaming addiction as the same construct. This suggests the importance of expanding online gaming research in order to better understand it as a unique disorder.

Kim and Kim (2010) contributed to this body of research with the creation of the Problematic Online Game Use Scale (POGUS) to offer an assessment, which specifically
focuses on online gaming. They observed that past instruments were primarily variants of the DSM-IV (APA, 1994) criteria for chemical dependency and were more focused on video game play or computer gaming than MMORPG’s (Kim & Kim, 2010). The authors noted that such assessments did not consider the unique characteristics of MMORPG’s and also proposed the elimination of the term “Internet addiction,” citing that this term may be outdated due to the frequency of Internet use by most people on a daily basis. Rather, Kim and Kim (2010) advocate for discussing addiction relative to the actual behaviors (i.e. shopping, pornography, gambling) instead of the means to access them. Lastly, and perhaps most importantly, the researchers note that many assessment instruments lack the appropriate questions regarding the socialization aspect of MMORPG’s, which, as indicated by Yee (2006), may be one of the largest factors as to why people play these games.

To address these issues, Kim and Kim (2010) had three major goals in their research. First, they wanted to develop an appropriate instrument to measure problematic online game use. Second, they desired to identify different types of problematic online game use. Third, the authors wanted to assess the validity of the instrument they would create (Kim & Kim, 2010). They began their work by investigating two of the most unique aspects of MMORPG’s and developing specific measurable items: randomization (in battles, items collected, encounters, etc.) and socialization (friendships, groups, guilds, virtual societies, etc.). They specifically defined problematic online game use as play that causes psychological, sociological, or vocational consequences. This explanation is consistent with other definitions in past research such as those created by
Kim and Kim (2010) then connected their items to prior research on behavioral addiction, most specifically the six specific core concepts that define addiction as outlined by Brown (1991) and Brown (1993). The first concept is salience, which is when the activity or behavior assumes a dominant and important role in one’s life. Second, euphoria is a “high” experienced from engaging in the activity. Third, the concept of tolerance refers to needing greater periods of engagement in order to achieve the same “high.” The fourth core idea is withdrawal, or when people experience withdrawal symptoms, such as irritability of preoccupation, when not engaging in the activity. The fifth concept indicates there are instances of interpersonal or self-conflict because of continued use. The last concept describes periods of cessation of the behavior followed by a relapse back to the behavior.

The researchers then conducted a pilot study creating items based on these six core concepts (Brown, 1991; Brown 1993) and others adapted from previous assessments for gaming use, Internet addiction, and gaming addiction (Kim & Kim, 2010). Some items were eliminated for a variety of reasons, such as lack of variability in answers, a lower Cronbach’s α relative to other items, and questions that had little commonality when compared using a principal axis factoring model. Twenty items remained useable and all spanned across five distinct dimensions defined by the researchers. These dimensions were euphoria, health problems, conflict, loss of self-control, and preference for a virtual relationship. These 20 items comprised the POGUS. Each dimension
The sample for the POGUS study was extended to three phases and each one tested different age groups of children and adolescents (Kim & Kim, 2010). In the first phase, the sample size was 1422 fifth-grade students from seven different elementary schools (674 females and 748 males) \(M_{age} = 11.88\). In phase two the sample size consisted of 199 eight-grade males \(M_{age} = 14.74\) and phase three included 393 11th graders (198 females/195 males; \(M_{age} = 17.87\)). All subjects were from Seoul, South Korea.

The five dimensions of the POGUS accounted for 65.13% of the total item variance and all items in the scale had factor loading of greater than .62 (Kim & Kim, 2010). The researchers also assessed the dimension subscale reliability scores and judged...
all dimensions to be acceptable (euphoria $\alpha = .836$; health problems $\alpha = .777$; conflict $\alpha = .811$; failure of self-control $\alpha = .822$; preference for a virtual relationship $\alpha = .866$). They conducted a goodness of fit test and two fit indices (Tucker Lewis Index (TLI) and the Root Mean Square Error of Approximation (RMSEA)) and found a $X^2 (165, N=1422) = 1119.729, p < .001$, TLI = .913, RMSEA = .064. They also tested two other models; the first was a single factor analysis (eliminating the five dimensions) where they found a goodness of fit $X^2 (170, N=1422) = 3361.361, p < .001$, TLI = .718, RMSEA = .115 and the second was a uni-dimensional model (eliminating the Problematic Online Game Use second order) where they found a goodness of fit $X^2 (160, N=1422) = 882.228, p < .001$, TLI = .932, RMSEA = .056. Although Kim & Kim (2010) discovered a five factor, one second order model and the uni-dimensional model to be good fits, they choose the more restricted model (the first).

The researchers used several measures to assess reliability and validity of the POGUS (Kim & Kim, 2010). The scale demonstrates reliability as a confirmatory factor analysis and was used between samples, which contributed to finding a factor loading above .70 for all items. The first sample had a Cronbach’s $\alpha = .911$, $X^2 (165, N = 199) = 332.884, p < .001$, TLI = .886, RMSEA = .072 and the second sample had a Cronbach’s $\alpha = .948$, $X^2 (165, N = 393) = 717.943, p < .001$, TLI = .880, RMSEA = .082. They thus determined that the scale could be generalized to similar populations and cultures beyond these samples.

The researchers also assessed measures of discriminant validity and convergent validity (Kim & Kim, 2010). To test this, the researchers used assessments for four additional components that have been linked to problematic game play in prior studies.
These four components were loneliness, as measured by the *UCLA Loneliness Scale* (Russell, Peplau & Cutrona, 1980); academic self-efficacy, as measured by the *Academic Self-Efficacy Scale* (Chemers, Hu, & Garcia, 2001); anxiety, as measured by the *General Health Questionnaire-28* (Goldberg & Hillier, 1979); and life satisfaction, as measured by the *Satisfaction with Life Scale* (Diener, et al., 1985). Kim and Kim (2010) noted that if there were sound convergent and discriminant validity for the POGUS, the score would be negatively correlated with healthy components (academic self-efficacy and life satisfaction) and positively correlated with unhealthy components (anxiety and loneliness). The significant outcomes of these comparisons and the resulting correlations can be seen in Table 2.2.

The correlations for the measures of life satisfaction, academic self-efficacy, anxiety, and loneliness demonstrated significant correlations in the directions the researchers expected. However, some relationships were stronger than others and the sample of 11th graders and loneliness failed to demonstrate a significant relationship (the researchers do not address this discovery). Nonetheless, Kim and Kim (2010) suggest the resulting validity indicated that the POGUS was a distinguishable and unique assessment and therefore could be a first-step towards building a comprehensive instrument for problematic online game use.
Table 2.1

Significant Convergent and Discriminant Validity Correlations

<table>
<thead>
<tr>
<th>Trait</th>
<th>Sample</th>
<th>Correlation</th>
<th>$\chi^2$</th>
<th>df</th>
<th>TLI</th>
</tr>
</thead>
<tbody>
<tr>
<td>Life satisfaction</td>
<td>5th graders</td>
<td>-.324***</td>
<td>1235.220</td>
<td>224</td>
<td>.917</td>
</tr>
<tr>
<td></td>
<td>8th graders</td>
<td>-.412***</td>
<td>397.462</td>
<td>224</td>
<td>.891</td>
</tr>
<tr>
<td></td>
<td>11th graders</td>
<td>-.192**</td>
<td>795.532</td>
<td>224</td>
<td>.886</td>
</tr>
<tr>
<td>Academic</td>
<td>5th graders</td>
<td>-.285***</td>
<td>1264.162</td>
<td>224</td>
<td>.922</td>
</tr>
<tr>
<td>Self-efficacy</td>
<td>8th graders</td>
<td>-.146*</td>
<td>415.011</td>
<td>224</td>
<td>.889</td>
</tr>
<tr>
<td>Anxiety</td>
<td>8th graders</td>
<td>.533***</td>
<td>423.254</td>
<td>224</td>
<td>.888</td>
</tr>
<tr>
<td>Loneliness</td>
<td>5th graders</td>
<td>.337***</td>
<td>1211.002</td>
<td>224</td>
<td>.916</td>
</tr>
<tr>
<td></td>
<td>11th graders</td>
<td>-.100</td>
<td>579.949</td>
<td>224</td>
<td>.917</td>
</tr>
</tbody>
</table>

5th graders ($N = 1422$), 8th graders ($N = 199$), 11th graders ($N = 393$)

* $p < .05$.
** $p < .01$.
*** $p < .001$.

Overall, it appears that the POGUS gives future researchers an instrument to use when studying online game use. However, there are several limitations of Kim and Kim’s (2010) study and the assessment instruments that warrant mentioning. First, the five factors do not satisfy the majority of the variability, and thus perhaps other factors may better account for problematic game use. Future research may consider different variables and models to better establish what additional factors and could be added to the POGUS.

A second limitation of the study is that the sample size consisted of exclusively children and adolescents. This is problematic since, as previously mentioned, the average age of a MMORPG user is $M = 31.16$ (Williams, et al., 2008). Since the items were adapted from other instruments that have been used for adult samples it can be inferred that the POGUS is generalizable, but a study using an adult sample would help to validate this. Additionally, the POGUS does not account for unique variables, which may be
more impactful on adults such as careers, higher education, marriage, and children and how these life experiences may impact play. The addition of these types of questions would be an area for further study.

Lastly, the study did not report gender differences for the POGUS. Significant differences in instrument scores could skew future research studies, especially considering that males comprise a larger portion of the sample in this study. Nonetheless, even with the aforementioned limitations, the POGUS is currently one of the most specific and validated measures available for testing online gaming.

**Current Study**

The current study intends to combine the above concepts of dualistic passion (Vallerand, et al., 2003; Vallerand, 2010) and player typology (Yee, 2006), and to investigate how they interact and relate to each other. The researcher is also interested in how these components may contribute to and predict online gaming addiction by using Kim and Kim’s (2010) Problematic Online Gaming Use Scale. The result will be assessed using correlations and a multiple regression model, which can contribute insight toward how these constructs relate and their relevance to online gaming addiction.

**Summary**

This research literature review is intended to provide a framework and context for the current proposed study. Chemical addiction is a disease with characteristics such as tolerance, withdrawal, and continued use despite negative consequences. Models of addiction include hedonism, negative and positive reinforcement, and incentive motivation. Process addictions, such as pathological gambling, compulsive shopping, and sex addiction, are comparable with chemical addictions. Process addictions share
many similarities with chemical addiction such as the characteristics tolerance, withdrawal, and continued use despite negative consequences. Research on process addictions is not as prevalent as they are for chemical addition but there has been growth in the area over the past two decades. The American Psychiatric Association has asked for more research on process addictions, namely Internet gaming.

Massively multiplayer online roleplaying games (MMORPG’s) are a genre of games that opens a virtual world allowing dozens to thousands of players to play together at the same time. There are six factors that make MMORPG’s different from other type of games: persistence of the gaming universe, physics relative to the gaming world, social interactions with other players, avatar mediated play (players use a representation of themselves in the game), vertical gameplay (i.e. avatars advance in level, strength, wealth), and perpetuity meaning that the game universe is always on regardless of whether the player is playing in it or not.

Yee (2006) offered three primary motivators for playing MMORPG’s. First is achievement in the game through character advancement, defeating other players, or optimizing their character to be the best at their profession or role. Second is socialization with other players through groups or guild and making connections with players outside of the gameplay. Last is immersion in the gaming world as demonstrated by exploration of the game areas, seeking out little known dungeons, or and role-playing as the character. A 38-item Motivation for Play survey was created to assess what factor(s) motivate players.

Passion is defined as a strong inclination towards a self-defining activity that one likes, finds important (or highly values), and invests time and energy toward. Passion is
dualistic with harmonious and obsessive types. Harmonious passion happens when an activity is freely chosen and a person willingly engages in it without connection to other needs or extrinsic motivations. Obsessive passion is connected to other values, feelings of self, desires, needs, or other meanings about oneself. The person is engaged not only for the enjoyment of the activity but also for what it personally represents for them externally (reputation, status, credibility, etc.) or what it gains for them other than personal satisfaction (wealth, status, a job, a partner, etc.). Obsessive passion has been connected to negative consequences and process addictions.

Online gaming addiction is defined as a type of process addiction, which involves compulsively playing online games such as MMORPG’s. Kim and Kim’s (2010) Problematic Online Gaming Use Scale (POGUS) is a 20-item instrument used to assess online gaming addiction. The instrument’s validity and reliability measures indicate the instrument can be used in the present study. However, this will be the first time the assessment is used with adults.

The researcher is interested in how motivations for play (achievement, immersion, and socialization) and passion (harmonious and obsessive) might predict online gaming addiction. The Motivation for Play Scale (Yee, 2006), Passion Scale (Vallerand, 2010) and POGUS (Kim & Kim, 2010) will be used. Player demographics and playing behaviors will also be recorded.
Chapter 3

Research Design and Procedure

The purpose of this study is to evaluate how two constructs (dualistic passion and player typology) predict levels of addiction among MMORPG players. The nature of the evaluation is quantitative utilizing existing assessments for each of the identified constructs. Items from the existing assessments were adapted to be specific for online gaming and to create a constant format. The constructs are defined below. These assessments are combined into one uniform questionnaire that uses a Likert-type scale.

The assessment is self-report and uses a Likert-type scale. The collected data is ordinal since it is gained using a Likert-type scale. However, since the scale approximates each point as equidistant (i.e. a range of points that approximate a median and each point as equally distant from the point in front and behind it) the data can be considered quasi-ordinal and treated similar to interval data. This will allow for a more rigorous quantitative analysis and in this case use of regressional analysis.

This study poses four research questions:

1: What are the means and distributions of MMORPG player’s age, gender, race, education, personal income, and frequency/duration of game play?

2: To what degree are people motivated by obsessive passion, harmonious passion, and the three types of player Typologies (immersion, socialization, and achievement)?
3: What is the correlation between the independent variables obsessive passion, harmonious passion, immersion, socialization, and achievement?

4: Are there patterns of play and passion according to Vallerand’s Dualistic Model of Passion (IV) and Yee’s player typologies immersion, socialization, and achievement (IVs) that can predict levels of addiction according to Kim & Kim’s Problematic Online Game Use Scale (DV)?

**Variables and Instrumentation**

**Problematic Online Gaming Use Scale**

The first variable in this study, the dependent variable, is online gaming addiction. The variable is defined as a given score on the Problematic Online Gaming Use Scale (POGUS) (Kim & Kim, 2010). There are 20 items on the POGUS and each is scored on an adapted Likert-scale with seven points (0 = Not Agree at All; 1 = Very Slightly Agree; 2 = Slightly Agree; 3 = Moderately Agree; 4 = Mostly Agree; 5 = Strongly Agree; 6 = Very Strongly Agree) giving a scoring range of 0 to 120. Sample items from the instrument include:

- I tend to spend increasing amounts of time playing online games
- I feel more intimate with people who I know from online games than people in real life
- I have attempted to reduce or stop playing online games but often fail
- I imagine or fantasize about playing online games when I’m not playing

These items encompass areas of concern related to addiction such as consequences, tolerance, withdrawal, euphoria, and loss of control.
The POGUS demonstrates adequate reliability and validity with adolescents and children. Kim and Kim (2010) conducted a confirmatory factor analysis and found a factor loading above .70 for all items. The first sample they evaluated had a Cronbach’s \(\alpha = .911, \chi^2_{(165, N = 199)} = 332.884, p < .001, \text{TLI} = .886, \text{RMSEA} = .072\) and the second sample had a Cronbach’s \(\alpha = .948, \chi^2_{(165, N = 393)} = 717.943, p < .001, \text{TLI} = .880, \text{RMSEA} = .082\). They concluded that the scale could be generalizable across similar populations. Discriminant validity and convergent validity was also measured (Kim & Kim, 2010). They compared four components linked to problematic game play, loneliness, academic self-efficacy, anxiety, and life satisfaction, to their current measures. Discriminate and convergent validity can be inferred based upon the strong correlations between these four factors and their relative items. They suggest the POGUS is a distinguishable and unique assessment. Adding additional credibility to the instrument is its inclusion by multiple researchers listing Internet and gaming addiction assessments (King, Haagsma, Delfabbro, Gradisar, & Griffiths, 2013; Kuss & Griffiths, 2012; Pontes & Griffiths, 2014). The scale has only been used for adolescents and children so there is concern regarding its use with this adult sample. However, when this researcher explored all viable options for an assessment, the POGUS was evaluated to be the most comprehensive and best suited for the purposes and scope of this research.

The full assessment of the POGUS can be viewed in Appendix B.

**Motivation for Play**

The first independent variable is Player Typology as defined as a given score on Yee’s (2006) Motivation for Play (MFP) questionnaire. There are 38 items on the MFP and each is scored on an adapted Likert-scale with seven points (0 = Not Agree at All; 1
Very Slightly Agree; 2 = Slightly Agree; 3 = Moderately Agree; 4 = Mostly Agree; 5 = Strongly Agree; 6 = Very Strongly Agree). The MFP includes three subscales.

Participants receive scores in three primary components related to style of play: social, immersion, and achievement. Participant’s scores range from 0 to 66 on the social subscale, 0 to 84 on the achievement subscale, and 0 to 84 on the immersion subscale. Additionally, there are 10 total subcomponents under the three subscales.

The achievement subscale has three subcomponents (advancement, mechanics, and competition) and comprises 14 total items. The advancement subcomponent (6 items) asks participants about creating powerful characters, accumulating wealth or rare items, and being well known in the game. The mechanics subcomponent (4 items) includes questions centered on creating “ideal” characters and using the in-game character building system to optimize character performance. The competition subcomponent (4 items) includes questions regarding playing against other players or purposely annoying or provoking other players.

The social subscale has three subcomponents (socializing, relationship, and teamwork) and comprises 11 total items. The socializing subcomponent (4 items) contains questions regarding player enjoyment with interacting, chatting, or helping other players. The relationship subcomponent (3 items) includes questions about forming more meaningful connections with other players. The teamwork subcomponent (4 items) includes questions regarding cooperation with other players and joining groups.

The immersion subscale has four subcomponents (discovery, role-playing, customization, and escapism) and comprises 14 total items. The discovery subcomponent (3 items) includes questions regarding exploration of the game world and
learning about the world’s history. The role-playing subcomponent (4 items) includes questions about players adopting their characters persona in the game, experimenting with different personalities, or creating a history for their character. The customization subcomponent (3 items) includes questions about changing and coordinating a characters visual appearance such as color coordination, tattoos, hair and eye color, or accessories that do not serve a function in the game. The escapism subcomponent (3 items) includes questions pertaining to using the game as a means to relax, relieve stress, or escape from real world problems.

The MFP was chosen as an assessment because of the potentially rich data that can be gained given the three primary subscales that are defined as well as the 10 subcomponents that provide further exploration. The primary subscales will provide three independent variables for this study and the subcomponents can provide further insight into more specific components that motivate players. Subcomponents will be analyzed in post hoc analyses. Sample items include:

Rate how important it is to you:

To acquire rare items that most players will never have? (Achievement; Advancement)

That your character is as optimized as possible for their profession/role? (Achievement; Mechanics)

To be able to talk to your online friends about personal issues? (Social; Relationship)

To explore the world just for the sake of exploring it? (Immersion; Discovery)
Analysis of the MFP will focus on the three subscales social play, immersion, and achievement. The ten subcomponents, while informative, fail to stand alone because they contain only three to four items each. Post hoc analysis may prove helpful in extrapolating factors contributing to scores for the three subscales but for purposes of the research questions, the three subscales will be used for analysis.

Cronbach’s alpha tests were conducted on each of the subscales and subcomponents by Yee (2006). The results can be seen in Table 3.1.

Yee, Ducheneaut, and Nelson (2012) provided additional reliability and validity of the MFP scale. A confirmatory factor analysis was conducted to understand if the scale was usable across cultures. They gathered samples from Hong Kong, Taiwan, and the United States and compared their scores on the MPF to see if they were consistent across the cultures. A total of 2,071 participants were sampled (1,358 males and 709 females) with a mean age of 29.95 (SD = 9.20). The chi-square statistic was significant $X^2_{(71, 2070)} = 140.88, p < .001$, CFI = .91, SRMR = .04, RMSEA = .05 suggesting that the three-factor MFP is operational with a non-Western culture. All of these measures are within acceptable limits for goodness of fit indices. Additionally, predictive validity was measured. The researchers followed 1,000 subjects playing World of Warcraft over a six-month period. They measured their activity and accomplishments in the game and gave them the MFP. They hypothesized that activity in-game would correlate positively with their associated MPF subscales (i.e. achievement would strongly positively correlate with dungeon raids and person versus person combat). They calculated a factor score for each of the subscales and conducted a multivariate regression to predict ratios for each. Tests were significant for the three subscales
(Achievement $F = 19.95, p < .001$; Social $F = 11.61, p < .001$; Immersion $F = 3.38, p < .001$). The researchers concluded that the three-factor MFP is a valid and reliable measure. To lend further credibility, the MPF has been the primary assessment in several research studies over the past decade evaluating adult gaming samples (Billieux, et al., 2013; Dauriat, et al., 2011; Przybylski, Rigby, & Ryan, 2009; Williams, Kennedy, & Moore, 2011; Williams, Yee, & Caplan, 2008).

The full version of the MFP can be viewed in Appendix C.

**Table 3.1**

**Motivations for Play Subscale and Subcomponents Cronbach Test**

<table>
<thead>
<tr>
<th>Subscale</th>
<th>Cronbach’s Alpha</th>
</tr>
</thead>
<tbody>
<tr>
<td>Achievement</td>
<td>$\alpha = .74$</td>
</tr>
<tr>
<td>Social</td>
<td>$\alpha = .77$</td>
</tr>
<tr>
<td>Immersion</td>
<td>$\alpha = .75$</td>
</tr>
<tr>
<td><strong>Subcomponents</strong></td>
<td></td>
</tr>
<tr>
<td>Advancement</td>
<td>$\alpha = .79$</td>
</tr>
<tr>
<td>Mechanics</td>
<td>$\alpha = .68$</td>
</tr>
<tr>
<td>Competition</td>
<td>$\alpha = .75$</td>
</tr>
<tr>
<td>Socializing</td>
<td>$\alpha = .74$</td>
</tr>
<tr>
<td>Relationship</td>
<td>$\alpha = .80$</td>
</tr>
<tr>
<td>Teamwork</td>
<td>$\alpha = .71$</td>
</tr>
<tr>
<td>Discovery</td>
<td>$\alpha = .73$</td>
</tr>
<tr>
<td>Role-Playing</td>
<td>$\alpha = .87$</td>
</tr>
<tr>
<td>Customization</td>
<td>$\alpha = .74$</td>
</tr>
<tr>
<td>Escapism</td>
<td>$\alpha = .65$</td>
</tr>
</tbody>
</table>

**Passion Scale**

The final independent variable is motivation as defined by attained score on the Passion Scale (Vallerand, 2010). The Passion Scale has three subscales: harmonious passion, obsessive passion, and passion criteria. There are 16 total items on the Passion scale and each are scored on an adapted Likert-scale with seven points (0 = Not Agree at All; 1 = Very Slightly Agree; 2 = Slightly Agree; 3 = Moderately Agree; 4 = Mostly Agree; 5 = Very Much Agree; 6 = Almost Always Agree; 7 = Always Agree).
Agree; 5 = Strongly Agree; 6 = Very Strongly Agree). For the purposes of this study only the harmonious and obsessive passion subscales will be used. Vallerand (2010) added the passion criteria items to differentiate between subjects that are passionate or not passionate on the given subject. Although this could be used as a qualifier, most research using the DMP scale does not use it in such ways and no reports of validity have been found to substantiate use of this subscale. As such, for the purposes of this study subjects will be evaluated on harmonious and obsessive passion. Post hoc analyses will report the differences between the passionate and non-passionate group if there are any.

There are four items on the passion criteria subscale and scores on this scale range from 0 to 24. The questions assess activity valuation, time and energy investment, and love or passion for the activity. These questions include

- I love playing online games
- Playing online games is important for me

The harmonious passion subscale has six items and scores range from 0 to 36. Sample items from the harmonious subscale include

- Online gaming is well integrated in my life
- Online gaming reflects the qualities I like about myself

The obsessive passion subscale has six items and scores range from 0 to 36. Sample questions from the obsessive passion subscale include

- I have the impression that online gaming controls me
- Online gaming is so exciting that sometimes I lose control over it

The developers of the initial Passion Scale (Vallerand, et al., 2003) reported that
the scale demonstrates sound factorial validity supporting the use of the harmonious and obsessive passion scales. An exploratory factor analysis of the initial 34 items helped eliminate 20 items that either loaded on both the harmonious passion and obsessive passion subscales or items that had weak loadings. A second confirmatory factor analysis found 14 items had significant loadings and the model was a good fit $X^2_{(76, 235)} = 171.70, p < .001$. Reliability was measured using the Cronbach alpha of the two subscales (Obsessive Passion $\alpha = .89$ and Harmonious Passion $\alpha = .79$). Since the initial validity and reliability tests, the scale has been amended. Twelve of the original items are still used (six for each subscale) and four qualifying questions were added. The researchers added the qualifying subscale, passion criteria, to help quantify passion among participants before dividing them further with the obsessive and harmonious passion subscales. According to the researchers, subjects who reach a threshold of 16 on the passion criteria scale are labeled as passionate about the activity or behavior. The subscale has not been widely used and no validity measures could be determined for the subscale so for purposes of this study the variable will be used in post hoc analyses only.

The full Passion Scale can be seen in Appendix D.

**Demographics and Game Play Assessment**

Participants were asked for demographic information. Specific information requested was subject’s age, sex, level of education, marital status, personal income, and racial identification. Categories and tiers for these questions are consistent with the U.S. census. Game play questions include what specific MMORPG’s subjects have played in the past six months, how many total months they have been playing MMORPG’s, how many days they play MMORPG’s in a week, how many hours they play MMORPG’s in a
day, what time of day they typically play MMORPG’s, and who initially introduced them to MMORPG’s. This information will help to create comparative groups such as male and female players or younger and older groups, which can be informative in post hoc analyses.

Demographic questions can be seen in Appendix A.

Participants

The population for this study is adult MMORPG players. This study is not concerned with which online game players prefer but rather their playing behavior. A MMORPG player is defined as an adult online game player who engages actively (logs in and plays) a defined MMORPG and has done so at least once in the past six months. The data collection software, SurveyGizmo.com, qualified participants by asking questions regarding age and games played. If a participant indicated that they are under 18 years old or have not entered a qualified MMORPG (as listed on xmmorpg.com, 2013) they will not be permitted to complete the survey and will be notified that they do not qualify for this study. Since there was an option to enter additional MMORPG’s in a narrative space or MMORPG’s played, the researcher evaluated these answers for qualification. Any questionnaires returned without a qualifying MMORPG were removed from analysis.

The sample was gathered by advertising on popular online gaming website portals such as wow.allakhazam.com (2013). According to websitelooker.com (2013), this website attracts 30,484 visitors each day, which makes it one of the largest non-specific MMORPG related website. It was chosen for the amount of traffic it attracts and that it attracts players across different MMORPG games. This ideally would give the sample a
varied demographic. Other websites used include mmo-champion.com (2013), a *World of Warcraft* specific website with 341,667 visits per day, xmmorpg.com (2013), a general MMORPG site which attracts 3409 visits a day, and mmohuts.com (2013), a portal to playing MMORPG’s online and attracts 39,636 visits a day. Additionally, links to the survey were placed on social media outlets in an attempt to reach a broad audience of MMORPG players.

A power analysis was conducted using G*Power 3.1 software. Analysis estimated that 220 participants would be needed to provide this study with adequate statistical power. The number of subjects recruited was 250 to account for any surveys that will be removed from analysis.

**Limitations and Threats to Validity**

**Generalizability**

The proposed study has several limitations and threats to validity. The first and likely the most concerning is generalizability. Since the sample is being drawn from an online gaming website portal likely populated by more serious gamers it is likely that the sample will be biased and not representative of the population. Although previous studies have used websites to gather participants, there is no way to validate that the sample is representative.

**Construct Validity**

Another potential threat is construct validity. The assessments that are being used have been independently measured for validity and reliability scores. The items are being adapted for this study so that consistent language is used and scoring measures can be unified. For example, a question for the Passion Scale is “This activity is in harmony
with other activities in my life” will be adapted to read “Online gaming is in harmony with the other activities in my life”. Another example is Yee’s Motivation for Play scale was initially scored on a five-point Likert-type scale. For the purposes of this study, the questions are adjusted to a seven-point Likert scale to be consistent with the other assessments. This will aid in the ease of use for participants as the questions will be presented in a consistent format. While this is not expected to be a major threat to validity it is a concern that warrants attention.

**Attrition and Sampling Bias**

Attrition and sampling bias are additional validity concerns. As noted in the procedure below, the participation will be incentivized with a random drawing for one $100 Visa giftcard to encourage participants to take it. This may skew the sample and draw a different set of participants that a non-incentive questionnaire would. However, the incentive is in place to initially attract potential participants but also to encourage them to finish the questionnaire, which is lengthy at 74 items plus demographic information. This leads to the validity concern of attrition that many participants will not complete the questionnaire due to its length. Although the estimated time to complete the questionnaire is approximately nine minutes (based on initial tests) the questionnaire can appear intimidatingly long when first seen. To attempt to counteract this effect, participants will be alerted to the idea that the length to complete is approximately 9 minutes to prepare them and hopefully discourage attrition. Additionally, with large sample numbers this is not expected to impact the dispersion of participants.
Procedure

The study began in the winter of 2014 and data collection was completed April of 2014. Data analysis spanned April 2014 to April 2016. Submission for approval to the Internal Review Board (IRB) at The Ohio State University was submitted and can be seen in Appendix E. Upon approval the completed questionnaire was fully developed using the adapted items.

The questionnaire was be digitized so that it is accessible and easily used online. The web service site surveygizmo.com (2013) was used for data collection. This site was chosen for its ability to transfer data securely while offering the needed flexibility in survey development. The website is able to download the attained data to a secure and confidential database which was encrypted and only assessable by the researcher.

Participants were provided a disclosure statement at the beginning of the survey and asked to provide consent to participant in the study in accordance with IRB standards. After giving consent the participant was asked to provide demographic information and questions from the POGUS, MFP, and Passion Scale. To prevent participants taking the survey multiple times, surveygizmo.com tracked IP addresses of computers used to take the survey and did not allow the same computer to take the survey twice. The researcher could also see IP addresses of participants and checked that no duplicates existed.

The questionnaire was advertised until the sample was obtained (approximately six weeks) on the above-mentioned websites and online portals. The advertisement incentivized participation with the potential gift of a $100 Visa Giftcard, which was awarded to one winner. Contact information was obtained separate from the participant’s
answers and was not linked to individual answers. The researcher conducted a random
drawing using a random number generator. The winner was identified and sent the prize
via certified mail. Cost of advertising was approximately $277 for websites and $76 per
month for data gathering services via surveygizmo.com. The researcher covered all
expenditures.

Individual surveys were assessed for usability. Any questionnaires that did not
meet participant requirements or appear to be random in answering (nonsensical patterns
such as answering all 1’s) were discarded and not included in the data analysis. The data
was entered into the Statistical Package for Social Sciences (SPSS)-21 statistical analysis
software system.

**Recommended Data Analysis**

Before data analysis can begin, the data set will need to be assessed for normality.
Tests for independence, homoscedasticity, linearity, and reliability will be conducted.
Assuming the data set is normal each of the four research questions will be answered.

Descriptive statistics will be reported to help answer research question one. This
will include means, standard deviations, and frequencies for variables age, sex, education,
race, and marital status. Game play statistics such as total length of play, weekly and
daily play, and when time of play will be reported, as well. Crosstabs will help report the
descriptive statistics.

Means and standard deviations of the independent variables Player Typology
(immersion, socialization, and achievement) and Passion (harmonious passion and
obsessive passion) will be reported. A Pearson product-moment correlation coefficient
will be conducted on these variables as well to determine correlation relationships. This
will help answer research questions two and three.

For research question four, the chosen method of data analysis is multiple regression. This method will allow the researcher to investigate how independent variables (achievement, immersion, social, obsessive passion and harmonious passion) predict the dependent variable (level of gaming addiction). It also allows for the differing variables to be examined individually through part and partials. The ability to closely evaluate individual components is a strength of multiple regression analysis and will allow for a variety of predictive models to be created as an outcome of this research. The “enter” method of entry will be used for the regression. This will allow for evaluation of each variable’s beta weight. Since the primary goal of this study is to understand the predictive strength of player typology and passion on addiction, it made multiple regression an ideal analysis for this study.
Chapter 4

Results

This chapter presents and summarizes the statistical findings relevant to the research questions and hypotheses presented in the prior chapters. The report will review the demographics of the sample including age, gender, race, education, martial status, and statistics concerning play of MMORPG’s. A correlation report is presented in order to examine relationships of the demographics, the variables player typology, passion, and problematic online gaming addiction, and their sub-variables. Regression analyses are also examined in order to find patterns of the variables player typology and/or passion that are predictive of problematic online gaming addiction levels. Lastly, post hoc analyses are presented.

The research questions for this study are:

1: What are the means and distributions of MMORPG player’s age, gender, race, education, personal income, and frequency/duration of game play?

2: To what degree are people motivated by obsessive passion, harmonious passion, and the three types of player Typologies (immersion, socialization, and achievement)?

3: What is the correlation between the independent variables obsessive passion, harmonious passion, immersion, socialization, and achievement?

4: Are there patterns of play and passion according to Vallerand’s Dualistic Model of
Passion (IV) and Yee’s player typologies immersion, socialization, and achievement (IVs) that can predict levels of addiction according to Kim & Kim’s Problematic Online Game Use Scale (DV)?

Participants

The researcher obtained 250 survey samples. Each survey was evaluated to ensure it met qualifications for inclusion in the study. These qualifications were that the participant was over 18 years of age, had played a qualified MMORPG in the past six months, and that the answers given did not appear nonsensical. As there were several open-ended questions in the survey it was necessary to evaluate them for inconsistencies or invalid answers. Four of the surveys were eliminated from the sample. Two were eliminated because they did not identify a qualified MMORPG as indicated by xmmorpg.com (2014) and two were eliminated because they gave nonsensical answers to open ended questions (48 days played per week, 35 hours played per day). This left 246 usable surveys for data analysis.

The data obtained was screened for completeness and accuracy in coding. There were several electronic errors in transferring the data from the site surveygizmo.com and SPSS-21. The individual’s raw data was inspected to identify the correct data and it was inputted to SPSS-21 to complete the data set. No other errors were identified. No outliers were identified.

Tests of Normality

An evaluation of the data was completed. Table 4.1 reports the mean, standard deviation, kurtosis, and skewness statistics for the independent and dependent variables.
Table 4.1

Descriptive Statistics

<table>
<thead>
<tr>
<th>Variable</th>
<th>Mean</th>
<th>Std. Dev.</th>
<th>Skewness</th>
<th>Std. Error</th>
<th>Kurtosis</th>
<th>Std. Error</th>
</tr>
</thead>
<tbody>
<tr>
<td>Achievement</td>
<td>36.42</td>
<td>17.06</td>
<td>.371</td>
<td>.155</td>
<td>-.361</td>
<td>.309</td>
</tr>
<tr>
<td>Social</td>
<td>39.93</td>
<td>15.70</td>
<td>.106</td>
<td>.155</td>
<td>-.672</td>
<td>.309</td>
</tr>
<tr>
<td>Immersion</td>
<td>36.80</td>
<td>17.12</td>
<td>.021</td>
<td>.155</td>
<td>-.827</td>
<td>.309</td>
</tr>
<tr>
<td>Harmonious Passion</td>
<td>17.59</td>
<td>7.92</td>
<td>.213</td>
<td>.155</td>
<td>-.426</td>
<td>.309</td>
</tr>
<tr>
<td>Obsessive Passion</td>
<td>6.70</td>
<td>7.33</td>
<td>1.369</td>
<td>.155</td>
<td>1.356</td>
<td>.309</td>
</tr>
<tr>
<td>POGUS</td>
<td>32.67</td>
<td>22.03</td>
<td>.914</td>
<td>.155</td>
<td>.343</td>
<td>.309</td>
</tr>
</tbody>
</table>

The samples appear to represent a normally distributed data set. Evaluating the histograms of the seven variables evidences this. Additionally, skewness and kurtosis measurements were calculated and all were demonstrated to be within normal and acceptable range (< 3). Obsessive passion was slightly positively skewed (1.369) and platykurtic (.914) representing the variable with the highest scores on either measure.

Table 4.2 displays the histograms and normalcy curve for each variable.

P-P plots were calculated for each variable. Results can be seen in table 4.3. The plots appear normal for most variables except obsessive passion. However, similar to the histogram, given the nature of the variable (likely to impact a smaller, more concentrated sample) it is expected to be skewed and slightly irregular. Otherwise, there appear to be no concerns. Additionally the scatterplot appears to demonstrate a homoscedastic data set. The scatterplot can be seen in table 4.4. There appears to be independence of subjects. Overall, the data set appears to meet normality standards.
Table 4.2

Histograms for Independent and Dependent Variables
Table 4.3

P-P Plots of Independent and Dependent Variables
Table 4.4

Scatterplot of Standardized Predicted Value and Dependent Variable

Reliability

Internal consistency was tested for each of the independent and dependent variables using the Cronbach’s Alpha test. All scales have acceptable levels of internal consistency and are representative of prior research on the scales reliability. Table 4.5 displays the results of the Cronbach’s Alpha test.
Table 4.5

*Cronbach’s Alpha Test Results*

<table>
<thead>
<tr>
<th>Variable</th>
<th>Number of Items</th>
<th>Cronbach’s Alpha</th>
</tr>
</thead>
<tbody>
<tr>
<td>Harmonious Passion</td>
<td>6</td>
<td>$\alpha = .847$</td>
</tr>
<tr>
<td>Obsessive Passion</td>
<td>6</td>
<td>$\alpha = .833$</td>
</tr>
<tr>
<td>POGUS</td>
<td>20</td>
<td>$\alpha = .924$</td>
</tr>
<tr>
<td>Achievement</td>
<td>14</td>
<td>$\alpha = .895$</td>
</tr>
<tr>
<td>Social</td>
<td>11</td>
<td>$\alpha = .888$</td>
</tr>
<tr>
<td>Immersion</td>
<td>13</td>
<td>$\alpha = .893$</td>
</tr>
</tbody>
</table>

Research Question One

Age and Sex

The mean age of the sample was $M = 28.69$ ($SD = 7.79$). Participants ranged from 18 to 63 years of age with a multimodal frequency of 17 for ages 19, 28, and 32. The median age was 28. Two scores were greater than three SD from the mean (ages 55 and 63). If these outliers are removed the mean is reduced to $M = 28.44$ ($SD = 7.31$). Males ($n = 199$) represented 80.9% of the sample outnumbering females ($n = 47; 19.1\%$).

Table 4.6 provides a cross-tabulation of sex and age.

Table 4.6

*Cross-tabulation of Participants across Sex and Age*

<table>
<thead>
<tr>
<th>Gender</th>
<th>18-21</th>
<th>22-25</th>
<th>26-29</th>
<th>30-33</th>
<th>34-37</th>
<th>38-41</th>
<th>&gt;41</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Male</td>
<td>44</td>
<td>41</td>
<td>38</td>
<td>28</td>
<td>23</td>
<td>17</td>
<td>8</td>
<td>199</td>
</tr>
<tr>
<td>Female</td>
<td>5</td>
<td>8</td>
<td>7</td>
<td>13</td>
<td>7</td>
<td>2</td>
<td>5</td>
<td>47</td>
</tr>
<tr>
<td>Total</td>
<td>49</td>
<td>49</td>
<td>45</td>
<td>41</td>
<td>30</td>
<td>19</td>
<td>13</td>
<td>246</td>
</tr>
</tbody>
</table>

Race

The majority of participants identified as White (85%, $n = 209$). The second most populous group were Latinos (7.7%, $n = 19$) followed by Asian (3.3% $n = 8$), Black or
African American (2% n = 5), American Indian or Native Alaskan (1.6% n = 4), and Native Hawaiian or Other Pacific Islander (.4%, n = 1).

Education

The largest education group was Some College Credit/ No Degree representing 47.6%  (n = 117) of the sample. The survey indicated that 78.1% (n = 192) of the sample had at least some college with 26.4% (n = 65) holding a degree. Education diversity can be seen in table 4.7.

Table 4.7

<table>
<thead>
<tr>
<th>Education Level</th>
<th>Frequency</th>
<th>Percent</th>
<th>Cum Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>No High School</td>
<td>3</td>
<td>1.2</td>
<td>1.2</td>
</tr>
<tr>
<td>Some High School</td>
<td>6</td>
<td>2.4</td>
<td>3.6</td>
</tr>
<tr>
<td>High School Diploma or Equivalent</td>
<td>45</td>
<td>18.3</td>
<td>21.9</td>
</tr>
<tr>
<td>Some College Credit/No Degree</td>
<td>117</td>
<td>47.6</td>
<td>69.5</td>
</tr>
<tr>
<td>Trade School or Vocational Training</td>
<td>10</td>
<td>4.1</td>
<td>73.6</td>
</tr>
<tr>
<td>Bachelors Degree</td>
<td>46</td>
<td>18.7</td>
<td>92.3</td>
</tr>
<tr>
<td>Masters Degree</td>
<td>18</td>
<td>7.3</td>
<td>99.6</td>
</tr>
<tr>
<td>Professional Degree</td>
<td>1</td>
<td>0.4</td>
<td>100</td>
</tr>
<tr>
<td>Total</td>
<td>246</td>
<td>100</td>
<td></td>
</tr>
</tbody>
</table>

Annual Income

The most represented group of participants made less than $10,000 a year (20.7%, n = 51). The median was the $20,000 - $24,999 income range. The frequency of annual income categories can be seen in table 4.8. An estimated income mean was calculated using the rounded median of the income range (i.e. $32,500 for the range $30,000 - $34,999) and multiplying it by the frequency. The product was then divided by the number of participants. The income section $200,000 or greater was excluded since it could not be estimated. This brought the number of participants to 244 for the purpose of
this calculation. Using this method the estimated mean was $M = $30092. Annual income was strongly positively correlated with education level in a Pearson product moment correlation coefficient two-tailed test ($r = .441, p = .01$).

Table 4.8

Annual Income

<table>
<thead>
<tr>
<th>Income Level</th>
<th>Frequency</th>
<th>Percent</th>
<th>Cum Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Unemployed</td>
<td>35</td>
<td>14.2</td>
<td>14.2</td>
</tr>
<tr>
<td>Less than $10,000</td>
<td>51</td>
<td>20.7</td>
<td>35.0</td>
</tr>
<tr>
<td>$10,001 - $14,999</td>
<td>14</td>
<td>5.7</td>
<td>40.7</td>
</tr>
<tr>
<td>$15,000 - $19,999</td>
<td>12</td>
<td>4.9</td>
<td>45.5</td>
</tr>
<tr>
<td>$20,000 - $24,999</td>
<td>20</td>
<td>8.1</td>
<td>53.7</td>
</tr>
<tr>
<td>$25,000 - $29,999</td>
<td>11</td>
<td>4.5</td>
<td>58.1</td>
</tr>
<tr>
<td>$30,000 - $34,999</td>
<td>22</td>
<td>8.9</td>
<td>67.1</td>
</tr>
<tr>
<td>$35,000 - $39,999</td>
<td>8</td>
<td>3.3</td>
<td>70.3</td>
</tr>
<tr>
<td>$40,000 - $44,999</td>
<td>8</td>
<td>3.3</td>
<td>73.6</td>
</tr>
<tr>
<td>$45,000 - $49,999</td>
<td>12</td>
<td>4.9</td>
<td>78.5</td>
</tr>
<tr>
<td>$50,000 - $59,999</td>
<td>16</td>
<td>6.5</td>
<td>85.0</td>
</tr>
<tr>
<td>$60,000 - $74,999</td>
<td>14</td>
<td>5.7</td>
<td>90.7</td>
</tr>
<tr>
<td>$75,000 - $99,999</td>
<td>11</td>
<td>4.5</td>
<td>95.1</td>
</tr>
<tr>
<td>$100,000 - $124,999</td>
<td>7</td>
<td>2.8</td>
<td>98.0</td>
</tr>
<tr>
<td>$125,000 - $149,999</td>
<td>2</td>
<td>0.8</td>
<td>98.8</td>
</tr>
<tr>
<td>$150,000 - $199,999</td>
<td>1</td>
<td>0.4</td>
<td>99.2</td>
</tr>
<tr>
<td>$200,000 or more</td>
<td>2</td>
<td>0.8</td>
<td>100</td>
</tr>
</tbody>
</table>

Martial Status

Marital status was nearly evenly divided between the two participant groups single, never married and married/ partnered. The largest group was single, never married with 48% ($n = 118$). However, the married or domestic partner group represented 44.7% ($n = 110$). If widowed or separated participants are added to the married/partnered group, the majority of participants either are or were married at some point in their lives (52%, $n = 128$). Frequencies can be seen in table 4.9.
Table 4.9

Marital Status

<table>
<thead>
<tr>
<th>Status</th>
<th>Frequency</th>
<th>Percent</th>
<th>Cum Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Single/ Never Married</td>
<td>118</td>
<td>48.0</td>
<td>48.0</td>
</tr>
<tr>
<td>Married or Domestic Partnership</td>
<td>110</td>
<td>44.7</td>
<td>92.7</td>
</tr>
<tr>
<td>Divorced</td>
<td>16</td>
<td>6.5</td>
<td>99.2</td>
</tr>
<tr>
<td>Widowed</td>
<td>0</td>
<td>0</td>
<td>99.2</td>
</tr>
<tr>
<td>Separated</td>
<td>2</td>
<td>0.8</td>
<td>100</td>
</tr>
<tr>
<td>Total</td>
<td>246</td>
<td>100</td>
<td></td>
</tr>
</tbody>
</table>

Number of Months Playing MMORPG’s

The number of months played ranged from less than one to 360 with a mean of \( M = 90.33 \) (7.53 years) (\( SD = 48.19 \)). Three outliers were in this range (one participant indicated 360 months and two indicated 240 months). This indicates that these players are including primitive MMORPG’s such as MUDs in their time frame. Removing these outliers lowers the mean to \( M = 87.98 \) (7.33 years) (\( SD = 43.12 \)). The mode of the sample was 120 months played.

Number of Days Playing MMORPG’s Per Week

Most participants played MMORPG’s seven days a week (32.5\%, \( n = 80 \)). Ninety percent of participants play MMORPG’s at least three days a week (\( n = 221 \)). Participants played on an average of \( M = 4.52 \) hours per day (\( SD = 2.59 \)). Table 4.10 displays number of days played per week.
Table 4.10

<table>
<thead>
<tr>
<th>Days</th>
<th>Frequency</th>
<th>Percent</th>
<th>Cum Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt; 1</td>
<td>3</td>
<td>1.2</td>
<td>1.2</td>
</tr>
<tr>
<td>1</td>
<td>5</td>
<td>2.0</td>
<td>3.2</td>
</tr>
<tr>
<td>2</td>
<td>17</td>
<td>6.9</td>
<td>10.1</td>
</tr>
<tr>
<td>3</td>
<td>36</td>
<td>14.6</td>
<td>24.7</td>
</tr>
<tr>
<td>4</td>
<td>30</td>
<td>12.2</td>
<td>36.9</td>
</tr>
<tr>
<td>5</td>
<td>50</td>
<td>20.3</td>
<td>57.2</td>
</tr>
<tr>
<td>6</td>
<td>25</td>
<td>10.2</td>
<td>67.4</td>
</tr>
<tr>
<td>7</td>
<td>80</td>
<td>32.5</td>
<td>100</td>
</tr>
<tr>
<td>Total</td>
<td>246</td>
<td>100.0</td>
<td></td>
</tr>
</tbody>
</table>

Number of Hours Playing MMORPG’s Per Day

The most endorsed choices for this question were three hours (23.6%, n = 58), four hours (20.3%, n = 50), and two (16.3%, n = 40). Answers ranged from < 1-16 hours per day. Table 4.11 displays the full range of hours played per day.

Who Introduced You to MMORPG’s

Another person introduced the majority of participants to MMORPG’s. A friend introduced 44.5% of the sample (n = 112). Participants referred by a family member accounted for 14.2% (n = 35) of the sample. A romantic partner introduced 8.5%, (n = 21) of the sample. The minority of participants found the game on their own (31.7%, n = 78).
Table 4.11

<table>
<thead>
<tr>
<th>Hours</th>
<th>Frequency</th>
<th>Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt; 1</td>
<td>2</td>
<td>.8</td>
</tr>
<tr>
<td>1</td>
<td>4</td>
<td>1.6</td>
</tr>
<tr>
<td>2</td>
<td>40</td>
<td>16.3</td>
</tr>
<tr>
<td>3</td>
<td>58</td>
<td>23.6</td>
</tr>
<tr>
<td>4</td>
<td>50</td>
<td>20.3</td>
</tr>
<tr>
<td>5</td>
<td>28</td>
<td>11.4</td>
</tr>
<tr>
<td>6</td>
<td>23</td>
<td>9.3</td>
</tr>
<tr>
<td>7</td>
<td>9</td>
<td>3.7</td>
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<td>8</td>
<td>14</td>
<td>5.7</td>
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<td>9</td>
<td>5</td>
<td>2</td>
</tr>
<tr>
<td>10</td>
<td>6</td>
<td>2.4</td>
</tr>
<tr>
<td>12</td>
<td>3</td>
<td>1.2</td>
</tr>
<tr>
<td>13</td>
<td>1</td>
<td>.4</td>
</tr>
<tr>
<td>15</td>
<td>2</td>
<td>.8</td>
</tr>
<tr>
<td>16</td>
<td>1</td>
<td>.4</td>
</tr>
<tr>
<td>Total</td>
<td>246</td>
<td>100.0</td>
</tr>
</tbody>
</table>

Time of Day

Participants typically play later in the day with 52% (n = 128) indicating they play in the late evening, 20.3% (n = 50) playing in early evening, and 9.3% (n = 23) after midnight. Participants playing in the morning (8.9%, n = 22) and in the afternoon (9.3%, n = 23) were nearly equal.

MMORPG’s Played

The majority of participants indicated they have played more than one MMORPG in the past six months (71.14%, n = 175). Total number of MMORPG’s played in the past six months ranged from 1-13. Table 4.12 contains data on MMORPG’s played in the last six months. *World of Warcraft* was the most endorsed game (n = 204). This is
congruent with national data for game sales and play (Electronic Software Association, 2014). *Star Wars: The Old Republic* (*n* = 69) and *Guild Wars 2* (*n* = 63) were second and third respectively. Participants endorsed a total of 42 unique MMORPG’s. A full listing of MMORPG’s endorsed can be seen in table 4.13.

*Table 4.12*

<table>
<thead>
<tr>
<th>Number of MMORPG’s Played in the Past Six Months</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number</td>
</tr>
<tr>
<td>--------</td>
</tr>
<tr>
<td>1</td>
</tr>
<tr>
<td>2</td>
</tr>
<tr>
<td>3</td>
</tr>
<tr>
<td>4</td>
</tr>
<tr>
<td>5</td>
</tr>
<tr>
<td>6</td>
</tr>
<tr>
<td>7</td>
</tr>
<tr>
<td>8</td>
</tr>
<tr>
<td>9</td>
</tr>
<tr>
<td>10</td>
</tr>
<tr>
<td>11</td>
</tr>
<tr>
<td>12</td>
</tr>
<tr>
<td>13</td>
</tr>
</tbody>
</table>
Table 4.13

MMORPG’s Played by Participants

<table>
<thead>
<tr>
<th>Title</th>
<th>Participants</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>World of Warcraft</td>
<td>204</td>
<td>82.9</td>
</tr>
<tr>
<td>Star Wars: The Old Republic</td>
<td>69</td>
<td>28.1</td>
</tr>
<tr>
<td>Guild Wars 2</td>
<td>63</td>
<td>25.6</td>
</tr>
<tr>
<td>Rift</td>
<td>61</td>
<td>24.8</td>
</tr>
<tr>
<td>Final Fantasy XIV</td>
<td>43</td>
<td>17.5</td>
</tr>
<tr>
<td>The Lord of the Rings Online</td>
<td>33</td>
<td>13.4</td>
</tr>
<tr>
<td>Runescape</td>
<td>28</td>
<td>11.4</td>
</tr>
<tr>
<td>EVE Online</td>
<td>20</td>
<td>8.1</td>
</tr>
<tr>
<td>Everquest</td>
<td>19</td>
<td>7.7</td>
</tr>
<tr>
<td>Everquest II</td>
<td>16</td>
<td>6.5</td>
</tr>
<tr>
<td>Marvel Heroes</td>
<td>15</td>
<td>6.1</td>
</tr>
<tr>
<td>Star Trek Online</td>
<td>14</td>
<td>5.7</td>
</tr>
<tr>
<td>Elder Scrolls Online</td>
<td>13</td>
<td>5.3</td>
</tr>
<tr>
<td>The Secret World</td>
<td>12</td>
<td>4.9</td>
</tr>
<tr>
<td>Warhammer Online</td>
<td>10</td>
<td>4.1</td>
</tr>
<tr>
<td>Age of Conan</td>
<td>9</td>
<td>3.7</td>
</tr>
<tr>
<td>Maplestory</td>
<td>7</td>
<td>2.9</td>
</tr>
<tr>
<td>Ultima Online</td>
<td>7</td>
<td>2.9</td>
</tr>
<tr>
<td>DC Universe Online</td>
<td>7</td>
<td>2.8</td>
</tr>
<tr>
<td>Neverwinter Nights</td>
<td>3</td>
<td>2.8</td>
</tr>
<tr>
<td>Tera Rising</td>
<td>5</td>
<td>2.0</td>
</tr>
<tr>
<td>Lineage I or II</td>
<td>4</td>
<td>1.6</td>
</tr>
<tr>
<td>Final Fantasy XI</td>
<td>3</td>
<td>1.2</td>
</tr>
<tr>
<td>League of Legends</td>
<td>3</td>
<td>1.2</td>
</tr>
<tr>
<td>Dungeons &amp; Dragons Online</td>
<td>2</td>
<td>0.8</td>
</tr>
<tr>
<td>Wildstar</td>
<td>2</td>
<td>0.8</td>
</tr>
<tr>
<td>A Tale in the Desert</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Other</td>
<td>15</td>
<td>6.1</td>
</tr>
</tbody>
</table>

Independence of Samples Analysis

To determine whether demographic variables differed between the dependent and independent variables, a series of independent samples t tests and regressions were calculated. This will help determine if there are any moderating variables that will need
further analysis in post hoc. All demographic variables listed in Appendix A were evaluated.

An independent samples \(t\)-test was conducted to determine differences between males and females on the independent and dependent variables. There was one significant difference between sexes on the achievement variable (\(t(246) = 3.598, p < .05\)). This is consistent with prior research on gaming motivation and sex (Yee, 2006). All other variables were not moderated by sex. Table 4.14 reports the independent samples \(t\) test. This finding indicates that the data can be evaluated with males and females combined.

Regression analyses were conducted using age as a predictor of the other variables to determine if age was a moderating variable. Age was a significant predictor of POGUS (\(F_{(1, 244)} = 17.95, p < .001\)). The model is \(\text{Yhat} = 53.914 - .741(\text{age})\). This indicates that the older a participant is the lower the score on their POGUS will be. Age accounts for 6.9\% (\(r^2 = .069\)) of the variance in POGUS score. The implications of these findings will be discussed in chapter five.
Education levels were examined and independent samples $t$ tests were conducted. Findings demonstrated that most groups were statistically similar. Groups were separated into the demographic categories used in the survey such as high school diploma or professional degree. Groups with a lower number of participants, such as “no high school” and “masters degree,” demonstrated significant differences on some variables. However, the difference can be assumed to be due to the low number of subjects in that category (three participants with no high school and one participant with a masters degree and doctorate degree each). A larger subject pool would be needed to determine if there are differences between these education groups.

A $t$ test was conducted between single and married participants since they represent the two largest groups in the marital status variable. A significant difference was found on the variable achievement ($t(228) = 2.81, p = .005$). The single group had
higher scores on the achievement subscale ($M = 40.09, n = 118$) than the married group ($M = 33.90, n = 110$). All other variables were insignificant but it is notable that the means of all variables were higher for the single group than the married group.

A $t$ test was conducted to examine the impact of income on the variables. To make groups nearly even, $35,000 was used as a cutoff point. The $< 35,000$ group ($n = 132$) and the $\geq 35,000$ ($n = 114$) group were significantly different on all variables with the exception of achievement and social. This indicates that income is a moderating variable for most of the other variables. Implications will be discussed in chapter five. See table 4.15 for the results of the $t$ test.

An independent samples $t$ test was conducted in order to examine the impact of race on the independent and dependent variables. No significant differences were found. Race is not a moderating variable and all data can be analyzed together.
Table 4.15

Independent Samples Test – Income and Independent/Dependent Variables

<table>
<thead>
<tr>
<th>Research Question Two</th>
</tr>
</thead>
<tbody>
<tr>
<td>Correlations were calculated to understand the relationship each independent variable has with the dependent variable. Results can be seen in Table 4.16. All relationships between independent variables and the dependent variable were positive and significant. The strongest relationship was between POGUS and the obsessive passion ($r = .767, p &lt; .005$). The three MFP variables were all strongly correlated and relatively close in value with achievement demonstrating the strongest ($r = .52, p &lt; .005$) followed by immersion ($r = .46, p &lt; .005$) and social ($r = .45, p &lt; .005$). Harmonious passion had the weakest correlation among the independent variables but still demonstrated a moderate to strong relationship ($r = .37, p &lt; .005$).</td>
</tr>
</tbody>
</table>
Table 4.16

<table>
<thead>
<tr>
<th>Independent Variable</th>
<th>Pearson Correlation</th>
<th>Sig. (2-tailed)</th>
<th>N</th>
</tr>
</thead>
<tbody>
<tr>
<td>Achievement</td>
<td>.527**</td>
<td>.000</td>
<td>246</td>
</tr>
<tr>
<td>Social</td>
<td>.455**</td>
<td>.000</td>
<td>246</td>
</tr>
<tr>
<td>Immersion</td>
<td>.447**</td>
<td>.000</td>
<td>246</td>
</tr>
<tr>
<td>Harmonious Passion</td>
<td>.369**</td>
<td>.000</td>
<td>246</td>
</tr>
<tr>
<td>Obsessive Passion</td>
<td>.769**</td>
<td>.000</td>
<td>246</td>
</tr>
</tbody>
</table>

**correlation significant at the .01 level (2 tailed)

Research Question Three

A Pearson’s product moment correlation coefficient two-tailed test was conducted to investigate relationships between the independent variables obsessive passion, harmonious passion, immersion, socialization, and achievement. Results can be seen in table 4.17. There were significant strong positive correlations between the three MFP variables: socialization, immersion, and achievement. Socialization was positively correlated with immersion (r = .75, p < .01) representing the strongest relationship between these variables. Achievement was strongly positively correlated with socialization (r = .55, p < .01) and immersion (r = .49, p < .01).
The MFP variables also had significant relationships with the Passion variables. Achievement was strongly positively correlated harmonious passion ($r = .46, p < .01$) and obsessive passion ($r = .44, p < .01$). Socialization was strongly positively correlated with harmonious passion ($r = .53, p < .01$) and moderately positively correlated with obsessive passion ($r = .30, p < .01$). Immersion was strongly positively correlated with harmonious passion ($r = .54, p < .01$) and moderately positively correlated with obsessive passion ($r = .34, p < .01$). It is notable that the achievement variable had the strongest relationship from among the three MFP variables with obsessive passion and the weakest for harmonious passion. The passion variables had significant intercorrelational values. Harmonious passion was moderately positively correlated with obsessive passion ($r = .28, p < .01$). It is notable that harmonious and obsessive passion had a moderately positive relationship given that they are often viewed as dichotomous in the research.

Collinearity statistics need to be examined given the high correlations among all of the independent variables. All variables were entered (entry method) into a multiple regression to better understand multicollinearity. Table 4.18 displays the collinearity diagnostics.
### Table 4.17

**Correlations among Independent Variables**

<table>
<thead>
<tr>
<th>Independent Variable</th>
<th>Pearson Correlation</th>
<th>Soc</th>
<th>Imm</th>
<th>Har</th>
<th>Obs</th>
</tr>
</thead>
<tbody>
<tr>
<td>Achievement</td>
<td></td>
<td>0.895</td>
<td>0.554**</td>
<td>0.488**</td>
<td>0.455**</td>
</tr>
<tr>
<td></td>
<td>Sig. (2-tailed)</td>
<td></td>
<td>0.000</td>
<td>0.000</td>
<td>0.000</td>
</tr>
<tr>
<td></td>
<td>N</td>
<td>246</td>
<td>246</td>
<td>246</td>
<td>246</td>
</tr>
<tr>
<td>Social</td>
<td></td>
<td>0.554**</td>
<td>0.888</td>
<td>0.751**</td>
<td>0.527**</td>
</tr>
<tr>
<td></td>
<td>Sig. (2-tailed)</td>
<td></td>
<td>0.000</td>
<td>0.000</td>
<td>0.000</td>
</tr>
<tr>
<td></td>
<td>N</td>
<td>246</td>
<td>246</td>
<td>246</td>
<td>246</td>
</tr>
<tr>
<td>Immersion</td>
<td></td>
<td>0.488**</td>
<td>0.751**</td>
<td>0.893</td>
<td>0.537**</td>
</tr>
<tr>
<td></td>
<td>Sig. (2-tailed)</td>
<td></td>
<td>0.000</td>
<td>0.000</td>
<td>0.000</td>
</tr>
<tr>
<td></td>
<td>N</td>
<td>246</td>
<td>246</td>
<td>246</td>
<td>246</td>
</tr>
<tr>
<td>Harmonious Passion</td>
<td></td>
<td>0.455**</td>
<td>0.527**</td>
<td>0.537**</td>
<td>0.847</td>
</tr>
<tr>
<td></td>
<td>Sig. (2-tailed)</td>
<td></td>
<td>0.000</td>
<td>0.000</td>
<td>0.000</td>
</tr>
<tr>
<td></td>
<td>N</td>
<td>246</td>
<td>246</td>
<td>246</td>
<td>246</td>
</tr>
<tr>
<td>Obsessive Passion</td>
<td></td>
<td>0.437**</td>
<td>0.298**</td>
<td>0.335**</td>
<td>0.281**</td>
</tr>
<tr>
<td></td>
<td>Sig. (2-tailed)</td>
<td></td>
<td>0.000</td>
<td>0.000</td>
<td>0.000</td>
</tr>
<tr>
<td></td>
<td>N</td>
<td>246</td>
<td>246</td>
<td>246</td>
<td>246</td>
</tr>
</tbody>
</table>

**correlations significant at the .01 level (2-tailed)**
Table 4.18

Collinearity Calculations

<table>
<thead>
<tr>
<th>Model</th>
<th>Dimension</th>
<th>Eigenvalue</th>
<th>Condition Index</th>
<th>(Constant)</th>
<th>ACH</th>
<th>SOC</th>
<th>IMM</th>
<th>HAR</th>
<th>OBS</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>1</td>
<td>5.273</td>
<td>1.000</td>
<td>.00</td>
<td>.00</td>
<td>.00</td>
<td>.00</td>
<td>.00</td>
<td>.01</td>
</tr>
<tr>
<td>2</td>
<td>.418</td>
<td>3.553</td>
<td>.02</td>
<td>.00</td>
<td>.00</td>
<td>.00</td>
<td>.01</td>
<td>.88</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>.99</td>
<td>7.286</td>
<td>.35</td>
<td>.03</td>
<td>.04</td>
<td>.27</td>
<td>.02</td>
<td>.00</td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>.090</td>
<td>7.634</td>
<td>.12</td>
<td>.03</td>
<td>.04</td>
<td>.52</td>
<td>.00</td>
<td>.01</td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>.084</td>
<td>7.941</td>
<td>.45</td>
<td>.02</td>
<td>.04</td>
<td>.45</td>
<td>.05</td>
<td></td>
<td></td>
</tr>
<tr>
<td>6</td>
<td>.035</td>
<td>12.214</td>
<td>.07</td>
<td>.06</td>
<td>.64</td>
<td>.00</td>
<td>.01</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Tolerance: .589 .330 .399 .646 .786
VIF: 1.699 2.631 2.505 1.548 1.273

Indices such as condition indexes, tolerance levels, and variance inflation factors (VIF) help indicate if the multicollinearity is a concern. Acceptable levels of these indices are condition indexes < 30, tolerance levels above zero, and values on the VIF < 4. For this sample, there are multiple loadings on dimension 6 and Eigenvalues for this dimension is approaching zero. However, the condition index in all dimensions remains within acceptable ranges, tolerance levels are well above zero (.399 - .786), and VIF values are below the standard threshold. Overall, although there are some mild multicollinearity concerns, it appears there is sufficient evidence that the model and the predictors are acceptable.

Research Question Four

In order to examine how the independent variables (MFP and Passion) predict problematic online game use a multiple regression analysis was conducted. All independent variables (achievement, social, immersion, harmonious passion, obsessive passion) were input using the “Entry” method with the dependent variable problematic online game use. Parts and partials were also run to better understand the amount of variance each variable contribute. The model is statistically significant given $F_{(5, 240)} =$
93.977, \ p < .001 with \ R^2 = .66. \ However, not all variables were significant in the model. Obsessive passion was significant (t_{obs} = 15.28, \ p < .001) as was achievement (t_{ach} = 2.68, \ p = .008) and social (t_{soc} = 2.33, \ p = .02). \ The full model can be seen in Table 4.19. \ The model is Yhat = 2.018 + .131(achievement) + .142(social) + .044(immersion) + .028(harmonious passion) + .647(obsessive passion).

**Table 4.19**

**Multiple Regression Model**

<table>
<thead>
<tr>
<th>ANOVA(^a)</th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Model</td>
<td>Sum of Squares</td>
<td>df</td>
<td>Mean Square</td>
<td>F</td>
<td>Sig.</td>
<td></td>
</tr>
<tr>
<td>Regression</td>
<td>78716.671</td>
<td>5</td>
<td>15743.334</td>
<td>93.977</td>
<td>.000(^b)</td>
<td></td>
</tr>
<tr>
<td>Residual</td>
<td>40205.659</td>
<td>240</td>
<td>167.524</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>118922.329</td>
<td>245</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Coefficients(^a)</th>
<th>Unstd. B</th>
<th>Std. Error</th>
<th>Std. B</th>
<th>t</th>
<th>Sig.</th>
<th>Partial</th>
<th>Part</th>
</tr>
</thead>
<tbody>
<tr>
<td>Model</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(Constant)</td>
<td>2.018</td>
<td>2.483</td>
<td>.131</td>
<td>.813</td>
<td>.417</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Achievement</td>
<td>.169</td>
<td>.063</td>
<td>.131</td>
<td>2.680</td>
<td>.008</td>
<td>.170</td>
<td>.101</td>
</tr>
<tr>
<td>Social</td>
<td>.200</td>
<td>.085</td>
<td>.142</td>
<td>2.338</td>
<td>.020</td>
<td>.149</td>
<td>.088</td>
</tr>
<tr>
<td>Immersion</td>
<td>.056</td>
<td>.076</td>
<td>.044</td>
<td>.737</td>
<td>.462</td>
<td>.048</td>
<td>.028</td>
</tr>
<tr>
<td>Harmonious Passion</td>
<td>.079</td>
<td>.130</td>
<td>.028</td>
<td>.608</td>
<td>.543</td>
<td>.039</td>
<td>.023</td>
</tr>
<tr>
<td>Obsessive Passion</td>
<td>1.945</td>
<td>.127</td>
<td>.647</td>
<td>15.284</td>
<td>.000</td>
<td>.702</td>
<td>.574</td>
</tr>
</tbody>
</table>

\(^a\) Dependent Variable: POGUS
\(^b\) Predictors: (Constant), Achievement, Social, Immersion, Harmonious Passion, Obsessive Passion

In this model, obsessive passion has the largest slope effect (B = .647) and accounts for the largest portion of variance with part_{obsessive passion}^2 = .329 indicating that it uniquely accounts for 32.9% of the total variance. The other significant variables account for 1.02% (part_{achievement}^2 = .0102) and .7% (part_{social}^2 = .0077) respectively.

If the regression is calculated again with just the three significant variables the model changes slightly. It is significant \( F(3, 242) = 156.776, \ p < .001 \) with \( R^2 = .66 \). All three variables remain significant with obsessive passion (t_{obs} = 15.648, \ p < .001),
achievement \((t_{\text{ach}} = 2.916, p = .004)\) and social \((t_{\text{soc}} = 4.066, p < .001)\). The full model can be seen in Table 4.20. The model is \[
\text{Yhat} = 2.637 + .140(\text{achievement}) + .183(\text{social}) + .654(\text{obsessive passion}).
\]
Obsessive passion still accounts for the largest portion of variance with \(\text{part}_{\text{obsessive passion}}^2 = .343\) indicating that it uniquely accounts for 34.3% of the total variance. The other significant variables account for 1.18% \(\text{part}_{\text{achievement}}^2 = .0118\) and 2.3% \(\text{part}_{\text{social}}^2 = .023\) respectively. It is noteworthy that the amount of variance contributed by the variable social increases from .7% to 2.3% when the model changes representing the largest adjustment.

*Table 4.20*

**Multiple Regression Model**

<table>
<thead>
<tr>
<th>Model</th>
<th>Sum of Squares</th>
<th>df</th>
<th>Mean Square</th>
<th>F</th>
<th>Sig.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Regression</td>
<td>78520.771</td>
<td>3</td>
<td>26173.590</td>
<td>156.776</td>
<td>.000</td>
</tr>
<tr>
<td>Residual</td>
<td>40401.558</td>
<td>242</td>
<td>166.949</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>118922.329</td>
<td>245</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Model</th>
<th>Unstd. B</th>
<th>Std. Error</th>
<th>Std. B</th>
<th>t</th>
<th>Sig.</th>
<th>Partial</th>
<th>Part</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 (Constant)</td>
<td>2.637</td>
<td>2.372</td>
<td></td>
<td>1.112</td>
<td>.267</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Achievement</td>
<td>.180</td>
<td>.062</td>
<td>.140</td>
<td>2.916</td>
<td>.004</td>
<td>.184</td>
<td>.109</td>
</tr>
<tr>
<td>Social</td>
<td>.257</td>
<td>.063</td>
<td>.183</td>
<td>4.066</td>
<td>.000</td>
<td>.253</td>
<td>.152</td>
</tr>
<tr>
<td>Obsessive</td>
<td>1.966</td>
<td>.126</td>
<td>.654</td>
<td>15.648</td>
<td>.000</td>
<td>.709</td>
<td>.586</td>
</tr>
</tbody>
</table>

a. Dependent Variable: POGUS  
b. Predictors: (Constant), Achievement, Social, Obsessive Passion

Given the amount of variance accounted for by the variable obsessive passion and the strong correlation between obsessive passion and the MFP variables, a multiple regression was conducted with just the three MFP independent variables input entry method. This will help understand if these variables account for more variance that is not
observed because of the inclusion of the obsessive passion variable. The results of the multiple regression can be seen in table 4.21.

Table 4.21

Multiple Regression Model – Motivations for Play Variables Only

<table>
<thead>
<tr>
<th>Model</th>
<th>Sum of Squares</th>
<th>df</th>
<th>Mean Square</th>
<th>F</th>
<th>Sig.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Regression</td>
<td>39264.963</td>
<td>3</td>
<td>13088.321</td>
<td>39.762</td>
<td>.000</td>
</tr>
<tr>
<td>Residual</td>
<td>79657.366</td>
<td>242</td>
<td>329.163</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>118922.329</td>
<td>245</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Coefficientsa</th>
</tr>
</thead>
<tbody>
<tr>
<td>Model</td>
</tr>
<tr>
<td>-------</td>
</tr>
<tr>
<td>1 (Constant)</td>
</tr>
<tr>
<td>Achievement</td>
</tr>
<tr>
<td>Social</td>
</tr>
<tr>
<td>Immersion</td>
</tr>
</tbody>
</table>

a. Dependent Variable: POGUS  
b. Predictors: (Constant), Achievement, Social, Immersion

The MFP variables only model is significant $F(3, 242) = 39.762, p < .001$ with $R^2 = .33$. Two variables were significant with achievement ($t_{ach} = 5.935, p < .001$) and social ($t_{imm} = 2.221, p = .027$). Achievement accounts for the largest portion of variance with $\text{part}_{ach}^2 = .0973$ indicating that it uniquely accounts for 9.73% of the total variance. Immersion accounts for 1.37% ($\text{part}_{imm}^2 = .0137$).

It is important to note that when the passion variables are removed from the model several changes occur. First, the amount of variance accounted for by achievement increases from 1.18% to 9.73%. Second, the social variable, although significant in the previous model, is not significant in the MFP only model. Conversely, immersion was not significant before but in the MFP model it emerges. This highlights the interplay of the correlations between obsessive passion and the MFP variables and also the predictive qualities of these variables when examined alone.
Post Hoc Analyses

There are several areas of interest concerning the research questions asked and what is available for inquiry given the data. This section will examine some of the more pertinent of these areas such as gender differences, differences between participants according to the demographic income level, and demographic information as predictors of problematic online game use using the predictive model above.

Gender

As indicated above, males (80.89%, \( n = 199 \)) outnumbered females (19.11, \( n = 47 \)). A profile of each gender may lend insight as to what attracts males and females respectively and where there are differences and similarities. Unpaired \( t \) tests were compared between genders on the demographic variables, the independent variables, and the dependent variable and can be seen in table 4.22. The two significant variables were marital status (\( t_{\text{marital status}} = 2.747, p = .007 \)) and achievement (\( t_{\text{achievement}} = 3.597, p < .001 \)).

Table 4.22

<table>
<thead>
<tr>
<th>Differences between Gender</th>
<th>Men ( M )</th>
<th>Men ( SD )</th>
<th>Female ( M )</th>
<th>Female ( SD )</th>
<th>( t )</th>
<th>Sig.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Education Level</td>
<td>3.25</td>
<td>17.97</td>
<td>3.28</td>
<td>9.73</td>
<td>.011</td>
<td>.991</td>
</tr>
<tr>
<td>Income Level</td>
<td>5.21</td>
<td>4.323</td>
<td>3.94</td>
<td>4.332</td>
<td>1.811</td>
<td>.071</td>
</tr>
<tr>
<td>Months Playing</td>
<td>92.67</td>
<td>48.301</td>
<td>80.38</td>
<td>46.897</td>
<td>1.578</td>
<td>.116</td>
</tr>
<tr>
<td>Days Played/Week</td>
<td>5.02</td>
<td>1.852</td>
<td>4.87</td>
<td>1.789</td>
<td>.503</td>
<td>.616</td>
</tr>
<tr>
<td>Hours Played/Day</td>
<td>4.70</td>
<td>3.359</td>
<td>4.36</td>
<td>2.69</td>
<td>.646</td>
<td>.519</td>
</tr>
<tr>
<td>Achievement</td>
<td>38.27</td>
<td>17.244</td>
<td>28.55</td>
<td>13.876</td>
<td>3.597</td>
<td>.000**</td>
</tr>
<tr>
<td>Social</td>
<td>39.884</td>
<td>15.94</td>
<td>40.298</td>
<td>14.788</td>
<td>.162</td>
<td>.871</td>
</tr>
<tr>
<td>Immersion</td>
<td>36.191</td>
<td>17.117</td>
<td>39.383</td>
<td>17.056</td>
<td>1.151</td>
<td>.251</td>
</tr>
<tr>
<td>Harmonious Pass.</td>
<td>17.518</td>
<td>7.961</td>
<td>17.894</td>
<td>7.841</td>
<td>.292</td>
<td>.771</td>
</tr>
<tr>
<td>Obsessive Passion</td>
<td>7.101</td>
<td>7.322</td>
<td>5.021</td>
<td>7.188</td>
<td>1.757</td>
<td>.080</td>
</tr>
<tr>
<td>POGUS</td>
<td>32.915</td>
<td>21.713</td>
<td>31.638</td>
<td>23.548</td>
<td>.357</td>
<td>.722</td>
</tr>
</tbody>
</table>

**: Significant at \( p < .05 \)
Differences between gender among the nominal variables marital status and race were evaluated by examining crosstabulations. A Chi-square analysis was considered but the number of participants in each category was too small for a comprehensive analysis. Regarding the variable marital status, males (51.8% within gender, $n = 103$) were more likely to be single/never married than females (31.9% within gender, $n = 15$). Females (51.1% within gender, $n = 24$) were more likely to be married than males (43.2%, $n = 86$). Regarding the variable race, more females identified as white within gender (91.5%, $n = 43$) than males (83.4%, $n = 166$) and more males (8.5%, $n = 17$) than females (4.3%, $n = 2$) identified as Hispanic or Latino. Other racial identifications were relatively equal.

The subcomponents of the MFP were evaluated to attempt to understand both the significant difference between genders on the achievement component but also to understand if there were differences on other subcomponents. A $t$ test was conducted and the results can be seen in Table 4.23.

Table 4.23

<table>
<thead>
<tr>
<th>Differences between Gender – MFP Subcomponents</th>
</tr>
</thead>
<tbody>
<tr>
<td>Variable</td>
</tr>
<tr>
<td>-----------</td>
</tr>
<tr>
<td>Advancement</td>
</tr>
<tr>
<td>Mechanics</td>
</tr>
<tr>
<td>Competition</td>
</tr>
<tr>
<td>Socializing</td>
</tr>
<tr>
<td>Relationship</td>
</tr>
<tr>
<td>Teamwork</td>
</tr>
<tr>
<td>Discovery</td>
</tr>
<tr>
<td>Role-Playing</td>
</tr>
<tr>
<td>Customization</td>
</tr>
<tr>
<td>Escapism</td>
</tr>
</tbody>
</table>

**: Significant at $p < .05$
In order to better understand what variables may differ between males and females, a multiple regression was run on each gender. The results of each can be see in table 4.24 and table 4.25. The male only model is significant $F(5, 193) = 67.019, p < .001$ with $R^2 = .64$. Three variables were significant with obsessive passion ($t_{obs} = 13.123, p < .001$), achievement ($t_{ach} = 2.517, p = .013$) and social ($t_{soc} = 2.008, p = .046$). The female only model is significant $F(5, 41) = 38.349, p < .001$ with $R^2 = .82$. Two variables were significant with obsessive passion ($t_{obs} = 8.656, p < .001$) and achievement ($t_{ach} = 2.911, p = .006$).

Table 4.24

Multiple Regression Model –Males

<table>
<thead>
<tr>
<th>ANOVA*</th>
<th></th>
<th>Sum of Squares</th>
<th>df</th>
<th>Mean Square</th>
<th>F</th>
<th>Sig.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Model</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Regression</td>
<td></td>
<td>21013.591</td>
<td>5</td>
<td>4202.718</td>
<td>38.249 .000b</td>
<td></td>
</tr>
<tr>
<td>Residual</td>
<td></td>
<td>4493.260</td>
<td>41</td>
<td>109592</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td></td>
<td>25506.851</td>
<td>46</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Coefficients*</th>
<th>Model</th>
<th>Unstd. B</th>
<th>Std. Error</th>
<th>Std. B</th>
<th>t</th>
<th>Sig.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Achievemnt</td>
<td>-1.064</td>
<td>4.817</td>
<td>-0.221</td>
<td>.826</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Social</td>
<td>.452</td>
<td>.155</td>
<td>.266</td>
<td>2.911</td>
<td>.006</td>
<td></td>
</tr>
<tr>
<td>Immersion</td>
<td>.088</td>
<td>.175</td>
<td>.056</td>
<td>.506</td>
<td>.615</td>
<td></td>
</tr>
<tr>
<td>Harmonious</td>
<td>.059</td>
<td>.138</td>
<td>.042</td>
<td>.425</td>
<td>.673</td>
<td></td>
</tr>
<tr>
<td>Passion</td>
<td>.165</td>
<td>.273</td>
<td>.055</td>
<td>.604</td>
<td>.549</td>
<td></td>
</tr>
<tr>
<td>Obsessive</td>
<td>2.184</td>
<td>.252</td>
<td>.667</td>
<td>8.656</td>
<td>.000</td>
<td></td>
</tr>
</tbody>
</table>

a. Dependent Variable: POGUS
b. Predictors: (Constant), Achievement, Social, Immersion, Harmonious Passion, Obsessive Passion
Table 4.25

Multiple Regression Model – Females

<table>
<thead>
<tr>
<th>Model</th>
<th>Sum of Squares</th>
<th>df</th>
<th>Mean Square</th>
<th>F</th>
<th>Sig.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Regression</td>
<td>19848.357</td>
<td>5</td>
<td>3969.671</td>
<td>32.556</td>
<td>.000</td>
</tr>
<tr>
<td>Residual</td>
<td>20728.825</td>
<td>170</td>
<td>121.934</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>40577.182</td>
<td>175</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Model</th>
<th>Unstd. B</th>
<th>Std. Error</th>
<th>Std. B</th>
<th>t</th>
<th>Sig.</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 (Constant)</td>
<td>2.849</td>
<td>2.556</td>
<td>.188</td>
<td>2.738</td>
<td>.007</td>
</tr>
<tr>
<td>Achievement</td>
<td>.183</td>
<td>.067</td>
<td>.188</td>
<td>2.738</td>
<td>.007</td>
</tr>
<tr>
<td>Social</td>
<td>.121</td>
<td>.089</td>
<td>.119</td>
<td>1.358</td>
<td>.176</td>
</tr>
<tr>
<td>Immersion</td>
<td>.125</td>
<td>.078</td>
<td>.137</td>
<td>1.598</td>
<td>.112</td>
</tr>
<tr>
<td>Harmonious Passion</td>
<td>-.048</td>
<td>.143</td>
<td>-.022</td>
<td>-.337</td>
<td>.736</td>
</tr>
<tr>
<td>Obsessive Passion</td>
<td>1.843</td>
<td>.206</td>
<td>.518</td>
<td>8.952</td>
<td>.000</td>
</tr>
</tbody>
</table>

a. Dependent Variable: POGUS
b. Predictors: (Constant), Achievement, Social, Immersion, Harmonious Passion, Obsessive Passion

Passion Criteria

The Passion Scale as outlined above includes a four-question passion criteria subscale. This subscale is intended to separate participants into those who are “passionate” and those that are not in regards to a specific behavior or activity of interest. The subscale was not used in this study due to its relative newness, lack of validity measures, and lack of use in other studies. However, separating out the participants based on this variable may provide insight into use of this variable. A two-tailed t test was conducted between the group that met the passion criteria (≥16) and the group that did not (<16). All variables were significantly different between groups. The results can be seen in table 4.26.
To extrapolate this further a multiple regression was run with just the group that met the passion criteria. All independent variables (achievement, social, immersion, harmonious passion, obsessive passion) were input using the “Entry” method with the dependent variable problematic online game use. The model is statistically significant given $F_{(5, 64)} = 13.91, \ p < .001$ with $R^2 = .52$. However, only one variable, obsessive passion was significant in the model ($t_{\text{obs}} = 6.50, \ p < .001$). The full statistical analysis can be seen in Table 4.27. Conversely, a multiple regression was run with the group that did not meet the threshold for passion. The model is statistically significant given $F_{(5, 170)} = 32.556, \ p < .001$ with $R^2 = .49$. In this instance two variables were significant predictors of POGUS. Obsessive passion ($t_{\text{obs}} = 8.95, \ p < .001$) and achievement ($t_{\text{ach}} = 2.74, \ p = .007$) were significant. The full statistical analysis can be seen in Table 4.28.
### Table 4.27

#### Multiple Regression Model – Only Passion Criteria Met Group

<table>
<thead>
<tr>
<th>Model</th>
<th>Sum of Squares</th>
<th>df</th>
<th>Mean Square</th>
<th>F</th>
<th>Sig.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Regression</td>
<td>16960.829</td>
<td>5</td>
<td>3392.166</td>
<td>13.906</td>
<td>.000</td>
</tr>
<tr>
<td>Residual</td>
<td>15611.871</td>
<td>64</td>
<td>243.935</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>32572.700</td>
<td>69</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Model</th>
<th>Unstd. B</th>
<th>Std. Error</th>
<th>Std. B</th>
<th>t</th>
<th>Sig.</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 (Constant)</td>
<td>25.098</td>
<td>8.662</td>
<td></td>
<td>2.897</td>
<td>.005</td>
</tr>
<tr>
<td>Achievement</td>
<td>.061</td>
<td>.138</td>
<td>.043</td>
<td>.444</td>
<td>.658</td>
</tr>
<tr>
<td>Social</td>
<td>.244</td>
<td>.188</td>
<td>.156</td>
<td>1.294</td>
<td>.200</td>
</tr>
<tr>
<td>Immersion</td>
<td>.055</td>
<td>.175</td>
<td>.040</td>
<td>.316</td>
<td>.753</td>
</tr>
<tr>
<td>Harmonious</td>
<td>-.359</td>
<td>.316</td>
<td>-.118</td>
<td>-1.135</td>
<td>.260</td>
</tr>
<tr>
<td>Obsessive</td>
<td>1.534</td>
<td>.236</td>
<td>.637</td>
<td>6.496</td>
<td>.000</td>
</tr>
</tbody>
</table>

a. Dependent Variable: POGUS
b. Predictors: (Constant), Achievement, Social, Immersion, Harmonious Passion, Obsessive Passion

### Table 4.28

#### Multiple Regression Model – Passion Criteria Not Met Group

<table>
<thead>
<tr>
<th>Model</th>
<th>Sum of Squares</th>
<th>df</th>
<th>Mean Square</th>
<th>F</th>
<th>Sig.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Regression</td>
<td>19848.357</td>
<td>5</td>
<td>3969.671</td>
<td>32.556</td>
<td>.000</td>
</tr>
<tr>
<td>Residual</td>
<td>20728.825</td>
<td>170</td>
<td>121.934</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>40577.182</td>
<td>175</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Model</th>
<th>Unstd. B</th>
<th>Std. Error</th>
<th>Std. B</th>
<th>t</th>
<th>Sig.</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 (Constant)</td>
<td>2.849</td>
<td>2.556</td>
<td></td>
<td>1.115</td>
<td>.267</td>
</tr>
<tr>
<td>Achievement</td>
<td>.183</td>
<td>.067</td>
<td>.188</td>
<td>2.738</td>
<td>.007</td>
</tr>
<tr>
<td>Social</td>
<td>.121</td>
<td>.089</td>
<td>.119</td>
<td>1.358</td>
<td>.176</td>
</tr>
<tr>
<td>Immersion</td>
<td>.125</td>
<td>.078</td>
<td>.137</td>
<td>1.598</td>
<td>.112</td>
</tr>
<tr>
<td>Harmonious</td>
<td>-.048</td>
<td>.143</td>
<td>-.022</td>
<td>-3.37</td>
<td>.736</td>
</tr>
<tr>
<td>Obsessive</td>
<td>1.843</td>
<td>.206</td>
<td>.518</td>
<td>8.952</td>
<td>.000</td>
</tr>
</tbody>
</table>

a. Dependent Variable: POGUS
b. Predictors: (Constant), Achievement, Social, Immersion, Harmonious Passion, Obsessive Passion
Motivation for Play Subcomponents

Although the MFP survey’s 10 subcomponents were not individually included in the research questions due to concerns over statistical power and convolution of analysis, it is worth performing some examination to lend better insight to the above findings. Means and standard deviations for each of the 10 subcomponents were calculated and correlations were computed to understand the relationship each subcomponent has with the dependent variable POGUS. Results can be seen in Table 4.29. All relationships between the subcomponents and the dependent variable were positive and significant. Given the significant correlations among the three primary subcomponents and the dependent variable this was expected. The strongest relationships were between POGUS and the escapism ($r = .532$, $p < .005$), advancement ($r = .509$, $p < .005$) and competition ($r = .456$, $p < .005$) subcomponents.

A multiple regression was run to understand if the individual subcomponents could be used to predict POGUS scores. All subcomponents were input using the “Entry” method with the dependent variable problematic online game use. The model is statistically significant given $F(5, 64) = 18.61$, $p < .001$ with $R^2 = .44$. Three subcomponents were significant in the model. Advancement ($t_{adv} = 2.20$, $p = .029$), competition ($t_{com} = 2.71$, $p < .001$) and escapism ($t_{esc} = 4.55$, $p < .001$) were all significant. The full statistical analysis can be seen in Table 4.30.
### Table 4.29

**Correlations between MFP Subcomponents and Dependent Variable**

<table>
<thead>
<tr>
<th>Independent Variable</th>
<th>Person Correlation</th>
<th>Sig. (2-tailed)</th>
<th>N</th>
</tr>
</thead>
<tbody>
<tr>
<td>Advancement</td>
<td>.509**</td>
<td>.000</td>
<td>246</td>
</tr>
<tr>
<td>Mechanics</td>
<td>.386**</td>
<td>.000</td>
<td>246</td>
</tr>
<tr>
<td>Competition</td>
<td>.456**</td>
<td>.000</td>
<td>246</td>
</tr>
<tr>
<td>Socialization</td>
<td>.358**</td>
<td>.000</td>
<td>246</td>
</tr>
<tr>
<td>Relationship</td>
<td>.441**</td>
<td>.000</td>
<td>246</td>
</tr>
<tr>
<td>Teamwork</td>
<td>.435**</td>
<td>.000</td>
<td>246</td>
</tr>
<tr>
<td>Discovery</td>
<td>.197**</td>
<td>.000</td>
<td>246</td>
</tr>
<tr>
<td>Role-Playing</td>
<td>.343**</td>
<td>.000</td>
<td>246</td>
</tr>
<tr>
<td>Customization</td>
<td>.368**</td>
<td>.000</td>
<td>246</td>
</tr>
<tr>
<td>Escapism</td>
<td>.532**</td>
<td>.000</td>
<td>246</td>
</tr>
</tbody>
</table>

**correlation significant at the .01 level (2 tailed)
Table 4.30

Multiple Regression Model – MFP Subcomponents

<table>
<thead>
<tr>
<th>Model</th>
<th>Sum of Squares</th>
<th>df</th>
<th>Mean Square</th>
<th>F</th>
<th>Sig.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Regression</td>
<td>52554.209</td>
<td>10</td>
<td>5255.421</td>
<td>18.609</td>
<td>.000</td>
</tr>
<tr>
<td>Residual</td>
<td>66368.120</td>
<td>235</td>
<td>282.418</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>118922.329</td>
<td>245</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Coefficients

<table>
<thead>
<tr>
<th>Model</th>
<th>Unstd. B</th>
<th>Std. Error</th>
<th>Std. B</th>
<th>t</th>
<th>Sig.</th>
<th>Partial</th>
<th>Part</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 (Constant)</td>
<td>1.816</td>
<td>3.350</td>
<td>.54</td>
<td>.588</td>
<td>.588</td>
<td>.107</td>
<td></td>
</tr>
<tr>
<td>Advancement</td>
<td>.508</td>
<td>.231</td>
<td>.193</td>
<td>2.20</td>
<td>.029*</td>
<td>.142</td>
<td>.107</td>
</tr>
<tr>
<td>Mechanics</td>
<td>.002</td>
<td>.260</td>
<td>.000</td>
<td>.007</td>
<td>.995</td>
<td>.000</td>
<td></td>
</tr>
<tr>
<td>Competition</td>
<td>.727</td>
<td>.267</td>
<td>.179</td>
<td>2.72</td>
<td>.007*</td>
<td>.175</td>
<td>.133</td>
</tr>
<tr>
<td>Socializing</td>
<td>-.465</td>
<td>.312</td>
<td>-.122</td>
<td>-1.49</td>
<td>.138</td>
<td>-.097</td>
<td>-.073</td>
</tr>
<tr>
<td>Relationship</td>
<td>1.206</td>
<td>.312</td>
<td>.266</td>
<td>3.86</td>
<td>.000*</td>
<td>.245</td>
<td>.188</td>
</tr>
<tr>
<td>Teamwork</td>
<td>.274</td>
<td>.381</td>
<td>.065</td>
<td>.72</td>
<td>.473</td>
<td>.047</td>
<td>.035</td>
</tr>
<tr>
<td>Discovery</td>
<td>-.267</td>
<td>.284</td>
<td>-.064</td>
<td>-.94</td>
<td>.347</td>
<td>-.061</td>
<td>-.046</td>
</tr>
<tr>
<td>Role-Playing</td>
<td>.054</td>
<td>.234</td>
<td>.015</td>
<td>.23</td>
<td>.818</td>
<td>.015</td>
<td>.011</td>
</tr>
<tr>
<td>Customization</td>
<td>.099</td>
<td>.300</td>
<td>.024</td>
<td>.33</td>
<td>.741</td>
<td>.022</td>
<td>.016</td>
</tr>
<tr>
<td>Escapism</td>
<td>1.390</td>
<td>.305</td>
<td>.298</td>
<td>4.55</td>
<td>.000*</td>
<td>.285</td>
<td>.222</td>
</tr>
</tbody>
</table>

a. Dependent Variable: POGUS
b. Predictors: (Constant), Advancement, Mechanics, Competition, Socializing, Relationship, Teamwork, Discovery, Role-Playing, Customization, Escapism
* significant at p < .05

Time Played

As indicated in prior research (Yee, 2006), the amount of time a participant plays MMORPG’s can be an indicator of addiction. To examine this concept the variables of amount of total time (in months), days per week, and hours per day of MMORPG gameplay were evaluated. A Pearson product-moment correlation coefficient was conducted to understand the relationship between these constructs. The results can be seen in Table 4.31.
Table 4.31

*Correlations between Time Played and Independent/Dependent Variables*

<table>
<thead>
<tr>
<th>Variable</th>
<th>Total Months Played</th>
<th>Days Per Week</th>
<th>Hours Per Day</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Person Correlation</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Achievement</td>
<td>.044</td>
<td>.144*</td>
<td>.131*</td>
</tr>
<tr>
<td>Sig. (2-tailed)</td>
<td>.491</td>
<td>.024</td>
<td>.040</td>
</tr>
<tr>
<td>N</td>
<td>246</td>
<td>246</td>
<td>246</td>
</tr>
<tr>
<td>Social</td>
<td>.177**</td>
<td>.106</td>
<td>.225**</td>
</tr>
<tr>
<td>Sig. (2-tailed)</td>
<td>.006</td>
<td>.098</td>
<td>.000</td>
</tr>
<tr>
<td>N</td>
<td>246</td>
<td>246</td>
<td>246</td>
</tr>
<tr>
<td>Immersion</td>
<td>.116</td>
<td>.068</td>
<td>.114</td>
</tr>
<tr>
<td>Sig. (2-tailed)</td>
<td>.068</td>
<td>.291</td>
<td>.075</td>
</tr>
<tr>
<td>N</td>
<td>246</td>
<td>246</td>
<td>246</td>
</tr>
<tr>
<td>Harmonious</td>
<td>.069</td>
<td>.234**</td>
<td>.096</td>
</tr>
<tr>
<td>Passion</td>
<td>.279</td>
<td>.000</td>
<td>.135</td>
</tr>
<tr>
<td>N</td>
<td>246</td>
<td>246</td>
<td>246</td>
</tr>
<tr>
<td>Obsessive</td>
<td>-.025</td>
<td>.255**</td>
<td>.263**</td>
</tr>
<tr>
<td>Passion</td>
<td>.692</td>
<td>.000</td>
<td>.000</td>
</tr>
<tr>
<td>N</td>
<td>246</td>
<td>246</td>
<td>246</td>
</tr>
<tr>
<td>POGUS</td>
<td>-.014</td>
<td>.284**</td>
<td>.182**</td>
</tr>
<tr>
<td>Sig. (2-tailed)</td>
<td>.832</td>
<td>.000</td>
<td>.000</td>
</tr>
<tr>
<td>N</td>
<td>246</td>
<td>246</td>
<td>246</td>
</tr>
</tbody>
</table>

**Correlation significant at the .01 level (2 tailed)**
*Correlation significant at the .05 level (2 tailed)

Addiction Level

The participant group was split in order to better understand the profile of a participant who scores high on the POGUS contrasted with one who scores lower. A score of 60 or greater was used as the cutoff point for the former group. This score was chosen as it would lend approximately 12% of the sample in the higher scoring group. This percentage reflects national statistics on rates of chemical addiction. A t-test was conducted between the two groups on the independent variables and several of the demographic questions to detect significant differences between the groups. The two groups were significantly different on all independent variables but none of the
demographic variables. Mean values for the respective groups were relatively close within group for the MFP variables (Achievement, Immersion, Social). The most significant difference between the groups was on the Obsessive Passion variable ($t_{obs} = 11.86, p < .0001$). Full results can be seen in Table 4.32.

Table 4.32

Differences between POGUS Groups

<table>
<thead>
<tr>
<th>Variable</th>
<th>POGUS &gt; 60* SD</th>
<th>POGUS ≤ 60 **</th>
<th>SD</th>
<th>t</th>
<th>Sig.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Achievement</td>
<td>51.67</td>
<td>15.57</td>
<td>34.30</td>
<td>16.19</td>
<td>5.53</td>
</tr>
<tr>
<td>Social</td>
<td>52.10</td>
<td>12.15</td>
<td>38.28</td>
<td>15.41</td>
<td>4.70</td>
</tr>
<tr>
<td>Immersion</td>
<td>48.63</td>
<td>14.18</td>
<td>35.16</td>
<td>16.87</td>
<td>4.17</td>
</tr>
<tr>
<td>Harmonious</td>
<td>21.97</td>
<td>8.76</td>
<td>16.98</td>
<td>7.62</td>
<td>3.30</td>
</tr>
<tr>
<td>Passion</td>
<td>18.57</td>
<td>7.31</td>
<td>5.06</td>
<td>5.62</td>
<td>11.86</td>
</tr>
<tr>
<td>Age</td>
<td>27.10</td>
<td>6.59</td>
<td>28.91</td>
<td>7.92</td>
<td>1.16</td>
</tr>
<tr>
<td>Education</td>
<td>3.13</td>
<td>1.20</td>
<td>3.42</td>
<td>1.34</td>
<td>1.12</td>
</tr>
<tr>
<td>Marital Status</td>
<td>.57</td>
<td>.56</td>
<td>.62</td>
<td>.70</td>
<td>.37</td>
</tr>
<tr>
<td>Income</td>
<td>4.60</td>
<td>4.61</td>
<td>5.02</td>
<td>4.30</td>
<td>.49</td>
</tr>
<tr>
<td>Race</td>
<td>1.17</td>
<td>.531</td>
<td>1.40</td>
<td>1.03</td>
<td>1.19</td>
</tr>
</tbody>
</table>

* $n = 30$
** $n = 216$
*** Significant at $p < .0001$
Chapter 5
Conclusions, Summary, and Recommendations

This chapter will explore and discuss the findings and results presented in the previous chapter. Implications and relevance to the existing body of knowledge on the subject of online gaming addiction will be shared. First the most pertinent findings of the research will be discussed, and clinical implications will be considered. Second, each of the four research questions will be examined and finally post hoc analyses will be discussed. Concurrently, connections between current findings and previous research will be reported. Additionally, methodological implications will be noted and limitations of the current study will then be reviewed. Lastly, notes on future directions for online gaming research will be discussed and a summary is provided.

Research Findings

Obsessive Passion

The independent variable, obsessive passion, was the strongest predictor of online gaming addiction. This indicates that the most important part of assessing gaming addiction is the value that the player ascribes gaming to their identity and self-esteem. As addressed earlier, obsessive passion is present when a behavior becomes integral to a person’s definition of identity and the benefits one believes this identity provides. his suggests that it is more important to understand what the player believes they get from
playing MMORPG’s rather then any particular aspect of the game itself. Additional research connecting identity to obsessive passion, online gaming, and negative consequences would help substantiate this idea and provide further credibility to Vallerand’s (2010) theory of dualistic passion.

**Gender Differences**

Meaningful among the results was the difference in the predictive models between males and females. The independent variables accounted for more variance in the regression models among females. This indicates that, despite the indication that the genders play for similar reasons and levels, (with achievement being a possible exception) these factors contribute more to addiction among females. This does not indicate that females are more susceptible to addiction as means between the genders and the dependent variable were relatively similar. Rather, it suggests that when females are motivated by the independent variables they are increasingly disposed to addiction. An additional explanation is that there are fewer additional variables that contribute to the variance in the female sample than males.

To complement these results, there were a lack of differences between males and females across the variables. Scores were relatively identical for almost every independent variable, the dependent variable, and most demographic dimensions for each gender group. The principal difference was on the achievement variable, on which males scored significantly higher than females. There was not one subcomponent (advancement, mechanics, competition) of achievement that skewed the means between the groups. Rather, males and females were significantly different on all three. This is
consistent with Yee’s (2006) research. Despite the significant difference on the achievement variable, the key finding is that males and females are overwhelming similar throughout. The independent samples test conducted (table 4.14) reinforces this.

**Time Played**

Prior research has indicated that the amount of time that a player plays MMORPG’s (per day, per week, etc.) correlates with online gaming addiction. This study also denoted a relationship between problematic game use and time played (table 4.31). However, this relationship was relatively small compared to other variables and indicators. This is in line with the time-played myth that explains negative consequences and addiction is not contingent on time played. There is common misnomer that only addicts engage in behaviors at extreme levels but these cases tend to be anecdotal. Research in addiction have consistently supported that amount of use (or engagement in a behavior) is not a reliable indicator for addiction level. Rather, as discussed prior, continued use/engagement despite negative consequences is a key marker for addiction.

**Clinical Implications**

There are several important findings pertinent to the clinical professional who works with mental health, addiction, and, in this case, online gaming addicts. It is clear that not everyone who plays MMORPG’s becomes obsessed or addicted. Rather, it is a small percentage who display symptomology. It should not be assumed that everyone who plays is deficient in some area, is trying to escape real world stressors, has a problem related to play, or is addicted. Conversely, as prior research has suggested and this research reinforces, the majority of players engage in the games at appropriate and
healthy levels. Future research using similar variables (motivation for play, passion) and positive consequences might demonstrate some of the more favorable outcomes for players such as leadership skills, prosocial skills, and problem solving. Additionally it provides a safe environment to practice skills, provides a social support system with immediate feedback, and allows players the opportunity to practice new roles, among others (McGonigal, 2015). Clinicians should assess the role of the game in an individual’s life before making any treatment goals to change or eliminate it.

There are diagnostic implications for clinicians as well. With the call for research in the area of online gaming addiction from the American Psychological Association, this research provides insight to several constructs that may be used to diagnose online gaming addiction. Per the obsessive passion variable, items on the scale suggest preoccupation for playing, feeling a lack or loss of control relative to playing MMORPG’s, and obsession (i.e. I would only play online games if I could, online gaming is the only thing that excites me). These concepts could provide a foundation for diagnostic criteria. Additionally, as mentioned above, the link between self-identity and obsessive passion would suggest that a problematic player would self-identifying as a “gamer” and may be part of the diagnostic equation. Further research will help provide other diagnostic variables and to substantiate this one but it provides a foundation.

Passion Criteria

A subscale included in the Passion Scale demonstrates potential as an indicator for high scores in other areas. Vallerand’s (2010) passion criteria was not used in this study as it has little support as a valid construct and has not been used to date as a way to
separate groups into passionate or non-passionate groups. However, as seen in table 4.26, there were significant differences between the two groups in all five of the independent variables and the dependent variable. This indicates that the more passionate a player is for MMORPG’s the more involved they are in all areas of play. Additionally, it is worth noting that the average scores between groups showed the largest difference on the POGUS variable. This indicates that the more passionate a player is the more susceptible they are to addiction. However, the passion criteria did not separate out addiction levels since obsessive passion and achievement were still predictive of POGUS. Also, participants scored at relative levels between groups on both harmonious and obsessive passion indicating that meeting the threshold for passion does not mediate type of passion or type of play. There is some support for separating out groups on passion level for comparison purposes. This also lends credibility to the passion criteria subscale for use in future studies. Further research would help to understand the role of the passion criteria subscale in terms of its relevance for comparing groups and ability to be a predictor of variables.

**Motivations for Play**

The motivations for play variables achievement, social, and immersion all correlated with the dependent variable and, depending on the regression model, account for varying degrees of variance. Although obsessive passion is the primary predictor, these motivators should not be discounted by researchers and clinicians alike. As indicated in table 4.21, when obsessive passion was removed as a predictor, the MFP variables changed. This is likely due to the large correlation between obsessive passion
and the MFP variables. Examination of how these variables interplay will continue to be an important part of MMORPG research.

Research Question Analyses

Research Question One

Research question one investigated participant means across various demographics. Age of participants was fairly evenly spread through the range of 18-63 years of age with some descending values after age 41. However it is of note that 13 of the 247 participants were over the age of 41. The mean age of 28.69 years was consistent with other findings in past research (Charlton & Danforth, 2007; Williams, et al., 2008; Yee, 2006) in which means ranged from 28 – 32 years of age. Williams, Yee, and Caplan (2008) posited that the average age of gamers reflects and will continue to reflect the general population as more people engage in playing games.

Males were the most represented gender in the sample. This is also consistent with past research (Williams, et al., 2008; Yee, 2006). However, recent research is suggesting that females are a constantly growing demographic making up 44% of the gaming population (including MMORPG players) (Electronic Software Association, 2015). Adult women now sizably outnumber boys under 18 as identified gamers and the gap between men and women in general continues to close with games that appeal to specifically to women, accessibility via mobile devices, and increasing social acceptance for women to enjoy video games.

Consistency with race is difficult to establish, as it is often dependent on the source of the research. For example, research conducted in Korea is skewed towards
Koreans and so on. As such, it was expected that White/Caucasian would be the largest represented race among the sample and this was found. However, it is of note that all racial groups presented on the demographic assessment were represented.

Education was also consistent with past research (Yee, 2006). Most of the sample had at least some college credit with over a quarter holding a degree. Annual income was found to approximately $30,000 a year; however, it is noteworthy that the most represented group were those that made less than $10,000. It can be deduced that college students were the largest population in the below $10,000 group since age and income were positively correlated but most people had at least some college credit. A cross-tabulation confirmed that the majority (but not all) of the 18 – 22 year olds were in the bottom of the income spectrum. Marital status was relatively evenly split between married/have been married groups and the never married group.

These results affirm what has been found in previous research. The stereotypical notion of a video gamer does not apply to MMORPG’s. Most players are males in their late 20’s to early 30’s, have at least some advanced education, have been or are married, and have a middle class income.

The majority of the sample had been playing MMORPG’s for many years with some participants indicating they had been playing back to more primitive, non-graphics based MMORPG’s. This seems to lend credibility to the pervasive nature of these types of games. Since there is no definitive end point, players tend to spend more time playing them than a game that has a specific goal and endpoint. Even if these players are not playing the same MMORPG over a long period of time, they are choosing to stay within
the genre. The number and variety of MMORPG’s endorsed by the sample further evidences this. The majority of participants indicated they had played at least two different MMORPG’s in the past six months. Nearly one-fifth of participants had played five or more. *World of Warcraft* was by far the most popular of the MMORPG’s. *World of Warcraft* is aggressive in its marketing campaigns, is easily assessable, and comes out with an expansion every year to two years. This accounts for it being the most endorsed game in the sample but with over 30 games represented as a whole, the genre’s presence in the video game market and the likelihood that these types of games will be around for the foreseeable future is emphasized.

The majority of players indicated they played the game everyday for three to four hours a day. Anecdotal cases have lent some insight as to why players want to play everyday (Williams, et al., 2008). Principal among these reasons are the social connectedness, a desire to stay current with friends and teammates achievements, and a way to disconnect from daily stress. Although qualitative responses were not gathered for this survey, participants across most domains indicated feeling motivated to play for achievement, social, and immersive reasons. A mixed methods study would help to better connect these underlying motivations and desire to play regularly. It is also noteworthy to mention that regular or daily play of three to four hours is similar to other hobbies such as television viewing or reading so it may not be reasonable to think these levels of play are excessive or necessarily problematic.

The majority of participants indicated that someone (i.e. friend, significant other, family member) introduced them to the genre of MMORPG’s. This underscores the
social aspect of these types of games. A desire to engage with others a player knows in real life in the game is quite common.

**Research Question Two**

Research question two examined the correlations between the independent and dependent variables. All five of the independent variables (achievement, immersion, social, harmonious passion, and obsessive passion) had strong positive relationships with the dependent variable. This lends credibility to the hypothesis that underlying motivating factors are contributing to addiction. Most substantially was obsessive passion, which had the strongest relationship. This was expected given the notion that obsessive passion is directly related to lack of control over a behavior. However, the strength of the relationship truly lends credence to Vallerand’s (2010) theory. This is consistent with the work of Lafrenière and Vallerand (2009) but extends their work. The previous study connected negative behaviors with obsessive passion. The present study connects it directly to an assessment used to test problematic gaming, thus deepening its integrity as a construct.

**Research Question Three**

Research question three examined the relationships among the independent variables. All five of the variables shared moderate to strong positive correlations. This is of note considering they are used to measure different components of MMORPG gaming (for the MFP variables) or general engagement (for the Passion variables). This does support Yee’s (2006) assertion that the MFP variables were not mutually exclusive and that players could be motivated by multiple factors concurrently.
Also notable among the results is the strong positive relationship between harmonious passion and obsessive passion. It has been suggested that these two constructs are dichotomous. However, the strong correlation would suggest otherwise. A critical item analysis of the Passion Scale questions lends insight. Obsessive passion questions include concepts about difficulty controlling the urge to play online, exclusivity in desire to play over other activities, and an overall lack of control over play. Conversely, some harmonious passion questions center on the ability to integrate play with other life areas, ability to adhere to other responsibilities, and an internal equilibrium with play and feelings of self. However, not all of the harmonious passion scale questions reflect the division of control and lack thereof which is the crux of the division between obsessive and harmonious passion. These additional questions concern a desire for a variety of gameplay experiences, discovering new aspects of the game that one appreciates, and a reflection of the game and the aspects one likes about oneself. These questions are from the harmonious passion subset of questions but do not directly separate out the aspect of control. This may be where the overlap among the variables can be accounted. A critical analysis of individual answers among participants may illuminate this but that is beyond the scope of this study and may be appropriate for a closer evaluation in a future study.

**Research Question Four**

Research question four assessed what independent variables could be used to predict levels of addiction using Kim and Kim’s (2010) Problematic Online Gaming Use Scale. The overall model was significant. Specifically the variables obsessive passion,
achievement, and social accounted for the largest amount of variance. Obsessive passion was clearly the strongest predictor of POGUS scores (32.9% of the variance). This is consistent with Lafrenière and Vallerand’s (2009) research and to Yee’s (2006) research on predictive variables (obsessive passion and achievement respectively). However, Yee did not find the social variable significant in his regression model. This is likely due to the fact games have become more sophisticated in how players can interact with one another. At the time of Yee’s study most communication was in chat form and although this is still the primary way for many games, players now have options to speak to others with microphones or they may even have video chat available. This likely deepens the quality of social relationships and their motivating factor for players. However, it is worth noting that although the social variable was significant in the model, the amount of variance (2.3%) it accounted for was quite small comparatively.

**Post Hoc Analyses**

Post hoc analyses focused on a variety of findings outside the research questions. The subcomponent relationship (Social variable) is an area of divergence between past research (Yee, 2006) and present findings. Yee noted a significant difference between males and females on this variable with females scoring higher. He noted there was no difference between groups on the subcomponent socializing indicating that both genders play for social reasons but the outcomes for these interactions may vary. However, the present research found no significant difference between the genders on any of the Social subcomponents. In fact, among the three subcomponents (socializing, relationship, teamwork) relationship was the lowest scoring between both genders. One explanation
may be that present day MMORPG’s are faster paced with less down time. As such, there is not as much time to have meaningful conversation among a group and therefore not allowing for deeper relationships.

Lastly, of significant note are the strong positive relationships between MFP subcomponents escapism, advancement, and competition. Yee’s (2006) work supported escapism as a significant variable and predictor of addiction but advancement and competition were not. It could be that as MMORPG’s have become increasingly complex and expansive that reaching increasingly higher levels is necessary to enjoy the full breadth of the game. When new expansions for an existing game are sold, the maximum level a character can reach is often extended. Increased importance is placed on advancing quickly in order to explore the latest content. Competition is also a new predictor. Increasingly, games such as *League of Legends* and *Guild Wars 2* either emphasize or are exclusively played in direct competition with other teams or players. The growth of this type of MMORPG may be one explanation for the rise of the competition subcomponent as a factor.

**Methodological Implications**

The process and results of this study have brought several methodological implications worthy of note. Among these are the use of Kim and Kim’s (2010) POGUS assessment with adults, the continued validation of passion as an important construct in diagnosing process addictions, and the commonalities of the variables used from across assessments. These implications have significant impact on future research in this area.
Kim and Kim’s (2010) previous validation measures of the POGUS used children and adolescents of various ages as their sample. There was substantial concern that the assessment would not translate for use with an adult sample. However, validation measures used in the present sample appear to give the assessment credibility for use among adults and across other demographics such as age, race, and education. Metrics from the present study demonstrate similar outcomes as Kim and Kim’s original research. This extends Kim and Kim’s purpose of creating the assessment, which could provide a consistent and specific measure to assess online use and addiction.

Vallerand’s (2010) Dualistic Model of Passion and the related Passion Scale proved to be an important factor in the current study. Obsessive passion as a construct has a significant role moving forward as a way to better understand process addictions at large and online gaming addiction in particular. Assessments that are specific to process addictions are rare but the Passion Scale may become a strong stepping-stone towards creating one.

The interplay of the independent variables and the high correlations between them may help future researchers to combine them in unique and extended ways. There is reason to believe that all these variables have value in describing MMORPG players. Although some were not directly related to addiction in significant ways, they might still have merit in better understand how and why players play MMORPG’s and perhaps are related to other variables not explored here.
Limitations

All studies have limitations and this study is no exception. Generalizability is likely the most important to mention. Although the survey was open across multiple portals and in theory could be accessed in any setting that has Internet access, the sample was overwhelmingly from the United States. Since MMORPG’s are played throughout the world, it is difficult to generalize these findings across cultures. Additionally, self-selection further skews the sample. It is possible that participants recruited friends to take the survey via message boards and online forums. Again, this perpetuates the generalizability limitation.

Additionally, due to the nature of recruitment, it is possible the more enthusiastic players were overly represented in the sample. These players are more likely to visit websites focused on MMORPG’s or see the advertisement for the survey on social media outlets. This may have skewed the sample towards more devoted players and the findings here may not represent players who define themselves as more casual.

Another limitation is that the study focused exclusively on adults. The findings of this study cannot be extended to children and adolescents. Future research may consider focusing on this population specifically or combining them with adults to create comparison groups.

Future Research

As mentioned above, although some of the variables in the MFP were not significant for predicting addiction, there is reason to believe they may predict other constructs. One aspect not explored in this study is the potential benefits of video
gameplay. Future research may choose to explore the relationship between the
motivating factors of immersion, socialization, and achievement (and subcomponents) to
concepts such as leadership development, relationship building, self-efficacy, and other
positive skills. There is additional evidence that gaming principles can be used to effect
positive change for people diagnosed with depression, anxiety, physical injury, and other
mental and health disorders (McGonigal, 2015). If these types of games can integrate the
motivating factors from MMOPRG’s, they may be able to further motivate and retain
players to play games that can help them.

Future researchers can build from this study to evaluate additional variables that
may be predictive of addiction. Examples may include mental health correlations that
have been suggestively linked in past research (Williams, et al., 2008) such as major
depressive disorder, social anxiety, or obsessive-compulsive disorder. Other examples
may consider scales on loneliness, self-esteem, and social support systems.

Another area of further exploration is how the variables of passion interact and
predict other process addictions. Given the validity to the theory and the importance of
obsessive passion for predicting online gaming addiction it follows logically that the
same would apply to other process addictions. As indicated earlier, the Internet has
provided access to and is a conduit for engaging in potentially problematic behaviors
such as sex, pornography, gambling, shopping, among others. Additionally, it would be
interesting to examine long term Internet use among those that have exhibited
problematic symptomology to understand if there are trends to use, abuse, and
dependency among various process behaviors on the Internet over time.
Since the sample gained in this study is potentially not representative of the population, it is recommended that future research attempt to survey MMORPG gamers across a wider spectrum. Gaining access to players in the game with cooperation from game manufacturers would lend itself to a more representative sample and inferences could be made regarding the demographic findings. This would also be a method to interview players directly individually or in groups to gather qualitative data. A mixed methods study would likely provide significant insight to how and why players play MMORPG’s, their perceived interest in the game, player awareness to potential problems or skills built linked to gameplay.

Summary

Overall, demographics of the sample largely mirrored past research. The average MMORPG gamer was male, currently or previously married, age 28, and has had some level of college education. Many players in the sample have been playing MMORPG’s for several years with many also playing across different MMORPG’s. Over 30 different MMORPG’s were represented in the sample with World of Warcraft overwhelmingly dominating the list.

Past research on motivation for play and passion were largely supported by the current research. The current study found that achievement and social play along with obsessive passion were the most predictive of problematic online gaming play. Most significant among these was obsessive passion, giving credibility to the dualistic model of passion and past research that obsessive passion was predictive of problematic behaviors. Some subcomponents demonstrated significance in post hoc studies such as
escapism, advancement, and competition. The addition of the latter two indicates that MMORPG’s and their attractiveness to players continues to change and evolve as games advance and play differently than their predecessors. There were significant differences between males and female MMORPG gamers on the variable achievement. It is posited that males more often are motivated by superiority and activities in which they can proclaim they are the best.

The study added to the body of research for online gaming addiction. It extended the work on dualistic passion to encompass specifically a process addiction. This may help future assessments better understand the underlying factors of process addiction in general. It also lends credence to the motivational factors of prior research although comparatively to obsessive passion, these appear to not be as important to identifying addiction but can provide insight to why players play.

Future research in this area can further examine additional motivational variables beyond those explored in this study. Additionally, expanding this research to children and adolescents will be a direction for future study. Larger scale studies and mixed methods studies will also help better understand the issue on online gaming addiction and motivational factors.
References


Grusser S. M., Thalemann, R., & Griffiths, M. D. (2007). Excessive computer game 134
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James, W. (1950/1890). *The principles of psychology (Vols. 1 and 2).* New York: Dover


APPENDIX A
DEMOGRAPHICS QUESTIONNAIRE
Demographics Questionnaire

1. What is your age?
2. What is your sex?
   - Male
   - Female
3. What is the highest level of education completed?
   - No High School
   - Some High School
   - High School Diploma or Equivalent
   - Some College Credit, No Degree
   - Trade School or Vocational Training
   - Bachelor’s Degree
   - Master’s Degree
   - Professional Degree
   - Doctorate degree
4. What is your marital status?
   - Single, Never Married
   - Married or Domestic Partnership
   - Divorced
   - Widowed
   - Separated
5. What is your personal annual income?
   - Less than $10,000
   - $10,001 - $14,999
   - $15,000 - $19,999
   - $20,000 - $24,999
   - $25,000 - $29,999
   - $30,000 - $34,999
   - $35,000 - $39,999
   - $40,000 - $44,999
   - $45,000 - $49,999
   - $50,000 - $59,999
   - $60,000 - $74,999
   - $75,000 - $99,999
   - $100,000 - $124,999
   - $125,000 - $149,999
   - $150,000 – $199,999
   - $200,000 or more
   - Unemployed
6. What is your racial identification?
7. What MMORPG’s have you played in the past six months? (check all that apply)
   - Age of Conan
   - EVE online
   - Everquest
   - Everquest II
   - Final Fantasy XIV
   - Guild Wars 2
   - Lineage I or II
   - The Lord of the Rings Online
   - Marvel Heroes
   - Maplestory
   - Rift
   - Runescape
   - The Secret World
   - Star Wars: The Old Republic
   - A Tale in the Desert
   - Ultima Online
   - Warhammer Online
   - World of Warcraft
   - None
   - Other: __________

8. Approximately How Many Months Have You Been Playing MMORPGs?
9. On Average, How Many Days Do You Play MMORPGs?
10. On Average, How Many Hours Do You Play MMORPGs in a Day?
11. Who Introduced You to MMORPGs?
    - Found it Myself
    - Friend
    - Family Member
    - Romantic Partner
12. At What Time of Day Do You Typically Play MMORPGs?
    - Morning
    - Afternoon
    - Early Evening
    - Late Evening
    - After Midnight
APPENDIX B
PROBLEMATIC ONLINE GAMING USE SCALE
**Problematic Online Gaming Use Scale** (adapted from Kim & Kim, 2010)

While thinking of playing online roleplaying games (i.e. World of Warcraft, Everquest) and using the scale below, please indicate your level of agreement with each item.

<table>
<thead>
<tr>
<th>Not Agree at All</th>
<th>Very Slightly Agree</th>
<th>Slightly Agree</th>
<th>Moderately Agree</th>
<th>Mostly Agree</th>
<th>Strongly Agree</th>
<th>Very Strongly Agree</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td>6</td>
<td>7</td>
</tr>
</tbody>
</table>

1. I feel unrestricted when playing online games
2. I feel good and very interested while I play online games
3. I experience a buzz of excitement while I play online games
4. Playing online games is when I most feel pleasure
5. My health has gotten worse from playing online games
6. I get headaches from overplaying online games
7. My eyesight has dropped from overplaying online games
8. I have broken appointments because of playing online games
9. Others have told me I spend too much time playing online games
10. My schoolwork or job and other activities have suffered due to playing online games
11. Playing online games is a priority to me
12. Playing online games interferes with completing my obligations
13. When playing online games, I tend to play longer than I originally intended
14 I imagine or fantasize about playing online games when I’m not playing
15 I find myself saying “just a few more minutes” when playing online games
16 I have attempted to reduce or stop playing online games but often fail
17 I tend to spend increasing amounts of time playing online games
18 I feel more intimate with people who I know from online game than people in real life
19 I feel that more people playing online games acknowledge my skills than in real life
20 People I meet in online games are easier to be friendly with than people in real life
APPENDIX C
THE MOTIVATIONS FOR PLAY QUESTIONNAIRE
The Motivations for Play Questionnaire (adapted from Yee, 2006)

While thinking of playing online roleplaying games (i.e. World of Warcraft, Everquest) and using the scale below, please indicate your level of agreement with each item.

<table>
<thead>
<tr>
<th>Not Agree at All</th>
<th>Very Slightly Agree</th>
<th>Slightly Agree</th>
<th>Moderately Agree</th>
<th>Mostly Agree</th>
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<tr>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td>6</td>
<td>7</td>
</tr>
</tbody>
</table>

1. To level up your player as fast as possible?
2. To acquire rare items that most players will never have?
3. To become powerful?
4. To accumulate resources, items, or money?
5. To be well known in the game?
6. To be part of a serious, raid/loot-oriented guild?
7. To know the precise numbers and percentages underlying the games mechanics?
8. That your character is as optimized as possible for their profession/role?
9. You plan out your characters advancement at an early level using a character builder or template?
10. To know as much about the game mechanics and rules as possible?
11. To compete with other players?
12. To purposefully provoke or irritate other players?
13. To dominate/kill other players?
14 To do things that will annoy other players? 1 2 3 4 5 6 7
15 To get to know other players? 1 2 3 4 5 6 7
16 To help other players? 1 2 3 4 5 6 7
17 To chat with other players? 1 2 3 4 5 6 7
18 To part of a friendly, casual guild? 1 2 3 4 5 6 7
19 To have meaningful conversations with other players? 1 2 3 4 5 6 7
20 To be able to talk to your online friends about personal issues? 1 2 3 4 5 6 7
21 To have online friends offer you support when you have real life problems? 1 2 3 4 5 6 7
22 To be able to group with other players? 1 2 3 4 5 6 7
23 To have a character that can solo well? 1 2 3 4 5 6 7
24 To be able to work with others in a group? 1 2 3 4 5 6 7
25 To have a self-sufficient character? 1 2 3 4 5 6 7
26 To explore the world just for the sake of exploring it? 1 2 3 4 5 6 7
27 To find quests, NPCs, or locations that most people do not know about? 1 2 3 4 5 6 7
28 To explore every map or zone in the world? 1 2 3 4 5 6 7
29 To try out new roles and personalities with your characters? 1 2 3 4 5 6 7
30 To be immersed in a fantasy world? 1 2 3 4 5 6 7
31 To make up stories or histories for your character? 1 2 3 4 5 6 7
32 To be able to role-play your character? 1 2 3 4 5 6 7
33 To spend time customizing your character during character creation? 1 2 3 4 5 6 7
<table>
<thead>
<tr>
<th></th>
<th>Question</th>
<th>Scores</th>
</tr>
</thead>
<tbody>
<tr>
<td>34</td>
<td>That your character's armor/outfit match in color, style, or type?</td>
<td>1 2 3 4 5 6 7</td>
</tr>
<tr>
<td>35</td>
<td>That your character looks different from other characters?</td>
<td>1 2 3 4 5 6 7</td>
</tr>
<tr>
<td>36</td>
<td>To play so you can avoid thinking about real life problems or worries?</td>
<td>1 2 3 4 5 6 7</td>
</tr>
<tr>
<td>37</td>
<td>To play in order to relax from the day's work?</td>
<td>1 2 3 4 5 6 7</td>
</tr>
<tr>
<td>38</td>
<td>To escape from the real world?</td>
<td>1 2 3 4 5 6 7</td>
</tr>
</tbody>
</table>

Scoring key:
Achievement: # 1-14
Social: # 15-25
Immersion: # 26-38
APPENDIX D
THE PASSION SCALE
The Passion Scale (adapted from Vallerand, et al., 203)

While thinking of playing online roleplaying games (i.e. World of Warcraft, Everquest) and using the scale below, please indicate your level of agreement with each item.

<table>
<thead>
<tr>
<th>Not Agree at All</th>
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<th>Slightly Agree</th>
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</table>

1. Online gaming is in harmony with the other activities in my life
2. I have difficulties controlling my urge to play online games
3. The new things I discover while playing online games allow me to appreciate it even more
4. I have almost an obsessive feeling for playing online games
5. Online gaming reflects the qualities I like about myself
6. Online gaming allows me to live a variety of experiences
7. Online gaming is the only thing that really excites me
8. Online gaming is well integrated in my life
9. If I could, I would only play online games
10. Online gaming is in harmony with other things that are part of me
11. Online gaming is so exciting that I sometimes lose control over it
12. I have the impression that online gaming controls me
13. I spend a lot of time playing online games
14. I love playing online games
15. Playing online games is important for me
16. Playing online games is a passion for me
Scoring key:
Obsessive Passion: # 2,4,7,9,11,12
Harmonious Passion: # 1,3,5,6,8,10
Passion Criteria: # 13-16
APPENDIX D
IRB APPROVAL
May 11, 2015
Protocol Number: Protocol Title:
Type of Review: IRB Staff Contact:

Dear Dr. Granello,

2014B0095
MASSIVELY MULTIPLAYER ONLINE ROLEPLAYING GAMING: MOTIVATION TO PLAY, PLAYER TYPOLOGIES, AND ADDICTION, Paul Granello, Michael Lewis, Dept. of Educational Studies
Continuing Review – expedited
Jenna Mowls-Hutkowski Phone: 614-688-2208 Email: mowls-hutkowski.1@osu.edu

The Behavioral and Social Sciences IRB APPROVED BY EXPEDITED REVIEW the above referenced research. The Board was able to provide expedited approval under 45 CFR 46.110(b)(1) because the research meets the applicability criteria and one or more categories of research eligible for expedited review, as indicated below.

Date of IRB Approval:
Date of IRB Approval Expiration: Expedited Review Category:
May 10, 2015 May 10, 2016 7

In addition; the research has been reapproved for a waiver of documentation of the consent process.

If applicable, informed consent (and HIPAA research authorization) must be obtained from subjects or their legally authorized representatives and documented prior to research involvement. The IRB-approved consent form and process must be used. Changes in the research (e.g., recruitment procedures, advertisements, enrollment numbers, etc.) or informed consent process must be approved by the IRB before they are implemented (except where necessary to eliminate apparent immediate hazards to subjects).

This approval is valid for one year from the date of IRB review when approval is granted or modifications are required. The approval will no longer be in effect on the date listed above as the IRB expiration date. A Continuing Review application must be approved within this interval to avoid expiration of IRB approval and cessation of all research activities. A final report must be provided to the IRB and all records relating to the research (including signed consent forms) must be retained and available for audit for at least 3 years after the research has ended.

It is the responsibility of all investigators and research staff to promptly report to the IRB any serious, unexpected and related adverse events and potential unanticipated problems involving risks to subjects or others.
This approval is issued under The Ohio State University’s OHRP Federalwide Assurance #00006378. All forms and procedures can be found on the ORRP website – www.orrp.osu.edu. Please feel free to contact the IRB staff contact listed above with any questions or concerns.

Michael Edwards, PhD, Chair
Behavioral and Social Sciences Institutional Review Board