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Personality, Motivation, and Internet Gaming Disorder: Understanding the Addiction

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PERSONALITY, MOTIVATION, AND INTERNET GAMING DISORDER:

UNDERSTANDING THE ADDICTION

by

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ABSTRACT

PERSONALITY, MOTIVATION, AND INTERNET GAMING DISORDER:
UNDERSTANDING THE ADDICTION

Kristy L. Carlisle
Old Dominion University, 2017
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This dissertation examined the relationships among personality traits, motivation for play, and Internet gaming disorder in a diverse sample of Internet gamers, using a group correlational design and path analysis. The researcher sampled participants who self-identify as Internet gamers by posting invitations to participate in the study on Internet forums, as well as by accessing the gaming population at Pokémon Go hotspots. The study used valid and reliable instruments: The Ten-Item Internet Gaming Disorder Test (IGD-10), the abbreviated form of the Big Five Inventory (BFI-10), and the Motivation to Play Online Games Questionnaire (MPOGQ). Data analysis included descriptive statistics related to population demographics and prevalence rates, and multiple regression based on proposed causal relationships in a path analysis model. Prevalence analysis indicated that 4.2% of the population sampled met IGD criteria, with higher prevalence rates among males, students, and people under age 30, indicating potential risk factors for IGD. Findings showed that significant predictors of IGD amongst the variables in the model include male gender, neurotic and introverted personality traits, and motivation related to achievement, socialization, and immersion. A critical analysis of frequency of IGD criteria in the *DSM-5* provided further implications for screening and assessment, with specific implications for female and non-White gamers. Limitations related to self-report data and generalizability, as well as recommendations for future research, are discussed.

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This dissertation is dedicated to the family we made while completing our Ph.Ds.

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CHAPTER 1

INTRODUCTION TO THE STUDY

In this chapter, the researcher introduces the proposed study by providing a background of the problem and the study's purpose. She summarizes the conceptual underpinnings guiding the study. Finally, the researcher briefly describes the design of the proposed study, its research questions, its assumptions, its delimitations, operational definitions, and technological terminology.

Background of the Problem

This dissertation will examine the relationships among personality traits, motivation for play, and Internet gaming disorder (IGD) in a diverse sample of Internet gamers. Gamers will be assessed for IGD, as defined by the *Diagnostic and Statistical Manual (DSM-5)* in Section III, which introduces conditions for further study. Nine diagnostic criteria are proposed in the manual, and several instruments (e.g., The IGD-20, the IGD-10, and the Problematic Online Gaming Questionnaire) have been published to assess IGD. However, future research is needed to conceptualize IGD's etiology in order to develop consistency across assessment instruments and efficacy in the areas of prevention and treatment.

The nine diagnostic criteria proposed in Section III include: (1) preoccupation with Internet gaming; (2) withdrawal symptoms when Internet is taken away; (3) tolerance: the need to spend increasing amounts of time engaged in Internet gaming, (4) unsuccessful attempts to control Internet gaming use; (5) continued excessive Internet use despite knowledge of negative psychosocial problems; (6) loss of interests, previous hobbies, entertainment as a result of, and with the exception of Internet gaming use; (7) use of the Internet gaming to escape or relieve a dysphoric mood; (8) has deceived family members, therapists, or others regarding the amount of

Internet gaming; and (9) has jeopardized or lost a significant relationship, job, or educational or career opportunity because of Internet gaming use. Currently, *DSM-5* suggests that five of the nine diagnostic criteria must be met over a period of 12 months for a credible diagnosis of IGD (APA, 2013a). The most popular form of Internet games, Massively Multiplayer Online Games (MMOGs), such as *World of Warcraft (WoW)* and *Guild Wars 2*, immerse players in a fantastical universe they can control. In Massively Multiplayer Online Role-Playing Games (MMORPGs), players take on virtual personae called avatars and have the opportunity to socialize in guilds and to interact with each other to achieve goals in the game. The social aspect of Internet games has implications for how and why people become addicted to them (Allison, von Wahlde, Shockley, & Gabbard, 2006; Chappell, Eatough, Davies, & Griffiths, 2006; Wan & Chiou, 2006b). Fully understanding the link between personality traits, motivations for play, and addiction could shed light on how to potentially prevent and treat people with problematic Internet game playing behavior. On a global scale, IGD has the potential to impact the lives of people in any country that has Internet access. Prevalence rates vary depending on the population samples, assessment tools used, and diagnostic criteria, and they range from 2% to 50% (e.g., Jeong & Kim, 2010; Yee, 2006a). Potential risk factors and consequences of IGD in the literature focus on psychosocial problems, like absence of real world relationships and activities (e.g., Allison et al., 2006; Griffiths, Davies, & Chappell, 2004), and psychiatric problems, such as depression and suicidal ideations (e.g., Peng & Liu, 2010; Rehbein, Psych, Kleimann, Mediasci, & Mossle, 2010).

Purpose of the Study

The primary purpose of this dissertation is, therefore, two-fold: 1) to understand the link between *personality* and *motivation to play* amongst Internet gaming participants; and 2) to

contribute culturally responsive research to the potential diagnostic criteria for Internet gaming disorder in the *DSM*. Internet gamers are a commonly stereotyped population. Current literature on these populations underrepresents women, people over the age of 30, non-Whites, and non-Asians, in particular. Further, the nine proposed diagnostic criteria for the disorder resemble criteria used to identify gambling disorder, which is now in the substance-related and addictive disorders section of the manual (APA, 2013a). However, these nine criteria lack context specifically related to technology and gaming culture. Essig (2012) proposes that the technology and simulation present in Internet games, as well as the social aspect of the gaming experience, make generic addiction models inadequate for fully explaining a model for Internet gaming addiction. A significant component of this dissertation entails examining the interplay between personality traits and motivation to play, in order to provide context for potential *DSM* diagnostic criteria specific to technology addictions.

This dissertation examined the intricacies of the social and personal motivations for Internet game play, while being responsive to the potential influence of gender, age, ethnicity, and college student status. College student status has been identified as a prime risk factor for technology addiction (Frangos, Frangos, & Kiohos, 2010; Lin, Ko, & Wu, 2011). Potential effects of addiction to Internet gaming, which would affect college students in particular, include decreased academic performance (Jeong & Kim, 2010), truancy (Rehbein et al., 2010), social isolation (Allison, von Wahlde, Shockley, & Gabbard, 2006), depression (Peng & Liu, 2010), and medical concerns like obesity (Melchior, Chollet, Fombone, Surkan, & Dray-Spira, 2014). The current study holds great importance for how educators and academic advisors at the college and secondary level, as well as practitioners, can help ensure student and client success by

informing prevention and treatment options for students with problematic Internet gaming behaviors.

This study provides implications for educators, student advisors, and counselors for working with diverse populations to help them understand the way gender, age, and ethnicity may relate to personality and motivation to play for excessive Internet gamers. Furthermore, this study holds potential to make a significant contribution to the *DSM* diagnostic criteria by providing context related to the social and simulation aspects of the technology of Internet gaming.

Research Design

The study utilized a cross-sectional, non-experimental group correlational design and used path analysis to analyze data. It contributed to the understanding of the etiology of IGD by examining relationships among Internet gaming disorder, personality, motivation to play Internet games, and demographic characteristics (gender, age, ethnicity, and college student status). The research questions that guided the design are as follows:

- RQ1 - To what extent is there a statistically significant relationship between Internet gaming disorder and personality traits?
- RQ2 –To what extent do Internet gamers with certain demographic characteristics (IV) and personality traits (IV) have motivations for playing Internet games (DV)?
- RQ3 - To what extent does motivation to play Internet games (IV) mediate personality traits (IV) for Internet gamers with varying levels of IGD (DV)?
- RQ4 - To what extent do the relationships among IGD (DV), personality traits (IV) and motivation to play Internet games (DV) vary by gender, age, ethnicity/race, and college student status (IVs)?

Three instruments with strong psychometric properties were used to measure IGD, personality traits, and motivation to play Internet games: The Ten-Item Internet Gaming Disorder Test (IGD-10) (Kiraly, Slecza, Pontes, Urban, & Griffiths, 2015a), the abbreviated form of the Big Five Inventory (BFI-10) (Rammstedt & John, 2007), and the Motivation to Play Online Games Questionnaire (MPOGQ) (Yee, Ducheneaut, and Nelson, 2012). A questionnaire gathered demographic information and specific information about participants' Internet use.

Participants were self-identified Internet gamers over the age of 18 and were sampled using a non-probability purposive sampling method. The researcher collected data from multiple sources to get a representative sample, including electronic sources (Facebook, Reddit, Nextdoor, email), and face-to-face sources in the vicinity of the researcher's university (Pokemon Go hotspots). Specifically to recruit diverse participants, the researcher posted invitations to participate on Facebook groups and Reddit blogs designed for Internet gamers across the nation and around the world.

Research questions 1 and 3 were analyzed using multiple and hierarchical regression to predict a hypothesized model of linear relationships amongst personality type, motivation to play, and IGD. Research questions 2 and 4 were analyzed using path analysis to test the significance of predictive relationships among the variables. To obtain the path coefficients (standardized betas), the researcher ran regression analyses with motivation to play and IGD as dependent variables and personality, gender, age, ethnicity and college student status as independent variables.

Assumptions and Delimitations of the Study

The researcher recognized several assumptions of the study, namely related to the self-report nature of the data and the use of the *DSM-5* for assessing IGD. First, the researcher

assumed that participants would each only take the survey one time, and she used the Qualtrics safeguard allowing only one survey submission per computer IP address. Next, she assumed that participants would answer survey questions honestly and based on their actual experiences with Internet games. Working with people with potential issues with addiction, the researcher understood the importance of emphasizing anonymity and confidentiality in the informed consent process. Next, the researcher recognized that the *DSM-5* criteria used to assess IGD in the study is still under development and requires further research, hence its inclusion in Section III of the manual. The researcher assumed that further research may enhance or change the criteria as they are currently written, and studies such as this dissertation will have to use the most up-to-date assessment measures available to reflect developments in the growing fields of process addictions and technology addictions.

Related to these assumptions, the researcher developed certain delimitations of the study in order to define its scope and produce the most valid and reliable results possible. First, the self-report nature of the study and the use of brief instruments allowed for quick and efficient data collection producing a relatively large sample in a short period of time. Specifically, the researcher selected a brief personality assessment tool with good validity and reliability statistics to minimize survey length and maximize potential participation. Further, the data collection is a single collection snap shot of Internet gamers at one point in time, not a longitudinal study, which would have different purposes and broader scope than the current study. The study's correlational design is the most realistic method to reach a large number of participants using random data collection methods. The vast majority of research designs in the literature related to the topics of IGD are also correlational in nature. Finally, to reach the largest number of

participants possible without having to obtain parental consent, the researcher chose to exclude any participant reporting to be age 17 or younger.

Operational Definitions

Because of the specialized nature of the dissertation topic, this chapter will close with general operational definitions, as well as an explanation of technological terms. Internet games in the study will refer to Massively Multiplayer Online Games (MMOGs), games in which players engage with other plays in an online forum. The term virtual experience is defined as any human-to-human interaction occurring over the Internet, and the term real world experience is defined as any human-to-human interaction occurring outside the Internet. Internet gaming disorder (IGD), problematic Internet gaming, or excessive Internet gaming will refer to gaming that meets at least five of the nine diagnostic criteria in Section III of the *DSM-5*. Technological terminology is also required to understand the forthcoming literature review and dissertation findings.

Technological Terminology

The first Internet games emerged in the 1970s, they reached their modern form in the 1990s, and they gained significant notoriety in the early 2000s (Downy, 2014). Downy and other authors, including Bartle (2004), Bell (2008), Sanchez (2009), and Spence (2008), refer to Internet games as “virtual worlds,” because they are large virtual spaces in which people interact to achieve goals of a particular game or engage in socialization. Bell (2008) defines a virtual world as “A synchronous, persistent network of people, represented as avatars, facilitated by networked computers” (p. 2). The author explains that “synchronous” refers to the way large-scale activities occur in real time. There is also a real life feel to the environment, since virtual worlds provide participants awareness of space, distance, and the presence of other participants.

When the author uses the term “persistent,” he means the virtual world cannot be paused. Participants are a part of a continuous system that functions before the participant enters the world and remains functioning after the participant leaves. The phrase “network of people” describes the fundamental interaction amongst participants and the environment. Participants can form social groups or interact with the environment in isolation, but every participant’s choices and actions ripple through the world and affect the environment and other participants. “Avatars” are virtual representations of participants that can perform actions in the virtual world and are controlled by human agents in real time. The author compares avatars to virtual puppets. A participant commands the action, and the avatar performs it in the virtual world. Finally, the use of “networked computers” allows participants to communicate instantaneously regardless of geographic location. In addition, the network manages and stores enormous amounts of data and allows the scale of the virtual worlds to be infinite.

Other common terms related to Internet games include Massively Multiplayer Online (MMO), Massively Multiplayer Online Games (MMOGs), Massively Multiplayer Online Role-Playing Games (MMORPGs), simulation games, and multi-user virtual environments (MUVEs). MMO is a generic term for virtual worlds. MMOG is a type of MMO oriented toward gaming. MMORPG is, in turn, a type of MMOG oriented toward role-playing games (Downy, 2014). Simulation games situate players in an alternate reality where players can perform real world actions in a separate virtual world (Kuss & Griffiths, 2012a; Young, 2009). Finally, MUVE is a term describing virtual worlds designed for socialization, as opposed to gaming (Downy, 2014). Still, socialization is an important component in Internet games, and cooperation in guilds, or teams, is often required to achieve in the game (Young, 2009). The social aspect of Internet games has implications for how and why people become addicted to them. Fully understanding

the link between personality traits, motivations for play, and addiction could shed light on how to potentially prevent and treat people with problematic Internet game playing behavior.

CHAPTER 2

LITERATURE REVIEW

In this chapter, the researcher defines Internet gaming disorder (IGD), its social components, and its place in the fifth edition of the *Diagnostic and Statistical Manual of Mental Disorders (DSM-5)*. The researcher presents a theoretical framework, which situates IGD as a behavioral, or process, addiction and explores models of addiction that explain its unique characteristics as an addiction related to technology. The researcher includes critical commentary on studies that have sought to report on personality type and motivation to play Internet games.

Prevalence

The popularity of Internet games is massive worldwide. Estimates of how many people play Internet games today varies considerably, but most sources agree hundreds of thousands of people play daily (Kuss & Griffiths, 2012a), and some estimates suggest that as many as 1.78 billion have participated in some form of gaming (Statista, 2014). The most wildly successful MMOG in history has been *World of Warcraft (WoW)* (Downy, 2014). While other games of its time, like EverQuest and Ultima Online, reached 300,000 and 230,000 users respectively at their peaks, *WoW* reached 240,000 on the night it was released in November 2004, breaking MMOG world records (Van Atrijve, 2004), and peaked at 11 million (Blizzard, 2008). In the 2015 MMO Market Report, the entire MMO category reported an anticipated \$11 billion revenue, with over \$4 billion coming from Asia, over \$3 billion coming from Europe, over \$2 billion coming from North America, and over \$1 billion coming from Africa and South America combined (Superdata, 2015).

On a global scale, IGD has the potential to impact the lives of people in any country that has Internet access. However, prevalence rates for problematic Internet gaming vary in the

studies reviewed based on population, criteria, and assessment tools. In fact, over 20 different instruments assessing for IGD have been noted in the literature when prevalence is being reported (Griffiths, 2016). King, Haagsma, Delfabbro, Gradisar, and Griffiths (2013) reviewed 18 of these instruments and found discrepancies amongst indicators of addiction, poor information on cutoff scores, and lack of interrater reliability and predictive validity. This lack of consistency makes it hard to pinpoint even a meaningful range relative to prevalence of IGD. The following studies demonstrate this inconsistency. A study of German adolescents ($N = 11,003$) using criteria adapted from the *DSM-5* reported a prevalence rate of 1.16% for IGD (Rehbein, Kliem, Baier, Mößle, & Petry, 2015). A Dutch study using the Compulsive Internet Use Scale (CIUS) and studying two samples ($N = 1,572$, $N = 1,476$) of adolescent online gamers age 13-16 showed that 3% of participants reported addiction-like problems including withdrawal, loss of control, salience, conflict, and coping for mood modification (van Rooij, Schoenmakers, Vermulst, van den Eijnden, & Van De Mheen, 2011). Similarly, in a South Korean study of students between 12 and 18 years of age ($N = 600$), 2.2% of participants met criteria for addiction according to Young's Internet Addiction Test (IAT) (Jeong & Kim, 2010). Rehbein et al. (2010) surveyed German ninth graders ($N = 44,610$) with a video game dependency scale based on the IAT to find that 3% of male and 0.3% of female students would be diagnosed as addicted to video games. In an Australian study of high school and college students ($N = 2,031$), 5% of participants met criteria for addiction to computer games and the Internet respectively, according to *DSM-IV-TR* criteria for pathological gambling (Thomas & Martin, 2010). In an international study of adolescent and adult gamers ($N = 1,945$), researchers used *DSM-IV* criteria for substance dependence to determine that 8% of participants met criteria for problematic gaming (Porter, Starcevic, Berle, & Fenech, 2010). The 8% reported having fewer friends in the

real world than non-problematic gamers and considered it easier to meet people online than in the real world. A German study sampled young adult Internet gamers with a mean age of 21 years ($N = 7,069$) and found that 11.9% of participants met criteria for addiction (Grüsser, Thalemann, & Griffiths, 2007). In a similar vein, researchers reported that 12% of MMORPG players prefer to socialize in virtual realms than in real-world realms (Ng & Wiemer-Hastings, 2005). Yee (2006a) reports that 50% of MMORPG players ($N = 30,000$), ranging in age from 11-68, consider themselves to be addicted. Although he did not perform a clinical assessment of IGD on the participants, the author reported the statistic to illustrate the emotional investment users have in the games, as well as the high level of appeal of the games. The above studies utilized different assessment instruments, criteria, and populations; however, the findings indicate the potential of a significant problem across generations and nationalities of Internet gamers with real world consequences.

Social Aspect of Internet Gaming

The social experience of Internet gamers has been explored in multiple studies in recent years and specific findings have been reported regarding the unique social experience of Internet gamers with signs of IGD. In a qualitative case study of an 18-year-old male excessive MMORPG player, researchers conducted psychiatric interviews to show that IGD is associated with devotion of time to the activity, i.e., as much as 16 hours daily, avoiding sleep, and absence of real-world social interaction. The researchers reported that the participant, in this case study, created an ideal virtual identity to compensate for the inadequacy he felt in the real world (Allison et al., 2006). Similarly, in another qualitative study, Wan & Chiou (2006b) interviewed 10 adolescents meeting IGD criteria to find that online gaming fulfills social and personal needs left unmet in the real world. More specifically, the researchers found that the virtual experience

of these gamers was used to compensate for the desire for social interaction in the real world, making the virtual world their prime focus. Chappell et al. (2006) emphasized the similarities between the symptoms of gamers addicted to, or previously addicted to, the MMORPG Everquest and the symptoms associated with *DSM-IV-TR* substance dependence, including salience, withdrawal, cravings, relapse, and interpersonal conflict. As a result of research findings, which identify online gamers' social experience as a unique factor of IGD and IGD-related symptoms, further research could capture how the social nature of the games contributes to motivation to play (Jansz & Martens, 2005; Jansz & Tanis, 2007; Yee, 2006b). Specifically, researchers suggest that the social aspect of the game is an integral part of gamers' motivations to play and may be relevant to identifying addiction (Leung, 2007; Young, 2009).

It is essential for researchers to understand the social nature of Internet gaming in order to describe the full impact IGD can have on gamers' behavior (Trepte, Reinecke, & Juechems, 2012; Yee, 2006b; Young, 2009). Authors indicate that Internet games have become a component of modern culture used to fulfill basic human needs for socialization and interpersonal interaction:

For clients, the culture of the Internet has had an immediate and powerful impact on two critical components of human relationships: communication and socialization... [and] being lonely and alone has always been the bane of culture and the quintessential struggle during therapy (Didelot, Hollingsworth, & Buckenmeyer, 2012, p.21).

Researchers are already recognizing that gamers build meaningful relationships within their virtual worlds to compensate for loneliness and inadequacy in the real world (Allison et al., 2006; Wan & Chiou, 2006b). Thus, some criteria used to assess for IGD, such as loss of interpersonal relationships (APA, 2013a), may not fully capture the experience of people, such as

online gamers. For instance, gamers who play MMORPGs build meaningful social relationships and become members of gaming guilds that can act as social support systems (Young, 2009). Researchers propose that elucidating the motivations to play Internet games with correlations to personality type may help to explain why gamers with certain personality features engage in gaming excessively (Graham & Gosling, 2013; Jeng & Teng, 2008; Park, Song, & Teng, 2011).

Demographic Risk Factors

When consequences of IGD are so potentially damaging, considering risk factors is an important part of prevention and treatment research. Several demographic risk factors are documented in the literature on IGD, but other groups are underrepresented. First, being male has been shown to be a risk factor for IGD (Batthyány, Müller, Benker, & Wölfling, 2009), but less research has been conducted on female gamers, and most studies report a much higher percentage of male participants (e.g., Fuster, et al., 2012). Still, recent studies have reported that there is a rising trend of female gamers (Kuss & Griffiths, 2012b), specifically female gamers over the age of 50 (ESA, 2014). Next, living in an Asian country is reported as a risk factor for Internet-related addiction (Lin et al., 2011). However, much of the research on IGD has been conducted in Asian countries, and more research should be conducted in the United States to determine risk factors specific to this culture (Kuss & Griffiths, 2012a). Finally, college students have been shown to be more highly susceptible to Internet-related addictions (Frangos et al., 2010; Lin et al., 2011). Ultimately, IGD has the potential to affect any population with Internet access, and risk factors go well beyond demographic factors to include psychological and psychosocial factors (Dowling & Brown, 2010). The American Psychiatric Association recognizes the potential problem of IGD and has called for further research on the disorder by placing it in Section III of the most updated edition of the *DSM* (APA, 2013a).

Internet Gaming Disorder in the DSM-5

In the *DSM-5* released in 2013, “Emerging Measures and Models” appear in Section III of the manual. These promising areas require further research until they can be considered for inclusion in the manual’s main section (APA, 2013c). In previous DSM editions, this material was placed in the appendices; however, the American Psychiatric Association has reserved a separate section in the manual in the hopes that clinicians will have a greater awareness of the criteria within it. IGD is one of eight conditions listed for further research in Section III. Each condition presents suggested diagnostic criteria, as well as information including diagnostic features, prevalence, risk factors, functional consequences, differential diagnosis, and comorbidity. The nine diagnostic criteria for IGD proposed in Section III include: (1) preoccupation with Internet gaming; (2) withdrawal symptoms when Internet is taken away; (3) tolerance: the need to spend increasing amounts of time engaged in Internet gaming, (4) unsuccessful attempts to control Internet gaming use; (5) continued excessive Internet use despite knowledge of negative psychosocial problems; (6) loss of interests, previous hobbies, entertainment as a result of, and with the exception of Internet gaming use; (7) use of the Internet gaming to escape or relieve a dysphoric mood; (8) has deceived family members, therapists, or others regarding the amount of Internet gaming; and (9) has jeopardized or lost a significant relationship, job, or educational or career opportunity because of Internet gaming. Five of these nine criteria must be observed over 12 months for a diagnosis of IGD (APA, 2013a).

The inclusion of nine proposed criteria for IGD in Section III of the *DSM-5* marks a pivotal change in the addictions field. Studies assessing for IGD can use this updated diagnosis as of the 2013 release of the new manual (APA, 2013a). Thus, it is important to note that the proposed dissertation will be unique among studies that assess for IGD and personality traits,

since it will use an instrument that reflects the *DSM-5* IGD diagnosis. The researcher also recognizes the importance of additionally assessing for motivation to play Internet games, in order to better understand the difference between people who play for purposes of social belonging and achievement and those who play to escape from negative feelings about the real world. This interplay between personality and motivation to play Internet games has only been examined in four studies. Again, the proposed dissertation will be unique amongst these four studies as the only one to use a validated personality test, a full version of a validated test of motivation to play Internet games, and an instrument reflective of the *DSM-5* criteria for IGD. A critical review of the literature will elaborate on how the proposed study contributes to the field in a unique and more complete way than previous studies. First, it is valuable to understand potential issues with the nine proposed criteria as they are currently written.

Issues with Internet Gaming Disorder Criteria

Researchers hope that the publication of nine diagnostic criteria in Section III of the *DSM-5* will lead to more consistent evidence-based studies to inform prevention, diagnosis, and treatment of IGD (Dowling, 2014; Kuss & Griffiths, 2012a). However, IGD's inclusion in the section engenders controversy in the helping and addictions fields. The nine criteria for the potential disorder, as they are currently worded, do not adequately distinguish IGD from a more general addiction to the Internet (Kuss, Griffiths, Karila, & Bilieux, 2014). Carlisle, Carlisle, Polychronopoulous, Goodman-Scott, & Kirk-Jenkins (2016) explain that the Internet is a broad forum where users can engage in many reinforcing activities, not just gaming. Other activities for which the Internet is the medium include Internet gambling addiction (Lee, Choi, Shin, Lee, Jung, & Kwon, 2012), sex addiction facilitated by the Internet (Jones & Hertlein, 2012), Internet addiction associated with online auctions (Tonioni et al., 2012), and social media and shopping

(Murali & Onuba, 2009). Carlisle et al. (2016) suggest that Internet addiction may be useful as an umbrella diagnosis (Luo, Brennan, & Wittenauer, 2015) to help explain comorbid addictions to the specific activities.

Many researchers are calling for refinement of the IGD criteria as they are currently written (Dowling, 2014; Tao, et al., 2012). Specifically, Tao et al. suggest that some of the criteria are not accurate and some may be more central to the diagnosis of IGD than others. King and Delfabbro (2014b) believe that the preoccupation criterion should emphasize the kinds of cognitions gamers experience, not how often they experience them. Tolerance and withdrawal criteria may not be measurable in the same way for a process addiction as it is for a substance addiction because there is no physiological input from a behavior (van Rooij & Prause, 2014). Ko (2014) suggests that tolerance for IGD may be measurable based on the decreased satisfaction gamers experience instead of the need to game more. Specific to withdrawal, researchers explain that withdrawal to IGD is not the unpleasant feelings experienced by gamers when they are suddenly forced to stop gaming, such as the anger a child might feel when a parent forces her to stop gaming. Instead, it is the symptoms, i.e., irritability, anxiety, or sadness, experienced from one hour up to two weeks after gaming has ceased (Kiraly, Griffiths, & Demitrovics, 2015). Other debated criteria include criterion 7, escape, and criterion 8, deception. Derived from *DSM-IV* criteria for pathological gambling and substance dependence, these criteria may not be accurate for IGD, as they show low frequency amongst problematic gamers (Ko, Yen, Chen, Wang, Chen, & Yen, 2014).

Finally, authors suggest that the criteria are confusing because they are conceptually too similar to criteria for gambling and substance use disorders (Petry et al., 2014) and because the disorder is often comorbid with such a wide variety of other disorders (Dowling & Brown,

2010). Disorders most commonly comorbid with IGD include depression, anxiety, panic disorder, social phobia (Allison et al., 2006), ADHD (Batthyány et al., 2009), and substance addiction (Ko, Yen, Yen, Chen, & Chen, 2012). Thus, it is difficult to conclude how IGD is associated with these issues. For example, it could be difficult to determine if IGD is being used as a coping mechanism for a condition like anxiety or if the IGD is an exacerbating factor for the anxiety. Carlisle et al. (2016) suggest that future research should be conducted to determine how people with IGD may be using Internet gaming to cope with symptoms of other mental health concerns, similarly to how people with substance addiction use the substance to cope with symptoms from other mental health concerns. Thus, the following section will address potential consequences of IGD with the understanding that the issues may be pre-existing or simply comorbid with the IGD. The documentation of these damaging issues associated with the overuse of Internet games merits research into how and why gamers are drawn into the world of Internet gaming. Personality traits and motivations to play may be factors that explain how and why gaming becomes problematic for some people.

Potential Consequences of Internet Gaming Disorder

Despite some issues with the appropriateness of the nine criteria proposed in Section III, the literature exposes many of the potential consequences of problematic Internet gaming. Several of these consequences are related to socialization and psychosocial issues. In a study on problematic gaming prevalence, problematic gamers reported having fewer friends in the real world than non-problematic gamers and considered it easier to meet people online than in the real world (Porter et al., 2010). Similarly, researchers reported that 12% of MMORPG players prefer to socialize in virtual realms than in real-world realms (Ng & Wiemer-Hastings, 2005). In

a pilot study, Carlisle & Carrington (2015) found that gamers could experience disruption to interpersonal relationships, lack of closeness, and feelings of social inadequacy.

Other findings on psychosocial and psychiatric issues also indicate potential significant problems for Internet gamers. Psychosocial and psychiatric distress are highlighted in the literature on IGD, including the absence of real world relationships (Allison, et al., 2006), aggression and hostility (Chan & Rabinowitz, 2006), decreased academic achievement (Jeong & Kim, 2010; Rehbein et al., 2010), and sacrificing real world activities in favor of virtual activities (Griffiths et al., 2004; Rehbein et al., 2010). Other studies demonstrate the relationship between IGD and psychiatric symptomatology, including depression (Peng & Liu, 2010; van Rooij et al., 2011; Yen, Ko, Yen, Chang, & Cheng, 2009), anxiety (Allison et al., 2006), loneliness (Lemmens, Valkenburg, & Peter, 2010), and suicidal ideations (Rehbein et al., 2010). Similarly to substance addiction, IGD has the potential to damage people personally, socially, and psychologically (Kuss, Shorter, van Rooij, van de Mheen, & Griffiths, 2014). However, Internet gaming is not a substance; it is a behavior; hence its identification as a process addiction. The following sections conceptualize IGD as a process addiction, emphasizing its unique characteristics related to technology.

Internet Gaming Disorder as a Process Addiction

IGD is identified as a behavioral, or process, addiction (Demetrovics & Griffiths, 2012; Grant, Potenza, Weinstein, & Gorelick, 2011), marked by compulsive-like behaviors associated with cravings, urges, and disruption of social and occupational functioning (APA, 2013a). Essentially, the pleasure of the behavior hijacks the brain's reward system, similarly to addictive substances, and alters cognitive functioning (Smith, 2012). The focus on process addictions is the behavior, not the substance, but the cycle of addiction in which the user engages is the same.

(Donovan & Marlatt, 1988). Behaviors speculated to be addictive in nature include gambling, Internet use, Internet gaming, sex, and exercise (Sussman, Lisha, & Griffiths, 2011), and non-suicidal self-injury (APA, 2013a; 2013b). Of these process addictions, only gambling disorder is included in the *DSM-5*, leaving IGD and non-suicidal self-injury in Section III for further research to support their categorization as addictive disorders (APA, 2013b). Further research into the emerging conditions presented in Section III, or previously Appendix B in the *DSM-IV-TR*, informs future editions of the *DSM*. Emerging conditions in Appendix B of the *DSM-IV-TR* that have become diagnosable mental health disorders in the *DSM-5* include premenstrual dysphoric disorder and caffeine withdrawal. It is expected that emerging conditions in Section III of the *DSM-5* will undergo the same evaluation required for consideration in the next *DSM* edition (APA, 2013c). Because process addictions resemble substance-related disorders in phenomenology, tolerance, comorbidity, genetic components, neurobiology, and treatment (Alavi et al., 2012; Grant et al., 2011; Potenza, 2014), there may be evidence to support their inclusion in the substance-related and addictive disorders section of the next edition of the *DSM*.

The Components Model of Addiction

Griffiths (2005) proposes a components model of addiction, which asserts that process addictions and substance addictions have common core components including salience, mood modification, tolerance, withdrawal, conflict, and relapse. In this model, addiction is the outcome of the interplay between key biopsychosocial factors: genetic predisposition; psychological makeup to include personality, motivations, attitudes, expectations and beliefs; the social environment; and the nature of the activity itself. Kuss et al. (2014) found that the addiction components model comprehensively conceptualizes addictions related specifically to the Internet. The nine criteria proposed for IGD in the *DSM-5* mirror the factors in the components

model of addiction (APA, 2013a). Understanding the interconnectedness of the components model's factors and then dissecting them could lead to implications for the perception, prevention, and treatment of process addictions. Dissecting psychological makeup, particularly personality traits and motivations, of specific process addictions like IGD could point to a body of risk factors associated with that specific behavioral addiction.

The concept of an “addictive personality” type has been long hypothesized (e.g., Nakken, 2013) and never empirically supported. However, certain personality factors have been associated with process addictions and with IGD, in particular, namely impulsivity and compulsivity, traits commonly associated with theories of addiction (Brewer & Potenza, 2008). Impulsivity may supercharge the addictive process, as immediate gratification reinforces the behavior. Compulsivity to continue engaging in the behavior may add fuel to the addiction fire by keeping cravings under control. However, process addictions associated with the Internet, like IGD, require a modified theory of addiction in order to fully understand them, since the technology takes the experience and stimulation to a new level (Essig, 2012).

Addiction and Technology

Essig's theory proposes that people with IGD may experience addiction differently than people with other process addictions or with substance addiction. This author asserts:

Because new experiential possibilities will inevitably include new pathologies, we should be open to updating our clinical concepts to fit this emerging world rather than assuming current concepts will be sufficient to explain new experiences and behaviors, and new problems. (pp. 1176)

The unique experience of addiction with a technological component could mean that certain personality types and motivations may predispose people to Internet addictive behaviors that are beyond the traditional impulsive/compulsive traits associated with addiction theory.

Essig explains “simulation entrapment,” a condition in which players can no longer distinguish between virtual and real-world realities and identities. Addiction to Internet games takes place in a virtual space that is distinct from the real world. In this simulated environment, gamers can experience anything they could possibly experience in the real world, but without the richness of the actual real world experience. People with IGD may experience “simulation entrapment,” and may think or believe that their virtual experiences are providing them with the experiences only real life could, in fact, offer. For example, gamers with IGD may neglect to go to class or go to sleep because they believe that they have been experiencing a character-building adventure in the game *World of Warcraft (WoW)*. Thus, they may feel compelled to play the game because that is where they believe their life is happening. In this way, Internet gaming could be viewed as a “failed solution” to people’s quest for life’s experiences or to people’s avoidance of real world social interaction.

The technology and simulation present in Internet games, as well as the social aspect of the gaming experience, make IGD a unique kind of process addiction (Essig, 2012). Gamers can create a fantasy world and control it. The level of simulation is such that, in most games, anything they can do in the real world is theoretically possible to do in the virtual world of the game. Gamers can design and give life to an avatar and decide how he or she behaves in the game and interacts with others. It is essential to understand how these aspects of Internet gaming contribute to how and why gamers become addicted. Understanding gamers’ motivations to play, especially related to their personality types, is vital to accurately representing diagnostic criteria

and informing prevention and treatment. The unique experience of addiction with a technological component could be related to certain personality types and motivations to play that may predispose individuals to Internet addictive behaviors beyond the traditional impulsive/compulsive traits associated with current addiction theory.

Finally, different people play Internet games for different reasons. Treating gamers as a monolithic group has been shown to be a narrow-minded approach (Yee, 2006b). Yee (2006b) and others, including Griffiths, Davies, and Chappell (2003, 2004), report that certain demographic characteristics may be useful for predicting disordered gaming behaviors, as well as predicting why gamers play (Teng, 2008). Further, gamers with certain personality traits could show common motivations for Internet game play. Furthermore, they could show common underlying reasons why they chose Internet gaming as their “failed solution” to their search for life experience. By finding the relationships between personality traits and motivation amongst excessive Internet gamers, researchers may be able to group risk factors for more effective prevention and treatment.

Critical Review of Personality Studies and Internet Gaming Disorder

Personality traits of Internet gamers have been researched as risk factors for IGD in at least 21 studies (e.g., Allison et al., 2006; Caplan, Williams, & Yee, 2009; Charlton & Danforth 2007; Chiu, Lee, & Huang, 2004; Cole & Hooley, 2013; Graham & Gosling, 2013; Jeong & Kim, 2011; Kim, Namkoong, Ku, & Kim, 2008; Ko, Yen, Chen, Chen, & Yen, 2005; Lehenbauer-Baum & Fohringe, 2015; Mehroof & Griffiths, 2010; Montag, Flierl, Markett, Walter, Jurkiewicz, & Reuter, 2011; Müller, Beutel, Egloff, & Wolfling, 2014; Jowon, & Guiohk, 2012; Park et al., 2011; Parker, Taylor, Eastabrook, Schell, Wood, 2008; Peters & Malesky, 2008; Porter et al., 2010; Wang, Ho, Chan, & Tse, 2015; Wei-na et al., 2014; Yao et

al., 2015). Most of the studies use quantitative designs and validated personality tests, including the Minnesota Multiphasic Personality Inventory (Butcher, Dahlstrom, Graham, Tellegen, & Kaemmer, 1989), the NEO Personality Inventory (Costa & McCrae, 1985), the BFI-10 (Rammstedt & John, 2007), and the Rosenberg Self-Esteem Scale (Rosenberg, 1965). The studies address a variety of topics and implications, but findings point to three areas of personality: neuroticism versus stability, impulsivity versus control, and introversion versus extraversion. Studies show congruent findings when reporting on neuroticism and impulsivity; however, studies that examine the introversion/extraversion components of personality report inconsistent findings.

Multiple studies showed links between IGD and neurotic traits, including avoidant interpersonal tendencies (Allison et al., 2006), low self-esteem (Ko et al., 2005), neuroticism (Mehroof & Griffiths, 2010; Peters & Malesky, 2008), state and trait anxiety (Mehroof & Griffiths, 2010), and low self-efficacy in the real world as opposed to high self-efficacy in the virtual work (Jeong & Kim, 2010). Following this logic, gamers who showed personality traits such as stability had decreased risk for addiction to the Internet (Vermulst & Gerris, 2009). Next, when personality and impulsivity were examined, researchers found traits of social inhibition (Porter et al., 2010), aggression and hostility (Caplan et al., 2009; Kim et al., 2008; Mehroof & Griffiths, 2010), diminished self-control, and narcissism (Kim et al., 2008). Finally, studies that examined introversion and extraversion had conflicting results. While Caplan et al. (2009) found that IGD is associated with loneliness and introversion, Park et al. (2011) found that gamers with IGD show extraversion traits, especially when they are motivated by adventure and escape in the game. By showing the interaction between personality and motivation to play, findings by Park et al. (2011) may have implications for understanding how different gamers play games for

different reasons. A large-scale study using validated instruments for assessing IGD, personality, and motivation to play could contribute to a fuller understanding of the interplay between personality traits and what motivates problematic gamers to engage in play. Specifically, such a study could show how gamers with introverted or extraverted personality traits have different motivations for their gaming behavior, thus informing prevention, screening, and treatment.

Overall, studies had multiple weaknesses regarding measurement of IGD, including using *DSM-IV-TR* criteria for assessing IGD, using unsupported concepts of addiction, or failing to assess for IGD at all. All of the studies on personality traits and IGD used assessment tools for IGD based on *DSM-IV-TR* criteria for pathological gambling or substance dependence, or based on their own concepts of the addiction, and none used the nine criteria for IGD published in Section III of the *DSM-5*. Using an instrument that most closely conceptualizes the most up-to-date understanding of addictive disorders is most useful for determining how an addiction model applies to IGD. Therefore, a study on IGD, which would use a validated assessment tool developed from the nine criteria for IGD in Section III of the manual, i.e., The IGD-20 (Pontes, Kiraly, Demetrovics, & Griffiths, 2014) or the IGD-10 (Kiraly et al., 2015a), could update understanding of IGD as a PA with potential to join gambling disorder in the substance-related and addictive disorders section of the *DSM-5*.

Critical Review of Motivation Studies and Internet Gaming Disorder

Motivation for playing Internet games has been researched in at least 42 studies (e.g., Beard & Wickham, 2016; Beranuy, Carbonell, & Griffiths, 2013; Billieux et al., 2013; Blinka & Mikuška, 2014; Bowman, Schultheiss, & Schumann, 2012; Caplan et al., 2009; Carlisle & Carrington, 2015; Chang & Lin, 2014; Chiao-ling, Shu Ching, & An-Sing, 2015; Cole & Hooley, 2013; Dindar & Akbulut, 2015; Dauriat, et al., 2011; Fuster, Chamarro, Carbonell, & Vallerand,

2014; Graham & Gosling, 2013; Grüsser, Thalemann, Albrecht, & Thalemann, 2005; Hellström, Nilsson, Leppert, & Åslund, 2012; Hoffman & Nadelson, 2010; Hsu, Wen, & Wu, 2009; Hussain & Griffiths 2009; Hussain, Williams, & Griffiths 2015; Jeng & Teng, 2008; Kardefelt-Winther 2014a; 2014b; Kim, Kim, & Oh, 2014; King & Delfabbro, 2009a; 2009b; King, Delfabbro, & Griffiths, 2011; Király et al., 2015b; Kirby, Jones, & Copello, 2014; Kneer & Rieger, 2015; Kowert & Oldmeadow, 2015; Kuss, Louws, & Wiers, 2012; Hsi-Peng & Shu-ming, 2008; Park et al., 2011; Ng & Wiemer-Hanstings 2005; Wan & Chiou 2006a, 2006b; 2007; Wang, Liu, Chye, & Chatzisarantis, 2011; Yang & Huang, 2013; Yee, 2006b; Zhong & Yao, 2013). Common motivational risk factors revealed in these studies include achievement, socialization, negatively coping with real world feelings or situations, and immersion in fantasy. Analysis of these risk factors shows that they sometimes conflict and may be complicated by the social nature of Internet games.

Three main areas of motivation for Internet gaming appear in the literature: achievement, socialization, and escape from the real world. Achievement, often for the purposes of empowerment, mastery, control, recognition, completion, excitement, challenge (Carlisle & Carrington; Jeng & Teng, 2008; King & Delfabbro 2009b; King et al. 2011; Park et al., 2011; Wan and Chiou 2006b; Yee, 2006b), and reward (Hsu et al. 2009; King et al. 2011), is a common motivational factor found in the research. In addition, several studies show that gamers are motivated to socially engage in the games by building virtual friendships (Beranuy et al., 2013; Caplan et al., 2009; Carlisle & Carrington, 2015; Hsu et al., 2009; King & Delfabbro, 2009a; Park et al., 2011; Ng & Wiemer-Hastings, 2005; Yee, 2006b), experiencing belonging (Hsu et al., 2009), and experiencing teamwork (Jeng & Teng, 2008). However, some of the same and other studies indicate a relationship between IGD and escape from negative emotions, stress,

fear, and social inadequacy (Carlisle & Carrington, 2015; Hussain & Griffiths, 2009; Jeng & Teng, 2008; Kardefelt-Winther 2014a; King & Delfabbro, 2009a; Ng & Wiemer-Hastings, 2005; Park et al., 2011; Wan & Chiou, 2006a, 2006b), as well as dissociation (Beranuy et al., 2013) and pursuit of immersion in the fantasy of the game (Caplan et al, 2009; Carlisle & Carrington, 2015; Jeng & Teng, 2008; Yee, 2006b). Further investigation into the motivations for excessive Internet game play is required for understanding the difference between using Internet gaming as a compulsive behavior that provides senses of belonging and achievement or as a coping strategy for the purposes of escape from the real world.

Although many of the studies reporting on motivation to play amongst Internet gamers have well-presented methodologies and use valid, reliable instrumentation to measure motivation, they do not report on the interplay between motivation to play Internet games and personality traits gamers may present. This interplay is critical for understanding why gamers with certain personality features are motivated to play games to excess. Some studies measure motivation with other traits, such as self-worth (Beard & Wickham, 2016) or anxiety (Kardefelt-Winther 2014b), but fundamental Big Five personality traits may be applicable to a broader population of gamers (Yee et al., 2012).

The Interplay between Personality and Motivation

Of the studies presented, few reported on the interplay between personality traits and motivation to play Internet games (Cole & Hooley, 2013; Graham & Gosling, 2013; Jeng & Teng, 2008; Park et al., 2011). These studies tended to have several apparent weaknesses, including failing to use validated instruments, sampling limited populations, e.g., gamers from only one MMO game or gamers from homogeneous demographic groups, and failing to assess for IGD.

By failing to use validated instruments to measure variables or by modifying instruments beyond their intended purposes, several studies fall short of accurately reporting on the interplay between personality and motivation amongst Internet gamers. Jeng and Teng (2008) only used five of the ten motivations for playing Internet games proposed by Yee's (2006b) validated instrument. By omitting mechanics, competition, socializing, relationships, and customization, the authors lost the opportunity to study main components shown to be associated with Internet gaming, namely the social nature of the activity, the potential for winning, and control over the environment. Park et al. (2011) did not use a validated assessment tool for motivation to play, and they relied on interviews to extract themes related to motivation. Similarly, Cole & Hooley (2010) did not use any validated instrumentation to measure motivation to play. A study using a validated personality test and a full version of a validated assessment for motivation to play Internet games would provide more reliable and comprehensive findings related to the interplay between personality traits and motivation to play Internet games.

Graham & Gossling (2013) modified Yee et al.'s (2012) instrument for assessing motivation to play, in order to focus on one particular game. Sampling a population of Internet gamers from a variety of games could produce results more generalizable to the larger gaming population. Both Jeng & Teng (2008) and Park et al. (2011) were studies conducted in Asian countries and sampled Taiwanese and Korean college students, respectively, between the ages of 17 and 28. A study with a more diverse sample related to age and ethnicity could provide more culturally inclusive implications for the gaming population. By understanding the relationships between personality traits and motivation amongst a culturally diverse sample of Internet gamers, researchers may be able to specify risk factors for the development of culturally responsive prevention strategies, diagnosis, and treatment.

Finally, three of the four studies (Graham & Gosling, 2013; Jeng & Teng, 2008; Park et al., 2011) failed to assess for IGD in the populations surveyed, and the fourth (Cole & Hooley, 2010) used an instrument inconsistent with current *DSM-5* criteria. Thus, a study clearly assessing for IGD in the population would pinpoint personality traits and motivational factors associated with problematic Internet game play and provide clearer implications for etiology, prevention, and treatment of the disorder as it is outlined in the *DSM-5*. The researcher proposes a path analysis research design to create a proposed model of relationships amongst IGD, personality, motivation to play, and demographics, using validated instrumentation and sampling a diverse population of Internet gamers.

CHAPTER 3

METHODOLOGY

In this chapter the researcher describes the methodological design of the study on Internet gaming disorder (IGD), personality, and motivation to play Internet games. First, she explains the purpose and research questions, which guide the study. Next, she briefly describes the quantitative research design of the study and its path analysis model. The researcher details information on instrumentation, participants, and data collection.

Purpose and Research Questions

The purpose of the study was to contribute to the understanding of the etiology of IGD by examining relationships among Internet gaming disorder, personality, motivation to play Internet games, and demographic characteristics (age, gender, ethnicity, and student status). The research questions that guided the study were as follows:

- RQ₁ - To what extent is there a statistically significant relationship between Internet gaming disorder and personality traits?
- RQ₂ - To what extent do Internet gamers with certain demographic characteristics (IV) and personality traits (IV) have motivations for playing Internet games (DV)?
- RQ₃ - To what extent does motivation to play Internet games (IV) mediate personality traits (IV) for Internet gamers with varying levels of IGD (DV)?
- RQ₄ - To what extent do the relationships among IGD (DV), personality traits (IV) and motivation to play Internet games (DV) vary by gender, age, ethnicity/race, and college student status (IVs)?

Research Design

The dissertation utilized a cross-sectional, non-experimental group correlational design and used path analysis to analyze data. Creswell (2014) identifies two advantages to non-experimental quantitative designs with no treatments implemented: 1) participant willingness increases and 2) more rapid data collection is possible leaving more time for robust data analysis. The design was cross-sectional because data was only collected at one point in time. The design was correlational because it examined the relationships amongst variables without any intervention. Keith (2015) considers path analysis to be one of the most effective analyses for non-experimental research, because a figure clearly presents presumed causes and effects. None of the four studies in the literature reporting on the interplay between personality and motivation to play Internet games amongst Internet gamers used path analysis to analyze data (Cole & Hooley, 2013; Graham & Gosling, 2013; Jeng & Teng, 2008; Park et al., 2011). Coley & Hooley (2013) used independent *t*-tests and stepwise regression; Graham & Gosling (2013) and Jeng & Teng (2008) used linear regression; and Park et al. (2011) used factor analysis and logistic regression. Though sound designs, none of the methods produced a model of presumed relationships amongst the variables tested.

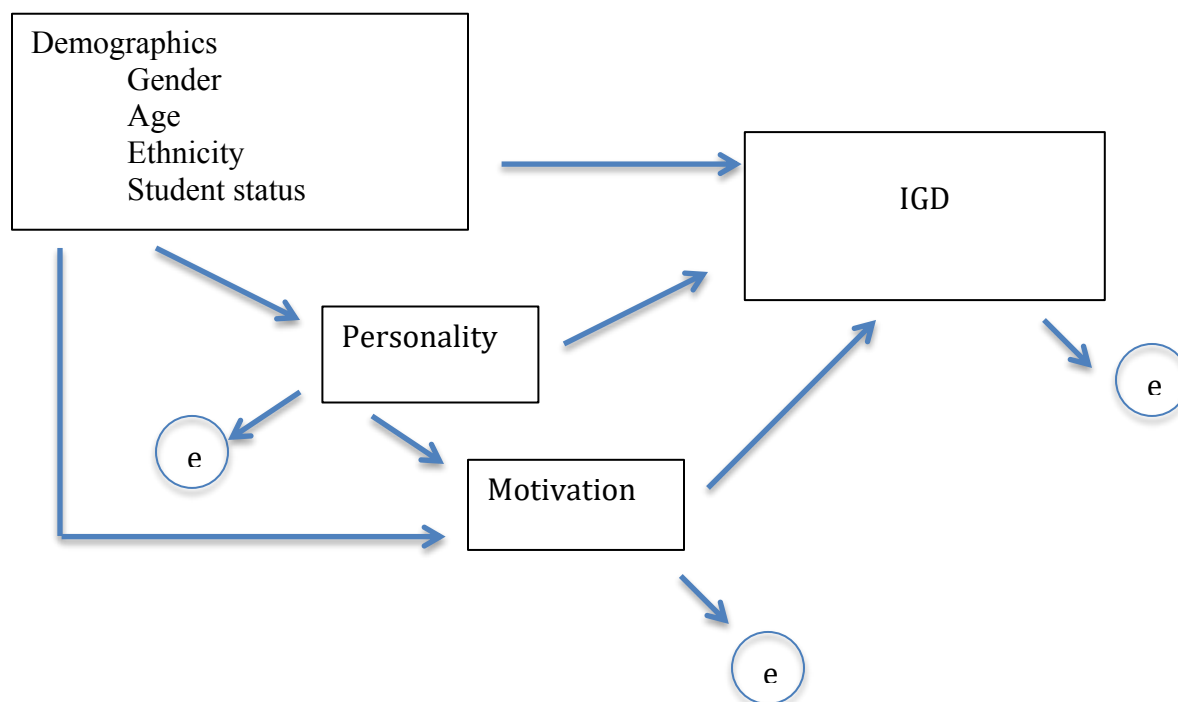
This dissertation examined the relationships among Internet gaming disorder (IGD), personality, motivation to play Internet games, and demographics, including age, gender, ethnicity, and student status. IGD is an interval level variable that describes the degree to which an individual exhibits symptoms of addiction to Internet games. Personality is an interval level variable that describes the distinguishing patterns of thoughts, feelings, and behaviors that form an individual's character. Motivation to play Internet games is an interval level variable that

describes the reasons why an individual engages in Internet gaming. Demographic variables analyzed in the study are age, gender, ethnicity, and student status.

The dissertation produced an overall just-identified path model (Figure 1) representing presumed relationships, based on theory and research, among variables related to IGD, personality, motivation to play Internet games, and demographic characteristics (gender, age, ethnicity, and student status). All relationships are unidirectional, with the hypothesized flow of causality moving from one variable to another in a single direction. The model contains one group of exogenous variables (demographic characteristics), which are variables caused by factors outside of the model, and three groups of endogenous variables (IGD, personality, and motivation), which are influenced by variables within the model. The demographic characteristics are a group of nominal variables, and all other variables in the model (IGD, personality, and motivation) are continuous variables.

Figure 1.

Model 1: Overall Proposed Path Model



Path analysis was used to analyze the model and its goodness of fit with the data. The above model proposed that demographic characteristics (gender, age, ethnicity, and student status), personality traits (extraversion, agreeableness, conscientiousness, neuroticism, and openness), and motivation to play online games (achievement, socialization, and immersion) are predictors of Internet gaming disorder (IGD). In addition, the model proposes that gender, age, ethnicity, and student status are predictors of personality traits and motivation to play, and personality traits are predictors of motivation to play, as well.

Instrumentation

Three instruments were used in the study in order to measure IGD, personality traits, and motivation to play Internet games. A demographic questionnaire gathered demographic

information and specific information about participants' Internet use. Participants read and opted in to the study on an informed consent sheet before completing any assessment instruments.

The IGD-10

The Ten-Item Internet Gaming Disorder Test (IGD-10) (Kiraly et al., 2015a) measures *DSM-5* criteria for IGD using the nine criteria in Section III: Preoccupation, withdrawal, tolerance, failed attempts to stop gaming, loss of interest in other activities, continued use despite psychosocial problems, deception, escapism, relational/educational/vocational consequences. Participants agree or disagree with a total of ten statements regarding these criteria on a 5-point Likert scale, taking minutes to complete. Each criterion is represented by one statement, except for the last, which is broken up into two statements in the assessment tool, one for relationship consequences and another for educational/vocational consequences, making a total of 10 statements to measure the nine criteria. The IGD-10 is based on Griffith's (2005) components model of addiction, which is consistent with the criteria proposed in Section III of *DSM-5* (Pontes et al., 2014). The researchers found that gamers with IGD typically devote 8-10 hours per day to game play, at least 30 hours per week, findings similar to Chappell, et al. (2006). The correlation between IGD and time spent playing was considered evidence of criterion-related validity.

Concurrent validity was assessed by the association of the IGD-10 Test with the nine IGD criteria from the *DSM-5*. Confirmatory factor analysis (CFA) showed that the nine criteria loaded on a single IGD factor (Kiraly et al., 2015a). Chi-squares were examined to show goodness of fit ($\chi^2 = 194.4$, $df = 27$, $p < .0001$). Factor loadings on all nine criteria were reported above the accepted Alpha threshold of .50 and ranged from .55 to .80. The IGD-10 Test's internal consistency was satisfactory (Bland & Altman, 1997), as measured by the Cronbach's

alpha of .68. Finally, the researchers confirmed that the *DSM-5* cutoff value of meeting five criteria for diagnosis of IGD was appropriate, based on scores from the highest Latent class analysis (LCA) group. Thus, participants who meet less than five of the nine criteria do not qualify for a diagnosis of IGD, and those who meet five or more of the nine criteria do qualify for the diagnosis. The research obtained permission to use the instrument from the authors. The instrument appears in Appendix A.

The BFI-10

The abbreviated form of the Big Five Inventory (BFI-10) (Rammstedt & John, 2007) measures five personality dimensions of Extraversion (E), Neuroticism (N), Agreeableness (A), Conscientiousness (C), and Openness (O) using two items for each construct. The 10-item instrument is less than one quarter of the length of the full version of the Big Five Inventory-44, allowing for efficient data collection (Gosling, Rentfrow, & Swann, 2003; Rammstedt & John, 2007). The assessment takes approximately one minute to complete. Gosling et al. (2003) explain that shorter instruments are coveted amongst researchers for their efficiency, even if their psychometric properties are not the same as the longer instruments. Still, results of psychometric analysis of the BFI-10 show that significant level of validity and reliability are retained from the longer version (Rammstedt & John, 2007). Specifically, the authors report on part-whole correlations, test-retest stability, structural validity, convergent validation, and external validation. Ultimately, reliability and discriminant validity for the BFI-10 remain excellent, with some losses in the areas of convergent and external validity.

First, part-whole correlations of the short scales with the longer scales are notable, with an overall mean correlation of .83. The Extraversion, Neuroticism, and Conscientiousness scales have the highest correlations, as their 2-item versions correlate with the full scales with average

correlations of .89, .86, and .82 respectively. Agreeableness and Openness scales have lower correlations of .74 and .79 respectively. Next, mean test-retest stability coefficients are .75 overall, indicating respectable stability compared to the .84 coefficient reported for the longer version of the instrument. Next, low intercorrelation scores, averaging .11, provide evidence of discriminant validity. Further, common-factor analysis show loadings of the 10 items in the scale on five separate factors, with scores almost identical to the longer version of the tool. Convergent validation with the NEO-PI-R average .67 with the five domains, compared to .78 for the full version, indicating a loss of convergent validity. Finally, there was also a loss in external validation when self-report and peer-report scores are compared (.44 as compared to .56 for the longer scale). Overall, the BFI-10 shows acceptable psychometric properties (Rammstedt & John, 2007) and has been used successfully in the literature to study the relationship between IGD and personality type (Lehenbauer-Baum & Fohringe, 2015; Wang et al., 2015). The authors provide public access to the instrument. It appears in Appendix B.

The MPOGQ

To assess for gaming motivation, the researcher distributed The Motivation to Play Online Games Questionnaire (MPOGQ) (Yee et al., 2012). Participants rate 12 statements on importance using a 5-point Likert scale to measure the factors motivating their Internet gaming play. It takes minutes to complete. The instrument is a revised form of an original instrument created by Yee (2006b), and it is the only assessment tool in the literature validated on a large sample to measure motivation to play MMORPGs (Kuss et al., 2012). The included game motivation scales assess 10 underlying factors: advancement, mechanics, competition, socializing, relationship, teamwork, discovery, role-playing, customization, and escapism. The factors were found to be internally consistent with Cronbach's alpha values ranging from 0.65-

0.87 (Yee, 2006b). Yee et al. (2012) developed and validated the modified instrument with cross-cultural and predictive validity by sampling a large population of US, Hong Kong, and Taiwanese participants. Their instrument has several advantages over Yee's (2006b). First, it is shorter in length with more concise item wording. Second, it directly assesses three high level factors associated with Internet gaming (Achievement, Social, and Immersion), in addition to the 10 underlying factors. Scale items within each of the three factors have Cronbach's alphas above 0.70. Third, the instrument shows predictive validity, as demonstrated by results of a comparison between self-report and gaming behaviors measured by in-game metrics. The multivariate tests were significant for the Achievement ($F = 19.95, p < .001$), Social ($F = 11.61, p < .001$), and Immersion ($F = 3.38, p < .01$) factors. The modified MPOGQ has been used successfully in the literature to study motivations of gamers who play Internet games excessively (Hussain et al., 2015; Kardefelt-Winther, 2014b; Kuss et al., 2012). Participants who complete the instrument produce three scores based on how much they are motivated by each of the three high level factors: Achievement, Social, and Immersion. The researcher obtained permission from the authors to use the instrument in the study. It appears in Appendix C.

Participant Demographic Sheet

Collection of demographic data occurred with a one-page questionnaire designed to be straightforward and nonintrusive. Participants were asked to provide their gender identity, race/ethnicity, age, and their college student status. In addition, they were asked to estimate current daily and weekly hours spent playing Internet games. Finally, they were asked to estimate how many hours they have played Internet games per week over the past year. The demographic sheet in its entirety appears in Appendix D.

Participants

Participants were Internet gamers over the age of 18 years, who have played Internet games, specifically a Massively Multiplayer Online game (MMO), within the last 12 months. IGD criteria in Section III of the *DSM-5* require symptoms to occur over a 12-month period (APA, 2013a). The target number of participants for the study was at least $N = 149$, based on a power analysis. G*Power 3.7.1 was utilized to calculate an a priori power analysis with a .05 alpha level (Cohen, 1988; 1992), a medium effect size for multiple R^2 of .09, (Cohen 1988) and a power of .80 (Cohen, 1992). Several authors support Cohen's use of .09 as a medium effect size when there are multiple R^2 (Preacher & Kelley, 2011; Smithson, 2001). The researcher collected 2,322 responses from participants and maintained 1,881 after removing cases with missing data.

The identity of participants was protected by following the HIPAA compliant use of university software for electronic communication. A number identified participants and the researcher masked any identifying information conveyed during electronic communication. The researcher received approval for the dissertation from the Institutional Review Board (IRB) in August 2016. The approval letter appears in Appendix E. The researcher applied for the exemption from state law based on not using participants under the age of 18, no foreseeable harm being imposed by taking part in this study, and exemption category 6.2, which provides exemption for studies that involve the use of educational tests and survey procedures. The researcher recruited participants via online tools, including Reddit and Facebook, and via local resources, including the local university and local settings where gamers are known to play. A copy of the data collection recruitment ad appears in Appendix F.

Participant Demographic Characteristics

An international sample of 1,881 was collected with 72.5% ($N = 1,563$) of participants living in the US and 27.5% ($N = 318$) living internationally. Forty-nine states, plus the District of Columbia and Puerto Rico, were represented in the US national sample. A total of 1,873 participants reported their ages, and the mean age of the sample was 28.27 years with a range of 18-95 years. Tables 1, 2, 3, and 4 provide descriptive statistics for reported age, gender identity, ethnicity, and student status. The population sample consisted mostly of young, White males and females.

Table 1.

Respondent Age

Age Range	Frequency	Percent
18-25 years	853	45.5%
26-30	467	25%
31-40	381	20.3%
41-50	127	6.8%
51+	53	2.4%
Total	1,873	100%

Table 2.

Respondent Gender Identity

Gender	Frequency	Percent
Male	1118	59.4%
Female	732	38.9%
Transgender	13	.70%
Other (e.g., non-binary)	18	1.0%
Total	1,881	100%

Table 3.

Respondent Ethnicity

Race	Frequency	Percent
White/Caucasian	1456	77.4%
Asian/Pacific Islander	128	6.8%
Black/African American	59	3.1%
Hispanic/Latino/Latina	100	5.3%
Middle Eastern	12	0.6%
Multiracial	58	3.1%
Other (e.g., Asian)	69	3.7%
Total	1,881	100%

Table 4.

Respondent Student Status

Student Status	Frequency	Percent
Not a student	1159	61.6%
High School	48	2.6%
Vocational/Technical	42	2.2%
Undergraduate College	493	26.2%
Graduate School	139	7.4%
Total	1,881	100%

Procedure

The researcher collected and cleaned data over the course of two months. The following sections detail data collection, data cleaning, and variable creation procedures.

Data Collection

The data collection procedure for the study used purposeful methods. The researcher used both electronic and face-to-face methods to collect data. Electronic methods included distributing the survey link on Facebook.com, on Reddit.com, on Nextdoor.com, and via email. Face-to-face distribution occurred at Pokémon Go hotspots within the vicinity of the researcher's university. All invitations to participate in the study included an explanation of the study and a link to a Qualtrics survey containing an informed consent sheet, the three instruments, and the

demographic questionnaire. Using electronic means to distribute the survey provided access to gamers all over the nation and the world, allowing for demographic diversity in the population sampled. The estimated time it took participants to complete the 46-item Qualtrics survey with the informed consent sheet and the demographic questionnaire was 10-15 minutes. No follow-up was necessary.

The researcher created six separate links to the dissertation survey in order to be able to analyze how different sources of data collection produced cases. Table 5 summarizes these six data collection links and how many cases they produced for the study.

Table 5.

Data Collection Sources

Source Name	Number of Cases Produced	Description
Snowball	91	Link distributed solely on researcher's personal Facebook account. Posted two times over the course of four weeks with 23 shares by friends.
Facebook	850	Link distribute on 362 Facebook groups designed for Internet gamers.
Forums	945	Link distributed on 60 subgroups designed for Internet gamers on Reddit.com.
Nextdoor	15	Link distributed on the website Nextdoor.com for researcher's local neighborhood.
Gatekeeper	208	The researcher sent requests to the 42 Chairs of departments at the local university to distribute the survey to their staff and students.
Hardcopies	213	The researcher input data manually from hardcopies of the survey she distributed to participants at local Pokémon Go hotspots. The researcher spent a total of seven hours on five separate occasions collecting data face-to-face in the community.
Total	2322	

Data Cleaning

Data collection produced 2,322 total cases. The researcher removed all cases of participants who could not participate in the study because they did not meet the two inclusion criteria (i.e., participants who were 17 years of age or younger or participants who had not played an MMO in the past 12 months). The researcher also removed cases of participants who did not complete any portion of the three instruments in the survey. A total of 441 cases were thus removed, and 1,881 viable cases remained. The researcher kept 53 cases of participants who completed all three instruments in the survey, but who did not complete the demographic information, as their data could still be used to answer research questions 1 and 3.

Variables

Once all appropriate cases were removed from the data set, the researcher began work on variables in preparation for data analysis. The researcher changed the names of variables for clarity. The researcher then dummy coded the items for each of the three instruments, changing terms “Strongly disagree,” “Strongly agree,” etc. to Likert scale numbers. The researcher reverse coded items in the BFI-10, as necessary. Finally, the researcher computed scale scores for each of the three instruments and created new variables from the results. For the BFI-10 personality instrument, the researcher combined each of the two items for each of the five constructs, and created new scale variables to represent scores for each of the Big Five Personality traits produced: P11_extraversion, P12_agreeableness, P13_conscientiousness, P14_neuroticism, and P15_openness. For the MPOGQ, the researcher weighed each item by its factor loading and then added them up to produce scores for each aggregate: Achievement, social, and immersion, producing the variables M_achievement, M_social, and M_immersion. For the IGD-10, the

researcher summed all nine criteria represented in the 10 items of the instrument into a combined scale score, producing the variable IGD_combined.

The name of the recoded variables, the data type, and description of the variables are provided in Table 6.

Table 6.

Description of Variables

Variable Name	Variable Type	Description
P11_extraversion	Continuous, endogenous	A participant's score on the extraversion scale of the BFI-10 personality test.
P12_agreeableness	Continuous, endogenous	A participant's score on the agreeableness scale of the BFI-10 personality test.
P13_conscientiousness	Continuous, endogenous	A participant's score on the conscientiousness scale of the BFI-10 personality test.
P14_neuroticism	Continuous, endogenous	A participant's score on the neuroticism scale of the BFI-10 personality test.
P15_openness	Continuous, endogenous	A participant's score on the openness scale of the BFI-10 personality test.
M_achievement	Continuous, endogenous	A participant's score on the achievement scale of the MPOGQ; to what extent a participant is motivated by achievement when gaming.
M_social	Continuous, endogenous	A participant's score on the social scale of the MPOGQ; to what extent a participant is motivated by socialization when gaming.
M_immersion	Continuous, endogenous	A participant's score on the immersion scale of the MPOGQ; to what extent a participant is motivated by immersion when gaming.
IGD_combined	Continuous, endogenous	A participant's score on the IGD-10, assessing for the nine <i>DSM-5</i> criteria; scores range from 0-9; 5 or higher indicates Internet gaming disorder.
Age	Nominal, exogenous	Numerical age as reported by participants.

Gender Identity	Nominal, exogenous	Dummy coded variable indicating a participant's reported gender identity. Dichotomous variable indicating male or female.
Ethnicity	Nominal, exogenous	Dummy coded variable indicating a participant's reported ethnic identity. Dichotomous variable indicating Caucasian or not Caucasian.
Student Status	Nominal, exogenous	Dummy coded variable indicating a participant's reported student status. Dichotomous variable indicating student status or non-student status.

Summary

In this chapter, the researcher explained the methodology used to explore the interactions among demographic characteristics, IGD, personality, and motivation to play Internet games. After explaining the purpose and research questions guiding the study, she briefly described the quantitative research design of the study and its path analysis model. The researcher detailed information on instrumentation, participants, data collection and cleaning procedures, and variable computation. Appendices are provided to review the instruments used in the study.

CHAPTER 4

RESULTS

The purpose of this study was to describe relationships amongst demographic characteristics, Internet gaming disorder, personality, and motivation to play Internet games. The researcher employed a cross-sectional, non-experimental group correlational design and produced a path analysis model. Four research questions were developed to guide the study. In this chapter, the researcher reports data analysis techniques including tests for assumptions, descriptive statistics, correlational analysis, and regression analysis. Descriptive statistics summarized the data and included a Pearson Correlation matrix of all the variables in the model. The researcher reports distributions on the continuous variables: IGD, personality, and motivation to play. For each research question, the researcher reports the regression analyses producing results for the model. The path model shows standardized path coefficients and effect sizes for the proposed relationships in the model. The researcher used SPSS Statistical Analysis software to conduct all analyses.

Data Analysis

After cleaning data for missing cases and transforming variables into analyzable form, the researcher conducted descriptive statistics to test for linear regression assumptions, identify any outliers, and assess the appropriateness of the path analysis model.

Assumptions

The researcher assured that assumptions were met for the linear regression models and the path model. First, the researcher tested for independence of observations using the Durbin-Watson statistic (2.027), indicating that there is no correlation between residuals. Next, the researcher tested for linearity and homoscedasticity by analyzing a scatterplot of the standardized

residuals against the predicted values and then by analyzing partial regression plots between each IV and DV. Next, the researcher assured there was no multicollinearity through an inspection of correlation coefficients and Tolerance/VIF values. Tolerance values ranged from .771-.974 and VIF values ranged from 1.027-1.296, indicating no issues with multicollinearity. Next, outliers were identified by examining casewise diagnostics and the standardized deleted residuals. The outliers identified were determined to be participants who meet criteria for IGD. Only 4.2% ($N = 79$) of participants met the clinical diagnostic criteria for IGD. Next, normality was tested by examining histograms and P-P plots of the DVs (IGD_combined and Motivation), as well as skew and kurtosis. IGD was positively skewed (1.79), which is logical since most of the population would score low on the IGD-10, and slightly leptokurtic (3.65). Finally, the researcher determined that assumptions for path analysis were met: linearity, causal closure, and unitary variable.

Descriptive Statistics and Reliability

The survey employed three instruments to measure three groups of variables: The IGD-10 (Kiraly et al., 2015a) to assess for IGD criteria in the *DSM-5*, the abbreviated form of the Big Five Inventory (BFI-10) (Rammstedt & John, 2007) to assess for personality traits (extraversion, agreeableness, conscientiousness, neuroticism, and openness), and the Motivation to Play Online Games Questionnaire (MPOGQ) (Yee et al., 2012) to test for reasons why gamers play (achievement, socialization, and immersion). Since reliability can vary depending on the sample used, internal consistency reliability estimates (Cronbach's alpha) were reported for each instrument used in the study.

Internet Gaming Disorder: The IGD-10. The IGD-10 consisted of 10 items and asked respondents to rate how often they experience certain behaviors related to Internet gaming on a

3-point Likert scale. It was scored by combining items 9 and 10 into one item, and then summing items 1-8, plus the combined 9/10 item. A score of 5 or higher indicated presence of Internet gaming disorder. Scores ranged from 0-9, with a mean score of 1.16 and a standard deviation of 1.54. A total 4.2% ($N = 79$) of participants met the clinical diagnostic criteria for IGD. The researcher assessed for reliability by testing the Cronbach's alpha, and overall reliability of the IGD-10 was .79 for the sample in the study.

The researcher also examined descriptive statistics for the nine individual criteria measured by the IGD-10. Table 7 displays the criteria as reported by participants in the study from most frequently reported to least frequently reported. The table shows the frequency counts for the sample population without IGD and for the participants in the study meeting IGD criteria. Percentages of both populations to report each criteria are provided. Tables 8, 9, and 10 display gender, age, and ethnicity differences in the frequency of reported criteria among the population with IGD.

Table 7.

IGD Criteria

Criteria	Frequency of Criteria for Participants without IGD	Percent to Report Criteria	Frequency of Criteria for Participants with IGD	Percent to Report Criteria
Preoccupation	485	26.9%	69	87.3%
Escape	484	26.8%	69	87.3%
Tolerance	211	11.7%	64	81%
Psychosocial	164	9.1%	70	88.6%
Loss Interest	99	5.4%	51	64.6%
Withdrawal	98	5.4%	59	74.7%
Deception	61	3.3%	34	43%
Jeopardized Job/Rel	59	3.2%	42	53.2%
Reduce Time	47	2.6%	18	22.8%
Total	1,802		79	

Table 8.

Gender Differences in IGD Criteria among Participants with IGD

Criteria	Frequency for Males	Percentage for Males	Frequency for Females	Percentage for Females
Psychosocial	55	85.9%	11	100%
Escape	55	85.9%	10	90.9%
Preoccupation	54	84.4%	11	100%
Tolerance	51	79.7%	10	90.9%
Withdrawal	47	73.4%	9	81.8%
Loss Interest	40	62.5%	8	72.7%
Jeopardized Job/Rel	37	57.8%	3	27.3%
Deception	29	45.3%	3	27.3%
Reduce Time	14	21.9%	3	27.3%
Total (<i>N</i> = 75)	64		11	

Table 9.

Ethnicity Differences in IGD Criteria among Participants with IGD

Criteria	Frequency for Whites	Percentage for Whites	Frequency for Non-Whites	Percentage for Non-Whites
Psychosocial	45	86.5%	15	93.8%
Escape	45	86.5%	16	100%
Preoccupation	48	92.3%	13	81.3%
Tolerance	43	82.7%	13	81.3%
Withdrawal	42	80.8%	10	62.5%
Loss Interest	31	59.6%	12	75%
Jeopardized Job/Rel	25	48.1%	8	50%
Deception	22	42.3%	6	37.5%
Reduce Time	9	17.3%	5	31.3%
Total (<i>N</i> = 78)	52		16	

Table 10.

Age Differences in IGD Criteria among Participants with IGD

Criteria	Frequency for 30 and Under	Percentage for 30 and Under	Frequency for 31+	Percentage for 31+
Psychosocial	58	86.6%	12	100%
Escape	59	88.1%	10	83.3%
Preoccupation	57	85.1%	12	100%
Tolerance	53	79.1%	11	91.7%
Withdrawal	49	73.1%	10	83.3%
Loss Interest	42	62.7%	9	75%
Jeopardized Job/Rel	35	52.2%	7	58.3%
Deception	28	41.8%	6	50%
Reduce Time	15	22.4%	3	25%
Total (<i>N</i> = 79)	67		12	

Personality: The BFI-10. The BFI-10 measures the Big Five personality traits using two items per construct. It was scored by summing each of the two items for Extraversion, Agreeableness, Conscientiousness, Neuroticism, and Openness. Scores for each construct ranged from 2 to 10. The mean scores for the constructs were as follows: Extraversion 5.82 with a standard deviation of 2.24; Agreeableness 6.82 with a standard deviation of 1.77; Conscientiousness 7.07 with a standard deviation of 1.76; Neuroticism 5.69 with a standard deviation of 2.18; Openness 7.55 with a standard deviation of 1.85. The researcher assessed for reliability by testing the Cronbach's alpha for each construct: Extraversion scale .67; Agreeableness scale .28; Conscientiousness scale .50; Neuroticism scale .59; Openness scale .32. Since Extraversion and Neuroticism were the two constructs to produce reliable results, those are the constructs that are reported to represent Personality in the analyses. Agreeableness, Conscientiousness, and Openness were, thus, not reported. When personality and Internet gaming are reported in the literature, findings point to three areas of personality: neuroticism, impulsivity, and extraversion. Thus, focusing on neuroticism and extraversion in the current

study is appropriate for making contributions to the current body of literature. Other studies in the literature also examined individual constructs of personality, instead of all of the Big Five traits, including Mehroof and Griffiths (2010), who measured neuroticism, along with other associated personality traits not included in Big Five categories.

Motivation: The MPOGQ. The MPOGQ measures participants' motivation to play online games in three constructs using four items per construct: Achievement, Social, and Immersion. It was scored by weighing each item by its factor loading and then adding them up to produce scores for each aggregate. Scores for the Achievement construct ranged from 2.63 to 13.15 with a mean score of 8.83 and a standard deviation of 2.31. Scores for the Social construct ranged from 2.70 to 13.5 with a mean score of 7.77 and a standard deviation of 2.86. Scores for the Immersion construct ranged from 2.65 to 13.25 with a mean score of 8.33 and a standard deviation of 2.76. The researcher tested for reliability by examining the Cronbach's alpha for each construct: Achievement .72; Social .85; and Immersion .80.

Correlation Analysis

To investigate possible relationships among the DVs (IGD and Motivation) and IVs, a correlation matrix displaying Pearson Correlations was appropriate. The results of the correlation analysis are displayed in Table 11.

Table 11.

Correlation Matrix

	1	2	3	4	5	6	7	8	9	10
1. Age	-									
2. Gender	.17**	-								
3. Ethnicity	-.11**	-.01	-							
4. Student Status	-.45**	-.08**	.08**	-						
5. Extraversion	.11**	.04	.04	-.03	-					
6. Neuroticism	-.11**	.29**	-.06**	.02	-.24**	-				
7. Achievement M	-.14**	-.26**	.09**	.01	.03	-.09**	-			
8. Social M	-.13**	-.19**	.02	.01	.11**	-.05*	.34**	-		
9. Immersion M	-.13**	-.03	.02	.01	-.04	.01	.15**	.23**	-	
10. IGD	-.17**	-.13**	.05*	.02	-.18**	.18**	.28**	.18**	.19**	-

Note: *indicates a correlation that is significant at the .05 level

**indicates a correlation that is significant at the .01 level

The correlation matrix and corresponding significance analysis suggested several important relationships regarding IGD. IGD was loosely correlated with being male ($r = -.13, p < .001$) and being younger ($r = -.17, p < .001$). It was loosely correlated with less Extraversion ($r = -.18, p < .001$) and more Neuroticism ($r = .18, p < .001$). Finally, IGD was moderately correlated with Achievement Motivation ($r = .28, p < .001$), and loosely correlated with Social Motivation ($r = .18, p < .001$) and Immersion Motivation ($r = .19, p < .001$).

The correlation matrix also suggests important relationships between Motivation and the other variables. Achievement and Social motivations were loosely to moderately correlated with being male ($r = -.26, p < .001$; $r = -.19, p < .001$) and being younger ($r = -.14, p < .001$; $r = -.13, p < .001$). Immersion motivation was also loosely correlated with being younger ($r = -.13, p < .001$). Next, Achievement Motivation was loosely correlated with less Neuroticism ($r = -.09, p < .001$). Social Motivation was loosely correlated with more Extraversion ($r = .11, p < .001$) and less Neuroticism ($r = -.05, p = .05$).

Goodness of Fit

To report the path analysis model, the researcher used maximum likelihood estimation to estimate the model parameters, including path coefficients and variance estimates. The chi-square (χ^2) statistical test was deemed inappropriate to test the null hypothesis that the model fits the data due to the large sample size (Keith, 2015). Unstandardized parameter estimates and standard error for each path coefficient are provided in Table 12. The researcher also reported the variance and standard error of the exogenous variables (demographic characteristics). As part of Figure 2, the researcher reported the R^2 variables for each endogenous variable (IGD, personality, and motivation) to show the percentage of variance in each variable that was accounted for by other variables in the model. The significance of these R^2 statistics indicated the goodness of fit of the path model.

In the overall path model in Figure 2, 14.5% of the variance of IGD ($R^2=.145$) was accounted for by the other variables in the model. In turn, 9.7% of the variance of Achievement Motivation ($R^2=.097$) was accounted for by personality traits and demographic characteristics, 6.7% of the variance in Social Motivation ($R^2=.067$), and 1.9% of the variance in Immersion Motivation ($R^2=.019$). Finally, 1.9% of the variance in Extraversion ($R^2=.019$) was accounted for by demographic characteristics and 12.2% of the variance in Neuroticism ($R^2=.122$).

Figure 2 also shows the standardized path coefficients to represent the direct effect each variable has on another variable. The standardized path coefficients appear along, above, or below the arrows between each variable. Only significant path coefficients are displayed. Nonsignificant results were not included.

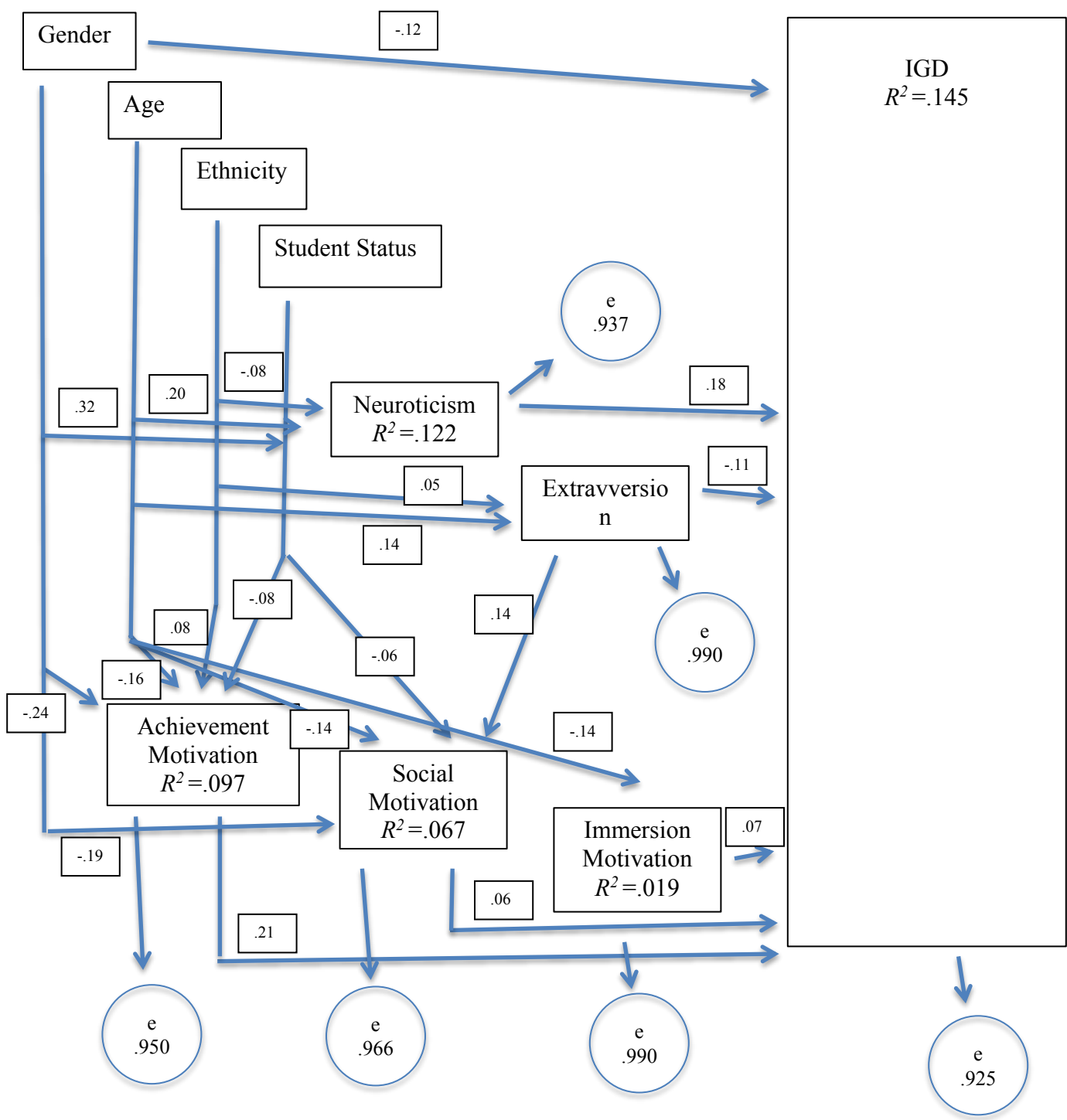
Table 12.

Unstandardized Parameter Estimates and Standard Errors

Parameter Description	Unstandardized Parameter Estimates	Standard Errors
IGD from Gender	-.351	.074
IGD from Age	-.006	.004
IGD from Ethnicity	.149	.084
IGD from Student Status	-.045	.073
IGD from Extraversion	-.073	.015
IGD from Neuroticism	.121	.017
IGD from Achievement M	.138	.016
IGD from Social M	.034	.013
IGD from Immersion M	.039	.013
Achievement M from Gender	-1.11	.113
Achievement M from Age	-.041	.007
Achievement M from Ethnicity	.452	.133
Achievement M from Student Status	-.385	.115
Achievement M from Extraversion	.044	.024
Achievement M from Neuroticism	-.019	.026
Social M from Gender	-1.08	.143
Social M from Age	-.045	.008
Social M from Ethnicity	-.037	.167
Social M from Student Status	-.353	.146
Social M from Extraversion	.173	.030
Social M from Neuroticism	.032	.033
Immersion M from Gender	-.095	.142
Immersion M from Age	-.043	.008
Immersion M from Ethnicity	.061	.116
Immersion M from Student Status	-.205	.145
Immersion M from Extraversion	-.038	.030
Immersion M from Neuroticism	-.007	.033
Extraversion from Gender	.084	.108
Extraversion from Age	.035	.007
Extraversion from Ethnicity	.292	.134
Extraversion from Student Status	.069	.117
Neuroticism from Gender	1.40	.100
Neuroticism from Age	-.049	.006
Neuroticism from Ethnicity	-.441	.123
Neuroticism from Student Status	-.065	.108
Variances of Exogenous Variables		
Gender	.240	.011
Age	78.13	.204
Ethnicity	.158	.009
Student Status	.237	.011

Figure 2.

Model 2: Path Model Results



Results of Hypothesis Testing

Research Question 1

For RQ1 - To what extent is there a statistically significant relationship between IGD and personality traits? – the researcher regressed IGD on personality constructs and reported the standardized coefficients. A regression of IGD on Extraversion and Neuroticism explained a significant 3.7% of the variance in IGD ($R^2=.037$); $F(2, 1880) = 36.579$, $MSE = 2.276$, $p < .001$. Specifically, Extraversion was a significant predictor of IGD ($\beta = -.12$) after controlling for other predictors. Neuroticism was also a significant predictor of IGD ($\beta = .13$). There was a statistically significant relationship between IGD and personality: Extraversion had a negative relationship with IGD, while Neuroticism was positively related. Both effect sizes were small. Below is the regression table for this model:

Table 13.

Regression of IGD on Extraversion and Neuroticism

Model		Unstandardized		Standardized		
		Coefficients		Coefficients		
		B	Std. Error	Beta	t	Sig.
1	(Constant)	1.124	.153		7.359	.000
	P11_extraversion	-.081	.016	-.118	-5.056	.000
	P14 neuroticism	.089	.017	.126	5.362	.000

a. Dependent Variable: IGDcombined

Research Question 2

For RQ2 –To what extent do Internet gamers with certain demographic characteristics (IV) and personality traits (IV) have motivations for playing Internet games (DV)? – the researcher regressed each motivation construct (Achievement, Social, and Immersion) on personality traits and the demographic characteristics and reported the standardized coefficients.

A regression of Achievement Motivation on Age, Gender, Ethnicity, Student Status, Extraversion, and Neuroticism, explained a significant 9.7% of the variance in Achievement Motivation; $F(6, 1781) = 31.930$, $MSE = 4.775$, $p < .001$. Specifically, Age was a significant predictor of Achievement Motivation ($\beta = -.16$) after controlling for other predictors. Gender was also a significant predictor of Achievement Motivation ($\beta = -.24$). Ethnicity was a significant predictor of Achievement Motivation ($\beta = .08$). Student Status was a significant predictor of Achievement Motivation ($\beta = -.08$). Extraversion and Neuroticism were not significant predictors of Achievement Motivation in this model. This model showed statistically significant relationships when demographic characteristics and personality predict motivation to play online games. Age and Student Status had small negative relationships with Motivation, and Ethnicity had a small positive relationship. Gender had a moderate negative relationship with Motivation. The regression table is provided below:

Table 14.

Regression of Achievement Motivation on Demographics and Personality

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	10.344	.314		32.924	.000
	Age	-.041	.007	-.157	-6.235	.000
	Gender	-1.111	.113	-.238	-9.827	.000
	Ethnicity	.452	.133	.078	3.405	.001
	Student_dich	-.385	.115	-.081	-3.340	.001
	P11_extraversion	.044	.024	.043	1.840	.066
	P14_neuroticism	-.019	.026	-.018	-.727	.468

a. Dependent Variable: M_Achievement

A regression of Social Motivation on Age, Gender, Ethnicity, Student Status, Extraversion, and Neuroticism explained a significant 6.7% of the variance in Social Motivation;

$F(6, 1781) = 21.198$, $MSE = 7.610$, $p < .001$. Specifically, Age was a significant predictor of Social Motivation ($\beta = -.14$) after controlling for other predictors. Gender was also a significant predictor of Social Motivation ($\beta = -.19$). Student Status was a significant predictor of Social Motivation ($\beta = -.06$). Finally, Extraversion was a significant predictor of Social Motivation ($\beta = .14$). Ethnicity and Neuroticism were not significant predictors of Social motivation in this model. In this statistically significant model, Age, Gender, and Student Status all had small negative relationships with Social Motivation, and Extraversion had a small positive relationship with the outcome variable. Below is the regression table for this model:

Table 15.

Regression of Social Motivation on Demographics and Personality

Model		Unstandardized		Standardized	t	Sig.
		B	Std. Error	Coefficients		
1	(Constant)	8.363	.397		21.087	.000
	Age	-.045	.008	-.138	-5.373	.000
	Gender	-1.079	.143	-.186	-7.558	.000
	Ethnicity	.037	.167	.005	.220	.826
	Student_dich	-.353	.146	-.060	-2.425	.015
	P11_extraversion	.173	.030	.136	5.683	.000
	P14_neuroticism	.032	.033	.024	.960	.337

a. Dependent Variable: M_Social

A regression of Immersion Motivation on Age, Gender, Ethnicity, Student Status, Extraversion, and Neuroticism explained a significant 1.9% of the variance in Immersion Motivation; $F(6, 1781) = 5.732$, $MSE = 7.503$, $p < .001$. Only Age was a significant predictor of Immersion Motivation ($\beta = -.14$) after controlling for other predictors. Gender, Ethnicity, Student Status, Extraversion, and Neuroticism were not significant predictors of Immersion Motivation

in this model. In this statistically significant model, Age had a small negative relationship with Immersion Motivation. The regression table is provided below:

Table 16.

Regression of Immersion Motivation on Demographics and Personality

Model		Unstandardized		Standardized		
		Coefficients		Coefficients		
		B	Std. Error	Beta	t	Sig.
1	(Constant)	9.892	.394		25.117	.000
	Age	-.043	.008	-.136	-5.166	.000
	Gender	-.095	.142	-.017	-.667	.505
	Ethnicity	.061	.166	.009	.365	.715
	Student_dich	-.205	.145	-.036	-1.421	.156
	P11_extraversion	-.038	.030	-.031	-1.263	.207
	P14_neuroticism	-.007	.033	-.005	-.201	.841

a. Dependent Variable: M_Immersion

Research Question 3

For RQ3 - To what extent does motivation to play Internet games (IV) mediate personality traits (IV) for Internet gamers with varying levels of IGD (DV)? – the researcher used linear and hierarchical regression to test for the mediation effect. For Model 1, the researcher regressed IGD on personality. Then, the researcher regressed motivation on personality to confirm personality is a predictor of motivation. Finally, for Model 2, the researcher regressed IGD on personality and motivation to show the change in variance in IGD when Motivation is added to the list of predictors. Variance estimates and R^2 change coefficients were reported.

To confirm a mediation effect, the researcher confirmed personality traits as predictors of Achievement, Social, and Immersion Motivation. A regression of Achievement Motivation on personality traits explained a significant 0.7 % of the variance in Achievement Motivation ($R^2 =$

.007). A regression of Social Motivation on personality traits explained a significant 1.4% of the variance in Social Motivation ($R^2 = .014$). And a regression of Immersion Motivation on personality traits was not a significant model. For Model 1, as in research question 1, a regression of IGD on personality traits explained a significant 3.7% of the variance in IGD ($R^2 = .037$); $F(2, 1880) = 36.579$, $MSE = 2.276$, $p < .001$. Adding Achievement, Social, and Immersion Motivation in the second step of the hierarchical regression analysis led to a significant change in R^2 ($\Delta R^2 = .100$, $p < .001$). Thus, including Motivation in the second step explained an additional 10.0% of the variance in IGD. In the updated model, a regression of IGD on personality traits and motivation explained a significant 13.8% of the variance in IGD ($R^2 = .138$); $F(5, 1880) = 59.815$, $MSE = 2.043$, $p < .001$. The hierarchical regression table for both models is below:

Table 17.

Model Summary

Mode	R	Adjusted R Square	Std. Error of the Estimate	Change Statistics			Sig. F Change
				R Square Change	F Change	df1 df2	
1	.284 ^a	.081	1.43290	.081	25.905	6 1775	.000
2	.381 ^b	.145	1.38287	.065	44.579	3 1772	.000

a. Predictors: (Constant), P14_neuroticism, Student_dich, Ethnicity, P11_extraversion, Gender, Age

b. Predictors: (Constant), P14_neuroticism, Student_dich, Ethnicity, P11_extraversion, Gender, Age, M_Immersion, M_Achievement, M_Social

Research Question 4

Finally, for RQ4 - To what extent do the relationships among IGD (DV), personality traits (IV) and motivation to play Internet games (DV) vary by gender, age, ethnicity/race, and

college student status (IVs)? – the researcher regressed IGD on personality traits, motivation constructs, and the demographic characteristics and reported the standardized coefficients.

A regression of IGD on Age, Gender, Ethnicity, Student Status, Extraversion, Neuroticism, Achievement Motivation, Social Motivation, and Immersion Motivation explained a significant 14.5% of the variance in IGD; $F(9, 1781) = 34.40$, $MSE = 1.912$, $p < .001$.

Specifically, Gender was a significant predictor of IGD ($\beta = -.12$) after controlling for other predictors. For personality traits, Extraversion was a significant predictor of IGD ($\beta = -.11$) and Neuroticism was a significant predictor of IGD ($\beta = .18$). Finally, for achievement constructs, Achievement Motivation was a significant predictor of IGD ($\beta = .21$); Social Motivation was a significant predictor of IGD ($\beta = .06$); and Immersion Motivation was a significant predictor of IGD ($\beta = .07$). Age, Ethnicity and Student Status were not significant predictors of IGD in this model. This model showed statistically significant relationships when demographic characteristics, personality, and motivation predict IGD. Gender was negatively related to IGD with a small effect size. Extraversion had a small negative relationship with IGD, and Neuroticism had a small positive relationship with IGD. All three motivation constructs were positively related to IGD, Social and Immersion Motivation with small effect sizes and Achievement Motivation with a moderate effect size. The regression table appears below:

Table 18.

Regression of IGD on Demographics, Personality, & Motivation

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	-.644	.271		-2.374	.018
	Age	-.006	.004	-.034	-1.358	.175
	Gender	-.351	.074	-.116	-4.746	.000
	Ethnicity	.149	.084	.039	1.769	.077
	Student_dich	-.045	.073	-.015	-.615	.539
	P11_extraversi on	-.073	.015	-.109	-4.713	.000
	P14_neuroticis m	.121	.017	.176	7.262	.000
	M_Achieveme nt	.138	.016	.212	8.679	.000
	M_Social	.034	.013	.064	2.583	.010
	M Immersion	.039	.013	.071	3.071	.002

a. Dependent Variable: IGDcombined

Error

Error was calculated for each of the endogenous variables in the model (IGD, personality, and motivation) by calculating the square root of $1 - R^2$ for each regression equation. Error for IGD was .925. Error for Extraversion was .990. Error for Neuroticism was .937. Error for Achievement Motivation was .950. Error for Social Motivation was .966. And error for Immersion Motivation was .990.

Summary

In this chapter, the researcher reported results from the data analysis procedures. After testing for assumptions, the researcher reported descriptive statistics, including reliability statistics for each construct of the three instruments used in the study, correlational statistics, and

the regression analyses for each of the four research questions. The resulting path model displayed standardized path coefficients and effect sizes for the proposed causal relationships in the model.

CHAPTER 5

DISCUSSION

This study aimed to depict the relationships among personality, motivation to play, Internet gaming disorder (IGD), and demographic characteristics (gender, age, ethnicity, and student status) in a path analysis model. In this chapter, the researcher discusses results and implications related to demographic statistics in the Internet gaming population, the prevalence rates for IGD in the population sampled in the study, an analysis of IGD criteria frequency, correlation analyses, and analyses for each of the four research questions. The researcher relates current findings to literature on IGD, personality, and motivation. Finally, the researcher discusses the study's limitations and provides suggestions for future research.

Population Demographics

Data collection in this study produced an international sample of Internet gamers from 56 different countries around the world on six continents, and from 49 of the 50 United States, plus Washington D.C. and Puerto Rico. Based on the wide net cast to collect data from the Internet gaming population and on the international access to gamers afforded by electronic means of data collection, the researcher expected demographic diversity related to age, gender, ethnicity, and student status. However, the population sampled was particularly homogenous in the areas of age and ethnicity. Of the population sampled 45.5% of the gamers in the study were 25 years of age or under, and 70.5% were 30 years of age or under. The other 29.5% of the population sampled represented participants in their 30s, 40s, 50s, and beyond, with only 2.4% of the population sampled over the age of 51. In addition, more than three-quarters of the population sampled identified as White/Caucasian, leaving less than 23% represented by African American, Hispanic/Latino/Latina, Asian, and multiracial ethnicities. The population sampled is more

diverse related to gender, with almost 60% of participants identifying as male and almost 40% identifying as female. Finally, almost one-third of the population reported student status, providing an adequate proportion to compare to the non-student population. Because of the younger age reported by participants in the study, it is logical that a significant proportion would be students. Overall, if these demographic statistics were applied to the general population, it would appear that younger, White males and females are most representative of the Internet gaming population.

The population sampled in this study is comparable to populations sampled in the literature when personality, motivation, and IGD are examined, and it is generally more representative of age and ethnicity. Yee (2006b) collected data from 3,035 participants who were 91% male. Yee (2012) sampled two populations, one with 2,071 participants (65.6% male) with an average age of 29.95, and another with 645 participants from Taiwan and Hong Kong (80% male) with an average age of 23.59. Yee found that 22.2% of the population he sampled was represented by students. This author's populations sampled have more male participants than the current study, though average age is comparable, as is the percentage of participants with student status. Next, Jeng and Teng (2008) sampled 92 Taiwanese college students (age 18-27) with 60% being male. Park et al. (2011) also sampled Asian college students between the ages of 17 and 28. Of the 524 respondents, 47.6% were male. These smaller sample populations are equally representative of gender as the current study, but lack representation in the areas of age and ethnicity. Next, Caplan et al. (2009) sampled 4,278 participants ranging in age from 18 to 65 with a mean age of 32.47 and 81% being male. This larger sample had a similar age range as the current study with a slightly older average age and a significantly larger male population. Similarly, Graham and Gosling (2013) reported on a population of 1,413 comprised of 88%

males, who had an average age of 26.04. Compared to these two studies, the population in the current study had a more equal sample of males (60%) and females (40%). Cole and Hooley (2013) collected data on 163 participants (56% male, 40% female) with an average age of 27.3. This small sample is comparable to the demographics of the population collected in the current study related to gender and age.

Internet Gaming Disorder Prevalence

One of the most valuable aspects of this study is the results related to IGD prevalence and the specific criteria reported by the gaming population, in general, and by the population with a diagnosis of IGD. Of the population sampled 4.2% met criteria for IGD, meaning they reported five or more of the criteria listed in Section III of the *DSM-5*, as measured by the IGD-10. This prevalence rate is slightly higher than prevalence rates for other process addictions, including Anorexia Nervosa at up to 1.5% (APA, 2013a), gambling addiction at 2%, sex addiction at 3%, exercise addiction at 2%, and eating addiction at 2% (Sussman et al., 2011). Eight out of ten participants with IGD were male. Thus, the prevalence rate of IGD was higher for males in the study at 5.7%, and the prevalence rate for females was 1.5%. The prevalence rate for students was 4.3%, only slightly higher than the general population. Two-thirds of participants with IGD identified as White/Caucasian, with a prevalence rate of 3.6% for the White/Caucasian population and 3.9% for the non-White population. Finally, 85% of participants with IGD were age 30 or younger. Prevalence rates in the current study were significantly higher for participants age 30 or younger (5.1%) versus 31 or older (2.1%). Overall, prevalence rate for males (5.7%), students (4.3%), and for people age 30 or younger (5.1%) were higher than the prevalence rate for the overall population sampled in the study (4.2%), indicating that male gender, student

status, and younger age status may be risk factors for IGD. These findings are important for informing screening and prevention when counselors are working with diverse populations.

Prevalence rates in the literature vary significantly based on population sampled, criteria used, and assessment tool employed. Thus, it is most useful to compare prevalence rates among studies that use the same *DSM-5* criteria. Compared to other studies using *DSM-5* criteria for IGD, the prevalence rate in this study appears normal to high. Rehbein et al. (2015) found that 1.16% of the adolescents ($N = 11,003$) in their study had IGD according to *DSM-5* criteria. Male participants in the study had a higher prevalence rate (2.02%) than females (.26%). Muller et al. (2015) also assessed prevalence in an adolescent sample ($N = 12,938$) across seven European countries and found that 1.6% met IGD criteria. A study of Dutch adolescents and adults ($N = 2,444$) found that 5.4% had IGD according to *DSM-5* diagnosis (Lemmens, Valkenburg, Gentile, & Reynolds, 2015). The researchers also reported a higher prevalence rate among male participants (6.8%) than female participants (4.0%), consistent with the current dissertation.

Frequency of Internet Gaming Disorder Criteria

Prevalence rates for IGD are based on the nine criteria in Section III of the *DSM-5*. The criteria are currently under research to determine their appropriateness for diagnosing IGD. Thus, the current dissertation reported on the frequency of reported criteria among the population sampled, and focused on differences in gender, age, and ethnicity groups. The frequency order of criteria reported among the population sampled in this study with IGD were: psychosocial consequences, escape, preoccupation, tolerance, withdrawal, loss of interest in other activities, jeopardized job or relationship, deception, and unsuccessful attempts to reduce time playing. Rehbein et al. (2015) also reported on the frequency of criteria reported among the population meeting IGD criteria in the *DSM-5* and, similarly to the current dissertation, found escape and

preoccupation to be the most highly reported criteria among the population they sampled meeting IGD criteria. However, the authors reported that the lowest frequency criteria were loss of interest in other activities and jeopardized relationships, which fell into slots six and seven out of nine in the current study. Future research is needed to determine the least frequently reported criteria among the nine, as part of deciding the most appropriate diagnostic criteria for IGD.

Of additional importance is the observation that IGD criteria reported by participants with a diagnosis of IGD closely matches the order of frequency of IGD criteria reported by the general population not meeting diagnostic criteria, with the main exceptions that psychosocial problems is more prevalent than escape, preoccupation, and tolerance; withdrawal is more prevalent than loss of interest in other activities; and jeopardizing of job and relationships is more prevalent than deception in the IGD population. However, even though the population meeting IGD criteria reported IGD criteria in almost the same order of frequency as the general population, there was a higher percentage of each criteria reported in the IGD population. For example, using games as a means of escaping from negative emotions is the number one criteria reported in the general population and the number two criteria in the IGD population. In the general population 26.8% of participants reported using gaming to escape, but a much larger 87.3% of the population with IGD reported the criteria. Similarly, preoccupation was reported by 26.9% of the general population, but by 87.3% of people with IGD. It is logical to report that more criteria are reported more frequently among the population meeting diagnostic criteria for the disorder. However, this finding calls into question whether the criteria as they are currently presented in the DSM-5 are meaningful to discriminate gamers with addiction from gamers without addiction. Lemmens et al. (2015) explained that some criteria may lack specificity to IGD. These authors found that preoccupation, tolerance, and withdrawal were particularly

specific to gamers with IGD, but that escape was not especially useful for this purpose, despite its high frequency rate. Further research, beyond just frequency count, is needed to assess for the usefulness of the nine criteria in Section III of the *DSM-5* for determining an actual addiction to Internet games.

In an effort to add cultural context to the understanding of the IGD criteria, the researcher examined gender, age, and ethnicity differences in frequency of criteria reported in the study. Sixty percent of participants in the study were male, but 80% of participants meeting criteria for IGD were male. Still, though in a slightly different order, female participants meeting criteria for IGD had the same top five criteria for frequency reported: psychosocial consequences, preoccupation, escape, tolerance, and withdrawal. One area of interest, however, is that a significantly low percentage of female gamers with IGD report jeopardizing job or relationship, deception about gaming behavior, and difficulty reducing time spent gaming. These results indicate that screening using current *DSM-5* criteria for IGD can be conducted similarly for males and females, but some criteria may be less relevant for females than for males.

Implications for age and ethnicity groups follow suit. For age, 7 out of 10 participants in the study were 30 or younger, yet 85% of participants meeting IGD criteria were in this younger age bracket. Similarly to gender, older participants with IGD reported the same top five criteria, supporting similar screening for people of all ages. For ethnicity, three-quarters of participants identified as White/Caucasian and two-thirds of participants meeting IGD criteria were White/Caucasian. Again, though in a slightly different order, non-White participants with IGD had similar top five criteria for IGD as the dominant White/Caucasian group. However, non-White participants with IGD reported loss of interest in other non-gaming activities as the fifth most frequent criteria met, while White participants with IGD maintained withdrawal as the fifth

most frequent criteria. These results point to the possibility that there may be subtle differences between White and non-White groups when screening for IGD criteria, but that screening with current *DSM* criteria can be conducted similarly across ethnic groups. More research with a more diverse sample, specifically related to age and ethnicity, is needed to draw definitive conclusions.

Frequency of criteria is just one way to measure how appropriate criteria may be for making a particular diagnosis. However, the literature suggests potential problems with several of the IGD criteria listed in Section III of the *DSM-5*. Ko et al. (2014) suggest that low frequency of the escape and decision criteria may indicate that they are inaccurate for IGD. However, the current study showed that escape was the second most frequently reported criterion among participants with IGD, with 87.3% reporting the behavior. Deception, on the other hand, was reported with lower frequency by the population in the current study, with only 43% of participants with IGD identifying the behavior. It was not the least frequent criterion reported, however, with unsuccessful attempts to reduce time gaming coming in last slot at 22.8%. Both deception and unsuccessful attempts to reduce time gaming were reported with particularly low frequency among the female participants with IGD. Further research may indicate that deception is not an appropriate criterion for diagnosing IGD, but the escape criterion was consistently reported across gender, ethnic, and general population groups, and may remain as a valid criterion for assessing IGD.

Correlations

Results of the correlation analyses in the study justified the regression models used in the overall path analysis model. Based on the frequency statistics reported above, it is logical that IGD was loosely correlated with being male and with being younger, since younger males in the study had higher prevalence rates for IGD. For personality characteristics, the correlation

analyses showed that IGD was correlated with less extraversion and more neuroticism. IGD was also correlated with all three motivation constructs: achievement, social, and immersion. However, achievement motivation was the most highly correlated with IGD of the three motivation constructs. And achievement motivation was correlated with being male and being younger, also linked to IGD. Logically, social motivation was correlated with more extraversion. After examining the correlation analyses, the researcher concluded that the proposed regression models in the study would provide more insight into the relationship amongst IGD, personality, motivation, and demographic characteristics.

Research Question 1

RQ1 - To what extent is there a statistically significant relationship between IGD and personality traits? The results of the regression of IGD on Extraversion and Neuroticism showed a significant relationship, but with a small effect size ($R^2 = .037$). Less Extraversion ($\beta = -.12$) and more Neuroticism ($\beta = .13$) predicted IGD. These findings were consistent with results in the literature where effect sizes were even larger. Mehroof and Griffiths (2010) found neuroticism to be associated with addiction to Internet gaming ($\beta = .204, p < .01$) and suggested that neurotic gamers may use gaming as a coping strategy to escape the neurotic feelings. Similarly, Peters and Malesky (2008) reported higher neuroticism ($r = .381, p < 0.001$) and less extraversion ($r = .235, p < 0.05$) among problematic Internet gamers, suggesting that some gamers may be avoiding social situations by gaming or seeking out safer social environments via Internet gaming. Cole and Hooley (2013) also reported that gamers with higher problematic behaviors showed less extraversion and more neuroticism, though anxiety correlated with neuroticism may actually be the stronger predictor of problematic gaming. Caplan et al. (2009) examined introversion, not extraversion, but found results in line with the literature, and introversion was

associated with gamers exhibiting problematic gaming behavior. The overall conclusion based on these common results is that gamers' social tendencies, as determined by personality traits, may play a role in developing problematic gaming habits and addiction.

Research Question 2

RQ2 –To what extent do Internet gamers with certain demographic characteristics (IV) and personality traits (IV) have motivations for playing Internet games (DV)? For this research question, the researcher examined three separate models: one for Achievement Motivation, one for Social Motivation, and one for Immersion Motivation. In all three models, Neuroticism was not a predictor of motivation, and Extraversion was only a predictor of Social Motivation. Thus, when looking at demographic characteristics and personality traits alone as predictors of motivation for game playing, personality did not predict motivation, with the logical exception of Extraversion predicting Social Motivation. Graham and Gosling (2013 and) Jeng and Teng (2008) also used regression analyses to examine how personality predicts motivation to play online games. In line with the current study, Graham and Gosling reported on the positive relationship between extraversion and social motivation to play games. Jeng and Teng reported similar findings that extraversion predicts social motivation among gamers with an even higher effect size, though at a lower significance threshold ($\beta = .34, p = .01$). The authors also found significant findings related to the negative relationship between neuroticism and social motivation, which the current study could not report due to nonsignificant results. In a similar vein, and using a different methodology in their study, Cole and Hooley (2013) also reported that gamers with introverted and neurotic personality traits may be socially anxious and thus motivated to socialize online. Whereas the current study only found extraversion related to social motivation, Park et al. (2011) reported relationships between extraversion and other motivations

to play, including adventure/escape (immersion), relaxation, and achievement. Overall, the similar findings reported in the literature suggest that extraverted gamers, in particular, may be motivated to interact with others in the game who share common interests and experiences.

For demographic characteristics, there were some common themes in results for all three types of motivation. First, being male was a predictor of both Achievement and Social Motivation in the current study. This finding conflicts with findings by Park et al. (2011) who found that being female is related to relationship building motivation for game playing. Next, younger age was a predictor of Achievement, Social, and Immersion Motivation in the current study. This finding, again, is inconsistent with Park et al.'s (2011) report that older age predicts immersion motivation, in particular. Yee's (2006b) is the foundational research on the relationships between age, gender, and motivation to play online games. Yee, in fact, showed that younger age predicted achievement motivation, and that age was a stronger predictor than gender when predicting achievement motivation in particular. With regard to gender, the author asserts that, while being male is associated with achievement motivation and being female is associated with relationship building motivation, there is no gender difference when it comes to social motivation. Thus, male players were found to be equally motivated by social motivation as females in Yee's study, but may have different pursuits in online relationships. The author confirmed these findings in a subsequent study six years later (Yee et al., 2012). Thus, though female gamers tend to focus on relationship building while gaming, overall social motivation to play may be associated with males, and younger gamers appear to be especially motivated by achievement when gaming.

In terms of effect sizes found in the current study related to the three models above, the models predicting Achievement and Social Motivation were significantly larger than the effect

size for Immersion Motivation. The effect size for Immersion Motivation was small ($R^2 = .019$), and the only predictor in the model to have a significant relationship with the outcome variable was younger age, one of the findings in conflict with findings by Park et al. (2011). With three-quarters of the sample population under the age of 30, the finding of the current study may not be meaningful. However, effect sizes for Achievement Motivation ($R^2 = .097$) and Social Motivation ($R^2 = .067$) were large enough to engender more meaningful discussion. Specifically, the effect sizes for Achievement and Social Motivation in the current study are similar to those reported by Graham and Gosling (2013), namely between 5-10%.

Research Question 3

RQ3 - To what extent does motivation to play Internet games (IV) mediate personality traits (IV) for Internet gamers with varying levels of IGD (DV)? Personality traits alone predicted Achievement Motivation ($R^2 = .007$) and Social Motivation ($R^2 = .014$) with small effect sizes, and did not significantly predict Immersion Motivation. The weakness of these relationships called into question the meaningfulness of any results related to how motivation may mediate personality traits when predicting IGD. Still, adding motivation into the mix of demographic and personality predictors did add a significant 10% of the variance to the model predicting IGD. Thus, personality traits clearly predict IGD behavior, and certain motivations to play also predict IGD. However, since the personality traits examined in the current study did not strongly predict motivation to play, gamers with extraverted and neurotic tendencies may not be especially motivated to play online games for certain reasons. This finding coincides with a study by Caplan et al. (2009), which also used hierarchical regression to understand how motivation contributes to the variance in problematic Internet use scores, after controlling for demographic and psychosocial variables. However, whereas in the current study, adding

motivation variables to the regression model contributed an additional 10% of variance to the model, Caplan et al. only found motivation to add 2% of variance to their proposed hierarchical model. Personality and motivation are significant predictors of IGD behavior, but their interplay remains unclear.

Research Question 4

RQ4 - To what extent do the relationships among IGD (DV), personality traits (IV) and motivation to play Internet games (DV) vary by gender, age, ethnicity/race, and college student status (IVs)? This overall model showed that demographics, personality, and motivation all significantly predict IGD. However, only gender, specifically being male, predicted IGD among the demographic characteristics in the overall model. For personality traits, just like in the simpler model in RQ1, less extraversion and more neuroticism predicted IGD. Finally, all three kinds of motivation predicted IGD, but Achievement Motivation was a significantly stronger predictor than Social or Immersion Motivation. Only one study in the literature examined both personality and motivation in relation to problematic Internet use (Cole & Hooley, 2013). These authors concluded that gamers with problematic gaming behavior may be socially motivated to play the games, but may also be exhibiting psychosocial dysfunction. In addition, they discuss that more anxious, neurotic, and socially impaired gamers are associated with problematic play. The findings are in line with the results of the current study; however, the current study also points to the strong relationship between IGD and achievement motivation. Thus, a more comprehensive picture of risk factors for IGD may be social impairment, with the preference to socialize online and to obtain gratification from the achievement opportunities gaming affords. An additional demographic risk factor for IGD is being male. This picture is not the only way to view gamers with IGD; rather, it is a generalization based on the associations among variables

found in two studies. Still, it is a generalization supported in bits and pieces by a myriad of studies that focus on various aspects of personality or motivation related to gaming and IGD. More research is needed to understand the full interplay among personality, motivation, and IGD, along with demographic risk factors.

Limitations

As a correlational design, the current study is subject to flaws in internal validity, since it does not measure causation. In addition, some groups were not equivalent, including age, which was predominantly under 30, and ethnicity, which was predominantly White/Caucasian. The demographic characteristics reported in the current study are similar to populations sampled in other studies on personality, motivation, and IGD, suggesting that the Internet gaming population may simply be younger and more representative of White ethnicities. Also, the self-report data method proposed in the study could have been biased and potentially threatening to internal validity. Participants could have minimized their symptoms of addiction or could have failed to take the survey seriously. However, there are multiple benefits to the self-report method in the study, including ease of collection and the benefit of direct responses from participants as opposed to third-party observations. In addition, the presumed causal relationships of the path analysis design mitigate threats to internal validity. Finally, only two of the five personality constructs measured in the BFI-10 showed adequate reliability statistics, so the scope of the study to measure personality was limited by the use of fewer constructs in the analyses conducted.

External validity refers to how certain one can be that results are generalizable. Selection bias is a factor affecting external validity. Participants who chose to participate in the study may not be representative of the gaming population. Still, this sample population resembles sample

populations in several other large scale studies examining personality, motivation, and IGD (Caplan et al., 2009; Cole & Hooley, 2013; Graham & Gosling, 2013; Jeng & Teng, 2008; Park et al., 2011; Yee, 2006b; Yee et al., 2012); and the current study is in fact more representative of age and ethnicity and equally representative of gender. Additionally, responses are not evenly distributed across demographic groups in order to make the most accurate comparisons and correlations, namely age and ethnicity as described above. However, proposed data collection methods, namely the use of electronic methods and snowball sampling, allowed for the opportunity to collect data from diverse populations all over the nation and the world. Overall, lack of randomization, manipulation, and control factors in the correlational design make it difficult to establish cause-effect relationships, so results lack generalizability. Still, the path analysis models may show presumed causal relationship amongst variables, and the discussion emphasizes the strength of these relationships as well as effect sizes.

Future Research

Future research is clearly needed in all areas the current study examined. Personality traits and motivation distinctly play a role in the development of IGD, among a multitude of other variables. More personality traits, beyond the Big Five, should be analyzed in models that also include other psychosocial and environmental factors. Specific psychosocial and environmental factors supported in the literature include anxiety, social phobia, narcissism, family dynamics, and social preferences. Above all, a more reliable, valid, and comprehensive personality instrument should be used to measure Big Five personality traits, even at the sacrifice of short survey length and potentially larger sample sizes. Research should be continued with diverse sampling procedures to see if the homogeneity, especially with regard to ethnicity and age, is accurately representative of the makeup of the gaming population. Especially as games

develop different social aspects, such as the combination of real world and virtual world social interaction in Pokémon Go, research methods that compare groups of gamers who play certain games could add to the body of knowledge about how and why gamers become addicted.

Finally, qualitative research is a vital component of this research to understand how the socialization, simulation, fantasy, and technology influence why and how people play Internet games.

Summary

In this chapter, the researcher presented a discussion of findings in the dissertation. Descriptive statistics were used to describe prevalence rates for IGD and frequency counts for IGD criteria, both overall and among groups in the sample population. These findings point to risk factors for IGD, including male gender, student status, and age under 30. In addition, certain *DSM-5* criteria currently in Section III of the manual may be less relevant than others, namely jeopardized job or relationship, deception, and unsuccessful attempts to reduce time playing, and some criteria may be less relevant for female and non-White gamers. Correlation analyses and analyses for each research question are discussed to demonstrate how the current study adds to the body of literature on personality, motivation, and IGD. Significant predictors of IGD in the proposed path analysis model include male gender, neurotic and introverted personality traits, and motivation related to achievement, socialization, and immersion. The overall model paints a picture of IGD highlighting social impairment with a particular proclivity to pursue online social interactions and achievement in the games. Finally, the researcher explains the study's limitations, specifically related to self-report data and generalizability, and details suggestions for future research.

CHAPTER 6
MANUSCRIPT

Personality, Motivation, and Internet Gaming Disorder: Understanding the Addiction

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Abstract

This study examined the relationships among personality traits, motivation for play, and Internet gaming disorder in a diverse sample of Internet gamers, using a group correlational design and path analysis. The researcher sampled participants who self-identify as Internet gamers by posting invitations to participate in the study on Facebook, Reddit, Nextdoor, and email, as well as by accessing the local gaming population at Pokémon Go hotspots. The study used valid and reliable instruments: The Ten-Item Internet Gaming Disorder Test (IGD-10) was used to assess for Internet gaming disorder (IGD), the abbreviated form of the Big Five Inventory (BFI-10) was used to assess personality traits, and the Motivation to Play Online Games Questionnaire (MPOGQ) was used to assess motivation to play Internet games. Data analysis entailed multiple regression based on proposed causal relationships in a path analysis model. Findings showed that significant predictors of IGD amongst the variables in the model include male gender, neurotic and introverted personality traits, and motivation related to achievement, socialization, and immersion with implications for screening, assessment, and prevention. Limitations related to self-report data and generalizability, as well as recommendations for future research, are discussed.

Keywords: Internet gaming disorder, Internet gaming addiction, technology addiction, personality, motivation

Personality, Motivation, and Internet Gaming Disorder: Understanding the Addiction

The most popular form of Internet games, Massively Multiplayer Online Games (MMOGs), such as *World of Warcraft (WoW)* and *Guild Wars 2*, immerse players in a fantastical universe they can control. In Massively Multiplayer Online Role-Playing Games (MMORPGs), players take on virtual personae called avatars and have the opportunity to socialize in guilds and to interact with each other to achieve goals in the game. The social aspect of Internet games has implications for how and why people become addicted to them (Allison, von Wahlde, Shockley, & Gabbard, 2006; Chappell, Eatough, Davies, & Griffiths, 2006; Wan & Chiou, 2006b). Fully understanding the link between personality traits, motivations for play, and addiction could shed light on how to potentially prevent and treat people with problematic Internet game playing behavior. On a global scale, IGD has the potential to impact the lives of people in any country that has Internet access. Prevalence rates vary depending on the population samples, assessment tools used, and diagnostic criteria, and they range from 2% to 50% (e.g., Jeong & Kim, 2010; Yee, 2006a). Potential risk factors and consequences of IGD in the literature focus on psychosocial problems, like absence of real world relationships and activities (e.g., Allison et al., 2006; Griffiths, Davies, & Chappell, 2004), and psychiatric problems, such as depression and suicidal ideations (e.g., Peng & Liu, 2010; Rehbein, Psych, Kleimann, Mediasci, & Mossle, 2010).

Social Aspect of Internet Gaming

The social experience of Internet gamers has been explored in multiple studies in recent years and specific findings have been reported regarding the unique social experience of Internet gamers with signs of IGD. In a qualitative case study of an 18-year-old male excessive MMORPG player, researchers conducted psychiatric interviews to show that IGD is associated

with devotion of time to the activity, i.e., as much as 16 hours daily, avoiding sleep, and absence of real-world social interaction. The researchers reported that the participant, in this case study, created an ideal virtual identity to compensate for the inadequacy he felt in the real world (Allison et al., 2006). Similarly, in another qualitative study, Wan & Chiou (2006b) interviewed 10 adolescents meeting IGD criteria to find that online gaming fulfills social and personal needs left unmet in the real world. More specifically, the researchers found that the virtual experience of these gamers was used to compensate for the desire for social interaction in the real world, making the virtual world their prime focus. Chappell et al. (2006) emphasized the similarities between the symptoms of gamers addicted to, or previously addicted to, the MMORPG *Everquest* and the symptoms associated with *DSM-IV-TR* substance dependence, including salience, withdrawal, cravings, relapse, and interpersonal conflict. As a result of research findings, which identify online gamers' social experience as a unique factor of IGD and IGD-related symptoms, further research could capture how the social nature of the games contributes to motivation to play (Jansz & Martens, 2005; Jansz & Tanis, 2007; Yee, 2006b). Specifically, researchers suggest that the social aspect of the game is an integral part of gamers' motivations to play and may be relevant to identifying addiction (Leung, 2007; Young, 2009).

It is essential for researchers to understand the social nature of Internet gaming in order to describe the full impact IGD can have on gamers' behavior (Trepte, Reinecke, & Juechems, 2012; Yee, 2006b; Young, 2009). Authors indicate that Internet games have become a component of modern culture used to fulfill basic human needs for socialization and interpersonal interaction (Didelot, Hollingsworth, & Buckenmeyer, 2012). Researchers propose that elucidating the motivations to play Internet games with correlations to personality type may

help to explain why gamers with certain personality features engage in gaming excessively (Graham & Gosling, 2013; Jeng & Teng, 2008; Park, Song, & Teng, 2011).

Addiction and Technology

The technology and simulation present in Internet games, as well as the social aspect of the gaming experience, make IGD a unique kind of process addiction (Essig, 2012). Gamers can create a fantasy world and control it. The level of simulation is such that, in most games, anything they can do in the real world is theoretically possible to do in the virtual world of the game. Gamers can design and give life to an avatar and decide how he or she behaves in the game and interacts with others. It is essential to understand how these aspects of Internet gaming contribute to how and why gamers become addicted. Understanding gamers' motivations to play, especially related to their personality types, is vital to accurately representing diagnostic criteria and informing prevention and treatment. The unique experience of addiction with a technological component could be related to certain personality types and motivations to play that may predispose individuals to Internet addictive behaviors beyond the traditional impulsive/compulsive traits associated with current addiction theory.

Essig's (2012) theory proposes that people with IGD may experience addiction differently than people with other process addictions or with substance addiction. The unique experience of addiction with a technological component could mean that certain personality types and motivations may predispose people to Internet addictive behaviors that are beyond the traditional impulsive/compulsive traits associated with addiction theory. Finally, different people play Internet games for different reasons. Treating gamers as a monolithic group has been shown to be a narrow-minded approach (Yee, 2006b). Yee (2006b) and others, including Griffiths, Davies, and Chappell (2003, 2004), report that certain demographic characteristics may be useful

for predicting disordered gaming behaviors, as well as predicting why gamers play (Teng, 2008). Further, gamers with certain personality traits could show common motivations for Internet game play. Furthermore, they could show common underlying reasons why they chose Internet gaming as their virtual alternative in their search for life experience. By finding the relationships between personality traits and motivation amongst excessive Internet gamers, researchers may be able to group risk factors for more effective prevention and treatment.

Personality and Internet Gaming Disorder

Personality traits of Internet gamers have been researched as risk factors for IGD in at least 21 studies (e.g., Allison et al., 2006; Caplan, Williams, & Yee, 2009; Mehroof & Griffiths, 2010; Park et al., 2011; Yao et al., 2015). Most of the studies use quantitative designs and validated personality tests, including the Minnesota Multiphasic Personality Inventory (Butcher, Dahlstrom, Graham, Tellegen, & Kaemmer, 1989), the NEO Personality Inventory (Costa & McCrae, 1985), the BFI-10 (Rammstedt & John, 2007), and the Rosenberg Self-Esteem Scale (Rosenberg, 1965). The studies address a variety of topics and implications, but findings point to three areas of personality: neuroticism versus stability, impulsivity versus control, and introversion versus extraversion. Studies show congruent findings when reporting on neuroticism and impulsivity; however, studies that examine the introversion/extraversion components of personality report inconsistent findings.

Multiple studies showed links between IGD and neurotic traits, including avoidant interpersonal tendencies (Allison et al., 2006), low self-esteem (Ko et al., 2005), neuroticism (Mehroof & Griffiths, 2010; Peters & Malesky, 2008), state and trait anxiety (Mehroof & Griffiths, 2010), and low self-efficacy in the real world as opposed to high self-efficacy in the virtual world (Jeong & Kim, 2010). Following this logic, gamers who showed personality traits

such as stability had decreased risk for addiction to the Internet (Vermulst & Gerris, 2009). Next, when personality and impulsivity were examined, researchers found traits of social inhibition (Porter et al., 2010), aggression and hostility (Caplan et al., 2009; Kim et al., 2008; Mehroof & Griffiths, 2010), diminished self-control, and narcissism (Kim et al., 2008). Finally, studies that examined introversion and extraversion had conflicting results. While Caplan et al. (2009) found that IGD is associated with loneliness and introversion, Park et al. (2011) found that gamers with IGD show extraversion traits, especially when they are motivated by adventure and escape in the game. By showing the interaction between personality and motivation to play, findings by Park et al. (2011) may have implications for understanding how different gamers play games for different reasons. A large-scale study using validated instruments for assessing IGD, personality, and motivation to play could contribute to a fuller understanding of the interplay between personality traits and what motivates problematic gamers to engage in play. Specifically, such a study could show how gamers with introverted or extraverted personality traits have different motivations for their gaming behavior, thus informing prevention, screening, and treatment.

Motivation and Internet Gaming Disorder

Motivation for playing Internet games has been researched in at least 42 studies (e.g., Beard & Wickham, 2016; Carlisle & Carrington, 2015; Hussain, Williams, & Griffiths 2015; Király et al., 2015b; Yee, 2006b; Zhong & Yao, 2013). Common motivational risk factors revealed in these studies include achievement, socialization, negatively coping with real world feelings or situations, and immersion in fantasy. Analysis of these risk factors shows that they sometimes conflict and may be complicated by the social nature of Internet games.

Three main areas of motivation for Internet gaming appear in the literature: achievement, socialization, and escape from the real world. Achievement, often for the purposes of

empowerment, mastery, control, recognition, completion, excitement, challenge (Carlisle & Carrington; Jeng & Teng, 2008; King & Delfabbro 2009b; King et al. 2011; Park et al., 2011; Wan and Chiou 2006b; Yee, 2006b), and reward (Hsu et al. 2009; King et al. 2011), is a common motivational factor found in the research. In addition, several studies show that gamers are motivated to socially engage in the games by building virtual friendships (Beranuy et al., 2013; Caplan et al., 2009; Carlisle & Carrington, 2015; Hsu et al., 2009; King & Delfabbro, 2009a; Park et al., 2011; Ng & Wiemer-Hastings, 2005; Yee, 2006b), experiencing belonging (Hsu et al., 2009), and experiencing teamwork (Jeng & Teng, 2008). However, some of the same and other studies indicate a relationship between IGD and escape from negative emotions, stress, fear, and social inadequacy (Carlisle & Carrington, 2015; Hussain & Griffiths, 2009; Jeng & Teng, 2008; Kardefelt-Winther 2014a; King & Delfabbro, 2009a; Ng & Wiemer-Hastings, 2005; Park et al., 2011; Wan & Chiou, 2006a, 2006b), as well as dissociation (Beranuy et al., 2013) and pursuit of immersion in the fantasy of the game (Caplan et al, 2009; Carlisle & Carrington, 2015; Jeng & Teng, 2008; Yee, 2006b). Further investigation into the motivations for excessive Internet game play is required for understanding the difference between using Internet gaming as a compulsive behavior that provides senses of belonging and achievement or as a coping strategy for the purposes of escape from the real world.

The Interplay between Personality and Motivation

Of the studies presented, few reported on the interplay between personality traits and motivation to play Internet games (Cole & Hooley, 2013; Graham & Gosling, 2013; Jeng & Teng, 2008; Park et al., 2011). These studies tended to have several apparent weaknesses, including failing to use validated instruments, sampling limited populations, e.g., gamers from only one MMO game or gamers from homogeneous demographic groups, and failing to assess

for IGD.

By failing to use validated instruments to measure variables or by modifying instruments beyond their intended purposes, several studies fall short of accurately reporting on the interplay between personality and motivation amongst Internet gamers. Jeng and Teng (2008) only used five of the ten motivations for playing Internet games proposed by Yee's (2006b) validated instrument. By omitting mechanics, competition, socializing, relationships, and customization, the authors lost the opportunity to study main components shown to be associated with Internet gaming, namely the social nature of the activity, the potential for winning, and control over the environment. Park et al. (2011) did not use a validated assessment tool for motivation to play, and they relied on interviews to extract themes related to motivation. Similarly, Cole & Hooley (2010) did not use any validated instrumentation to measure motivation to play. A study using a validated personality test and a full version of a validated assessment for motivation to play Internet games would provide more reliable and comprehensive findings related to the interplay between personality traits and motivation to play Internet games.

Graham & Gossling (2013) modified Yee et al.'s (2012) instrument for assessing motivation to play, in order to focus on one particular game. Sampling a population of Internet gamers from a variety of games could produce results more generalizable to the larger gaming population. Both Jeng & Teng (2008) and Park et al. (2011) were studies conducted in Asian countries and sampled Taiwanese and Korean college students, respectively, between the ages of 17 and 28. A study with a more diverse sample related to age and ethnicity could provide more culturally inclusive implications for the gaming population. By understanding the relationships between personality traits and motivation amongst a culturally diverse sample of Internet gamers, researchers may be able to specify risk factors for the development of culturally

responsive prevention strategies, diagnosis, and treatment.

Finally, three of the four studies (Graham & Gosling, 2013; Jeng & Teng, 2008; Park et al., 2011) failed to assess for IGD in the populations surveyed, and the fourth (Cole & Hooley, 2010) used an instrument inconsistent with current *DSM-5* criteria. Thus, a study clearly assessing for IGD in the population would pinpoint personality traits and motivational factors associated with problematic Internet game play and provide clearer implications for etiology, prevention, and treatment of the disorder as it is outlined in the *DSM-5*. The researcher proposes a path analysis research design to create a proposed model of relationships amongst IGD, personality, motivation to play, and demographics, using validated instrumentation and sampling a diverse population of Internet gamers.

Method

The study utilized a cross-sectional, non-experimental group correlational design and used path analysis to analyze data. It examined the relationships among Internet gaming disorder (IGD), personality, motivation to play Internet games, and demographics, including age, gender, ethnicity, and student status. The study produced an overall just-identified path model (Figure 1) representing presumed relationships, based on theory and research, among variables related to IGD, personality, motivation to play Internet games, and demographic characteristics (gender, age, ethnicity, and student status).

Path analysis was used to analyze the model and its goodness of fit with the data. The model in Figure 1 proposed that demographic characteristics (gender, age, ethnicity, and student status), personality traits (extraversion, agreeableness, conscientiousness, neuroticism, and openness), and motivation to play online games (achievement, socialization, and immersion) are predictors of Internet gaming disorder (IGD). In addition, the model proposes that gender, age,

ethnicity, and student status are predictors of personality traits and motivation to play, and personality traits are predictors of motivation to play, as well.

Participants

Participants were Internet gamers over the age of 18 years, who have played Internet games, specifically a Massively Multiplayer Online game (MMO), within the last 12 months. IGD criteria in Section III of the *DSM-5* require symptoms to occur over a 12-month period (APA, 2013a). The researcher recruited participants via online tools, including Reddit and Facebook, and via local resources, including the researcher's university and settings in its vicinity where gamers are known to play.

An international sample of 1,881 was collected with 72.5% ($N = 1,563$) of participants living in the US and 27.5% ($N = 318$) living internationally. Forty-nine states, plus the District of Columbia and Puerto Rico, were represented in the US national sample. A total of 1,873 participants reported their ages, and the mean age of the sample was 28.27 years with a range of 18-95 years. Almost 60% ($N = 1,118$) participants were male and almost 40% ($N = 732$) were female. A notable 77.4% ($N = 1,456$) reported being White/Caucasian. Finally, 38.4% reported student status.

Instrumentation

Three valid and reliable instruments were used in the study in order to measure IGD, personality traits, and motivation to play Internet games. A demographic questionnaire gathered demographic information and specific information about participants' Internet use.

The IGD-10. The Ten-Item Internet Gaming Disorder Test (IGD-10) (Kiraly et al., 2015a) measures *DSM-5* criteria for IGD using the nine criteria in Section III: Preoccupation, withdrawal, tolerance, failed attempts to stop gaming, loss of interest in other activities,

continued use despite psychosocial problems, deception, escapism, relational/educational/vocational consequences. Participants who meet five or more of the nine criteria qualify for the diagnosis.

The BFI-10. The abbreviated form of the Big Five Inventory (BFI-10) (Rammstedt & John, 2007) measures five personality dimensions of Extraversion, Neuroticism, Agreeableness, Conscientiousness, and Openness using two items for each construct. The 10-item instrument is less than one quarter of the length of the full version of the Big Five Inventory-44, allowing for efficient data collection (Gosling, Rentfrow, & Swann, 2003; Rammstedt & John, 2007). Overall, the BFI-10 shows acceptable psychometric properties (Rammstedt & John, 2007) and has been used successfully in the literature to study the relationship between IGD and personality type (Lehenbauer-Baum & Fohringe, 2015; Wang et al., 2015).

The MPOGQ. To assess for gaming motivation, the researcher distributed The Motivation to Play Online Games Questionnaire (MPOGQ) (Yee et al., 2012). Participants rate 12 statements on importance using a 5-point Likert scale to measure the factors motivating their Internet gaming play. The instrument is a revised form of an original instrument created by Yee (2006b), and it is the only assessment tool in the literature validated on a large sample to measure motivation to play MMORPGs (Kuss et al., 2012). Participants who complete the instrument produce three scores based on how much they are motivated by each of the three high level factors: Achievement, Social, and Immersion.

Procedure

The data collection procedure for the study used purposeful methods. The researcher used both electronic and face-to-face methods to collect a. Electronic methods included distributing the survey link on Facebook.com, on Reddit.com, on Nextdoor.com, and via email. Face-to-face

distribution occurred at Pokémon Go hotspots within the vicinity of the researcher's university. Using electronic means to distribute the survey provided access to gamers all over the nation and the world, allowing for demographic diversity in the population sampled. After cleaning data for missing cases and transforming variables into analyzable form, the researcher conducted descriptive statistics to test for linear regression assumptions, identify any outliers, and assess the appropriateness of the path analysis model.

While assessing for reliability by testing the Cronbach's alpha for each instrument, the researcher discovered that three of the five constructs in the BFI-10 did not meet acceptable thresholds for reliability: Agreeableness scale .28, Conscientiousness scale .50, and Openness scale .32. Since Extraversion and Neuroticism were the two constructs to produce reliable results, those are the constructs that are reported to represent Personality in the analyses. Agreeableness, Conscientiousness, and Openness were, thus, not reported. When personality and Internet gaming are reported in the literature, findings point to three areas of personality: neuroticism, impulsivity, and extraversion. Thus, focusing on neuroticism and extraversion in the current study is appropriate for making contributions to the current body of literature. Other studies in the literature also examined individual constructs of personality, instead of all of the Big Five traits, including Mehroof and Griffiths (2010), who measured neuroticism, along with other associated personality traits not included in Big Five categories.

Results

To report the path analysis model, the researcher used maximum likelihood estimation to estimate the model parameters, including path coefficients and variance estimates. The chi-square (χ^2) statistical test was deemed inappropriate to test the null hypothesis that the model fits the data due to the large sample size (Keith, 2015). Unstandardized parameter estimates and

standard error for each path coefficient were recorded. The researcher also reported the variance and standard error of the exogenous variables (demographic characteristics). As part of Figure 2, which depicts the results of the path analysis, the researcher reported the R^2 variables for each endogenous variable (IGD, personality, and motivation) to show the percentage of variance in each variable that was accounted for by other variables in the model. The significance of these R^2 statistics indicated the goodness of fit of the path model.

In the overall model in Figure 2, 14.5% of the variance of IGD ($R^2 = .145$) was accounted for by the other variables in the model. In turn, 9.7% of the variance of Achievement Motivation ($R^2 = .097$) was accounted for by personality traits and demographic characteristics, 6.7% of the variance in Social Motivation ($R^2 = .067$), and 1.9% of the variance in Immersion Motivation ($R^2 = .019$). Finally, 1.9% of the variance in Extraversion ($R^2 = .019$) was accounted for by demographic characteristics and 12.2% of the variance in Neuroticism ($R^2 = .122$).

Figure 2 also shows the standardized path coefficients to represent the direct effect each variable has on another variable. The standardized path coefficients appear along, above, or below the arrows between each variable. Only significant path coefficients are displayed. Nonsignificant results were not included.

The researcher tested for the extent to which the relationships among IGD (DV), personality traits (IV) and motivation to play Internet games (DV) vary by gender, age, ethnicity/race, and college student status (IVs). A regression of IGD on Age, Gender, Ethnicity, Student Status, Extraversion, Neuroticism, Achievement Motivation, Social Motivation, and Immersion Motivation explained a significant 14.5% of the variance in IGD ($R = .38$); $F(9, 1781) = 34.40$, $MSE = 1.912$, $p < .001$. Specifically, Gender was a significant predictor of IGD ($\beta = -.12$) after controlling for other predictors. For personality traits, Extraversion was a significant

predictor of IGD ($\beta = -.11$) and Neuroticism was a significant predictor of IGD ($\beta = .18$).

Finally, for achievement constructs, Achievement Motivation was a significant predictor of IGD ($\beta = .21$); Social Motivation was a significant predictor of IGD ($\beta = .06$); and Immersion Motivation was a significant predictor of IGD ($\beta = .07$). Age, Ethnicity and Student Status were not significant predictors of IGD in this model. This model showed statistically significant relationships when demographic characteristics, personality, and motivation predict IGD. Gender was negatively related to IGD with a small effect size. Extraversion had a small negative relationship with IGD, and Neuroticism had a small positive relationship with IGD. All three motivation constructs were positively related to IGD, Social and Immersion Motivation with small effect sizes and Achievement Motivation with a moderate effect size.

As part of the overall model, the researcher also tested for the extent to which Internet gamers with certain demographic characteristics (IV) and personality traits (IV) have motivations for playing Internet games (DV). A regression of Achievement Motivation on Age, Gender, Ethnicity, Student Status, Extraversion, and Neuroticism, explained a significant 9.7% of the variance in Achievement Motivation ($R=.31$); $F(6, 1781) = 31.930$, $MSE = 4.775$, $p < .001$. Specifically, Age was a significant predictor of Achievement Motivation ($\beta = -.16$) after controlling for other predictors. Gender was also a significant predictor of Achievement Motivation ($\beta = -.24$). Ethnicity was a significant predictor of Achievement Motivation ($\beta = .08$). Student Status was a significant predictor of Achievement Motivation ($\beta = -.08$). Extraversion and Neuroticism were not significant predictors of Achievement Motivation in this model. This model showed statistically significant relationships when demographic characteristics and personality predict motivation to play online games. Age and Student Status had small negative

relationships with Motivation, and Ethnicity had a small positive relationship. Gender had a moderate negative relationship with Motivation.

A regression of Social Motivation on Age, Gender, Ethnicity, Student Status, Extraversion, and Neuroticism explained a significant 6.7% of the variance in Social Motivation ($R=.26$); $F(6, 1781) = 21.198$, $MSE = 7.610$, $p < .001$. Specifically, Age was a significant predictor of Social Motivation ($\beta = -.14$) after controlling for other predictors. Gender was also a significant predictor of Social Motivation ($\beta = -.19$). Student Status was a significant predictor of Social Motivation ($\beta = -.06$). Finally, Extraversion was a significant predictor of Social Motivation ($\beta = .14$). Ethnicity and Neuroticism were not significant predictors of Social motivation in this model. In this statistically significant model, Age, Gender, and Student Status all had small negative relationships with Social Motivation, and Extraversion had a small positive relationship with the outcome variable.

A regression of Immersion Motivation on Age, Gender, Ethnicity, Student Status, Extraversion, and Neuroticism explained a significant 1.9% of the variance in Immersion Motivation ($R=.14$); $F(6, 1781) = 5.732$, $MSE = 7.503$, $p < .001$. Only Age was a significant predictor of Immersion Motivation ($\beta = -.14$) after controlling for other predictors. Gender, Ethnicity, Student Status, Extraversion, and Neuroticism were not significant predictors of Immersion Motivation in this model. In this statistically significant model, Age had a small negative relationship with Immersion Motivation.

Finally, the researcher tested for the extent to which motivation to play Internet games (IV) mediates personality traits (IV) for Internet gamers with varying levels of IGD (DV). The researcher used linear and hierarchical regression to test for the mediation effect. To confirm a mediation effect, the researcher confirmed personality traits as predictors of Achievement,

Social, and Immersion Motivation. A regression of Achievement Motivation on personality traits explained a significant 0.7 % of the variance in Achievement Motivation ($R^2 = .007$). A regression of Social Motivation on personality traits explained a significant 1.4% of the variance in Social Motivation ($R^2 = .014$). And a regression of Immersion Motivation on personality traits was not a significant model. For Model 1, a regression of IGD on personality traits explained a significant 3.7% of the variance in IGD ($R^2 = .037$) ($R = .19$); $F(2, 1880) = 36.579$, $MSE = 2.276$, $p < .001$. Adding Achievement, Social, and Immersion Motivation in the second step of the hierarchical regression analysis led to a significant change in R^2 ($\Delta R^2 = .100$, $p < .001$). Thus, including Motivation in the second step explained an additional 10.0% of the variance in IGD. In the updated model, a regression of IGD on personality traits and motivation explained a significant 13.8% of the variance in IGD ($R^2 = .138$); $F(5, 1880) = 59.815$, $MSE = 2.043$, $p < .001$.

Discussion

In the overall model, less Extraversion ($\beta = -.11$) and more Neuroticism ($\beta = .18$) predicted IGD. These findings were consistent with results in the literature where effect sizes were even larger. Mehroof and Griffiths (2010) found neuroticism to be associated with addiction to Internet gaming ($\beta = .204$, $p < .01$) and suggested that neurotic gamers may use gaming as a coping strategy to escape the neurotic feelings. Similarly, Peters and Malesky (2008) reported higher neuroticism ($r = .381$, $p < 0.001$) and less extraversion ($r = .235$, $p < 0.05$) among problematic Internet gamers, suggesting that some gamers may be avoiding social situations by gaming or seeking out safer social environments via Internet gaming. Cole and Hooley (2013) also reported that gamers with higher problematic behaviors showed less extraversion and more neuroticism, though anxiety correlated with neuroticism may actually be

the stronger predictor of problematic gaming. Caplan et al. (2009) examined introversion, not extraversion, but found results in line with the literature, and introversion was associated with gamers exhibiting problematic gaming behavior. The overall conclusion based on these common results is that gamers' social tendencies, as determined by personality traits, may play in role in developing problematic gaming habits and addiction.

Neuroticism was not a predictor of any kind of motivation assessed in the study, and Extraversion was only a predictor of Social Motivation. Thus, when looking at demographic characteristics and personality traits alone as predictors of motivation for game playing, personality did not predict motivation, with the logical exception of Extraversion predicting Social Motivation. Graham and Gosling (2013 and) Jeng and Teng (2008) also used regression analyses to examine how personality predicts motivation to play online games. In line with the current study, Graham and Gosling reported on the positive relationship between extraversion and social motivation to play games. Jeng and Teng reported similar findings that extraversion predicts social motivation among gamers with an even higher effect size, though at a lower significance threshold ($\beta = .34, p = .01$). The authors also found significant findings related to the negative relationship between neuroticism and social motivation, which the current study could not report due to nonsignificant results. In a similar vein, and using a different methodology in their study, Cole and Hooley (2013) also reported that gamers with introverted and neurotic personality traits may be socially anxious and thus motivated to socialize online. Whereas the current study only found extraversion related to social motivation, Park et al. (2011) reported relationships between extraversion and other motivations to play, including adventure/escape (immersion), relaxation, and achievement. Overall, the similar findings

reported in the literature suggest that extraverted gamers, in particular, may be motivated to interact with others in the game who share common interests and experiences.

For demographic characteristics, there were some common themes in results for all three types of motivation. First, being male was a predictor of both Achievement and Social Motivation in the current study. This finding conflicts with findings by Park et al. (2011) who found that being female is related to relationship building motivation for game playing. Next, younger age was a predictor of Achievement, Social, and Immersion Motivation in the current study. This finding, again, is inconsistent with Park et al.'s (2011) report that older age predicts immersion motivation, in particular. Yee's (2006b) is the foundational research on the relationships between age, gender, and motivation to play online games. Yee, in fact, showed that younger age predicted achievement motivation, and that age was a stronger predictor than gender when predicting achievement motivation in particular. With regard to gender, the author asserts that, while being male is associated with achievement motivation and being female is associated with relationship building motivation, there is no gender difference when it comes to social motivation. Thus, male players were found to be equally motivated by social motivation as females in Yee's study, but may have different pursuits in online relationships. The author confirmed these findings in a subsequent study six years later (Yee et al., 2012). Thus, though female gamers tend to focus on relationship building while gaming, overall social motivation to play may be associated with males, and younger gamers appear to be especially motivated by achievement when gaming.

Personality traits alone predicted Achievement Motivation ($R^2 = .007$) and Social Motivation ($R^2 = .014$) with small effect sizes, and did not significantly predict Immersion Motivation. The weakness of these relationships called into question the meaningfulness of any

results related to how motivation may mediate personality traits when predicting IGD. Still, adding motivation into the mix of demographic and personality predictors did add a significant 10% of the variance to the model predicting IGD. Thus, personality traits clearly predict IGD behavior, and certain motivations to play also predict IGD. However, since the personality traits examined in the current study did not strongly predict motivation to play, gamers with extraverted and neurotic tendencies may not be especially motivated to play online games for certain reasons. This finding coincides with a study by Caplan et al. (2009), which also used hierarchical regression to understand how motivation contributes to the variance in problematic Internet use scores, after controlling for demographic and psychosocial variables. However, whereas in the current study, adding motivation variables to the regression model contributed an additional 10% of variance to the model, Caplan et al. only found motivation to add 2% of variance to their proposed hierarchical model. Personality and motivation are significant predictors of IGD behavior, but their interplay remains unclear.

The overall path model showed that demographics, personality, and motivation all significantly predict IGD. However, only gender, specifically being male, predicted IGD among the demographic characteristics in the overall model. For personality traits, just like in the simpler model in RQ1, less extraversion and more neuroticism predicted IGD. Finally, all three kinds of motivation predicted IGD, but Achievement Motivation was a significantly stronger predictor than Social or Immersion Motivation. Only one study in the literature examined both personality and motivation in relation to problematic Internet use (Cole & Hooley, 2013). These authors concluded that gamers with problematic gaming behavior may be socially motivated to play the games, but may also be exhibiting psychosocial dysfunction. In addition, they discuss that more anxious, neurotic, and socially impaired gamers are associated with problematic play.

The findings are in line with the results of the current study; however, the current study also points to the strong relationship between IGD and achievement motivation. Thus, a more comprehensive picture of risk factors for IGD may be social impairment, with the preference to socialize online and to obtain gratification from the achievement opportunities gaming affords. An additional demographic risk factor for IGD is being male. This picture is not the only way to view gamers with IGD; rather, it is a generalization based on the associations among variables found in two studies. Still, it is a generalization supported in bits and pieces by a myriad of studies that focus on various aspects of personality or motivation related to gaming and IGD. More research is needed to understand the full interplay among personality, motivation, and IGD, along with demographic risk factors.

Limitations

As a correlational design, the current study is subject to flaws in internal validity, since it does not measure causation. In addition, some groups were not equivalent, including age, which was predominantly under 30, and ethnicity, which was predominantly White/Caucasian. The demographic characteristics reported in the current study are similar to populations sampled in other studies on personality, motivation, and IGD, suggesting that the Internet gaming population may simply be younger and more representative of White ethnicities. Also, the self-report data method proposed in the study could have been biased and potentially threatening to internal validity. Participants could have minimized their symptoms of addiction or could have failed to take the survey seriously. However, there are multiple benefits to the self-report method in the study, including ease of collection and the benefit of direct responses from participants as opposed to third-party observations. In addition, the presumed causal relationships of the path analysis design mitigate threats to internal validity. Finally, only two of the five personality

constructs measured in the BFI-10 showed adequate reliability statistics, so the scope of the study to measure personality was limited by the use of fewer constructs in the analyses conducted.

External validity refers to how certain one can be that results are generalizable. Selection bias is a factor affecting external validity. Participants who chose to participate in the study may not be representative of the gaming population. Still, this sample population resembles sample populations in several other large scale studies examining personality, motivation, and IGD (Caplan et al., 2009; Cole & Hooley, 2013; Graham & Gosling, 2013; Jeng & Teng, 2008; Park et al., 2011; Yee, 2006b; Yee et al., 2012); and the current study is in fact more representative of age and ethnicity and equally representative of gender. Additionally, responses are not evenly distributed across demographic groups in order to make the most accurate comparisons and correlations, namely age and ethnicity as described above. However, proposed data collection methods, namely the use of electronic methods and snowball sampling, allowed for the opportunity to collect data from diverse populations all over the nation and the world. Overall, lack of randomization, manipulation, and control factors in the correlational design make it difficult to establish cause-effect relationships, so results lack generalizability. Still, the path analysis models may show presumed causal relationship amongst variables, and the discussion emphasizes the strength of these relationships as well as effect sizes.

Future Research

Future research is clearly needed in all areas the current study examined. Personality traits and motivation distinctly play a role in the development of IGD, among a multitude of other variables. More personality traits, beyond the Big Five, should be analyzed in models that also include other psychosocial and environmental factors. Specific psychosocial and

environmental factors supported in the literature include anxiety, social phobia, narcissism, family dynamics, and social preferences. Above all, a more reliable, valid, and comprehensive personality instrument should be used to measure Big Five personality traits, even at the sacrifice of short survey length and potentially larger sample sizes. Research should be continued with diverse sampling procedures to see if the homogeneity, especially with regard to ethnicity and age, is accurately representative of the makeup of the gaming population. Especially as games develop different social aspects, such as the combination of real world and virtual world social interaction in Pokémon Go, research methods that compare groups of gamers who play certain games could add to the body of knowledge about how and why gamers become addicted. Finally, qualitative research is a vital component of this research to understand how the socialization, simulation, fantasy, and technology influence why and how people play Internet games.

References

- Allison, S. E., von Wahlde, L., Shockley, T., & Gabbard, G. O. (2006). The development of the self in the era of the Internet and role-playing fantasy games. *The American Journal of Psychiatry*, *163*(3), 381–385.
- American Psychiatric Association. (2013a). *Diagnostic and statistical manual of mental disorders* (5th ed.). Washington, DC: Author.
- Beard, C. L., & Wickham, R. E. (2016). Gaming-contingent self-worth, gaming motivation, and Internet gaming disorder. *Computers in Human Behavior*, *61*, 507-515.
doi:10.1016/j.chb.2016.03.046
- Beranuy, M., Carbonell, X., & Griffiths, M. (2013). A qualitative analysis of online gaming addicts in treatment. *International Journal of Mental Health & Addiction*, *11*(2), 149-161. doi:10.1007/s11469-012-9405-2
- Butcher, J. N., Dahlstrom, W. G., Graham, J. R., Tellegen, A., & Kaemmer, B. (1989). *The Minnesota Multiphasic Personality Inventory-2 (MMPI-2): Manual for administration and scoring*. Minneapolis: University of Minnesota Press.
- Caplan, S. E., Williams, D., & Yee, N. (2009). Problematic Internet use and psychosocial well-being among MMO players. *Computers in Human Behavior*, *25*(6), 1312–1319.
- Carlisle, K. L. & Carrington, C. (2015). The social experience of Internet gamers: A pilot study. *VISTAS 2015*. Retrieved from <http://www.counseling.org/knowledge-center/vistas>
- Cole, S. S., & Hooley, J. M. (2013). Clinical and personality correlates of MMO gaming: Anxiety and absorption in problematic Internet use. *Social Science Computer Review*, *31*(4), 424-436. doi:10.1177/0894439312475280
- Costa, P. T., & McCrae, R. R. (1985). *The NEO personality inventory manual*. Odessa, Ukraine:

Psychological Assessment Resources.

- Didelot, M. J., Hollingsworth, L., & Buckenmeyer, J. A. (2012). Internet addiction: A logotherapeutic approach. *Journal of Addictions & Offender Counseling, 33*(1), 18-33.
- Essig, T. (2012). The addiction concept and technology: Diagnosis, metaphor, or something else? A psychodynamic point of view. *Journal of Clinical Psychology, 68*(11), 1174-1184.
- Gosling, S. D., Rentfrow, P. J., & Swann, W. B. (2003). A very brief measure of the Big-Five personality domains. *Journal of Research in Personality, 37*, 504-528.
- Graham, L. T., & Gosling, S. D. (2013). Personality profiles associated with different motivations for playing World of Warcraft. *Cyberpsychology, Behavior And Social Networking, 16*(3), 189-193. doi:10.1089/cyber.2012.0090
- Griffiths, M. D., Davies, M. N. O., & Chappell, D. (2003). Breaking the stereotype: The case of online gaming. *CyberPsychology & Behavior, 6*(1), 81-91.
- Griffiths, M. D., Davies, M. N. O., & Chappell, D. (2004). Demographic factors and playing variables in online computer gaming. *Cyberpsychology & Behavior, 7*(4), 479-487.
- Hussain, Z., & Griffiths, M. D. (2009). Excessive use of Massively Multiplayer Online Role-Playing Games: a pilot study. *International Journal of Mental Health and Addiction, 7*, 563-571.
- Hussain, Z., Williams, G., & Griffiths, M. (2015). An exploratory study of the association between online gaming addiction and enjoyment motivations for playing massively multiplayer online role-playing games. *Computers in Human Behavior, 50*, 221-230. doi:10.1016/j.chb.2015.03.075
- Hsu, S. H., Wen, M. H., & Wu, M. C. (2009). Exploring user experiences as predictors of

- MMORPG addiction. *Computers & Education*, 53(2), 990–999.
- Jansz, J., & Martens, L. (2005). Gaming at a LAN event: The social context of playing video games. *New Media & Society*, 7, 333–355.
- Jansz, J., & Tanis, M. (2007). Appeal of playing online first person shooter games. *CyberPsychology & Behavior*, 10, 133–136.
- Jeng, S. P., & Teng, C. I. (2008). Personality and motivations for playing online games. *Social Behavior and Personality*, 36(8), 1053-1060.
- Jeong, E. J., & Kim, D. W. (2010). Social activities, self-efficacy, game attitudes, and game addiction. *Cyberpsychology, Behavior & Social Networking*, 14(4), 213–221.
- Kardefelt-Winther, D. (2014a). The moderating role of psychosocial well-being on the relationship between escapism and excessive online gaming. *Computers in Human Behavior*, 38, 68-74. doi:10.1016/j.chb.2014.05.020
- Keith, T. (2015). *Multiple regression and beyond*. (2nd ed.). Boston, MA: Pearson Education.
- Kim, E. J., Namkoong, K., Ku, T., & Kim, S. J. (2008). The relationship between online game addiction and aggression, self-control and narcissistic personality traits. *European Psychiatry*, 23(3), 212–218. doi:10.1016/j.eurpsy.2007.10.010
- King, D. L., & Delfabbro, P. (2009a). Motivational differences in problem video game play. *Journal Of Cyber Therapy And Rehabilitation*, 2(2), 139-149.
- King, D. L., & Delfabbro, P. (2009b). Understanding and assisting excessive players of video games: a community psychology perspective. *The Australian Community Psychologist*, 21(1), 62–74.
- King, D. L., Delfabbro, P. H., & Griffiths, M. D. (2011). The role of structural characteristics in problematic video game play: An empirical study. *International Journal Of Mental*

- Health & Addiction*, 9(3), 320-333. doi:10.1007/s11469-010-9289-y
- Kiraly, O., Griffiths, M. D., & Demetrovics, Z. (2015a). Internet gaming disorder and the DSM-5: Conceptualization, debates, and controversies. *Current Addictions Report*, 2(3), 254-262.
- Király, O., Slezcka, P., Pontes, H. M., Urbán, R., Griffiths, M. D., & Demetrovics, Z. (2015b). Validation of the Ten-Item Internet Gaming Disorder Test (IGDT-10) and evaluation of the nine DSM-5 Internet Gaming Disorder criteria. *Addictive Behaviors*, doi:10.1016/j.addbeh.2015.11.005
- Ko, C., Yen, J., Chen, C., Chen, S., & Yen, C. (2005). Gender differences and related factors affecting online gaming addiction among Taiwanese adolescents. *Journal of Nervous And Mental Disease*, 193(4), 273-277.
- Kuss, D. W., Louws, J., & Weirs, R. W. (2012). Online gaming addiction? Motives predict addictive play behavior in massively multiplayer online role-playing games. *Cyberpsychology, Behavior & Social Networking*, 15(9), 480-485.
- Lehenbauer-Baum, M., & Fohringer, M. (2015). Towards classification criteria for Internet gaming disorder: Debunking differences between addiction and high engagement in a German sample of World of Warcraft players. *Computers In Human Behavior*, 45, 345-351. doi:10.1016/j.chb.2014.11.098
- Leung, L. (2007). Stressful life events, motives for Internet use, and social support among digital kids. *CyberPsychology & Behavior*, 10(2), 204-214.
- Mehroof, M. D., & Griffiths, M. D. (2010). Online gaming addiction: The role of sensation seeking, self-control, neuroticism, aggression, state anxiety, and trait anxiety. *Cyberpsychology, Behavior & Social Networking*, 13(3), 313-316.

- Ng, B. D., & Wiemer-Hastings, P. (2005). Addiction to the Internet and online gaming. *Cyberpsychology & Behavior*, *8*(2), 110–113.
- Park, J., Song, Y., & Teng, C. (2011). Exploring the links between personality traits and motivations to play online games. *Cyberpsychology, Behavior & Social Networking*, *14*(12), 747-751.
- Peng, W., & Liu, M. (2010). Online gaming dependency: A preliminary study in China. *CyberPsychology, Behavior and Social Networking*, *13*(3), 329–333.
- Peters, C. S., & Malesky Jr, L. A. (2008). Problematic usage among highly-engaged players of massively multiplayer online role playing games. *Cyberpsychology & Behavior*, *11*(4), 481-484. doi:10.1089/cpb.2007.0140
- Porter, G., Starcevic, V., Berle, D., & Fenech, P. (2010). Recognizing problem video game use. *Australian & New Zealand Journal of Psychiatry*, *44*(2), 120–128.
- Rammstedt, B. & John, O. P. (2007). Measuring personality in one minute or less: A 10-item short version of the Big Five Inventory in English and German. *Journal of Research in Personality*, *41*, 203-212.
- Rehbein, F., Psych, G., Kleimann, M., Mediasci, G., & Mossle, T. (2010). Prevalence and risk factors of video game dependency in adolescence: Results of a German nationwide survey. *CyberPsychology, Behavior & Social Networking*, *13*(3), 269–277.
- Rosenberg, M. (1965). *Society and adolescent self-image*. New Jersey: Princeton University Press.
- Teng, C. I. (2008). Personality differences between online game players and non-players in a student sample. *CyberPsychology & Behavior*, *11*(2), 232-234.

- Trepte, S., Reinecke, L., & Juechems, K. (2012). The social side of gaming: How playing online computer games creates online and offline social support. *Computers In Human Behavior*, 28, 832-839. doi:10.1016/j.chb.2011.12.003
- Vermulst, A. A., & Gerris, J. R. M. (2009). Quick Big Five (QBF). Persoonlijkheidstest. Nijmegen, The Netherlands: Behavioural Science Institute, University of Nijmegen.
- Wan, C. S., & Chiou, W. B. (2006a). Psychological motives and online games addiction: a test of flow theory and humanistic needs theory for Taiwanese adolescents. *Cyberpsychology & Behavior*, 9(3), 317–324.
- Wan, C. S., & Chiou, W. B. (2006b). Why are adolescents addicted to online gaming? An interview study in Taiwan. *Cyberpsychology & Behavior*, 9(6), 762–766.
- Wang, C., Ho, R. H., Chan, C. W., & Tse, S. (2015). Exploring personality characteristics of Chinese adolescents with internet-related addictive behaviors: Trait differences for gaming addiction and social networking addiction. *Addictive Behaviors*, 42, 32-35 doi:10.1016/j.addbeh.2014.10.039
- Yao, Y., Wang, L., Yip, S. W., Chen, P., Li, S., Xu, J., & ... Fang, X. (2015). Impaired decision-making under risk is associated with gaming-specific inhibition deficits among college students with Internet gaming disorder. *Psychiatry Research*, 229, 302-309. doi:10.1016/j.psychres.2015.07.004
- Yee, N. (2006b). Motivations for play in online games. *Journal of CyberPsychology and Behavior* 9, 772-775.
- Yee, N., Ducheneaut, N., & Nelson, L. (2012). *Online gaming motivation scale: Development and validation*. In Proceedings of the 2012 ACM annual conference on Human Factors in Computing Systems. Austin, TX: ACM 2012.

Young, K. S. (2009). Understanding online gaming addiction and treatment issues for adolescents. *American Journal of Family Therapy*, 37(5), 355–372.

doi:10.1080/01926180902942191

Zhong, Z., & Yao, M. Z. (2013). Gaming motivations, avatar-self identification and symptoms of online game addiction. *Asian Journal of Communication*, 23(5), 555-573.

doi:10.1080/01292986.2012.748814

Figure 1.

Model 1: Overall Proposed Path Model

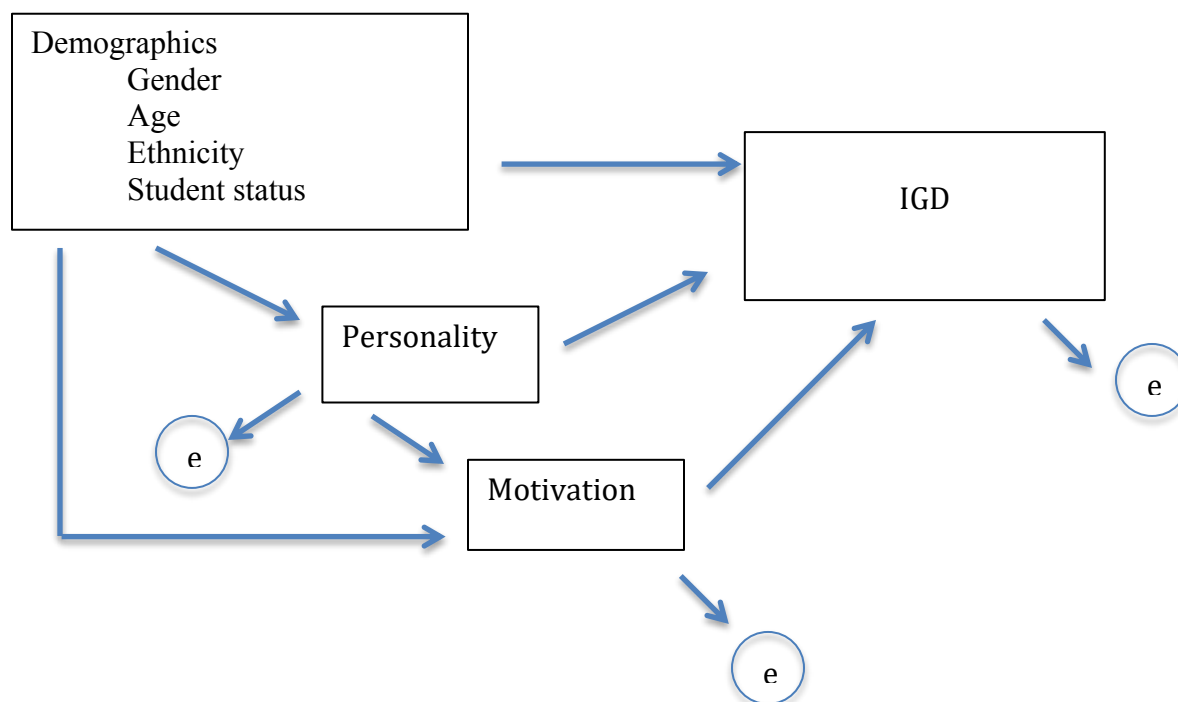
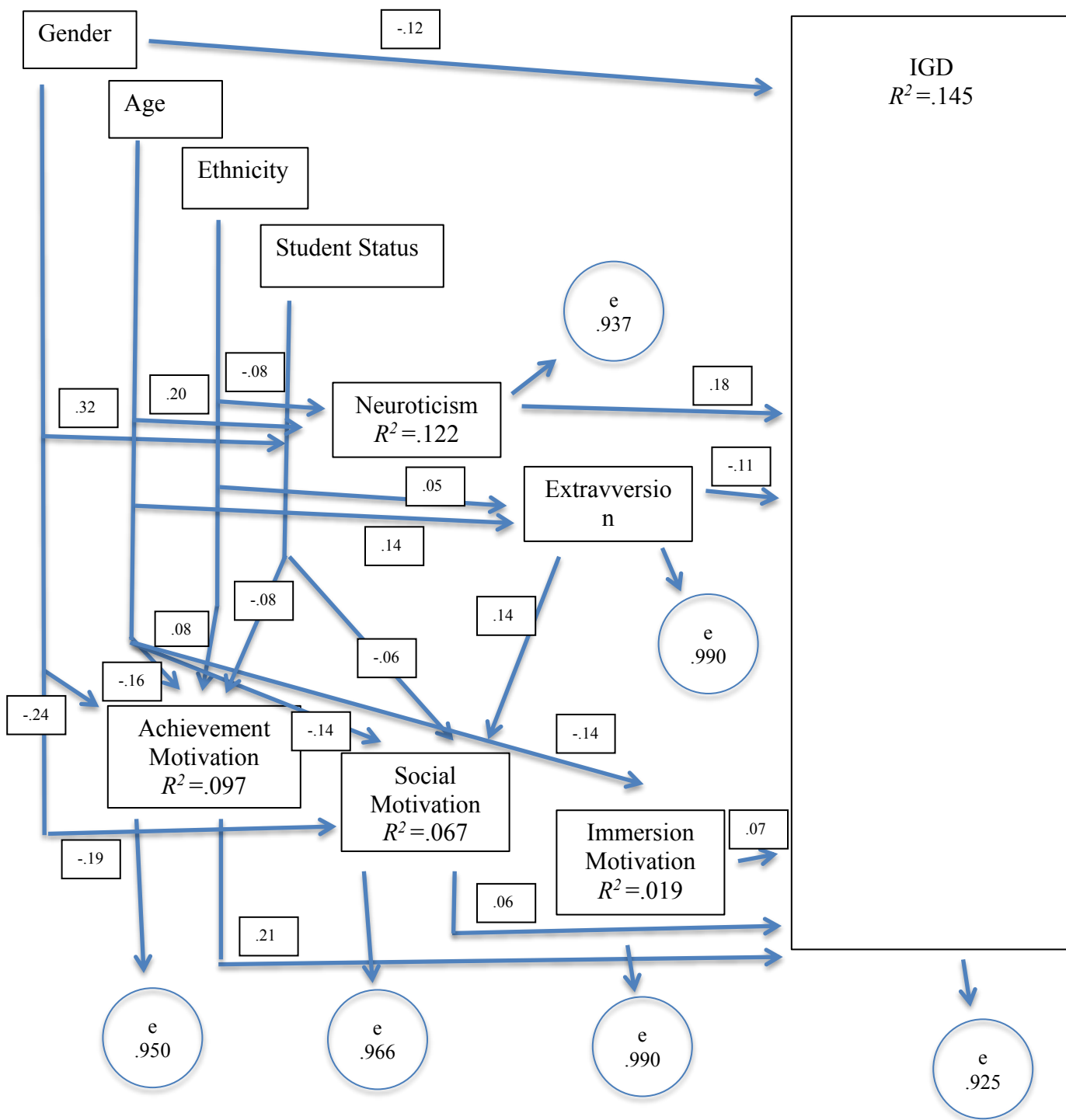


Figure 2.

Model 2: Path Model Results



References

- Alavi, S. S., Ferdosi, M., Jannatifard, F., Eslami, M., Alaghemandan, H., & Setare, M. (2012). Behavioral addiction versus substance addiction: Correspondence of psychiatric and psychological views. *International Journal of Preventive Medicine*, 3(4), 290-294.
- Allison, S. E., von Wahlde, L., Shockley, T., & Gabbard, G. O. (2006). The development of the self in the era of the Internet and role-playing fantasy games. *The American Journal of Psychiatry*, 163(3), 381–385.
- American Psychiatric Association. (2013a). *Diagnostic and statistical manual of mental disorders* (5th ed.). Washington, DC: Author.
- American Psychiatric Association. (2013b). *Highlights of Changes from DSM-IV-TR to DSM-5*. Retrieved from <http://www.dsm5.org/Documents/changes%20from%20dsm-iv-tr%20to%20dsm-5.pdf>
- American Psychiatric Association. (2013c). *Section III*. Retrieved from file:///Users/Kristy/Downloads/APA_DSM-5-Section-III.pdf
- Bartle, R. (2004). *Designing virtual worlds*. Berkeley, CA: New Riders.
- Batthyány, D., Müller, K. W., Benker, F., & Wölfling, K. (2009) Computer game playing: clinical characteristics of dependence and abuse among adolescents. *The Central European Journal of Medicine*, 121, 502–509.
- Beard, C. L., & Wickham, R. E. (2016). Gaming-contingent self-worth, gaming motivation, and Internet gaming disorder. *Computers in Human Behavior*, 61, 507-515.
doi:10.1016/j.chb.2016.03.046
- Bell, M. W. (2008). Toward a definition of “virtual worlds.” *Journal of Virtual Worlds Research* 1(1). Retrieved from <http://journals.tdl.org/jvwr/article/download/283/237>

- Beranuy, M., Carbonell, X., & Griffiths, M. (2013). A qualitative analysis of online gaming addicts in treatment. *International Journal of Mental Health & Addiction*, *11*(2), 149-161. doi:10.1007/s11469-012-9405-2
- Billieux, J., Van der Linden, M., Achab, S., Khazaal, Y., Paraskevopoulos, L., Zullino, D., & Thorens, G. (2013). Why do you play World of Warcraft? An in-depth exploration of self-reported motivations to play online and in-game behaviours in the virtual world of Azeroth. *Computers In Human Behavior*, *29* (Including Special Section Youth, Internet, and Wellbeing), 103-109. doi:10.1016/j.chb.2012.07.021
- Bland, J., & Altman, D. (1997). Statistics Notes: Cronbach's Alpha. *BMJ: British Medical Journal*, *314*(7080), 572-572. Retrieved from <http://www.jstor.org.proxy.lib.odu.edu/stable/25173851>
- Blinka, L., & Mikuška, J. (2014). The role of social motivation and sociability of gamers in online game addiction. *Cyberpsychology*, *8*(2), 1-10. doi:10.5817/CP2014-2-6
- Blizzard. (2008). World of Warcraft: Subscriber base reaches 11.5 million worldwide. [Press Release] Retrieved from <http://us.blizzard.com/en-us/company/press/pressreleases.html?081121>
- Bowman, N. C., Schultheiss, D., & Schumann, C. (2012). 'I'm attached, and I'm a good guy/gal!': How character attachment influences pro- and anti-social motivations to play Massively Multiplayer Online Role-Playing Games. *Cyberpsychology, Behavior & Social Networking*, *15*(3), 169-174.
- Brewer, J. A., & Potenza, M. N. (2008). The neurobiology and genetics of impulse control disorders: relationships to drug addictions. *Biochemical Pharmacology*, *75*, 63-75. doi:10.1016/j.bcp.2007.06.043

- Butcher, J. N., Dahlstrom, W. G., Graham, J. R., Tellegen, A., & Kaemmer, B. (1989). *The Minnesota Multiphasic Personality Inventory-2 (MMPI-2): Manual for administration and scoring*. Minneapolis: University of Minnesota Press.
- Caplan, S. E., Williams, D., & Yee, N. (2009). Problematic Internet use and psychosocial well-being among MMO players. *Computers in Human Behavior, 25*(6), 1312–1319.
- Carlisle, K. L. & Carrington, C. (2015). The social experience of Internet gamers: A pilot study. *VISTAS 2015*. Retrieved from <http://www.counseling.org/knowledge-center/vistas>
- Carlisle, K. L., Carlisle, R. M., Polychronopoulos, G., Goodman-Scott, E., & Kirk-Jenkins, A. (2016). Exploring Internet addiction as a process addiction. *Journal of Mental Health Counseling, 38*(2), 170-182.
- Chan, P. A., & Rabinowitz, T. (2006). A cross-sectional analysis of video games and attention deficit hyperactivity disorder symptoms in adolescents. *Annals of General Psychiatry, 5*(1), 16–26.
- Chang, S., & Lin, S. S. (2014). Team knowledge with motivation in a successful MMORPG game team: A case study. *Computers & Education, 73*, 129-140.
doi:10.1016/j.compedu.2013.09.024
- Chappell, D., Eatough, V., Davies, M. N. O., & Griffiths, M. D. (2006). Everquest—It's just a computer game right? An interpretative phenomenological analysis of online gaming addiction. *International Journal of Mental Health and Addiction, 4*, 205–216.
- Charlton, J. P., & Danforth, I. D. (2007). Distinguishing addiction and high engagement in the context of online game playing. *Computers in Human Behavior, 23*(Including the Special Issue: Avoiding Simplicity, Confronting Complexity: Advances in Designing Powerful Electronic Learning Environments), 1531-1548. doi:10.1016/j.chb.2005.07.002

- Chiao-Ling, H., Shu Ching, Y., & An-Sing, C. (2015). Motivations and gratification in an online game: Relationships among players' self-esteem, self-concept, and interpersonal relationships. *Social Behavior & Personality: An International Journal*, 43(2), 193-203.
- Chiu, S., Lee, J., & Huang, D. (2004). Video game addiction in children and teenagers in Taiwan. *Cyberpsychology & Behavior: The Impact Of The Internet, Multimedia And Virtual Reality On Behavior And Society*, 7(5), 571-581.
- Cohen, J. (1988). *Statistical power analysis for the behavioral sciences* (2nd ed.). Hillsdale, NJ: Lawrence Erlbaum.
- Cohen, J. (1992). A power primer. *Psychological Bulletin*, 112 (1), 155 – 159. doi: 10.1037/00332909.112.1.155
- Cole, S. S., & Hooley, J. M. (2013). Clinical and personality correlates of MMO gaming: Anxiety and absorption in problematic Internet use. *Social Science Computer Review*, 31(4), 424-436. doi:10.1177/0894439312475280
- Costa, P. T., & McCrae, R. R. (1985). *The NEO personality inventory manual*. Odessa, Ukraine: Psychological Assessment Resources.
- Creswell, J. W. (2014). *Research design: Qualitative, quantitative, and mixed methods approaches* (4th ed.). Thousand Oaks, CA: Sage Publications.
- Dauriat, F. Z., Zermatten, A., Billieux, J., Thorens, G., Bondolfi, G., Zullino, D., & Khazaal, Y. (2011). Motivations to play specifically predict excessive involvement in Massively Multiplayer Online Role-Playing Games: Evidence from an online survey. *European Addiction Research*, 17(4), 185-189.
- Demetrovics, Z., & Griffiths, M. D. (2012). Behavioral addictions: Past, present and future. *Journal of Behavioral Addictions*, 1(1), pp. 1–2.

- Didelot, M. J., Hollingsworth, L., & Buckenmeyer, J. A. (2012). Internet addiction: A logotherapeutic approach. *Journal of Addictions & Offender Counseling, 33*(1), 18-33.
- Dindar, M., & Akbulut, Y. (2015). Role of self-efficacy and social appearance anxiety on gaming motivations of MMOFPS players. *Computers & Education, 8*, 126-34.
doi:10.1016/j.compedu.2014.09.007
- Dowling, N. A. (2014). Issues raised by the DSM-5 Internet gaming disorder classification and proposed diagnostic criteria. *Addiction, (109)*, 1407-1413.
- Dowling, N. A., & Brown, M. (2010). Commonalities in the psychological factors associated with problem gambling and Internet dependence. *CyberPsychology, Behavior & Social Networking, 13*, 437– 41.
- Downey, S. (2014). History of the (Virtual) Worlds. *Journal of Technology Studies, 40*(2), 54-66.
- Entertainment Software Association. (2014). Essential facts about the computer and video game industry. Retrieved from [http:// www.theesa.com/facts/pdfs/esa_ef_2014.pdf](http://www.theesa.com/facts/pdfs/esa_ef_2014.pdf)
- Essig, T. (2012). The addiction concept and technology: Diagnosis, metaphor, or something else? A psychodynamic point of view. *Journal of Clinical Psychology, 68*(11), 1174-1184.
- Frangos, C. C., Frangos, C. C., & Kiohos, A. P. (2010). Internet addiction among Greek university students: Demographic associations with the phenomenon, using the Greek version of Young's Internet Addiction Test. *International Journal of Economic Sciences and Applied Research, 3*(1), 49-74.
- Fuster, H., Chamarro, A., Carbonell, X., & Vallerand, R. J. (2014). Relationship between passion and motivation for gaming in players of massively multiplayer online role-playing games.

Cyberpsychology, Behavior & Social Networking, 17(5), 292-297.

doi:10.1089/cyber.2013.0349

Fuster, H., Oberst, U., Griffiths, M., Carbonell, X., Chamarro, A., & Talar, A. (2012).

Psychological motivation in online role-playing games: A study of Spanish World of Warcraft players. *Anales de Psicología*, 28(1), 274–280.

Gosling, S. D., Rentfrow, P. J., & Swann, W. B. (2003). A very brief measure of the Big-Five personality domains. *Journal of Research in Personality*, 37, 504-528.

Graham, L. T., & Gosling, S. D. (2013). Personality profiles associated with different motivations for playing World of Warcraft. *Cyberpsychology, Behavior And Social Networking*, 16(3), 189-193. doi:10.1089/cyber.2012.0090

Grant, J. E., Potenza, M. N., Weinstein, A., & Gorelick, D. A. (2011). Introduction to behavioral addictions. *American Journal of Drug and Alcohol Abuse*, 36(5), 233-241.

Griffiths, M. D. (2005). A “components” model of addiction within a biopsychosocial framework. *Journal of Substance Use*, 10, 191-197.

Griffiths, M. D. (2016). Playing the field: Another look at Internet gaming disorder. Retrieved from http://www.gamasutra.com/blogs/MarkGriffiths/20160211/265709/Playing_the_field_An_other_look_at_Internet_Gaming_Disorder.php

Griffiths, M. D., Davies, M. N. O., & Chappell, D. (2003). Breaking the stereotype: The case of online gaming. *CyberPsychology & Behavior*, 6(1), 81-91.

Griffiths, M. D., Davies, M. N. O., & Chappell, D. (2004). Demographic factors and playing variables in online computer gaming. *Cyberpsychology & Behavior*, 7(4), 479–487.

- Grüsser, S. M., Thalemann, R., Albrecht, U., & Thalemann, C. N. (2005). Excessive computer usage in adolescents--results of a psychometric evaluation. *Wiener Klinische Wochenschrift*, *117*(5-6), 188-195.
- Grüsser, S. M., Thalemann, R., & Griffiths, M. D. (2007). Excessive computer game playing: evidence for addiction and aggression? *Cyberpsychology & Behavior*, *10*(2), 290–292.
- Hellström, C., Nilsson, K. W., Leppert, J., & Åslund, C. (2012). Influences of motives to play and time spent gaming on the negative consequences of adolescent online computer gaming. *Computers in Human Behavior*, *28*(1), 379-1387. doi:10.1016/j.chb.2012.02.023
- Hoffman, B., & Nadelson, L. (2010). Motivational engagement and video gaming: a mixed methods study. *Educational Technology Research & Development*, *58*(3), 245-270. doi:10.1007/s11423-009-9134-9
- Hsi-Peng, L., & Shu-ming, W. (2008). The role of Internet addiction in online game loyalty: an exploratory study. *Internet Research*, *18*(5), 499-519. doi:10.1108/10662240810912756
- Hussain, Z., & Griffiths, M. D. (2009). Excessive use of Massively Multiplayer Online Role-Playing Games: a pilot study. *International Journal of Mental Health and Addiction*, *7*, 563–571.
- Hussain, Z., Williams, G., & Griffiths, M. (2015). An exploratory study of the association between online gaming addiction and enjoyment motivations for playing massively multiplayer online role-playing games. *Computers in Human Behavior*, *50*, 221-230. doi:10.1016/j.chb.2015.03.075
- Hsu, S. H., Wen, M. H., & Wu, M. C. (2009). Exploring user experiences as predictors of MMORPG addiction. *Computers & Education*, *53*(2), 990–999.
- Jansz, J., & Martens, L. (2005). Gaming at a LAN event: The social context of playing video

- games. *New Media & Society*, 7, 333–355.
- Jansz, J., & Tanis, M. (2007). Appeal of playing online first person shooter games. *CyberPsychology & Behavior*, 10, 133–136.
- Jeng, S. P., & Teng, C. I. (2008). Personality and motivations for playing online games. *Social Behavior and Personality*, 36(8), 1053-1060.
- Jeong, E. J., & Kim, D. W. (2010). Social activities, self-efficacy, game attitudes, and game addiction. *Cyberpsychology, Behavior & Social Networking*, 14(4), 213–221.
- Jones, K., & Hertlein, K. (2012). Four key dimensions for distinguishing Internet infidelity from Internet and sex addiction: Concepts and clinical application. *American Journal of Family Therapy*, 40, 115-125. doi:10.1080/01926187.2011.600677
- Jowon, P., & Guiohk, L. (2012). Associations between personality traits and experiential gratification in an online gaming context. *Social Behavior & Personality: An International Journal*, 40(5), 855-862.
- Kardefelt-Winther, D. (2014a). The moderating role of psychosocial well-being on the relationship between escapism and excessive online gaming. *Computers in Human Behavior*, 38, 68-74. doi:10.1016/j.chb.2014.05.020
- Kardefelt-Winther, D. (2014b). Problematizing excessive online gaming and its psychological predictors. *Computers in Human Behavior*, 31, 118-122. doi:10.1016/j.chb.2013.10.017
- Keith, T. (2015). *Multiple regression and beyond*. (2nd ed.). Boston, MA: Pearson Education.
- Kim, Y., Kim, M., & Oh, S. (2014). Emerging factors affecting the continuance of online gaming: the roles of bridging and bonding social factors. *Cluster Computing*, 17(3), 849-859. doi:10.1007/s10586-013-0316-1

- Kim, E. J., Namkoong, K., Ku, T., & Kim, S. J. (2008). The relationship between online game addiction and aggression, self-control and narcissistic personality traits. *European Psychiatry, 23*(3), 212–218. doi:10.1016/j.eurpsy.2007.10.010
- King, D. L., & Delfabbro, P. (2009a). Motivational differences in problem video game play. *Journal Of Cyber Therapy And Rehabilitation, 2*(2), 139-149.
- King, D. L., & Delfabbro, P. (2009b). Understanding and assisting excessive players of video games: a community psychology perspective. *The Australian Community Psychologist, 21*(1), 62–74.
- King, D. L., & Delfabbro, P. H. (2014). The cognitive psychology of Internet gaming disorder. *Clinical Psychology Review, 34*, 298–308.
- King, D. L., Delfabbro, P. H., & Griffiths, M. D. (2011). The role of structural characteristics in problematic video game play: An empirical study. *International Journal Of Mental Health & Addiction, 9*(3), 320-333. doi:10.1007/s11469-010-9289-y
- King, D. L., Haagsma, M. C., Delfabbro, P. H., Gradisar, M., & Griffiths, M. D. (2013). Toward a consensus definition of pathological video-gaming: a systematic review of psychometric assessment tools. *Clinical Psychology Review, 33*, 331–342.
- Kiraly, O., Griffiths, M. D., & Demetrovics, Z. (2015a). Internet gaming disorder and the DSM-5: Conceptualization, debates, and controversies. *Current Addictions Report, 2*(3), 254-262.
- Király, O., Slezcka, P., Pontes, H. M., Urbán, R., Griffiths, M. D., & Demetrovics, Z. (2015b). Validation of the Ten-Item Internet Gaming Disorder Test (IGDT-10) and evaluation of the nine DSM-5 Internet Gaming Disorder criteria. *Addictive Behaviors, 61*, 253–261. doi:10.1016/j.addbeh.2015.11.005

- Kirby, A., Jones, C., & Copello, A. (2014). The impact of massively multiplayer online role playing games (MMORPGs) on psychological wellbeing and the role of play motivations and problematic use. *International Journal Of Mental Health & Addiction, 12*(1), 36-51. doi:10.1007/s11469-013-9467-9
- Kline, P., & Barrett, P. T. (1983). The factors in personality questionnaires among normal subjects. *Advances in Behavioral Research and Therapy, 5*, 141-202.
- Kneer, J., & Rieger, D. (2015). Problematic game play: The diagnostic value of playing motives, passion, and playing time in men. *Behavioral Sciences, 5*(2), 203-213. doi:10.3390/bs5020203
- Ko, C.H. (2014). Internet gaming disorder. *Current Addiction Reports, (1)*, 177–185.
- Ko, C., Yen, J., Chen, C., Chen, S., & Yen, C. (2005). Gender differences and related factors affecting online gaming addiction among Taiwanese adolescents. *Journal of Nervous And Mental Disease, 193*(4), 273-277.
- Ko, C. H., Yen, J. Y., Yen, C. F., Chen, C. S., & Chen, C. C. (2012). The association between Internet addiction and psychiatric disorder: a review of the literature. *European Psychiatry, 27*, 1–8.
- Ko, C. H., Yen, J. Y., Chen, S. H., Wang, P. W., Chen, C.C., & Yen, C. F. (2014). Evaluation of the diagnostic criteria of Internet gaming disorder in the DSM-5 among young adults in Taiwan. *Journal of Psychiatric Research, 53*, 103–110.
- Kowert, R., & Oldmeadow, J. A. (2015). Playing for social comfort: Online video game play as a social accommodator for the insecurely attached. *Computers In Human Behavior, 53*, 556-566. doi:10.1016/j.chb.2014.05.004
- Kuss, D., & Griffiths, M. D. (2012a). Internet gaming addiction: A systematic review of

- empirical research. *International Journal Of Mental Health & Addiction*, 10(2), 278-296.
doi:10.1007/s11469-011-9318-5
- Kuss, D., & Griffiths, M.D. (2012b). Online gaming addiction in children and adolescents: a review of empirical research. *Journal of Behavior & Addiction*, 1, 3–22.
- Kuss, D. J., Griffiths, M. D., Karila, L., & Billieux, J. (2014) Internet addiction: A systematic review of epidemiological research for the last decade. *Current Pharmaceutical Design*, 20, 4026-4052. doi:10.2174/13816128113199990617
- Kuss, D. W., Louws, J., & Weirs, R. W. (2012). Online gaming addiction? Motives predict addictive play behavior in massively multiplayer online role-playing games. *Cyberpsychology, Behavior & Social Networking*, 15(9), 480-485.
- Kuss, D. J., Shorter, G. W., van Rooij, A. J., van de Mheen, D., & Griffiths, M. D. (2014). The Internet addiction components model and personality: Establishing construct validity via a nomological network. *Computers in Human Behavior*, 39, 312-321.
doi:10.1016/j.chb.2014.07.031
- Lee, H., Choi, J., Shin, Y., Lee, J., Jung, H., & Kwon, J. (2012). Impulsivity in Internet addiction: A comparison with pathological gambling. *Cyberpsychology, Behavior and Social Networking*, 15, 373-377. doi:10.1089/cyber.2012.0063
- Lehenbauer-Baum, M., & Fohringer, M. (2015). Towards classification criteria for Internet gaming disorder: Debunking differences between addiction and high engagement in a German sample of World of Warcraft players. *Computers In Human Behavior*, 45, 345-351. doi:10.1016/j.chb.2014.11.098
- Lemmens, J., Valkenburg, P., Gentile, D., & Reynolds, Cecil R. (2015). The Internet Gaming Disorder Scale. *Psychological Assessment*, 27(2), 567-582.

- Lemmens, J. S., Valkenburg, P. M., & Peter, J. (2010). Psychosocial causes and consequences of pathological gaming. *Computers in Human Behavior, 27*(1), 144–152.
doi:10.1016/j.chb.2010.07.015
- Leung, L. (2007). Stressful life events, motives for Internet use, and social support among digital kids. *CyberPsychology & Behavior, 10*(2), 204–214.
- Lin, M., Ko, H., & Wu, J. (2011). Prevalence and psychosocial risk factors associated with Internet addiction in a nationally representative sample of college students in Taiwan. *Cyberpsychology, Behavior & Social Networking, 14*(12), 741-746.
doi:10.1089/cyber.2010.0574
- Luo, S. X., Brennan, T. K., & Wittenauer, J. (2015). Internet Addiction: The case of Henry, the “Reluctant Hermit”. In M. S. Ascher & P. Levounis (Eds.), *The behavioral addictions* (pp. 81-99). Washington, DC: American Psychiatric Publishing.
- Marlatt, G.A. (1988). Matching clients to treatment: treatment models and stages of change. In Donovan, D.M. & Marlatt, G.A. (Eds.) *Assessment of addictive behaviors* (pp. 474-484). New York: Guilford Press.
- Mehroof, M. D., & Griffiths, M. D. (2010). Online gaming addiction: The role of sensation seeking, self-control, neuroticism, aggression, state anxiety, and trait anxiety. *Cyberpsychology, Behavior & Social Networking, 13*(3), 313-316.
- Melchior, M., Chollet, A., Fombone, E., Surkan, P. J., & Dray-Spira, R. (2014). Internet and video game use in relation to overweight in young adults. *American Journal Of Health Promotion, 28*(5), 321-324. doi:10.4278/ajhp.121023-AKB-515
- Montag, C., Flierl, M., Markett, S., Walter, N., Jurkiewicz, M., & Reuter, M. (2011). Internet addiction and personality in first-person-shooter video gamers. *Journal Of Media*

- Psychology: Theories, Methods, And Applications*, 23(4), 163-173. doi:10.1027/1864-1105/a000049
- Müller, Janikian, Dreier, Wölfling, Beutel, Tzavara, . . . Tsitsika. (2015). Regular gaming behavior and internet gaming disorder in European adolescents: Results from a cross-national representative survey of prevalence, predictors, and psychopathological correlates. *European Child & Adolescent Psychiatry*, 24(5), 565-574.
- Müller, K. W., Beutel, M. E., Egloff, B., & Wölfling, K. (2014). Investigating risk factors for Internet gaming disorder: A comparison of patients with addictive gaming, pathological gamblers and healthy controls regarding the Big Five Personality Traits. *European Addiction Research*, 20(3), 129-136 8p. doi:10.1159/000355832
- Murali, V., & Onuba, I. (2009). Management of Internet addiction. *General Practice Update*, 2, 32-35.
- Nakken, C. (2013). *The addictive personality: Understanding the addictive process and compulsive behavior*. Minnesota: Hazelden Foundation.
- Ng, B. D., & Wiemer-Hastings, P. (2005). Addiction to the Internet and online gaming. *Cyberpsychology & Behavior*, 8(2), 110–113.
- Park, J., Song, Y., & Teng, C. (2011). Exploring the links between personality traits and motivations to play online games. *Cyberpsychology, Behavior & Social Networking*, 14(12), 747-751.
- Parker, J. D., Taylor, R. N., Eastabrook, J. M., Schell, S. L., & Wood, L. M. (2008). Problem gambling in adolescence: Relationships with Internet misuse, gaming abuse and emotional intelligence. *Personality And Individual Differences*, 45, 174-180. doi:10.1016/j.paid.2008.03.018

- Peng, W., & Liu, M. (2010). Online gaming dependency: A preliminary study in China. *CyberPsychology, Behavior and Social Networking*, *13*(3), 329–333.
- Peters, C. S., & Malesky Jr, L. A. (2008). Problematic usage among highly-engaged players of massively multiplayer online role playing games. *Cyberpsychology & Behavior*, *11*(4), 481-484. doi:10.1089/cpb.2007.0140
- Petry, N. M., Rehbein, F., Gentile, D. A., Lemmens, J. S., Rumpf, H., Mößle, T., & ... O'Brien, C. P. (2014). An international consensus for assessing Internet gaming disorder using the new DSM-5 approach. *Addiction*, *109*(9), 1399-1406. doi:10.1111/add.12457
- Pontes, H. M., Király, O., Demetrovics, Z., & Griffiths, M. D. (2014). The conceptualisation and measurement of DSM-5 Internet gaming disorder: The development of the IGD-20 Test. *Plos ONE*, *9*(10), 1-9. doi:10.1371/journal.pone.0110137
- Porter, G., Starcevic, V., Berle, D., & Fenech, P. (2010). Recognizing problem video game use. *Australian & New Zealand Journal of Psychiatry*, *44*(2), 120–128.
- Potenza, M. N. (2014). Non-substance addictive behaviors in the context of the DSM-5. *Addictive Behaviors*, *39*(1), 1-2.
- Rammstedt, B. & John, O. P. (2007). Measuring personality in one minute or less: A 10-item short version of the Big Five Inventory in English and German. *Journal of Research in Personality*, *41*, 203-212.
- Rehbein, F., Kliem, S., Baier, D., Mößle, T., & Petry, N. (2015). Prevalence of internet gaming disorder in German adolescents: Diagnostic contribution of the nine DSM-5 criteria in a state-wide representative sample. *Addiction*, *110*(5), 842-851.

- Rehbein, F., Psych, G., Kleimann, M., Mediasci, G., & Mossle, T. (2010). Prevalence and risk factors of video game dependency in adolescence: Results of a German nationwide survey. *CyberPsychology, Behavior & Social Networking, 13*(3), 269–277.
- Rosenberg, M. (1965). *Society and adolescent self-image*. New Jersey: Princeton University Press.
- Sanchez, J. (2009). A Social History of Virtual Worlds. *Library Technology Reports, 45*(2), 9-12.
- Smith, T. (2012). Revolutionizing diagnosis and treatment using *DSM-5*. *CMI Education Institute*.
- Spence, J. (2008). Demographics of virtual worlds. *Journal of Virtual Worlds Research, 1*(2). Retrieved from <http://journals.tdl.org/jvwr/article/view/360/272>
- Statista. (2014). Number of video gamers worldwide in 2014. Retrieved from <http://www.statista.com/statistics/293304/number-video-gamers/>
- Superdata. (2015). 2015 MMO Market Report. Retrieved from <https://www.superdataresearch.com/market-data/mmo-market/>
- Sussman, S., Lisha, N., & Griffiths, M. (2011). Prevalence of the addictions: A problem of the majority or the minority. *Evaluations and the Health Professions, 34*(1), 3-56. doi: 10.1177/0163278710380124
- Tao, R., Huang, X., Wang, J., Zhang, H., Zhang, Y., & Li, M. (2012). Proposed diagnostic criteria for Internet addiction. *Addiction, 105*, 556–64.
- Teng, C. I. (2008). Personality differences between online game players and non-players in a student sample. *CyberPsychology & Behavior, 11*(2), 232-234.

- Thomas, N. J., & Martin, F. H. (2010). Video-arcade game, computer game and Internet activities of Australian students: Participation habits and prevalence of addiction. *Australian Journal of Psychology*, 62(2), 59–66.
- Tonioni, F., D'Alessandris, L., Lai, C., Martinelli, D., Corvino, S., Vasale, M.,... Bria, P. (2012). Internet addiction: Hours spent online, behaviors and psychological symptoms. *General Hospital Psychiatry*, 34, 80-87. doi:10.1016/j.genhosppsy.2011.09.013
- Trepte, S., Reinecke, L., & Juechems, K. (2012). The social side of gaming: How playing online computer games creates online and offline social support. *Computers In Human Behavior*, 28, 832-839. doi:10.1016/j.chb.2011.12.003
- Van Autrijve (2004). *World of Warcraft is setting records*. Retrieved from <http://pc.gamespy.com/pc/world-of-warcraft/569888p1.html>
- Van Rooij, A. J., & Prause, N. (2014). A critical review of Internet addiction criteria with suggestions for the future. *Journal of Behavior & Addiction*, 3, 203–13.
- van Rooij, A. J., Schoenmakers, T. M., Vermulst, A. A., van den Eijnden, R. M., & Van De Mheen, D. (2011). Online video game addiction: identification of addicted adolescent gamers. *Addiction*, 106(1), 205–212. doi:10.1111/j.1360-0443.2010.03104.x
- Vermulst, A. A., & Gerris, J. R. M. (2009). Quick Big Five (QBF). *Persoonlijkheidstest*. Nijmegen, The Netherlands: Behavioural Science Institute, University of Nijmegen.
- Wan, C. S., & Chiou, W. B. (2006a). Psychological motives and online games addiction: a test of flow theory and humanistic needs theory for Taiwanese adolescents. *Cyberpsychology & Behavior*, 9(3), 317–324.
- Wan, C. S., & Chiou, W. B. (2006b). Why are adolescents addicted to online gaming? An interview study in Taiwan. *Cyberpsychology & Behavior*, 9(6), 762–766.

- Wang, C., Ho, R. H., Chan, C. W., & Tse, S. (2015). Exploring personality characteristics of Chinese adolescents with internet-related addictive behaviors: Trait differences for gaming addiction and social networking addiction. *Addictive Behaviors, 42*, 32-35
doi:10.1016/j.addbeh.2014.10.039
- Wang, C. J., Liu, W. C., Chye, S., & Chatzisarantis, N. L. (2011). Understanding motivation in Internet gaming among Singaporean youth: The role of passion. *Computers In Human Behavior, 27*, 1179-1184. doi:10.1016/j.chb.2010.12.012
- Wei-na, D., Jin-hua, S., Ya-wen, S., Xue, C., Yan, Z., Zhi-guo, Z., & ... Ya-song, D. (2014). Trait impulsivity and impaired prefrontal impulse inhibition function in adolescents with Internet gaming addiction revealed by a Go/No-Go fMRI study. *Behavioral & Brain Functions, 10*(1), 1-19. doi:10.1186/1744-9081-10-20
- Yang, S. C., & Huang, C. L. (2013). Using structural equation modeling to validate online game players' motivations relative to self-concept and life adaptation. *Journal Of Educational Computing Research, 49*(4), 527-542. doi:10.2190/EC.49.4.f
- Yao, Y., Wang, L., Yip, S. W., Chen, P., Li, S., Xu, J., & ... Fang, X. (2015). Impaired decision-making under risk is associated with gaming-specific inhibition deficits among college students with Internet gaming disorder. *Psychiatry Research, 229*, 302-309.
doi:10.1016/j.psychres.2015.07.004
- Yee, N. (2006a). The Demographics, motivations and derived experiences of users of Massively-Multiuser Online graphical environments. *Teleoperators and Virtual Environments, 15*, 309-329.
- Yee, N. (2006b). Motivations for play in online games. *Journal of CyberPsychology and Behavior, 9*, 772-775.

- Yee, N., Ducheneaut, N., & Nelson, L. (2012). *Online gaming motivation scale: Development and validation*. In Proceedings of the 2012 ACM annual conference on Human Factors in Computing Systems. Austin, TX: ACM 2012.
- Yen, C., Ko, C., Yen, J., Chang, Y., & Cheng, C. (2009). Multi-dimensional discriminative factors for Internet addiction among adolescents regarding gender and age. *Psychiatry & Clinical Neurosciences*, 63(3), 357–364. doi:10.1111/j.1440-1819.2009.01969.x
- Young, K. S. (2009). Understanding online gaming addiction and treatment issues for adolescents. *American Journal of Family Therapy*, 37(5), 355–372.
doi:10.1080/01926180902942191
- Zhong, Z., & Yao, M. Z. (2013). Gaming motivations, avatar-self identification and symptoms of online game addiction. *Asian Journal of Communication*, 23(5), 555-573.
doi:10.1080/01292986.2012.748814

Appendix A

Ten-Item Internet Gaming Disorder Test (IGD-10)

Please read the statements below regarding online gaming. The questionnaire refers to ONLINE GAMES, but the reference to ‘game’ or ‘gaming’ is used for the sake of simplicity. Please, indicate on the scale from 0 to 2 (Never, Sometimes, Often) to what extent, and how often, these statements applied to you over the **PAST 12 Months!**

	Never	Sometimes	Often
1. When you were not playing, how often have you fantasized about gaming, thought of previous gaming sessions, and/or anticipated the next game?	0	1	2
2. How often have you felt restless, irritable, anxious and/or sad when you were unable to play or played less than usual?	0	1	2
3. Have you ever in the past 12 months felt the need to play more often or played for longer periods to feel that you have played enough?	0	1	2
4. Have you ever in the past 12 months unsuccessfully tried to reduce the time spent on gaming?	0	1	2
5. Have you ever in the past 12 months played games rather than meet your friends or participate in hobbies and pastimes that you used to enjoy before?	0	1	2
6. Have you played a lot despite negative consequences (for instance losing sleep, not being able to do well in school or work, having arguments with your family or friends, and/or neglecting important duties)?	0	1	2
7. Have you tried to keep your family, friends or other important people from knowing how much you were gaming or have you lied to them regarding your gaming?	0	1	2
8. Have you played to relieve a negative mood (for instance helplessness, guilt, or anxiety)?	0	1	2
9. Have you risked or lost a significant relationship because of gaming?	0	1	2
10. Have you ever in the past 12 month jeopardized your school or work performance because of gaming?	0	1	2

Appendix B

Big Five Inventory-10 (BFI-10)

Appendix A. Big Five Inventory-10 (BFI-10)

English version.

Instruction: How well do the following statements describe your personality?

I see myself as someone who ...	Disagree strongly	Disagree a little	Neither agree nor disagree	Agree a little	Agree strongly
... is reserved	(1)	(2)	(3)	(4)	(5)
... is generally trusting	(1)	(2)	(3)	(4)	(5)
... tends to be lazy	(1)	(2)	(3)	(4)	(5)
... is relaxed, handles stress well	(1)	(2)	(3)	(4)	(5)
... has few artistic interests	(1)	(2)	(3)	(4)	(5)
... is outgoing, sociable	(1)	(2)	(3)	(4)	(5)
... tends to find fault with others	(1)	(2)	(3)	(4)	(5)
... does a thorough job	(1)	(2)	(3)	(4)	(5)
... gets nervous easily	(1)	(2)	(3)	(4)	(5)
... has an active imagination	(1)	(2)	(3)	(4)	(5)

Appendix C

The Motivation to Play Online Games Questionnaire (MPOGQ)

Game Play Motivations (12-item version)

Please rate how important each of the following game play elements is to you when play online games (like World of Warcraft, EVE Online, etc.).

1. Becoming powerful	Not At All Important ○ ○ ○ ○ ○ Extremely Important
2. Acquiring rare items	Not At All Important ○ ○ ○ ○ ○ Extremely Important
3. Optimizing your character as much as possible	Not At All Important ○ ○ ○ ○ ○ Extremely Important
4. Competing with other players	Not At All Important ○ ○ ○ ○ ○ Extremely Important
5. Chatting with other players	Not At All Important ○ ○ ○ ○ ○ Extremely Important
6. Being part of a guild	Not At All Important ○ ○ ○ ○ ○ Extremely Important
7. Grouping with other players	Not At All Important ○ ○ ○ ○ ○ Extremely Important
8. Keeping in touch with your friends	Not At All Important ○ ○ ○ ○ ○ Extremely Important
9. Learning about stories and lore of the world	Not At All Important ○ ○ ○ ○ ○ Extremely Important
10. Feeling immersed in the world	Not At All Important ○ ○ ○ ○ ○ Extremely Important
11. Exploring the world just for the sake of exploring it	Not At All Important ○ ○ ○ ○ ○ Extremely Important
12. Creating a background story and history for your character	Not At All Important ○ ○ ○ ○ ○ Extremely Important

Appendix D

Participant Demographic Sheet

1. What is your age? ____
2. What is your gender?
 - ___ male
 - ___ female
 - ___ transgender
 - ___ other: _____
3. How would you classify yourself?
 - ___ Asian American
 - ___ Black/African American
 - ___ Caucasian/White
 - ___ Hispanic/Latino
 - ___ Middle Eastern
 - ___ Multiracial
 - ___ Pacific Islander
 - ___ other: _____
4. Are you currently a student?
 - ___ no
 - ___ yes, high school
 - ___ yes, vocational/technical school
 - ___ yes, undergraduate college
 - ___ yes, graduate school
5. If you are a student, what is your most recent GPA? ____
6. If you are a student, how many hours per week do you devote to attending classes and completing schoolwork? ____
7. How many hours per week do you work for income? ____
8. On average, how many hours per week have you played Internet games in the past 12 months? ____
9. What games have you played on the Internet in the last 12 months? Please list all you have played. Please write out full names of games and avoid acronyms.

(optional) 10. Please explain how the following factors influence why you play Internet games: the technology, the simulation, and the socialization.

Appendix E

IRB Approval Letter

From: Petros Katsioloudis <no-reply@irbnet.org>
Date: August 8, 2016 at 7:54:55 PM EDT
To: Edward Neukrug <eneukrug@odu.edu>
Subject: IRBNet Board Action
Reply-To: Petros Katsioloudis <pkatsiol@odu.edu>

Please note that Old Dominion University Education Human Subjects Review Committee has taken the following action on IRBNet:

Project Title: [938967-3] Personality, Motivation, and Internet Gaming Disorder: Understanding the Addiction

Principal Investigator: Edward Neukrug, Ed.D.

Submission Type: New Project

Date Submitted: July 26, 2016

Action: EXEMPT

Effective Date: August 8, 2016

Review Type: Exempt Review

Should you have any questions you may contact Petros Katsioloudis at pkatsiol@odu.edu.

Thank you,

The IRBNet Support Team

<https://na01.safelinks.protection.outlook.com/?url=www.irbnet.org&data=01%7c01%7c9eukrug%40odu.edu%7cdd93ffa4928b475de69c08d3bfe76638%7c48bf86e811a24b8a8cb368d8be2227f3%7c0&sdata=IUHvAkXNMf4WSsJNzs6OtMAIV5Fsx1kvwws14tr6fMU%3d>

Appendix F

Data Collection Recruitment Ad

Hello! I am a doctoral candidate at Old Dominion University conducting an IRB-approved study on personality traits, motivation to play, and potential addiction to online gaming, with the intention of adding context to generic diagnostic criteria proposed in the DSM-5. Please consider taking my anonymous 10-minute survey if you are 18 years of age or older and have played an online multiplayer game (World of WarCraft, Call of Duty, PokemonGo, Clash of Clans, etc.) in the past 12 months. If you choose to provide your email at the end of the survey, I will put you in the running for 1 of 20, 10 USD I-Tunes gift cards. Thank you for your participation!

VITA

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CURRICULUM VITAE

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EDUCATION

Ph.D., Counselor Education and Supervision (CACREP) Old Dominion University, Norfolk, VA	SP 2017
M.A., Counseling Services (CACREP) Rider University, Lawrenceville, NJ	SP 2009
M.A., French Middlebury College, Middlebury, VT	SU 2007
B.A., French; International Studies & Economics Middlebury College, Middlebury, VT	SP 2002

RESEARCH INTERESTS

Process Addictions / Technology Addictions
Pedagogy and Practice in Counselor Education

School Counseling / Children & Families
Counselor Ethics / Technology & Ethics

PUBLICATIONS

Refereed

1. Alemu, B., Cramer, R., Akpinar-Elci, M., & **Carlisle, K. L.** (accepted, 2017). A theoretical analysis of health beliefs of physical activity among women with previous gestational diabetes. *American Journal of Health Education*, 48(2).
2. Wilson, A., Holman, L., Nelson, J., **Carlisle, K. L.**, Baker, C., Moro, R., Monakes, S., Carroll, S., & Becton, L. (accepted, 2017) Professional counselors' and students' current knowledge, training, and experience with process addictions. *Journal of Addiction and Offender Counseling Annual Review*, 4.
3. **Carlisle, K. L.**, Carlisle, R. M., Polychronopoulos, G., Goodman-Scott, E., & Kirk-Jenkins, A. (2016). Exploring Internet addiction as a process addiction. *Journal of Mental Health Counseling*, 38(2), 170-182.
4. **Carlisle, K. L.** & Carrington, C. (2015). The social experience of Internet gamers: A pilot study. *VISTAS 2015*. Retrieved from <http://www.counseling.org/knowledge-center/vistas>
5. Polychronopoulos, G. B., **Carlisle, K. L.**, Carlisle, R. M., & Kirk-Jenkins, A. (2014). Behavioral addictions in the DSM-5. *Journal of Human Services*, 34(1), 158-162.

6. Carlisle, R. M., **Carlisle K. L.**, Hill T., Kirk-Jenkins A.J., & Polychronopoulos G.B. (2013). Distance supervision in human services. *Journal of Human Services* 33, 19-31.
7. **Carlisle, K. L.**, Buser, J. K., & Carlisle, R. M., (2012). Childhood food addiction and the family. *The Family Journal: Counseling And Therapy For Couples And Families*, 20(3), 332-339.

Books, Chapters, & Reviews

8. Sink, C. A., & **Carlisle, K. L.** (2016). [Review of BASC-3 Behavioral and Emotional Screening System]. *Mental Measurements Yearbook*. Omaha, NB: Buros Institute of Mental Measurements, University of Nebraska Press.
9. Sink, C. A., & **Carlisle, K. L.** (2016). [Review of Kindergarten Readiness Test (KRT), 2nd ed.]. *Mental Measurements Yearbook*. Omaha, NB: Buros Institute of Mental Measurements, University of Nebraska Press.
10. **Carlisle, K. L.** (2015). Family constellation therapy. In E. Neukrug (Ed.). *Encyclopedia of theory in counseling and psychotherapy*. Sage: Thousand Oaks, CA.

UNIVERSITY TEACHING EXPERIENCE

Doctoral Graduate Instructor <i>Department of Counseling and Human Services, Old Dominion University, Norfolk, VA</i> Undergrad, Master's, and Doctoral level courses face-to-face and online	FA 2014 – SU 2016
Adjunct Instructor <i>Department of Counseling and Human Services, Old Dominion University, Norfolk, VA</i>	SP 2013 – FA 2013

CLINICAL EXPERIENCE

Child and Family Therapist/Counselor <i>Child and Adolescent Residential Facility</i>	SU 2014 – SU 2015
Clinical Coordinator & Supervisor <i>Intensive In-Home & Mental Health Skill Building</i>	SU 2013 – SU 2014
Case Manager/Counselor <i>Intensive In-Home & Mental Health Support Services</i>	FA 2012 - SU 2013
School Counselor, Maternity Leave Position <i>Hammar skjöld Middle School, East Brunswick, NJ</i>	SU 2009 - FA 2009