

THE DEVELOPMENT AND VALIDATION OF THE PROBLEMATIC ONLINE  
GAMING SCALE (POGS): AN ANALYSIS OF FACEBOOK GAMERS

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## ABSTRACT

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### THE DEVELOPMENT AND VALIDATION OF THE PROBLEMATIC ONLINE GAMING SCALE (POGS): AN ANALYSIS OF FACEBOOK GAMERS

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The current research began the development and validation of a measure of online gaming addiction using Facebook members. Three hundred and eighty-three participants were recruited from Facebook and from undergraduate psychology classes to complete the following questionnaires: (a) The Problematic Online Gaming Scale (POGS), (b) the Marlowe-Crowne Form C (Reynolds, 1982), (c) the Problematic Internet Use Questionnaire (PIUQ; Demetrovics, Szeredi, & Rozsa, 2008), (d) the Problematic Online Game Use scale (POGU; Kim & Kim, 2010), and (e) a demographic form. The questionnaires were used to assess the characteristics of Facebook online gamers. It was predicted that online gamers who suffer from a behavioral addiction would possess greater characteristics of salience, mood modification, tolerance, withdrawal symptoms, relapse and conflict. It was also predicted that there would be a greater feeling of social connection with other gamers in those who are more behaviorally addicted. The study found that Facebook gamers surveyed had the characteristics of conflict, mood modification, salience, social connection, tolerance and intrusive thoughts. It was also noted that different characteristics were more salient for different groups when examining

gender, ethnicity, age, and other Facebook relevant demographics. Further implications of online gaming addiction are discussed.

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## CHAPTER I

### INTRODUCTION

The popularity of online gaming is widespread, involving nearly one out of every two internet users, totaling 87 million users in the United States alone (ComScore, 2009). Several researchers have begun to explore this phenomenon (Blinka & Smahel, 2011; Caplan, Williams, & Yee, 2009; Griffiths, 2008, 2010a, 2010b; Ng & Wiemer-Hastings, 2005; Wan & Chiou, 2006, 2007; Young, 2009), and have noted negative consequences of this increased game play, including negative effects on social relationships (Cole & Griffiths, 2007; Peters & Malesky, 2008), performance (Ng & Wiemer-Hastings, 2005; Smyth, 2007), and withdrawal symptoms (Griffiths, 2010a; Young, 1998). Some authors have suggested that online activities displace activities that serve to maintain and improve healthy relationships (Kraut et al., 1998) and that those who spend more time playing online games have decreased satisfaction with their daily life (Ko, Yen, Chen, Chen, & Yen, 2005; Shapira, Goldsmith, Keck, Khosla & McElroy, 2000), have less social competence (Chak & Leung, 2004; Lo, Wang & Fang, 2005; Peters & Malesky, 2008), and have lower levels of self-esteem (Ko et al., 2005). An examination of existing literature that assesses this phenomenon is important.

There are currently many different descriptions being used in the literature to refer to behaviors associated with online gaming that include: high engagement (Charlton & Danforth, 2007; Brockmyer et. al., 2009), problematic use (Demetrovics et al., 2008; Kim

& Kim, 2010), or online gaming addiction (Blinka & Smahel, 2011; Griffiths, 2010a, 2010b; Lemmens, Valkenburg & Peter, 2008; Young, 1998, 2009). Although different names are being used to describe individuals who use internet games in a pathological fashion, researchers agree that there is a problematic pattern of behaviors present that can be related to behavioral addiction (Brown, 1991, 1993; Grant, Potenza, Weinstein, & Gorelick, 2010; Griffiths, 1995, 1996, 2008, 2010a, 2010b). Currently, one of the limitations in the current literature that examines this behavioral addiction, is that the focus of attention has been on individuals who play Massively Multiplayer Online Role-Playing Games (MMORPGs; e.g., Caplan et al., 2009; Chappell, Eatough, Davies, & Griffiths, 2006; Charlton & Danforth, 2007, 2010; Dauriat et al., 2011; Hsu, Wen, & Wu, 2009; Hussain & Griffiths, 2009; Kim & Kim, 2010; Liu & Peng, 2009; Ng & Wiemer-Hastings, 2005; Peters & Malesky, 2008; Smahel, Blinka & Ledabyl, 2008, Wan & Chiou, 2006). Because the amorphous nature of online games and the increasingly diverse community of online game players, it might be useful to develop a measurement that will be able to address the different varieties of online games as they continue to evolve. This study seeks to examine problematic gaming and to see if there is evidence of behavioral addiction components to online gaming.

### **The Evolution of Gaming**

Since the early 1980's, it was noted that arcade games such as Pac-Man, Asteroids, and Space Invaders became increasingly popular (Chaffin, Maxwell, & Thompson, 1982; Harris & Williams, 1985). Because some adults were concerned about

the possible impact of these games, arcade games were actually banned in some states (Klein, 1984). However, by the late 1980's, the introduction of the Nintendo home gaming system generated continued interest in video games, and industry sales figures went from \$100 million in 1985 to \$4 billion in 1990 (Provenzo, 1991). Researchers began to investigate the effects of video games on both physical and psychological functioning (Funk, 1992). Physical effects ranged from changes in heart rate and blood pressure to epileptic seizures (Gwinup, Haw, & Elias, 1983). Psychologically, some researchers found that violent games were related to increased aggressive behavior in younger children (Funk, 1992). After additional examination, Funk (1993) discussed that the physical impacts were found to be somewhat limited and transient, while Scott (1995) found that there was a lack of support for violent video games causing aggression.

Over the last decade, as interactive games have migrated to computer use over the internet, much of the online game research has examined the impacts of MMORPGs (Caplan et al., 2009). These MMORPGs are virtual three dimensional worlds that allow game players to immerse themselves in different environments and interact with others via the internet (Hsu et al., 2009) and each of them is a self-contained society where game players have characters that are able to grow and evolve (Young, 2009). In the United States, more than 45% of gamers play for over 20 hours a week and over 80% of those who play MMORPGs had indicated that they had gaming sessions that lasted for over eight consecutive hours (Ng & Wiemer-Hastings, 2005).

To begin play in one of these virtual worlds, a player must first create a character or avatar that is a reflection of who the player wants to be in this world (Young, 2009). Some of the player's choices, dependent on the genre or theme of the game, include such characteristics as race, species, and philosophy, as well as visual characteristics such as gender, skin color, hair color, weight and height (Young, 2009). Character profession is often an option as well where a player can choose to be a variety of roles including those of a warrior, a thief, or a being who can use magic (Young, 2009). Each player also chooses a name for their character and for some, as they spend more hours gaming, this character begins to become more real and less fictional (Young, 2009). Each of these virtual worlds has its own scenery that varies from forest, beaches, mountains, and prairies with towns where players are able to have their characters, or avatars, interact (Young, 2009). Additionally, gamers are able to participate in a social environment that gives them additional opportunities to establish friendships and emotional relationships (Cole & Griffiths, 2007; Young, 2009). Some recent studies have indicated that this immersion into a virtual world allows game players to become addicted (Yee, 2006).

As a way to examine this phenomenon of online game play, some researchers have chosen to focus on the internet and the possibility of internet addiction (Greenfield, 1999; Morahan-Martin & Schumacher, 2000; Young, 1996, 1998; Young, Pistner, O'Mara, & Buchanan, 1999), while others have examined a behavioral model of addiction and its application to online gaming (Charlton & Danforth, 2007; Griffiths, 1996, 2000a, 2000b, 2008). There have also been numerous studies that have targeted the

MMORPG model of online game play for study (Charlton & Danforth, 2007; Ng & Wiemer-Hastings, 2005; Smahel, Blinka & Ledabyl; 2008; Peters & Malesky, 2008; Kim & Kim, 2010). However, over the last several years there has been an increased use of Facebook online games, accounting for over 500 million active users (Gonzalez, 2010). While many of these Facebook games use the same components of character generation, choice of role, naming of the character, and a social environment, they also have an additional incentive of initially being free to play (MacMillan & Stone, 2011).

Instead of paying for the game itself, game players are given the opportunity to pay for additional services, which range from receiving unique items that they are not able to obtain by playing the game to getting additional bonuses that allow them to level faster and be more powerful in the game (MacMillan & Stone, 2011). Only about 10% of players pay for these additional services, and 1% make up between 25-50% of the total \$597 million dollars in revenue for one year (MacMillan & Stone, 2011; Wingfield & Cowan, 2011). Where MMORPGs currently are played by 16 million individuals worldwide (Woodcock, 2011) this new gaming platform that is available on Facebook are played by over 500 million users (Gonzalez, 2010) and it is important to study how individuals interact with online games, and whether any physical or psychological consequences may result from this interaction.

### **Statement of Purpose**

The purpose of this dissertation was to develop and validate the Problematic Online Gaming Survey (POGS). This instrument has provided a measure that was able to

examine the various models of online gaming that currently exist. There are a limited number of scales that have been used to examine online gaming, which have typically been used for specific games (Charlton & Danforth, 2007, 2010), MMORPGs (Dauriat, 2011; Hsu et al., 2009; Hussain & Griffiths, 2009), exploring themes of motivation (Chou & Tsai, 2007), examining adolescents (Kim & Kim, 2010; Lemmens, Valkenburg, & Peter, 2009) or the scales are specific to the internet and not gaming (Caplan et al., 2009; Young et al., 1999). Currently, researchers have not created a scale that has examined adult online game play in a variety of settings (i.e., MMORPGs, free-to-play games). This dissertation built on theories of behavioral addiction (Carnes, 1983; Griffiths, 1995; Jacobs, 1986; Miller, 1980) in order to examine some of the consequences adults might incur by playing online games in these settings.

### **Therapeutic Relevance**

A better understanding of how online gaming can impact gamers in their daily lives and social relationships can assist therapists (Young et al., 1999). In the survey developed by Young and colleagues, 94% of therapists indicated that they felt that problems associated with the internet were more widely spread than what their caseloads indicated. In order for therapists to be able to effectively prevent and treat problematic online game use, research first must identify the individual factors that account for it. Once these components can be accurately identified, then diagnostic criteria may be developed so that therapists are able to not only accurately identify and treat problematic online game use, but they can also develop strategies that would assist those who play

online games in the prevention of problematic use that may lead to negative consequences such as those noted by Young (2004) who discusses that many online gamers neglected their diets, hobbies, sleeping, and real life social interactions.

### **Conclusion**

Applying behavioral addiction theory to online gaming may provide the insight that is needed to develop treatments for those who may suffer from online gaming addiction. Because social networking sites, such as Facebook, are currently working under a new paradigm where game players are able to access many different online games for free, this work provides an opportunity to develop a measure that may be generalizable to a greater diversity of people. Therefore, this research was designed to create and validate an online gaming scale that could assist in identification of those who may be behaviorally addicted to online gaming, using Facebook game players as an initial population of interest.

### **Glossary of Terms**

**Avatar** – A character representation within a game that is recognizable to other users' and is ones' identity within an online game (Wood, Griffiths, Chappell, & Davies, 2004).

**Behavioral addiction** – A repetitive habit pattern that increases the risk of disease and/or associated personal and social problems. Addictive behaviors are often experienced subjectively as 'loss of control' – the behavior continues to occur despite volitional attempts to abstain or moderate use. These habit patterns are typically characterized by immediate gratification (short-term reward), often coupled with delayed, deleterious



effects (long-term costs). Attempts to change an addictive behavior (via treatment or by self-initiation) are typically marked by high relapse rates (Marlatt, Baer, Donovan, & Kivlahan, 1988).

**Character** – See avatar.

**Computer-Mediated Communication (CMC)** – Communication done over computer software so that game players are able to communicate with each other about game play experiences (King, Delfabbro, & Griffiths, 2010).

**Conflict** – Game play resulting in interpersonal, work, and internal conflicts (Charlton & Danforth, 2007; Griffiths, 1996, 2000a, 2000b, 2008).

**Experience (experience points)** – A way that online games measure completion of quest or the fighting/killing of other players or game-generated beast/characters. By gaining experience in the game, an individual's character gains levels, life, and abilities (King, et al., 2010).

**Free to play gaming model** – Players are able to play games for free but they may purchase different unique items or additional bonuses that allow for faster leveling so that player avatars become more powerful (Wu, Wang, & Tsai, 2010).

**Guild** – A group that players join whose function is to assist in game play, and competition. These groups allow for social interaction between individuals in connection with game play (King, et al., 2010).

**Level** – A way to measure time/experience in the game environment. As a character gains levels they typically gain life points, magic points, and abilities (MacMillan & Stone, 2011).

**Massively Multiplayer Online Role-Playing Games (MMORPGs)** – virtual three dimensional worlds that allow game players to immerse themselves in different environments and interact with others via the internet. Each MMORPG is a self-contained society where game players have characters that are able to grow and evolve (Charlton & Danforth, 2007, 2010; Hussain & Griffiths, 2009; Kim & Kim, 2010; Liu & Peng, 2009; Ng & Wiemer-Hastings, 2005; Peters & Malesky, 2008, Wan & Chiou, 2006).

**Mood Modification** – An assessment of how game playing may be used to either assist game players in achieving a euphoric state (Brown, 1993; Griffiths, 1996) or allowing them to numb the way they are feeling (Charlton & Danforth, 2007; Griffiths, 2000a, 2000b, 2008).

**Multi-User Domain (MUD)** – An environment where players can choose a specific theme for game play, and control a character within the gaming realm (Young, 1996).

**Pay-to-play gaming model** – Players purchase software and/or monthly subscriptions in order to access gamer servers (Wu, et al., 2010).

**Relapse** – Indicates that an individual has attempted to discontinue a behavior, however, that behavior resumes at the same or greater levels (Charlton & Danforth, 2007; Griffiths, 1996, 2000a, 2000b, 2008).

**Salience** – An assessment of how important online game play is to an individual. This may contain elements of affect, behavior and cognition (Charlton & Danforth, 2007; Griffiths, 1996, 2000a, 2000b, 2008).

**Tolerance** – A process by which an individual needs to have greater activity levels of game playing to achieve the same levels of mood modification. This might be measured by the number of games that the user chooses to play, by increasing game play time, or not leaving the game at a time they intended (Charlton & Danforth, 2007; Griffiths, 1996, 2000a, 2000b, 2008).

**Withdrawal symptoms** – When an individual feels troubled or has physical effects because their online game playing has been discontinued or has been dramatically reduced (Charlton & Danforth, 2007; Griffiths, 1996, 2000a, 2000b, 2008).

## CHAPTER II

### LITERATURE REVIEW

The purpose of this chapter is to review the literature relevant to the development and validation of the Problematic Online Gaming Scale (POGS). This chapter is organized by reviewing the research that examines behavioral addiction and the criteria that have been used to measure that construct in the past, as well as an analysis of the literature on internet addiction that serves as a model for the investigation of the specific concept of internet gaming addiction. Then an examination of the main characteristics of internet games and the motivations for effects of online game play will be discussed. Finally, the rationale and hypotheses for the development and validation of the POGS are discussed.

#### **A Theory of Addiction**

As researchers explore new phenomena, it behooves them to organize such pieces within an existing theory. Since the 1980's there has been a movement towards a different conceptualization of addiction, from one that required ingesting a substance, to an alternative perspective that includes a focus on behavior (Carnes, 1983; Jacobs, 1986; Miller, 1980). Through this new behavioral model of addiction, there has been an increased amount of attention considering the diversity of behaviors that could be considered addictive, for example, sex (Carnes, 1983; Garcia & Thibaut, 2010), shopping (Clark & Calleja, 2008; Lejoyeux & Weinstein, 2010), tanning (Kourosch, Harrington, &

Adinoff, 2010) and gambling (Griffiths, 1995; Jacobs 1986; Wareham & Potenza, 2010).

Marlatt, Baer, Donovan, and Kivlahan (1988) defined addictive behavior as:

A repetitive habit pattern that increases the risk of disease and/or associated personal and social problems. Addictive behaviors are often experienced subjectively as ‘loss of control’ – the behavior contrives to occur despite volitional attempts to abstain or moderate use. These habit patterns are typically characterized by immediate gratification (short-term reward), often coupled with delayed, deleterious effects (long-term costs). Attempts to change an addictive behavior (via treatment or by self-initiation) are typically marked by high relapse rates. (p. 224)

Jacobs also described addiction as a way of life rather than the mere act of ingesting a substance into the system, and suggested that behavioral addictions are addictions of the purest form, because no substance is introduced into the body. Griffiths proposed (1996) that no single set of criteria can be sufficient to define all necessary components of such a diverse number of behaviors, but the definition offered by Marlatt and colleagues’ provided researchers with a context from which to examine behavior patterns. In the early 1990’s, some researchers (e.g., Brown, 1993; Carnes, 1991) started examining how this definition might be broken down into separate measurable components.

In 1991, Carnes outlined ten different components that were indicative of addictive behaviors, which fit within the definition by Marlatt and colleagues (1988) and expanded on them, which provided a better understanding of the individual components.

The components that Carnes (1991) attributed to behavioral addiction were: (a) out-of-control behavior patterns, (b) severe consequences that are due to behavior, (c) an inability to stop behavior in spite of adverse consequences, (d) persistent pursuit of self-destructive or high risk behaviors, (e) ongoing efforts or desire to limit behavior, (f) the use of behavior as a coping strategy, (g) increased level of acting out behavior because the current level of activity is no longer sufficient, (h) severe mood changes associated with behavior, (i) inordinate amounts of time spent engaging in or recovering from behavior, and (j) behavior resulting in the neglect of important occupational, social and recreational activities. Carnes (1991) discussed that independently, none of these signs were enough to substantiate an addictive cycle of behavior, but typically, an individual suffering from an addictive behavior pattern will experience many of these symptoms concurrently.

In essence, an individual may experience adverse consequences of a behavior, use it as a coping strategy, or have severe mood changes that are associated with the behavior. Furthermore, the behavior may even impact occupational, social and recreational activities, but meeting these criteria does not necessarily mean that a person exhibits an addictive cycle of behavior. However, the more criteria that are met concurrently, including a desire to limit the behavior, increased acting out, and an inability to stop the behavior, the more likely the individual shows signs of having an addictive cycle of behavior. Some researchers argued that the term addiction should only be used when a habitual use of a substance created a psychological dependence on that

substance (Barth & Kinder, 1987; Levine & Troiden, 1988; Rachlin, 1990; Walker, 1989). Carnes (1991) responded to this proposition by observing that it is possible for individuals to get high on their own brain chemicals. Research describing the changes in prefrontal cortex activity with video game play and differences in cerebral glucose metabolism levels offer some support to Carnes' supposition (Han, Kim, Lee, Min & Renshaw, 2010; Park et al., 2010).

The ten criteria used by Carnes (1991) are outlined in a more parsimonious manner by Brown (1993), and were then slightly modified by Griffiths (1996) to include the six criteria of salience, mood modification, tolerance, withdrawal symptoms, conflict, and relapse. Using these criteria, Griffiths (2000a) described how different individuals might be classified as addicted to the computer or the internet. Because this model has been used for other behavioral addictions (Carnes, 1983; Clark & Calleja, 2008; Garcia & Thibaut, 2010; Griffiths, 1995; Jacobs 1986; Kourosh et al., 2010; Lejoyeux & Weinstein, 2010; Wareham & Potenza, 2010) and reflects a repetitive pattern of behavior that has short term benefits, long term costs, and resistance to attempts to change the behavior, the model should be adequate for use in the examination of internet gaming characteristics.

### **Salience**

When an individual has feelings that cause a desire to pursue an activity (affect), combined with a decline in social interactions (behavior), and a perception of increased importance of the activity in their lives (cognitions) this individual behaves in a fashion

that is consistent with the particular activity being the most important, or salient, thing in their lives (Charlton & Danforth, 2007; Griffiths, 1996, 2000a, 2000b, 2008). These affects, behaviors and cognitions lead to a domination of a person's life through their desire to pursue a particular activity.

### **Mood Modification**

This is a concept that was altered from Brown's (1993) original concept of euphoria. Previously, it was thought that an individual would need to experience a high from an activity to be considered as an addiction (Brown, 1993; Griffiths, 1996), but some research seemed to indicate that individuals who were addicted to a particular activity did not report using that activity to achieve an euphoric state but instead use the activity as a way to escape their emotions (Charlton & Danforth, 2007; Griffiths, 2000a, 2000b, 2008). A participant who felt this way would likely endorse items that indicated the activity was able to calm them when in an anxious state.

### **Tolerance**

Tolerance is a process through which an individual needs to continue to pursue an activity to a greater extent to achieve the same level of mood modification (Charlton & Danforth, 2007; Griffiths, 1996, 2000a, 2000b, 2008). This can be accomplished by increasing the time pursuing the activity, the pursuit of the same or similar activities simultaneously or by the increased allocation of other types of resources to that activity (i.e., money).



### **Withdrawal Symptoms**

This term is typically used to describe the physical effects and/or the troublesome feelings that are experienced when a behavior has been discontinued or dramatically reduced (e.g., moodiness, irritability, etc.; Charlton & Danforth, 2007; Griffiths, 1996, 2000a, 2000b, 2008). This symptomology could be a reason for individuals participating in the activity while at work or missing other pursuits so that they can attend to decreasing of these symptoms via their chosen activity.

### **Conflict**

Interpersonal conflicts may arise as a result of the individual's engagement with the activity. This conflict could take the form of interpersonal conflict (friends, family, employer), activities (work, school, social life, interest) or with themselves (frustration at feeling tied to a particular activity; Charlton & Danforth, 2007; Griffiths, 1996, 2000a, 2000b, 2008).

### **Relapse**

Relapse is conceptualized as an individual's continued attempts to cease a behavior but each time the person desists, there is a resumption of the activity at the same or greater levels than before (Charlton & Danforth, 2007; Griffiths, 1996, 2000a, 2000b, 2008). At the height of addiction, these patterns are quickly restored after many years of control or abstinence (Griffiths, 1996).

Because these criteria have been used in assessing other behavioral addictions (Carnes, 1983; Clark & Calleja, 2008; Garcia & Thibaut, 2010; Griffiths, 1995; Jacobs

1986; Kourosh et al., 2010; Lejoyeux & Weinstein, 2010; Wareham & Potenza, 2010) that display repetitive patterns of behavior that have short term benefits, long term costs, and a resistance to behavior change, they make a good beginning place for evaluation of those who play online games. However, it will also be necessary to identify additional criteria, such as the social aspects of addiction, that may be applied to this behavior as it is intrinsically different from addictions of consumption (i.e., drugs, alcohol, food) or excessive pursuit of basic needs (i.e., sex, gambling).

### **Social Aspects of Addictive Behaviors**

Although addiction has been noted to affect individuals in a negative social manner by causing conflict with friends and family (Charlton & Danforth, 2007; Griffiths, 1996, 2000a, 2000b, 2008), some addiction researchers note that social components may actually contribute to or support addictive behaviors (Brotzky & Giles, 2007; Giles, 2006). This paradoxically indicates that while online gaming addiction may be a cause of social problems with friends and family, there may be a component of social connection with others that allows online gamers to feel connected socially (Brotzky et al., 2007; Giles, 2006).

### **Internet Addiction**

Because of the increased use of the internet in the mid-to-late 1990's, researchers began to examine the possible consequences and abuses that could happen (Greenfield, 1999; Morahan-Martin & Schumacher, 2000; Young, 1996; Young et al., 1999). Young (1996) did an early empirical study that examined internet dependence, which led to

further research and scale development to examine internet addiction, the purpose of internet usage and types of sites accessed, attitudes towards the internet, as well as possible sources of pathology that could result from internet use. Some researchers also examined theories that could be used to explain internet addiction and the diagnostic criteria that should be used for this construct (Beard & Wolf, 2001; Griffiths, 1999, 2000a; Shapira et al., 2000). As a result of this research, there were some contentions that the internet was merely a new platform which allowed for the extension of other addictive behaviors (Griffiths, 1999, 2000a; Shaffer, Hall, & Bilt, 2000; Shapira et al., 2003).

## **A Historical Overview of Internet Addiction**

### **An Exploration of Internet Use**

An early empirical study that examined internet addiction was addressed by Young (1996). Young (1996) indicated that the behavioral nature of internet addiction was most comparable to the previously studied behavioral additions of compulsive sexual behavior, overeating, and compulsive gambling. The *Diagnostic and Statistical Manual of Mental Disorders, Fourth Edition (DSM-IV*; American Psychiatric Association [APA], 1994) criteria for pathological gambling was then modified to develop an eight-item screening questionnaire that would classify participants with regard to their dependence on the internet. The eight criteria included: (a) preoccupation with the internet, (b) increased amount of time spent on the internet, (c) unsuccessful efforts to control internet use, (d) negative mood states when attempting to curtail internet use, (e) staying online

longer than intended, (f) internet use jeopardizing the relationships, job, educational or career opportunities, (g) lying to significant others to conceal internet involvement, and (f) using the internet as a means of escape for dysphoric mood states (Young, 1996). Participants who affirmatively answered five of the eight criteria were classified as dependent. Of the 496 participants in Young's (1996) study, 396 of them met the criteria for addiction to the internet. Participants in Young's (1996) study were recruited from college campuses, nationally and internationally dispersed newspaper advertisements, electronic support groups for internet addiction, and those who searched the internet for internet addiction, which may account for the large number of participants that were classified as addicted to the internet.

The individuals in Young's (1996) study, who were classified as dependent on the internet, were found to have spent an average of 38.5 hours per week ( $SD = 8.04$ ) on the internet compared to 4.9 hours per week ( $SD = 4.07$ ) for those classified as non-dependent. These hours did not include time that was spent on the internet for academic or work related purposes. The most utilized applications for those dependent participants were interactive features such as chat rooms and MUDs (multi-user domains). MUDs were noted to be unique in the nature, because they typically provided an environment where players could choose a specific theme for their play, and control a character within the gaming realm. Young (1996) noted that many of those who were classified as dependent had reported moderate to severe consequences for their commitment to online activity, such as personal, family, financial and occupational problems, and that 54% of

those individuals had no desire to reduce the amount of time spent online. Furthermore, several of the participants had attempted to set restrictions on their own online activities by limiting the time that they spent online, but their preoccupation with the internet typically resulted in breaching those restrictions. Young (1996) came to the conclusion that games where individuals were able to interact with each other seemed to play a significant role in the pathological use of the internet and that use of these types of applications could lead to addictive behaviors in regards to the internet. Young (1996) suggested that individuals who felt like their real life relationships were not meeting their social needs tended to use the internet to establish virtual relationships, which acted as a unique form of reinforcement.

In an effort to extend Young's (1996) work, Greenfield (1999) put a survey on the website of ABC News which examined 15,414 participants' propensity towards excessive internet use. Greenfield's Virtual Addiction Survey (VAS) was formulated using the *DSM-IV* (APA, 1994) criteria for pathological gambling and found that 6%, or 919 participants, met five or more criteria and were classified as addicted to the internet. A preliminary analysis of the data was conducted and some support was found for the addictive components of tolerance and withdrawal in those who endorsed themselves as being addicted to the internet. Those individuals found themselves preoccupied with going online (83%), desiring more time online (58%), having frequent failed attempts to limit internet use (68%), and experiencing feelings of agitation when attempting to decrease internet use (79%; Greenfield).

Once early research examining internet addiction demonstrated that there was sufficient evidence to continue the exploration of technological addiction, (Greenfield, 1999; Young, 1996) researchers began to wonder how it might be impacting the caseloads of mental health practitioners. Young and colleagues (1999) analyzed the responses of 35 therapists to see what the reported incidence was and the associated behaviors were of those whose primary complaint was related to the internet. Therapists reported that they had noted an increase of clients that began having negative consequences in their lives as a result of their internet use (Young et al.). The therapists surveyed reported that over the previous year, they treated anywhere from 2-50 clients who they would classify as addicted to the internet, and that those clients had experienced a number of problems that were associated with their internet usage (Young et al.). Young and colleagues found that the therapists' biggest concern with this addiction was the impact it had on their client's relationships. Some of the categories therapists listed as concerning were the use of internet in sexually addictive behaviors, over-reliance on online relationships, obsessive online gambling, excessive shopping, extensive searches, and game playing (Young et al.). Because of the more focused examination of those who believed themselves to be addicted to the internet in some way (Greenfield, 1999; Young, 1996) and the fact that researchers had discovered therapists were also seeing some reflection of this new technological addiction in their practices (Young et al.), it was time for researchers to examine how this paradigm was reflected in additional populations.

Morahan-Martin and Schumacher (2000) noted that the majority of the past studies of internet addiction used sampling techniques that demonstrated sample bias, such as collecting data online and using participants who believed they had an issue with internet usage. At the time of this particular study, about 20-30% of the United States population had online access, so Morahan-Martin and Schumacher examined 283 college undergraduates that were in classes that required internet use but who did not necessarily classify themselves as internet dependent. A 13-item scale was developed which assessed pathological internet use (PIU) by addressing whether the internet was causing interpersonal, academic or work problems, mood-altering use, personal distress, or withdrawal symptoms. An additional 30 questions were used to review participants' specific use of the internet as well as the specific types of sites that were accessed. Behaviors and attitudes about the internet and participants' feelings of loneliness were evaluated as well. This scale was developed to examine how internet dependency or addiction might be reflected in those individuals who regularly had access to the internet.

Even though they reported that they were only using the internet for an average of 8.5 hours a week, approximately 8% of the students in this study were classified as being pathological internet users (Morahan-Martin & Schumacher, 2000). Although the amount of time demonstrated with these activities does not seem to be extreme, the authors argued these early patterns of work, academic, and interpersonal problems that were the result of increased internet use would appear to support the concept of internet dependence. Morahan-Martin and Schumacher concluded that because the internet

allowed an anonymous forum, which lowered inhibitions and lessened social risk, males who were technologically sophisticated and lonely were at more risk for pathological internet use. Now that a study had been conducted using a single population who had regular access to the internet, a study that examined a more representative population was needed.

Anderson (2001) examined the voluntary use of the internet by college students from a mixture of eight colleges located in the United States and Europe yielding a total of 1,302 participants. Anderson divided the participants into low- and high-use groups, determined by whether the individual had spent more or less than 400 minutes a day online, and noted that about 6% of the respondents were classified as being in the high-use group. A revised criterion, similar to the substance dependence criteria in the DSM-IV (APA, 1994), was used to measure the concept of internet dependence. The criteria that Anderson used included: (a) tolerance, (b) withdrawal, (c) using the internet for extended time periods, (d) unsuccessful attempts to limit internet use, (e) reduction of other activities as the result of using the internet, and (f) continued use despite negative effects. Almost 10% of the internet users in this study met three or more of the seven criteria for internet dependence and averaged 229 minutes a day of internet use compared to the 73 minutes a day for the rest of the sample (Anderson). Anderson noted that the top uses of the internet spent their time surfing the World Wide Web (92 minutes), checking/sending e-mails (50 minutes), and playing internet games/MUDs (31 minutes). One of the results of this study was that researchers had noted that individual's online use



negatively affected sleeping patterns, academic work, and their ability to meet new people. Anderson noted that this dependence to the internet was evident in several countries. At this time, it made sense to review the criteria that had been used in the identification of this problem and to attempt to classify it in a way that clinicians might be able to use it to universally identify clients for prospective treatments.

Beard and Wolf (2001) discussed some of the problems they felt Young's (1996) criteria had in classifying internet addiction, including the objectivity of and reliance on self-report, vague and unclear terminology, and that it might be possible to qualify for internet addiction using Young's (1996) criteria without actually having an addiction. Beard and Wolf indicated that there had been limited research including a representative for use as a comparison to those who were being diagnosed, and that there might be underlying addictive processes influencing participant's responses. Beard and Wolf also examined the term addiction and the fact that many times criteria used for substance disorders were not being adapted specifically to internet use but to pathological gambling, which was listed as an Impulse Control Disorder in the *DSM-IV* (APA, 1994). These authors suggested that instead of conceptualizing pathological internet use as addiction, it might be more appropriate to diagnose this use as an Impulse Control Disorder (Beard & Wolf). With these concerns in mind, Beard and Wolf discussed ways in which conditions might be met to reflect more accurate criteria to be used in diagnosis of this disorder.

Using the same foundation of pathological gambling as Young (1996), Beard and Wolf (2001) modified the criteria in such a way that they addressed some of the previously listed concerns. Beard and Wolf proposed a criterion for internet addiction in which the following criteria must be met: (a) preoccupation with the internet, (b) need for increased time on the internet for satisfaction, (c) unsuccessful attempts to curb or halt internet use, (d) negative mood changes when reducing internet use, and (e) staying online longer than intended. Additionally, the behavior must impact functioning or coping, such as impacting a significant relationships or a job, lying to a significant other about extent of internet use, or using the internet to escape from problems or negative emotions. Beard and Wolf also discussed that an examination of the different activities in which individuals are engaged should be reviewed, because it could be that these specific activities could be responsible for the user's addictive behaviors. Some possible activities might include gambling, viewing pornography, shopping or gaming on the internet. Other authors were also examining this construct to develop diagnostic criteria that more accurately reflected this problematic use of the internet.

Shapira and colleagues (2003) also argued for different diagnostic criteria for problematic internet use. A short three-point diagnostic criteria was suggested that consisted of the following: (a) maladaptive preoccupation with the use of the internet that is experienced as irresistible or use is longer than planned; (b) distress or impairment that was clinically significant in important areas of functioning; and (c) the use of the internet was not better accounted for by another Axis I disorders (Shapira et al., 2003). One of the

key arguments for this broad diagnostic criterion was the desire to be able to identify individuals with problematic internet use while allowing for the fact that this use may be the result of another treatable diagnosis, such as anxiety disorders, mood disorders, psychotic disorders, substance abuse disorders, or impulse control disorders (Shapira et al., 2003). This approach also attended to the concepts of sensitivity (e.g., correctly identifying those with problematic internet use), limiting the number of Type I errors, and specificity (e.g., correctly identifying those without problematic internet use) limiting the number of Type II errors.

Griffiths (2000b) argued for the concept of internet addiction indicating that although the internet might be used as a means to access other addictive behaviors (i.e., shopping, pornography, gambling, gaming); there are individuals who use the internet excessively to engage in behaviors that they would not ordinarily engage in (Griffiths, 1996, 2000a; Young, 1996). Griffith's (2000b) discussed the fact that a technological addiction was a behavioral addiction, which included the six core components of addiction, which are salience, mood modification, tolerance, withdrawal, conflict and relapse. Griffiths (2000b) explored five case studies, in which there was the possibility of addiction to the internet, and evaluated them with the six components of addiction. Out of these five cases, Griffith (2000b) concluded that only two of them met the criteria for addiction, although he discussed that a common theme in each of the cases seemed to be the pursuit of social contact, which, highlighted that it would be important to consider the positive outcomes of internet use as well as the deleterious effects. Griffith (2000b) then

discussed that it would be important to determine if the internet was only the means by which a primary addiction was being accessed (i.e., gambling, gaming, etc.). Griffiths (2000b) further discussed that if internet addiction or other behavioral addictions that were being accessed by using the internet were to be examined, that it only made sense to use a similar criteria to the clinical criteria that has been used for other addictions.

### **Recent Research in Internet Use**

Because the internet can be used as a method to achieve a convenient, anonymous, low cost form of reward, and may be used as a way to cope with or escape from the problems associated with daily living, it is important that psychologists understand the mechanisms associated with compulsive internet use. Douglas et al. (2008) indicated that internet addiction is a form of behavioral addiction and that several different authors (Griffiths, 2000a, 2000b; Ng & Wiemer-Hastings; Tsai & Lin, 2003; Young, 1997, 1998) have worked on defining criteria for internet addiction. The criteria that have been given for Internet Addiction Disorder (IAD) include (1) an irresistible urge to access the internet and/or excessive use of the internet beyond a specific amount of time that has been allotted, (2) preoccupation that leads to impairment, poor functioning or distress, and (3) the excessive use cannot be accounted for by Axis I clinical disorders or be exclusively associated with periods of mania or hypomania (Shapira et al., 2003). Griffiths (2000b) indicated that addiction that involves interactions between humans and machine should be conceptualized much like other addictions and should be shown to include the core components of addiction that include salience, mood

modification, tolerance, withdrawal, conflict and relapse. Douglas and colleagues also examined some of the motivations that might be connected to the initial increased use of the internet which might explain the transition from normal internet use into problematic use of the internet.

Meerkerk, Van Den Eijnden, Franken, and Garretsen (2010) examined problematic internet use using the Compulsive Internet Use Scale (CIUS; Meerkerk, Van Den Eijnden, Vermulst, & Garretsen, 2009) from the perspective of classical and operant conditioning mechanisms. The CIUS (Meerkerk et al., 2009) is a 14-item measure that was designed to examine the severity of compulsive internet use, by examining the criteria in the *DSM-IV* (APA, 1994) for Dependence and Obsessive Control disorder and developing a scale that would measure compulsive or addictive behavior (e.g., loss of control, conflict, preoccupation, conflict, withdrawal symptoms, and coping). Meerkerk and colleagues (2010) used the Behavioral Inhibition System/Behavioral Approach System Scale (BIS/BAS; Franken & Muris, 2006) to determine what personality characteristics might be associated with problematic internet use. Meerkerk and colleagues (2010) hypothesized that compulsive internet use would be associated with individuals who were sensitive to both reward and punishment.

Meerkerk and colleagues (2010) did find a relationship between compulsive internet use and individuals who were highly sensitive to punishment, but found that reward was only partially supported by a weak relationship to one of the subscales of the BAS, fun seeking. The relationship between compulsive internet use and punishment

could imply that the internet is being used by people as a way to escape the negative experiences that are a part of their daily living. Because reward, as defined by the BAS (e.g., fun seeking, reward responsiveness and drive), does not seem to be a reason that individuals may seek to get online, it may be that the motivation to engage in online activities may be a desire to escape thoughts about adverse real life experiences.

Additionally, the study found that individuals who reported high levels of impulsivity were more likely to demonstrate compulsive internet use as measured by the CIUS (Meerkerk et al., 2010). It would stand to reason that applications which offered individuals both the opportunity to have fun as well as escape from unfavorable life events, could lead to compulsive use by those who have higher levels of impulsive behaviors. Over the course of the last few decades, many terms have been used when examining the construct of internet addiction or problematic internet use and some researchers (Douglas et al., 2008) sought to examine some global characteristics of those individuals who might be most likely affected.

In a meta-analysis of research on internet addiction, Douglas and colleagues (2008) indicated that there are currently many different terms that have been associated with Internet Addiction Disorder (IAD), including cyberspace addiction, online addiction, net addiction, internet addiction disorder, high internet dependency, pathological internet use, problematic internet use and excessive internet use (Davis, Flett, & Besser, 2002; Hur, 2006; Widyanto & Griffiths, 2006). This problematic use of the internet has been conceptualized as an impulse control disorder where the user experiences arousal or

tension before use, which is followed by a pleasure or a sense of relief after use (Douglas et al.). Douglas and colleagues indicated that those who are more likely to become addicted to the internet were individuals who used the internet for purposes of enjoyment, especially when they were bored or lonely. Earlier, these individuals had been examined in more detail by Soule, Shell, and Kleen (2003) to determine personal characteristics of individuals who might use the internet for these reasons.

In a study that examined demographic characteristic of heavy internet users, Soule and colleagues (2003) found that 62% of respondents reported using the internet for more than 10 hours a week and 10% of respondents reported using the internet over 40 hours a week. When asked about recreational use of the internet, 13% reported 10 or more hours a week recreationally and 4% reported using recreationally for more than 20 hours a week (Soule et al.). Some of the reasons that participants gave for recreational online use included cyber-sex and cyber-relationships, chat rooms, checking email, gambling, and gaming (Soule et al.). Soule and colleagues reported that their results were consistent with other studies that found that individuals who were more likely to become addicted to the internet fell into one or more of the following categories: (a) young men, (b) middle age women, (c) single persons, (d) gay men, (e) college students, or (f) persons with less education. One of the common factors seems to be that these types of people use the internet for purposes of enjoyment or when they are bored or lonely.

When examining the different groups of individuals who are addicted to the internet and their characteristics, Douglas and colleagues (2008) indicated that

individuals who associate their internet use with independence, friendship, freedom, and excitement are those who are at a higher risk of becoming addicted. For example, MUDs have been discussed as a way in which users can use fantasy characters to enjoy a sense of recognition and power (Young, 1997). The interactions that individuals have within these games allow them to socialize in a way that feels safer (Young, 1996). It may be that there is less perceived risk when interacting online than in real life, because there is less of a possibility of face to face interactions, and the online interactions give individuals the opportunity to enjoy intimate and confidential relationships while being able to control the amount of interaction that they experience (Young 1996, 1997).

The research that examines internet addiction seems to indicate that the internet may not be the source of addiction but, instead, different forms of media, such as shopping, gambling, pornography, and games, which are accessible via the internet, are (Shaffer et al., 2000). Because people use the internet as a way to seek pleasurable experiences, many find activities that give them enjoyment and increase the amount of time they spend accessing that entertainment via the internet. Several authors have made reference to online games as one of the ways in which people find entertainment on the internet and discuss the importance of verifying if increased time spent playing these games could lead to a type of addictive behavior (Charlton & Danforth, 2007; Douglas et al., 2008; Griffiths, 2000a, 2000b, 2008; Liu & Peng, 2009; Wan & Chiou, 2007; Wu, Wang, & Tsai, 2010; Yee, 2006; Yellowlees & Marks, 2007).



Douglas et al. (2008) suggested that the internet is not only a way to escape from the pressures of work, school or family life but it is also a way in which individuals meet new people that they would not otherwise take the time in their real lives to meet. Many times, individuals suffer from a negative self image, and as a result of their low self-confidence, they find the anonymity and faceless interaction found on the internet appealing (Douglas et al.). The ability to escape the negative emotions such as loneliness, to fill time when isolated or bored, to release frustration and anger, and to be able to feel a sense of connection and relatedness can become powerful incentives to spend increasingly more time on the internet. The problems that develop as a consequence of this increased use can include less attention and focus on school, work, finances, leisure, and interpersonal lives that may have been previously a focus of attention (Douglas et al.). Relationally, this can mean that there are increased confrontations with family members and friends who have expressed concern with the individual's increased internet usage. Although researchers have established criteria that examine motivations for overall internet use (Douglas et al.; Meerkerk et al., 2010; Soule et al., 2003; Young, 1996, 1997) a specific examination of the motivations for online gaming is important to see what differences may exist.

### **Motivations of Online Game Play**

As each of the six addictions criteria, salience, mood modification, tolerance, withdrawal, conflict and relapse, is used in the evaluation of online game play for addictive characteristics, it is also important to note the literature that has examined

motivations of online gaming. Wan and Chiou (2007) used a perspective based on cognitive theory to examine the difference between internal and external motivations for online game play addiction. The motivation factor for other types of addiction such as alcohol, drugs, sex or gambling addictions cannot be easily extrapolated to the area of online game playing. One main difference between these types of addictions is that alcohol, drugs, sex and gambling all have tangible components (i.e., substances of use, another person, money) to the addictive cycle while the components of internet gaming addiction are intangible (i.e., virtual products, praise from others, fame, a sense of belonging) (Wan & Chiou, 2007). Because the motivating factors are of a different nature, this study was done to examine what types of motivations would encourage players to play online games for longer periods of times and what might motivate addictive playing (e.g., showing signs of tolerance, compulsive use and withdrawal) and when it creates negative consequences (e.g., related problems of health, family, school, peer interaction and finance) in game player's lives (Wan & Chiou, 2007).

Wan and Chiou (2007) found that intrinsic motivation was one of the driving forces for those who are addicted to online gaming and indicated that rewards which were highly contingent on play time and play interactions may be one of the most important factors in this type of addiction. The intrinsic motivators of competition and evaluation within online gaming, which are of a contingent nature, seem to be more encouraging to players of online games than those same types of rewards would be in the real world (Wan & Chiou, 2007). From an addiction perspective, rewards would be recognized

within a short time period and lead to more immediate gratification than those that might be experienced in the real world (e.g., getting a promotion at work, winning a sports competition).

Wan and Chiou (2007) looked for external factors (e.g., money, fame and power) that might undermine this intrinsic motivation and found that relevance, contingency, tangibility, and expectancy all played a significant role. Relevance was measured through examining whether a reward obtained in the game could be sold in exchange for money, contingency examined whether or not the user had to complete a specific objective for the reward, tangibility reflected whether a reward was substantial or non-substantial, and expectancy was the expectation of receiving bonuses, such as attaining a higher level in the game or gaining experience points in the game (Wan & Chiou, 2007). Wan and Chiou (2007) noted that when external factors were of importance to the individual, the relevance of the reward seemed to increase engagement in the activity for the sole purpose of receiving the reward. When rewards were contingent on a person's performance, and were tied to an evaluation or comparison to other competing individuals, intrinsic motivation also increased, while non-contingent rewards, which were given without regard to performance or ability, seemed to decrease intrinsic motivation (Wan & Chiou, 2007). If a player can expect to receive a reward after the completion of a task, it tends to reduce her or his intrinsic motivations. A scenario in which the player may or may not receive a reward seems to be a situation in which the player has increased motivation to play for enjoyment (e.g., mood modification) rather

than for rewards. As supported by previous research (Elaine, 1997; Rheingold, 1993), rewards such as money, grades, or prizes, also seemed to affect intrinsic motivation in a negative manner, while those intangible motivators do not seem to do so. Although this research has been able to provide a global perspective on motivations, some researchers (Wu et al., 2010; Yee, 2006) have examined motivations from an individual perspective.

Yee (2006) indicated that the motivation for online games is different for every person. As a result of these differences, game developers create multiple mechanisms within online games to motivate people with differing needs to play (Yee). The three factors that Yee found to be important within online game playing were factors that related to achievement, immersion, and social interaction. The achievement component included the desire for quick progression in the game to accumulate symbols of power and status, the desire to compete with others, and having an interest in analyzing the game in order to optimize their game character, or avatar, performance (Yee). Yee described immersion as using the game as a way to avoid thinking about real life difficulties, discovering different aspects of the online environment of which others were not aware, and the ability to customize their character and role play with others in order to create a story that was consistent with the background story of the game. The social component of online games was related to the desire of users to develop long-term meaningful relationships with others, helping and talking with other players, and being part of a group to accomplish shared goals (Yee). In this way, Yee indicated that the possible harmful consequences (i.e., addiction and aggression) for various individuals

may be a function of their particular motivation for playing the game and the individual goals that determine game play style.

Using this idea of varying motivations as a criterion for evaluating addictive behaviors in online game play, some authors (Wu et al., 2010) have been able to integrate this concept with the Uses and Gratifications Theory (Palmgreen, Wenner, & Rosengren, 1985; Rosengren, 1974) that has been previously used for different forms of media. The uses and gratifications approach began as a reaction to the exploration of media as a way to gratify users' various wants and needs and how this might serve as a motivation for using different types of media (Palmgreen, Wenner, & Rosengren, 1985; Rosengren, 1974). In this theory, users have a choice of media to select from in order to gratify their needs and interest. Each person's social and psychological factors determine the type of media to be used and what the intended purpose will be (Wu et al., 2010). This person's needs and interest will then be affected by their choice in media and the extent of gratification that they are able to experience from this choice (Katz, Blumer, & Gurevitch, 1974; Pornsakulvanich, Haridakis, & Rubin, 2008; Weibull, 1985).

Individuals' gratifications for media use, in general, have been grouped into the following categories: (a) diversion, which is emotional release or escape from problems, (b) personal identity, which includes self-understanding and reinforcement of values, (c) surveillance, which is the gathering of information, and (d) personal relationships, which refers to the substitute of media for social interactions or using media as topics of conversation (Mc-Quail, Blumler, & Brown, 1972). Researchers have more recently

begun to use this theory to examine internet use (Ko, Cho, & Roberts, 2005), internet dependency/addiction (Kim & Haridakis, 2009; Sun, Rubin, & Haridakis, 2008), and social networking sites (e.g., MySpace, Facebook) (Raacke & Bonds-Raacke, 2008; Sheldon, 2008; Urista, Qingwen, & Day, 2009). Using this same approach, Wu and colleagues (2010) also examined how game players might become attached to a specific online game.

Wu and colleagues (2010) used the Uses and Gratification approach themes (e.g., achievement, social, and immersion components; Yee, 2006) to provide a theoretical framework for how users might be motivated to play one online game over another. Wu and colleagues discussed that spatial and social presence are two ways in which the structure of online games keep the user engaged in the particular game, and the overall game playing experience. Spatial presence is composed of the game player's character interaction with the gaming environment, and is designed to create a psychological sense of social interaction within the gaming environment. Social presence refers to the ability of the individual to interact with others who are playing the game, and provides the player a sense of connection to others. An additional motivation that was discussed by Wu and colleagues was the fact that some internet gaming is moving from a pay-to-play model to a free-to-play model.

In a pay-to-play gaming model, players had to buy the software and/or monthly subscriptions in order to access gamer servers (Wu et al., 2010). Since 2004, however, players are able to download and test out games for free, so players can try out an

assortment of games before selecting one to play (Wu et al.). Within the free-play model, some of the items that users are able to purchase include virtual real estate, digital treasure and value-added services to augment their game characters. One of the interesting factors as the gaming community changes to a free-play model is that the gaming community as a whole actually ends up spending more money on these free games (Wu et al.). MacMillan and Stone (2011) indicated that less than 10% of the 232 million users of Facebook games purchased these services, accounting for over 597 million dollars in revenue in 2009. As a result, game developers are beginning to use different strategies to encourage players to spend money opposed to using the purchase of the game as a direct revenue source (Wu et al.). Because users are exposed to and able to search for additional game playing experiences, game developers and publishers must come up with additional methods to encourage users to continue investing in their game or chance losing these players to other forms of entertainment, including alternative online games (Wu et al.).

The conclusions that were made by Wu and colleagues (2010) included that they noted that gratification, presence, motivation, and the mode by which users interact to continue playing were all significant factors that contributed to users playing a specific online game. Some plausible explanations for online game play were noted as a manner to increase social interactions, to have fun or as ways to fill time (Wu et al.). To better understand how internet games are able to access these motivational factors within

gamers, it is important to have an understanding of what characteristics exist within online internet games.

### **Online Game Structural Characteristics**

King, Delfabbro, and Griffiths (2010) examined the structural components of video games that might be linked to excessive video game play, and the addictive qualities they may possess. Structural characteristics are features that are intrinsic to the video game that may affect the initiation, development, and maintenance of video game play over time (King et al., 2010). Some of the structural characteristics that were examined as implications for addiction were social components (i.e., social aspects within the game), narrative and identity components (i.e., character creation and interactive nature of story line), manipulation and control components (i.e., how much influence the character has on effecting in-game outcomes), presentation (i.e., visual and auditory game output), and reward and punishment (i.e., the ways in which players win or lose the game; King et al., 2010). Of these components, it might be that social components may be an important factor to consider when attempting to explain why some individuals use online games in a pathological or addictive manner.

When looking at the social components, King and colleagues (2010) examined the ways in which players of massively multiplayer online role playing games (MMORPGs) interact with each other. Some of the different ways in which social interactions take place include computer-mediated communication (CMC), representation through game character or avatar identity, group membership in a guild, whose function is to assist in



game play, and competition (King et al). CMC in online gaming can happen before, during and after game play. The before or after game interactions may include correspondence via email, voice communication, text, or forums that are used to communicate about different past or future interactions within the online game (King et al.). King and colleagues discuss that during the game, different online communities are able to use in-game voice connections, servers that specialize in group voice communications, in-game text, “emotes” (e.g., animated expressions), as well as specialized acronyms (i.e., be right back, “brb”). Part of the social presentation that individuals may use for identification include the creation of an avatar, membership in a guild and/or name that players are allowed to customize to create an online gaming identity (King et al.). These guilds may be another way in which social interactions may keep online game users connected to the game and should also be examined as another factor that could contribute to excessive online game play.

King and colleagues (2010) discussed the fact that guild membership may be part of the gaming identity that can cause conflicts with an individual’s real world life. Guilds may meet at specific times to complete various activities (i.e., raids, battles or other group objectives), and if these online social obligations are not met, then players may suffer penalties that include losing rewards, respect, or being asked to leave the guild. Although the negative effects of being ostracized from the group may be alleviated by an attitude of indifference that is somewhat unique to online activities (Williams et al., 2002), because a user can join new groups or play different games, it has still been found to have

significant negative effects for the individual (Williams, Cheung, & Choi, 2000; Williams et al., 2002).

Competition has also been noted as a determinant of the enjoyment that players may get from an online gaming experience (King et al., 2010). King and colleagues noted that rankings can encourage players to play for longer periods of time and to compete with others for more prestigious ranks that are associated with increased levels of self-efficacy, which is the belief that one is capable of organizing and taking actions to achieve a specific goal (Bandura, 1997). Understanding this social component as one that could be relevant to excessive online game play, we see how other game characteristics such as character identity might be relevant as well.

Narrative and identity components may aid players in their ability to both to engage with the game and their character at a deeper level and to further immerse themselves in the escape from their real world lives (Wood, Griffiths, Chappell, & Davies, 2004). Players typically are able to manipulate an avatar within online games and are able to choose character features such as name, gender, physical appearance, skill types, and class of character (Wood et al., 2004). The characteristics that game players typically look for are ability for growth in character traits (i.e., strength, intelligence) so that they too are able to experience this growth over time (Wood et al., 2004). This gives players the opportunity to create characters that may be stronger, more powerful, more social, or sexier than they currently believe themselves to be. Once players find a character type they enjoy, they are more likely to become attached to the character and

invested in its development (King et al, 2010). Although, social interaction and character creation/identification are components that can keep a player connected to the game, some additional functional game characteristics may be responsible for overall game enjoyment.

The physical characteristics of the game and the way that players interact with the game may be features that can contribute to online game addiction. Manipulation and control features, are ways in which players interact within the game. These features include things such as having multiple lives, save features, management of various resources needed in the game, and non-controllable scripted elements within the game (King et al., 2010). The uncontrolled scripted elements in the game may include movie like presentations by the game about story line and the character, loading times for different sections of the game, and turn- or time-based elements within the game (King et al.). These elements can be attractive to players as they allow time for taking care of real life concerns while still making progress in the game. Features of appearance may also contribute to the enhanced enjoyment of game players as a way of keeping them attached to the game.

Game presentation also affects what type of experience game players have and may increase the amount of time spent playing the game. Graphic and sound features in games allow for a more realistic feel to the game and may give players a better sense of escape from reality. Additionally, specific sounds may be associated with particular events within the game creating a pleasurable sensation that would be supported from a

classical conditioning standpoint (King et al., 2010). In-game music and sounds may also assist players in losing track of time, which could increase the amount of time spent on the game. Some games may have features that model players' real life experiences, like drinking alcohol, and thus, create a higher degree of connection with their in-game character.

There are several additional ways that games can reward and punish players during the game playing experience (King et al., 2010). King and colleagues (2010) discussed that in-game money or gold is one way in which players are able to purchase goods that enhance their game playing experience, as well as a way to compare themselves to other players. Players are also reinforced by obtaining experience points through completing objectives so that their characters can become more powerful and attain new levels of proficiency (King et al., 2010). With new levels, a player may receive rewards such as more health and more power, new abilities, and higher status in the game. Additionally, as individuals play the game, they typically earn different types of enhancements that can be used to strengthen their characters, such as improvements in weapons, armor, or other items that enhance their game playing experience (King et al., 2010; Wood et al., 2004). Some items within the game are extremely rare or unique and they require much more time played in the game, play of the game at a higher difficulty level, the completion of certain objective, or real money to acquire. Games typically have many different methods to receive rewards so that players can choose an aspect of the game that fits their game playing style, or if they choose to play the game on all levels,

they can receive a variety of rewards. In the same vein, players can choose to play games that are more competitive in nature or games that are more cooperative, depending on their particular desires (Wood et al., 2004).

Although online games typically focus on positive reinforcement so that they are able to encourage individuals to play the game for longer periods of time (Wan & Chiou, 2007), some elements of punishment and failure occur as well (Wood et al., 2004). Because game designers want to increase play time, punishments are of a less permanent nature, which may include having to restart a level, losing resources, failure to meet an objective, comparison points lost, or having a game death that does not have severe consequences. Other possible negative consequences may be a halt in the progression of the games narrative so that players will have to repeat play to see the story line further developed (King et al., 2010).

### **Gaming as a Social Outlet**

While playing different online games, individuals may find that they get stuck or have difficulty accomplishing a particular task without the assistance of others. Ho and Huang (2009) explored different aspects of leaders in online gaming virtual communities as it related to organizing and accomplishing tasks. Much like Sherif, Harvey, White, Hood, and Sherif (1954) reported with the Robbers Cave experiment, superordinate goals are ways in which communities focus on a single task which brings them together with the feeling of closeness and unity. Leaders within the online gaming communities are individuals who play the game but also take on the responsibility to arrange group events,

offer information that keeps players up to date with game content, recruits new members, and encourages interaction among individuals who play the game (Rothaermel & Sugiyama, 2001). Ho and Huang found that the more the sense of belongingness and family atmosphere was created, the more that individuals were involved in sharing knowledge with other players, the sense of usefulness that they felt in the community environment and the enjoyment that they felt from the virtual community. Liu and Peng (2009) examined this connection with other game players and how this might contribute to increased game play.

Liu and Peng (2009) found that psychological dependency on online games was most likely experienced by those who perceived their virtual gaming experience as one that was more attractive than what they experienced in real life. The internet was found to be a less threatening environment through which to have social interactions, and thus, lead to more dependency by those who were looking for positive social experiences they felt as if they were not able to have in real life (Liu & Peng). Shyness was also found to be a positive predictor of online gaming dependency, because individuals felt like they were able to navigate online communication experiences in a better way because the computer served as a mediator in social experiences (Liu & Peng).

Some authors believe that the social aspect of online gaming is a way through which gamers connect to other individuals and did not lead to addictive types of behavior. Ng and Wiemer-Hastings (2005) compared those who played online (MMORPGs) to those individuals who played off-line video games to assess the

similarities and differences in these two groups and to assess the addictive nature of each type of gaming. The researchers (Ng & Wiemer-Hastings) found that MMORPG users were more likely to play for eight or more hours consistently, have had others tell them that they spend too much time playing online games, and reported losing sleep because of gaming. Ng and Wiemer-Hastings also found that MMORPG players reported having more fun, found it easier to converse with others, and would rather spend time with friends that they had met in the game than with people that they knew in real life. Those who played MMORPGs also indicated that they felt happier in the game than anywhere else and did not find outside relationships as important as their game relationships (Ng & Wiemer-Hastings). Because of the nature of games on a social networking site, such as Facebook, it could be that individuals who play these online games could have a similar reaction in that they feel more comfortable with their online relationships than with people they know from everyday life. The use of online games as a way to connect socially, has lead some researchers to feel, however, as if online gaming may not be a behavioral addiction.

### **The Controversy: Addiction or Not**

Ng and Wiemer-Hastings (2005) reported that MMORPGs represented an alternative to other forms of social entertainment, and because players who used this medium would most likely find alternative forms of entertainment if online games were not available, players have an alternative view of social life than others may have. This thought is part of an ongoing controversy about whether online gaming leads to addictive

types of behaviors or if there is just a tendency for some players to have a high involvement in their game playing activities. This controversy means that it is important to understand what may differentiate those who may be highly engaged in gaming behavior from those who are using the games in an addictive manner. A 2007 study by Charlton and Danforth examined factors that may separate individuals who played online games for enjoyment from those who played in an addictive manner. Charlton and Danforth (2007) examined the criteria of salience, euphoria, tolerance, withdrawal symptoms, conflict, and relapse and reinstatement that have been used by previous authors to describe criteria that should be used to evaluate internet gaming addictions (Griffiths, 2000a, 2000b, 2008) based on a model of behavioral addiction by Brown (1991, 1993). This study found that euphoria, tolerance, and cognitive salience were concepts of limited usefulness when studying the use of the internet from the perspective of addiction as they seemed to be better accounted for by high engagement usage rather than addiction (Charlton & Danforth, 2007). Charlton and Danforth (2007) noted that Griffiths (2008) had modified this model and relabeled euphoria to mood modification to account for the possibility that players of online games might not be looking for the excitement of the game but were looking for escape from reality instead. Charlton and Danforth (2007) found that those who were classified as addicted to online gaming spent almost twice the time (e.g., 31.92 hours a week vs. 15.84 hours a week) playing than those who fell into the highly engaged category. The amount of time spent playing a



game does not necessarily indicate that the online game playing is addictive in nature as shown in a case study example by Griffiths (2010a).

Griffiths (2010a) examined two different individuals in an effort to describe how the same amount of play time can be viewed differently based on the subjective experiences of the individual. In this study, Griffiths examined a 21-year old, single, unemployed man named Dave who had just recently graduated from college with a degree in Chemistry. Dave spent an average of 10 to 14 hours a day playing an online game and reported not feeling addicted to the game but felt that it was a positive influence on his life. He had recently been separated from his closest friends as they had all moved after graduating. After Dave met a woman through the game and got a full-time job, he found that although still interested in the game (he played a couple hours a week) he was able to focus on the other events that were happening in his life. In this instance, the online game seemed to be symptomatic of his specific situation. This example supports that using the criteria of time played in the game, while it might be important, is not sufficient to merit a classification of addiction to online gaming. This case study can be seen as an instance where time playing the game does not reflect addictive behavior, contrasted with another individual's case study examined by Griffiths (2010a).

The second person that Griffiths (2010a) interviewed was a man named Jeremy who was a 38-year old, financial accountant who had two children and had been married for 13 years. Jeremy reported being addicted to online gaming and was looking for

assistance with this addiction. Jeremy began through playing an online game for three to four hours a night in the beginning but his play time had increased to playing for up to 14 hours a day. Jeremy indicated that his relationship was failing, he called in sick to play online, and the game gave him the feeling of being able to escape from the worries of real life. Jeremy had tried to quit playing several times but continued to play even after his wife threatened to leave him.

Although we see that Charlton and Danforth's (2007) study reflected that time playing internet games may contribute significantly to behavioral addiction to internet games, Griffiths (2010a) described good reasons for not utilizing this as a main criteria when assessing for internet gaming addiction. Because length of time playing a game is not a standard that can be used for evaluating those who may be addicted to online games, it is important that motivational factors for online gaming be examined as a factor to determine addictive behaviors.

Although many researchers argued that online gaming can be maladaptive to the point of addiction (Charlton & Danforth, 2007; Douglas et al., 2008; Griffiths, 2000a, 2000b, 2008; Liu & Peng, 2009; Wan & Chiou, 2007; Wu et al., 2010; Yee, 2006; Yellowlees & Marks, 2007) there are researchers who might note otherwise (Blaszczynski, 2008; Ng & Wiemer-Hastings, 2005; Wood, 2008). In a 2008 edition of *International Journal of Mental Health Addiction*, several authors summarized many of the current arguments about whether online gaming would qualify as an addictive

behavior. This paper will first examine the arguments from researchers who argue against considering online gaming a behavioral addiction.

Wood (2008) examined four separate case studies to understand the different reasons people played online games and why it seemed that online gaming was just a symptom of what was going on with these individuals and not the real problem. Wood examined each of the case studies for examples where the structural characteristics of the game caused problems in these individual's lives. Each of the case studies had the common theme of a person (a 10 and 11 year-old boy, a 32 year-old woman, and a 42 year-old man) who played a MMORPG for long periods of time and had family members concerned that they were addicted to online gaming. In each of the examples, Wood found that the individuals gaming behavior was actually a symptom of something else that was going on in the person's life. This symptomology was being caused by experience of being bullied outside of the home, the experience of a father going off to war, a bad job experience and relationship difficulties, and bad time management. From these examples, Wood concluded that what first looks like addictive behavior is probably just the symptom of something that is more important that should be addressed in the individual's life.

Wood (2008) indicated that a comparison between online game playing and gambling as a means to measure the construct of addiction is not a logical one. Gaming is not likely to make one lose their home or have financial concerns as could be the result of excessive gambling. Another argument that the author made is that the time lost playing

online games that researchers qualify as a negative outcome, can actually be positive in nature. Wood described several different possible positive effects that could happen during this lost time (relaxation, entertainment) and indicated that those who complained about lost time were mainly frustrated that they could have done something better with their time or that they had bad time management skills. Wood asserted that when researchers use the same criteria to examine gaming addictions that are used for gambling, it is an inaccurate application of the criteria that is both misleading and inappropriate. Wood pointed to other activities that people do that waste as much time such as watching television, reading, or training for a marathon. One of the main arguments that Wood gave for online gaming not being an addictive behavior is the fact that there must be negative consequences for a behavior to be considered an addiction and that his examples show that when there is a problem, that online gaming is only a symptom of the problem and not the cause. This is however, one of the same arguments that critics of addictions make against alcohol addiction and substance addictions as well (Turner, 2008).

In a commentary that followed the Wood (2008) article, Blaszczynski (2008) indicated that he agreed that it did not make sense to apply the diagnostic criteria for gambling or any other addictions to online gaming. Blaszczynski asserted the accounting for specific negative consequences attributable to online gaming must be a part of ensuring that salience, tolerance, withdrawal, and reinstatement were features that could be directly attributable to the online gaming. Blaszczynski argued that discussing the loss

of time and the lack of opportunity to socialize outside of online games were arguments that lead to confusion and overlap between the terms of addiction, dependence, abuse, and misuse. Blaszczynski stated that video gaming does seem to share some of the same characteristics with slot machine gambling and that teasing out addictive properties in human-machine interactions could provide insights as to how these processes could lead to addiction. Turner (2008) addressed the concerns of Blaszczynski and Wood in his support of a concept of online gaming addiction.

Turner (2008) responded that consequences have little to do with how addiction should be defined. Two examples that he uses to support this argument are the addictive qualities found in tobacco that have few short term consequences and the addictive qualities of caffeine which is most likely the most abused drug in the world. Turner indicated that Wood (2008) dismissed many of the consequences that have been found for online gaming which include job loss, weight gain, poor grades, repetitive strain injuries, social problems and aggression. The main argument that Turner gave to define what may be thought of as an addiction is when something is used in a maladaptive way to solve emotional problems in the short term but does not address the long term consequences. Turner argued that these maladaptive strategies not only do not assist with the original problem, but they often cause the problem to be exacerbated with the additional consequences from online gaming. Turner addressed the different case studies that Wood (2008) used to indicate that internet gaming is just a symptom of the real problem by discussing the fact that drug addiction or gambling could be the result of

depression, and yet from a cognitive behavioral standpoint, these symptoms are still classified as addictive behaviors. Addictive behaviors are behaviors which are positively or negatively reinforced that cause dependence in a way that the behavior cannot be stopped. Turner concluded with the fact that addictive behavior should be thought of as something that falls at the high point of a continuum of behaviors in such a way that individuals have a difficult time escaping the behavior and that the consequences of the behavior can be either short or long term in nature.

Studies on excessive play on internet games and how that might lead to pathological internet gaming use has been examined by researchers over the last several decades. However, this research has typically been done on games that users must purchase, upload onto their computer, and sometimes pay a subscription so that they are able to interact with others for online for game play. Recently, with the introduction of social networking sites, there are online games, which an individual does not have to purchase to play, no subscription is needed, and the individuals that they interact with are people that they have connected to via this site. Because the games do not require any payment, these games are now more accessible to a larger group of individuals and have the potential to impact game players in a new way.

Because there is continued controversy on whether online gaming should be considered as an addiction or just problematic game play, it is necessary that psychologists continue to examine characteristics and consequences that are associated with online gaming. Research should be conducted in an effort to determine if online

game play via the internet is an addiction, problematic usage, or a source of enjoyment that is misperceived by others. The focus of this study was to create a measurement device that can provide a better understanding on this important issue of what might be relevant criteria to use in the assessment of internet gaming addiction on Facebook.

### **Internet Gaming on Facebook**

As of December 2010 there were over 571 million users of Facebook with the United States accounting for over 146 million (25.7%) users (Gonzalez, 2010). When looking at the demographics that represented United States Facebook population, the group aged 18-24 make up the largest segment at over 45 million users (30.9%), with users aged 25-34 (over 33 million, 22.6%), 35-44 (over 22 million, 15.5%), and 45-54 (over 16 million, 11.4%) still contributing to a large proportion of Facebook consumers with over 80 million (55.9%) of that population being female (Gonzalez). With a continued increase in the popularity of this internet-based social website, it is important for psychologists to continue to study what implications it might have on individual groups as well as society as a whole. With over 500 million active users spending over 700 billion minutes a month (about 40 minutes a day per user) and over 50% of active consumers logging in each day, it is easy to see that Facebook is a popular time-consuming activity that assuredly has some impact on the daily lives of many. Because there is a large population of individuals on this social networking site, Ross and colleagues (2009) hypothesized that different personality types would use the application for different purposes.

Ross and colleagues (2009) examined the personality factors associated with different functions of the Facebook application. The authors examined areas such as posting messages to others profiles (leaving a comment on a users page), private communication within the Facebook interface (e.g., email), use of groups in Facebook (e.g., communities created for a specific purpose), posting events and topics of interest (e.g., creating links to news stories, etc.), updating status information (e.g., a message that post at the top of users page), posting photos, posting comments on others posted material, and the poke feature (e.g., a message that someone has been to that users page).

Ross and colleagues found that different personality variables were associated with different functions of the Facebook social networking site. Extroverts were more likely to use the group function feature but were not more likely to have a greater number of friends (Ross et al.). On the other hand, posting messages to other's profiles was associated with those who were high in Neuroticism, while those scoring low on this personality trait were more likely to post pictures (Ross et al.). Ross and colleagues reported that individuals who scored high on Openness to Experience were more likely to use the comment feature and post on other's profiles, as these individuals have a greater tendency to use Facebook as a social tool. Motivationally, those who score high on Openness to Experience, search for opportunities for varieties of experiences (McCrae, 1992), and these tendencies may account for those individuals using Facebook from a social connection framework.



Because of the diversity of features that are available in Facebook that appeal to different personality types, it is easy to see why it has become a tool that so many people use regularly. However, Ross and colleagues limited their study to some of the main features of Facebook and did not examine characteristics or traits of the individuals who used the diverse numbers of applications that are tied to the Facebook platform. A review of the number of individuals who play internet games on Facebook, however, describes why researchers should examine this area in more depth.

A review of the top Facebook games for April 2010 has Farmville listed at number one with over 82 million active users, Café World at number three with over 30 million users, Mafia Wars at number five with over 25 million users, and Castle Age was not listed in the top 25 games (Mack, 2010). Additional games in the top 10 were Birthday Cards at number two (over 39 million users), Texas HoldEm Poker at number four (almost 29 million users), Happy Aquarium at number six (over 23 million users), Fishville at number seven (over 22 million users), MindJolt Games at number eight (over 21 million users), Petville at number nine (over 20 million users) and Pet Society at number 10 (over 19 million users) (Mack, 2010).

One of the reasons that the examination of Facebook game applications is important is because they are unique in several different ways. One of the ways in which these game applications are different is that they are free (MacMillan & Stone, 2011). If an individual wishes to play a game on Facebook, she or he is able to download the application and play for free within Facebook's platform. Game players then have the

opportunity to pay for different services within the game if they desire. Users can pay for the opportunity to receive unique items that are not available to those who play the game for free or to level up faster than they would be able to playing the game for free (MacMillan & Stone, 2011). Sometimes leveling up faster also gives the user the opportunity to achieve goals in the game, get special items or complete quest faster than they would be able to do playing the game for free. So although the games are able to be played for free, there is also the opportunity to spend more money on these games than one would by paying for a boxed game or paying a monthly service fee for a MMORPG. Those individuals who do pay for these extra services give researchers a unique way to evaluate a possible addiction tied to the amount of money spent and how this redirection of funds impacts the game player (MacMillan & Stone, 2011).

MacMillan and Stone (2011) interviewed a former employee of Zynga, which is one of the leading companies in game development for Facebook, who indicated that less than 10% of game players spend money on the internet games and that less than 1% is responsible for between 25-50% of the company's total revenue. The company refers to this population as "whales" and gives them membership in a VIP club that allows them to wire large amounts of cash directly from their bank accounts to Zynga (MacMillan & Stone). One employee of a company that works for Zynga, who was interviewed by MacMillan and Stone, reported that a single gamer spent \$75,000 on a single game in a year's time. Wingfield and Cowan reported that in the last year, Zynga reported a net income of \$91 million on revenue of \$597 million and further indicated that if all of the

virtual good revenue had been also counted, then the company would have had reported revenue of \$829 million. If this type of revenue is being generated from less than 10% of the players, the majority of it coming from less than 1%, it makes sense to examine the impact that this has on the game player's lives and if these individuals could be classified as addicted to internet gaming.

### **Summary and Hypotheses**

Mental health practitioners are beginning to see individuals whose primary complaint is behaviors that are related to the internet (Young et al., 1999), and it is important that practitioners continue to examine these behaviors and establish a diagnostic criteria that can be used in the potential diagnosis of internet addiction to help measure treatment effects (Beard & Wolf, 2001; Shapira et al., 2003). As the internet continues to be a platform by which business and recreation is pursued (Gonzalez, 2010), there is an increasing need for examination of psychopathologies that might be specific to the internet or use of the internet to access information that could be fueling other addictions (Douglas et al., 2008; Shaffer et al., 2000).

This study was designed to develop a measure that could be used to identify the problematic internet use of highly engaged individuals who may qualify as addicted to internet gaming as conceptualized by behavior addictions (Carnes, 1983; Jacobs, 1986; Miller, 1980). Specifically, the six criteria of salience, mood modification, tolerance, withdrawal symptoms, conflict and relapse, noted by Griffiths (1996; 2000a, 2000b, 2008) were used to evaluate the addictive traits of game players. An additional social

component was also be examined in this study due to the research noting the importance of social connection in online games (King et al., 2010; Liu & Peng, 2009; Ng & Wiemer-Hastings, 2005; Wu et al., 2010; Yee, 2006).

Facebook is an online social networking site that combines individual's need for connection with others, with games that assist individuals in meeting these needs (King et al., 2010). The online games from Facebook can be downloaded and played for free, although some users choose to pay for special virtual services. Less than 10% of 232 million users pay over a half billion dollars for these virtual services and virtual online goods in a single year (MacMillan & Stone, 2011). Because of the unique payment methods and accessibility that may exacerbate the visibility of addictive qualities, Facebook internet games were used to examine the factor structure of online gaming addiction. The following three hypotheses were the focus of this study:

### **Hypothesis 1**

An examination on Facebook online gaming will have a clear and systematic factor structure by which problematic internet gaming behavior will be measured by the POGS.

### **Hypothesis 2**

The POGS will demonstrate convergent validity with a problematic internet use scale as well as a problematic online gaming scale by having a significant positive relationship with these scales.

### **Hypothesis 3**

The POGS will demonstrate discriminant validity by having a non-significant relationship with a scale of social desirability.

## CHAPTER III

### METHOD

The following chapter will examine the methodology of the current study. First, participants will be discussed. Second, instrumentation will be examined. Next, the procedure will be explained. Finally, the overall research design and data analysis will be provided.

#### **Participants**

Using a web-based survey, data for a total of 383 participants were collected. A total of 181 participants were recruited from Facebook and another 202 participants were recruited from undergraduate psychology classes in a predominately female southwestern institution. One participant's data was eliminated for reporting an age under 18. Forty-eight participants were deleted because they had not completed the POGS. An additional six participants were deleted for acquiescence response bias (Cronbach, 1946), where participants responded with the highest numerical score on all measures. After an initial analysis of responses, it was discovered that many participants indicated they played zero Facebook games. As a result, these participants were deleted from the analysis as well (49 from Facebook and 109 from undergraduate psychology class participants). This resulted in a total of 226 participants, which were used in the study.

As shown in Table 1, the combined sample of participants recruited from Facebook and collegiate undergraduate classes were composed of 164 women (73%) and

62 men (27%). The majority of participants identified as heterosexual (n = 210; 92.5%), with smaller numbers identifying themselves as gay (3; 1.3%), lesbian (5; 2.2%), bisexual (7; 3.1%) or transsexual (1; .4%). Respondents in the survey self-identified as Caucasian (130; 57.3%), African American (29; 12.8%), Hispanic (26; 11.5%), Asian (21; 9.3%), Biracial (4; 1.8%), Multiracial (3; 1.8%), Native American (2; .9%), and other (11; 4.8%).

Table 1

*Participant Demographics: Frequency and Percentile*

Variable	Facebook		College Students		Total	
	Freq	%	Freq	%	Freq	%
<b>Gender</b>						
Female	76	58.0	88	92.6	164	72.6
Male	55	42.0	7	7.4	62	27.3
<b>Sexual Orientation</b>						
Heterosexual	121	92.4	89	93.7	210	92.5
Gay	2	1.5	1	1.1	3	1.5
Lesbian	2	1.5	3	3.2	5	2.2
Bisexual	5	3.8	2	2.1	7	3.1
Transsexual	1	.8	0	0.0	1	.4
<b>Race/Ethnicity</b>						
Caucasian	106	80.9	24	25.3	130	57.5

Table 1 (*cont.*)

Variable	Facebook		College Students		Total	
	Freq	%	Freq	%	Freq	%
African American	2	1.5	27	28.4	29	12.8
Hispanic/Latina(o)	3	2.3	23	24.2	26	11.5
Asian American	8	6.1	13	13.7	21	9.3
Native American	1	.8	1	1.1	2	.9
Bi-racial	3	2.3	1	1.1	4	1.8
Multi-racial	1	.8	2	2.1	3	1.3
Other	7	5.3	4	4.2	11	4.8

The average age of participants was 31.35 years ( $SD = 13.08$ ) and ages ranged from 18 to 68. Participants recruited from Facebook had an average age of 39.64 ( $SD = 11.09$ ) with ages ranging from 20 to 68, while participants recruited from the undergraduate psychology classes had an average age of 19.91 ( $SD = 3.31$ ) ranging from ages 18 to 36. An average education level for the total participant population was 13.63 ( $SD = 4.09$ ) with Facebook participants having 13.29 ( $SD = 5.13$ ) years of education and the participants surveyed from the undergraduate psychology class having 14.08 ( $SD = 1.85$ ) years of education.



Because exploratory factor analyses (EFA) was the main analyses of this study, empirical research was examined to determine the appropriate number of participants needed for the study. Early recommendations for sample size were based on an absolute number of participants while recent research suggested that sample size should be focused on the number of cases per variable (DeWinter, Dodou, & Wieringa, 2009). From the absolute sample size perspective, Gorsuch (1974) indicated that sample sizes of 50 would be small while those samples including above 200 participants as large. Other researchers focused on the number of participants per variable (N:p) expected and cited appropriate ranges that ranged from 20:1 (Hair, Anderson, Tatham, & Grablovsky, 1979) to 3:1 (Cattell, 1978). More recently, Jackson (2001, 2003) has explored the N:p approach and had mixed results, the first study indicated that there was no support for this approach, and the second study, done for replication, found that this approach was feasible.

MacCallum (1999) also reviewed the N:p approach and determined that sample sizes of less than 100 were adequate if the number of commonalities (e.g., the proportion of the variance of a variable that is accounted for by common factors) were high. Alternatively, if the number of commonalities were low, with well determined factors, then MacCallum suggested that numbers between 100 and 200 should be sufficient. Given that this study is examining a behavioral addiction model that has been empirically described to have six factors (Griffiths, 1996, 2000a, 2000b, 2008) and a potential additional factor (e.g., social component), a ratio of twenty participants for each factor

that is expected in this model was considered adequate. Additionally, Gorsuch (1983) recommended that 3-5 participants be used for each scale item in order to generate a stable factor pattern. Although it is only expected that there will be a total of seven factors, and thus a sample of 140 would be adequate, the sample size desired for the current study was to have at least 300 individuals based on a conservative view of Gorsuch's recommendation, which is widely used in the research. This number was not attained for this study. As a result, preliminary EFA's were examined with the data collected, which provided a clear and coherent factor structure. As a result the study was concluded and analyses were conducted on the data set of 226 participants.

### **Instrumentation**

Instruments were completed in the following order: (a) demographic form, (b) the Problematic Online Gaming Survey (POGS), (c) the Marlowe-Crowne Social Desirability Scale Form C (M-C Form C; Reynolds, 1982), (d) the Problematic Internet Use Questionnaire (PIUQ; Demetrovics et al., 2008), and (e) the Problematic Online Game Use scale (POGU; Kim & Kim, 2010).

### **Demographic Form**

A brief demographic form (Appendix A) was completed by all participants so that descriptive statistical data from the sample was obtained. Participant age, gender, race/ethnicity, annual income, and information pertaining to internet and gaming use were collected for analysis.

## **Problematic Online Gaming Scale (POGS)**

The development of an instrument that would assess the effects of online gaming was the main focus of this study. A review of the literature in addictions, problematic internet use, and internet gaming, served as a foundation when generating items for the POGS (Appendix B). Although addiction has typically been viewed from the perspective of an individual ingesting a substance that affects them in negative ways, this scale examined an emerging type of addiction that was being researched, that of behavioral addictions (Carnes, 1983; Clark & Calleja, 2008; Garcia & Thibaut, 2010; Griffiths, 1995; Jacobs 1986; Kourosch et al., 2010; Lejoyeux & Weinstein, 2010; Wareham & Potenza, 2010). Accordingly, the development of the POGS scale was the result of an examination of components of behavioral addiction (Marlatt et al., 1988) and research supported six factor model of behavioral addiction (Griffiths, 1996; 2000a). The six factors that were used in the creation of scale items were salience, mood modification, tolerance, withdrawal symptoms, conflict, and relapse. Although this study was exploratory in nature, it was anticipated that these factors would contribute significantly to the identification of internet gaming addiction and that this initial study would also assist in the identification of additional areas of exploration in the future, such as the social component to online gaming.

**POGS scale development.** DeVellis' (2003) guidelines for scale development were used as an outline for the development of the Problematic Online Gaming Scale (POGS). Theory on internet addiction and online gaming addiction were used in the

initial development of the POGS items. The initial number of items for the POGS was 120. The scale was then sent to several professionals in the field of addiction and two psychologists with expertise in scale development. The scale was reviewed to ensure that there were no double barreled questions (e.g., items that convey two or more ideas) or multiple negatives (i.e., “I am not stopping”), and that a sufficient number of items were reverse coded (DeVellis). Additionally, the scale items were reviewed for clarity and were created in a format of short question length and a low syllable count per question to aid in question viability (DeVellis). The professional review of the scale items resulted in a total of 60 questions that were unique yet also demonstrated some redundancy, which was suggested in the literature (DeVellis). The item response format was developed as a seven point Likert scale that ranged from “strongly agree” to “strongly disagree” with a midpoint item of “neither agree or disagree.”

#### **Marlowe-Crowne Social Desirability Scale, Form C (M-C Form C; Reynolds, 1982)**

Several different short forms of the Marlowe-Crowne Social Desirability Scale (Crowne & Marlowe, 1960) were developed by Reynolds (1982) and a 13-item version of the true/false, Form C, was found to have an adequate reliability ( $\alpha = .76$ ) and to significantly positively correlate ( $r = .93$ ) with the original 33-item Marlowe-Crowne Social Desirability scale (Appendix C). Reliability for the Marlowe-Crowne Form C for the POGS was found to be adequate ( $\alpha = .76$ ). The Marlow-Crowne Form C was designed to assess the impact of an individual’s social desirability on self-report measures and has demonstrated concurrent validity with other measures of social desirability

(Reynolds). The M-C Form C has also shown to have concurrent validity with other measures of social desirability (Reynolds). Items in this scale included “I’m always willing to admit it when I make a mistake” and “I sometimes feel resentful when I don’t get my own way.” Items 1, 2, 3, 4, 6, 8, 11, and 12 are given a score of 0 for a true response and a 1 for a false response while the remaining 5 items are given a score of 1 for true responses and a 0 for false responses. The higher the individual scores on this measure reflect a tendency to report socially desirable responses on self-report measures.

#### **The Problematic Internet Use Questionnaire (PIUQ; Demetrovics et al., 2008)**

The Problematic Internet Use Questionnaire (PIUQ; Demetrovics et al., 2008) (Appendix D) was a measure based on a three factor model used to measure excessive, compulsive or addictive uses of the internet. Items in the scale included “How often do you choose the internet rather than being with your partner,” “How often do you dream about the internet,” and “How often do you spend time online when you’d rather sleep.” Internal consistency was sufficient, where Cronbach’s alpha for the total scale was .91 and Cronbach’s alpha for subscales, obsession, neglect, and control disorder were also found to be adequate at .81, .77, and .91, respectively (Kelly & Gruber, 2010). For this study, the overall internal consistency for the PIUQ was sufficient ( $\alpha = .94$ ) as was the Cronbach’s alpha for each of the subscales, obsession, neglect, and control disorder where the alpha levels were .88, .83, and .83, respectively.

The PIUQ (Demetrovics et al., 2008) had a total of 18 items, six questions under each of the subscales of obsession, neglect and control disorder. Responses to questions

were ranked from 1 (never) to 5 (always) so that each subscale had a possible range of scores from 6-30 with a total scale range of 18-90. After generating participant's scores on the PIUQ, Demetrovics and colleagues (2008) created four groups based on their standard deviation from the mean score. A no-problem group was created for those individuals who had scores one standard deviation ( $SD = 9.85$ ) or more below the mean (score of 18-23), those that scored up to one standard deviation above the mean were placed in the few/average problem group (23-42), while participants whose scores were more than one standard deviation above the mean were classified as the problem group (43-52; less than two standard deviations above the mean) or in the significant problem group (scores more than two standard deviations above the mean; scores of 53 and above.)

To establish construct validity, Demetrovics and colleagues (2008) initially ran a principal component analysis using a varimax rotation on 30 items. The rotation resulted in either a three- or four-factor solution, but a three-factor solution was decided upon since the fourth factor only consisted of three items. The three-factor solution included the subscales Demetrovics and colleagues titled, neglect, obsession, and control disorder. This study demonstrated a strong connection with increased levels of non-work internet use with decrease in importance of work, school, and relationships, obsession about internet use, and difficulties in controlling internet use (Demetrovics et al.).

Convergent validity was also demonstrated by having significant correlations between the three subscales and several measurements of psychological and physical

health (Kelly & Grubber, 2010). Kelly and Grubber's analysis made some suggestions on some slight modifications to this scale to better fit the statistical analysis, although the factor labels were found to still be adequate. Some of the variables that were of interest in measuring general internet addiction may be useful to the development of a scale for online gaming addiction.

### **The Problematic Online Game Use scale (POGU; Kim & Kim, 2010)**

A recent scale that has been developed to investigate online game behaviors is the Problematic Online Game Use scale (POGU; Kim & Kim, 2010); (Appendix E). Kim and Kim initially developed a scale with 25 items but dropped 5 after a pilot study had been conducted, and found those items had little variability. Kim and Kim used a principal axis factoring (PAF) and an oblique rotation on the remaining 20 items to establish construct validity that yielded a five factor model. This model was reliable, with alpha levels that ranged from .78 - .87. The five factors that resulted from this analysis were (a) euphoria, (b) health problems, (c) conflict, (d) failure of self-control, and (e) preference of virtual relationship (Kim & Kim). This study also found the overall internal reliability to be acceptable for the POGU ( $\alpha = .94$ ) as well as for each of the subscales euphoria ( $\alpha = .78$ ), health problems ( $\alpha = .80$ ), conflict ( $\alpha = .90$ ), failure of self-control ( $\alpha = .89$ ), and preference of virtual relationship ( $\alpha = .91$ ).

Scale items for the POGU (Kim & Kim, 2010) included "I put effort to reduce the time on playing online games, but I often fail," "My eyesight has dropped for overplaying online games," and "My school work and other activities suffer because of playing online

games.” Responses to questions are ranked from 1 (strongly agree) to 6 (strongly disagree) so that the total scale range is 20-120. The number of questions and the range of scores varied for each of the subscales: euphoria had four items (4-24), health problems and preference for virtual relationship had three items (3-18), there were five items in both conflict and failure of self-control (5-30).

Convergent validity of the POGU was further established by showing significant correlations with life satisfaction, academic self-efficacy, anxiety and loneliness (Kim & Kim, 2010). Although the focus of Kim and Kim’s work was to create a scale to examine problematic online gaming, the focus of this scale was on an adolescent population. The POGS focus was on an adult (18+) population where some characteristics of online gaming addictive traits may be different. Some examples of how an adult population might differ from an adolescent population would include the amount of income that they have available that could be invested in online gaming, the availability to access computer games from work, and not being held accountable for the amount of time spent playing online games. As a result the types of conflict that could occur in their lives may have results that impact them in different ways (i.e., loss of job, loss of relationships).

### **Procedure**

On March 30, 2010 a Facebook account was created by the author and shortly after, many individuals who played various Facebook games requested friendship so that they could complete game objectives. Many friendship requests came from a variety of locations around the world. Friendship requests were accepted if the individual was over



the age 18 and the request was for gaming purposes. Some friendship connections were deleted due to the use of offensive or discriminating language or pictures. An examination of the most popular games was done as well as an examination of the games that Facebook friends were playing to determine what games would be played on this Facebook account.

A review of the top Facebook games for April 2010 listed Farmville as the top game played with over 82 million active users, Café World third with over 30 million users, and Mafia Wars at number five with over 25 million users (Mack, 2010). These were the top listed games that also reflected Facebook friends' main gaming choices. Additional games in the top 10 were Birthday Cards at number two (39 million users), Texas HoldEm Poker at number four (29 million users), Happy Aquarium was sixth (23 million users), Fishville was seventh (22 million users), MindJolt Games at number eight (21 million users), Petville was ninth (over 20 million users), and tenth, with 19 million users was Pet Society (Mack, 2010). Birthday cards was not considered as a game as it was an application for sending birthday cards and Texas HoldEm Poker was excluded due to the fact that it could also be considered as a form of gambling. Farmville, Café World, and Mafia Wars were played to a medium level of experience (enough to not be considered a beginner) as well as Castle Age and Dawn of the Dragons, which were played by many individuals who were Facebook friends as well.

Initially, participants for this study were recruited through a post via the researcher on Facebook. Snowball sampling was then utilized and participants were

asked to repost the link to the study if they had any friends who might be interested in participating. The post, reflected in the text under “Explanation and Purpose of the Research” in Appendix F, briefly described the study and provided a URL link to the PsychData website where the data was collected. The participants gave informed consent (Appendix F) indicating that they wished to participate in the study on problematic online gaming. The informed consent included eligibility requirements that were needed to participate in the study, the purpose of the study, potential benefits and risk, the right of participant termination, and contact information was provided for psychological services if desired. Participants were informed that the survey would take approximately 20 minutes to complete. As an incentive to complete the survey, participants were given the opportunity to enter a drawing to win one of two Visa gift cards.

After a month of recruiting from the Facebook platform, a total of 182 participants had responded to the survey. Because a total of 300 participants were desired to run the exploratory factor analysis, additional participants were recruited from several undergraduate psychology classes from a south western university that has a predominately female population. An additional 204 participants were recruited from this venue.

The initial study, as well as the amendment for collecting data from an additional population, was approved by the Texas Woman’s University Institutional Review Board (IRB) (Appendix G). Participants were informed that their participation in this study would be completely anonymous and that no personally identifiable data will be

collected. In order to maximize participants' anonymity, information regarding IP addresses was not collected.

The use of online data collection methods has been supported by Griffiths (2010b) where he indicated that online data collection can be useful for eliciting detailed data for such areas as gaming addictions, reducing participants' propensity to give socially desirable responses, providing additional access to those who may not have participated if the scale was offline, having the potential for global participation, aiding in participant recruitment, and providing opportunities for snowball sampling. Although some disadvantages may include generalizability, reliability, and validity, it has been argued that these concerns are just as likely to occur in surveys that are conducted offline (Griffiths). Disadvantages of conducting an online survey have also been addressed in previous studies (Griffiths).

Some of the disadvantages that Griffiths (2010b) noted in online surveys, especially in the gaming community, were potential addicts might be suspicious of unsolicited request to take part in an online survey that measured components of game play. Another concern that Griffiths had about online surveys was that individuals could respond in a socially desirable manner. Although at the same time, Griffiths indicated that when discussing sensitive issues like addiction, an online survey may have a disinhibiting effect on participants and lead to increased levels of honesty. Additionally, Griffiths indicated that online survey response rates have been noted to be lower than those who complete surveys offline and that this could be the result of privacy concerns

about data transferred over the internet and those individuals who attempted the online survey but did not complete the survey.

However, Griffiths (2010b) noted that individuals who could be suspicious of the online survey could feel inclined to participate if the researcher participated in the activities of that online community. Griffiths also indicates that there are many advantages of conducting online surveys as well. Some of the advantages Griffiths listed were: (a) rich and detailed data in sensitive areas such as gaming addictions can be elicited, (b) access to individuals who may not have participated if the survey was offline, (c) a global pool of participants which can allow for cross-cultural comparisons, and (d) the existence of those who have online gaming addiction may also be confirmed. Being that participants will also be able to take the online survey anonymously, that may increase participation in the study as well.

## CHAPTER IV

### RESULTS

An examination of the results from this study will be presented in this chapter. First, a preliminary analysis of the data and processes that were used to remove participants from this data set will be described. Next, an overview of the descriptive statistics for the scales used will be presented. An exploratory factor analysis will then be presented in this section. Finally, each of the hypotheses will be examined within the framework of the exploratory analysis.

#### **Preliminary Analysis**

Preliminary analyses were conducted to investigate the data and describe how variables were related in this study. Initial screening of the data resulted in an elimination of 156 participants from the study. Forty-eight participants, who did not answer any questions on the Problematic Online Gaming Survey (POGS), were deleted from the analysis. Six participants were deleted for entering a response of Strongly Disagree for all responses on the POGS, including the reverse coded items (DeVellis, 2003). One participant's responses were deleted because participant age was listed as sixteen years old. Finally, all 101 participants who endorsed that they have not played any Facebook games were also deleted from the analysis. As a result, the total participants in the final analysis were reduced from 383 participants to 227 participants.

Additionally, scale means, standard error of mean, standard deviations, internal consistency and scale ranges were all computed and listed in Table 2. Higher scores for each of the scales indicate higher levels of the variable that was measured. Internal consistency reliabilities ranged from .76 (MC-SD) to .95 (POGS).

Table 2

*Descriptive Statistics for Scales*

Measure	Mean	SEM	SD	$\alpha$	Act Rng	PosRng
POGS	257.30	3.12	47.06	.95	105 - 350	60 - 360
MC-SD	6.10	.20	3.01	.76	0 - 12	0 - 12
PIUQ	36.20	.85	12.80	.94	18 - 75	18 - 90
POGU	93.68	1.30	18.62	.94	23 - 120	20 - 120

*Note:* POGStot = Problematic Online Gaming Scale; MC-SD = Marlow-Crowne Social Desirability, Form C; PIUQ = The Problematic Internet Use Questionnaire; POGU = The Problematic Online Game Use scale; SEM = Standard Error of Mean; SD = Standard Deviation;  $\alpha$  = Cronbach Alpha; Act Rng = Actual Range; PosRng = Possible Range.

### **Analyses of Hypotheses**

#### **Factor Structure of the POGS**

The following section will discuss the reduction of the original 60 item question pool into the final 29 items that were found to as a part of the factor structure of the POGS. This analysis resulted in a seven factor solution.

**Hypothesis 1.** It was hypothesized that there would be a clear and systematic factor structure for the POGS that would allow for the measurement of problematic internet gaming use. Prior to conducting factor analyses, reliability and descriptive statistics were conducted so that an initial overall assessment of the scale could be made. For the original 60 question item pool, an overall Cronbach's alpha of .95 was found, while the final iteration of the POGS scale that included six factors with 26 items had a Cronbach's alpha of .91. The Kaiser-Meyer-Olkin measure of sampling adequacy (KMO) was .91, which provided evidence that the distribution of variables in the sample was adequate. Bartlett's test of sphericity (approximate  $\chi^2 = 8004.11$ ,  $df = 1770$ ,  $p = .00$ ) revealed the data were multivariate normal. The Bartlett's test of sphericity and the KMO estimate each provided statistical evidence that analyzing the data further via factor analysis would be appropriate (Leech, Barrett, & Morgan, 2005). Although the number of participants did not reach this study's conservative goal of 300 individuals it did fall within the range suggested by Gorsuch (1983), thus these analyses were run recognizing a that greater number of participants would be desirable.

Considerations for inclusion of scale items in a subsequent factor analysis were based on recommendations proposed by Thompson (2004), who asserted that (1) factor loadings must be a .4 or greater for retained items; (2) items will be retained on the factor on which they most strongly load, and (3) items cannot cross load onto more than one factor. Furthermore, the criterion recommended eigenvalues and screeplots to be examined to determine which items would be retained in the factor analysis process, thus,

eigenvalues below 1.0 were removed (Thompson, 2004). In addition, items with low communality scores and those not theoretically or conceptually related to each other were removed from subsequent analysis.

A series of principal component exploratory factor analyses were conducted on the POGS. A factor analysis was conducted on the original 60 survey items that were given to all participants, using a varimax rotation with Kaiser normalization. The results of the first step of the factor analysis revealed a 13 factor solution with eigenvalues over 1.0 that accounted for 65.75% of the total variance. Items 2, 8, 15, 16, 21, 23, 28, 30, 31, 32, 35, 36, 44, 46, 47, 54, and 59 were all removed because they loaded on more than one factor. Additionally, items 9, 20, 34, 42 and 49 were removed as they did not load on any of the factors. Items 4 “I have not tried to reduce the amount of time I spend on online games” and 38 “I feel disconnected from others when playing online games” were removed because they represented negative loadings that may have resulted from confusion or being perceived as double negatives (DeVellis, 2003).

A second factor analysis was run on the remaining 36 items revealing an eight factor solution that accounted for 62.67% of the total variance. Items 1, 13, 22, 26, and 52 were removed for loading onto more than one factor and items 5 and 11 were removed for not loading on a factor. The remaining 29 items were calculated into the third and final factor analysis using a varimax rotation revealing a seven factor solution accounting for 63.03% of the total variance. The eigenvalues for the seven factors are displayed in Table 2, the final factor loadings and accompanying items for the seven factors are



displayed in Table 3, and the scree plot for the final factor analysis is displayed in Figure 1. The first hypothesis that indicated that there would be a clear and systematic factor structure when examining online game use on the Facebook platform was supported.

Table 3

*Final Factor Analysis with Eigenvalues, Percentage of Variance, and Cumulative Percentage of Variance*

Factor	Eigenvalue	% of Variance	Cumulative % of Variance
1	9.48	32.68	32.68
2	2.29	7.89	40.57
3	1.74	6.00	46.56
4	1.42	4.88	51.44
5	1.26	4.35	55.79
6	1.09	3.77	59.56
7	1.00	3.46	63.03

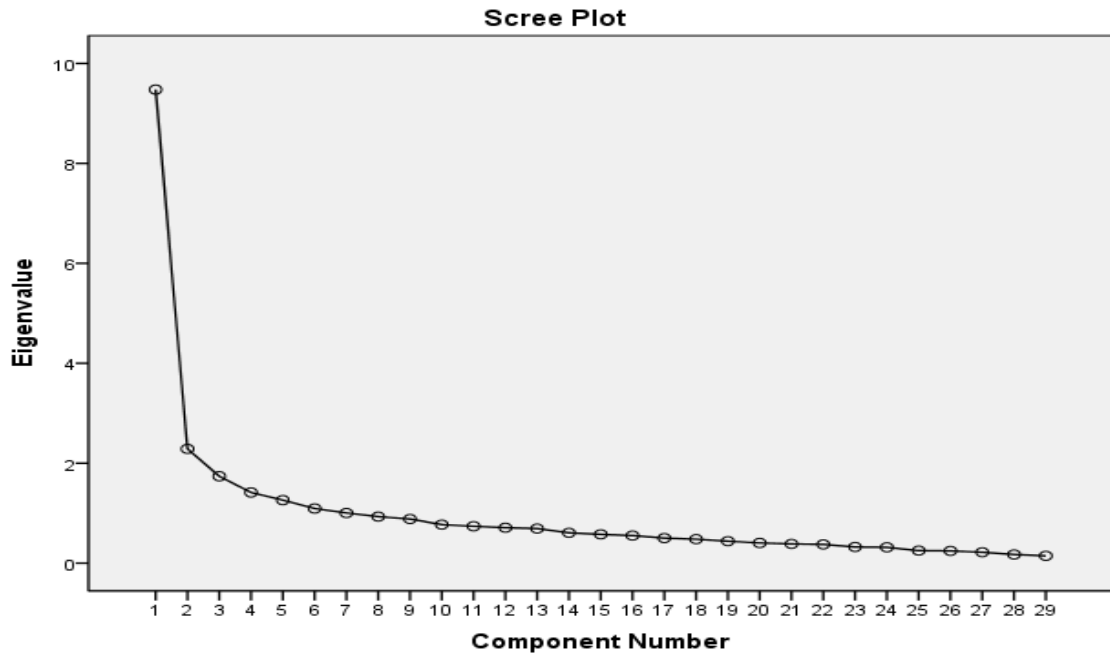


Figure 1: Scree plot for final factor analysis

## **Final POGS Factors**

In this section, each one of the factors was examined to determine what construct the collective items represented. A rationale is provided for each item grouping, except for the seventh factor which was excluded from further analysis.

**Factor 1: Conflict.** The concept that differentiated the 8 items in the first factor related to the conflict that people perceive in their lives as the result of their online gaming. These items may include direct conflict (e.g., *“I have had arguments with others about my online game play”*), perceived conflict with work (e.g., *“I have missed out on a job or career opportunity as the result of online game play”*) or a recognition of behavior that may prevent conflict about their online gaming (e.g., *“I hide the amount of time that I spend online”*). The Cronbach’s alpha for this first factor was .88.

**Factor 2: Mood Modification.** Conceptually, factor two consisted of six items that were related to the ability of the online game to affect a person’s mood. This modification of mood may have been recognized as explicit (e.g., *“I am in a bad mood when I am not able to play my online game for a while”*) or this may be an unconscious process that leads the individual to continue playing the online game for longer durations of time (e.g., *“I find myself saying (thinking) just a few more minutes when playing an online game”*). The Cronbach’s alpha for the second factor was .87.

**Factor 3: Salience.** Factor three consisted of five items that displayed an individual’s desire to play online games coupled with a neglect of other activities of daily living in a fashion that would lead one to believe that online gaming was a dominant

factor in their lives. These items reflected awareness about the neglect of other activities (e.g., *“I neglect other things in my life as a result of playing online games”*) or perhaps some things that the individual might be aware of but may not be connecting to their online game play (e.g., *“I have gained or lost weight since I have been playing online games”*). The Cronbach’s alpha for the third factor was .71.

**Factor 4: Social Connection.** The fourth factor had three items that demonstrated how online gamers seem to feel connected to others who also play online games. These items displayed how online game players feel more able to be themselves (e.g., *“In my interactions with other online game players, I am able to be myself”*) as well as how they felt connected to the online gaming community (e.g., *“I feel like I am a member of an online community during game play”*). The Cronbach’s alpha for the fourth factor was .72.

**Factor 5: Compulsivity.** The fifth factor had three items that describe compulsive playing of online Facebook games (e.g., *“I have logged out of an online game only to log back in a few minutes later”*) as well as continuing their online game play simultaneously with other activities (e.g., *“I play online games at the same time as working on other tasks”*). The Cronbach’s alpha for the fifth factor was .67.

**Factor 6: Intrusive Thoughts.** The sixth factor had items that were either directly related to intrusive thinking about online games or a perception that could lead to these intrusive thoughts. Two of the items related directly to the individual thinking about online games during other activities (e.g., *“When I am working on other tasks, I do not*

*think about my online games*”) while one of the items was a reverse coded item that could contribute to these intrusive thought patterns (e.g., “*Playing the online games is boring*”). The Cronbach’s alpha for the sixth factor was .59.

**Factor 7: Inconclusive.** The seventh factor only had two items with a Cronbach’s alpha of .36 and not enough evidence was available to make a determination of what this item set may have represented (Thompson, 2004). Because this factor had a low reliability and did not theoretically make sense, it was eliminated from further analysis. Table 4 displays the final factor analysis with scale items and final factor loadings with alpha values for the full scale and each of the factors.

Table 4

*Final Factor Analysis: Scale Items and Final Rotated Factor Loadings*

Item #	Item Name	Factor Loading	Cronbach’s Alpha
Total Scale Cronbach’s Alpha = .91			
<b>Factor 1: Conflict</b>			0.88
14	I have missed out on a job or career opportunity as the result of online game play.	.57	
19	I have had arguments with others about my online game play.	.69	
25	Others tell me that I play online games too much.	.61	
37	I have had fights with others regarding my online game play.	.75	
41	I have left an event early to go play online games.	.66	

Table 4 (Cont'd)

Item #	Item Name	Factor Loading	Cronbach's Alpha
43	I have had a loss of a significant relationship as the result of online game play.	.72	
50	I hide the amount of time that I spend online.	.66	
55	I become defensive when others ask me what I do online.	.72	
<b>Factor 2: Mood Modification</b>			<b>0.87</b>
Item			
3	I am in a bad mood when I am not able to play my online game for a while.	.77	
7	I feel angry when I am not able to log onto an online game.	.69	
27	I feel agitated if I am not able to get online to play my games for several days.	.80	
33	When not able to play online games I get agitated	.75	
48	I find myself saying (thinking) just a few more minutes when playing an online game.	.47	
56	I get frustrated when a computer cannot access my online game.	.73	
<b>Factor 3: Saliency</b>			<b>0.71</b>
10	Work and other activities have not suffered because of playing games online. (R)	.49	
12	I neglect other things in my life as a result of playing online games.	.76	
18	I neglect household chores to play online games.	.73	

Table 4 (Cont'd)

Item #	Item Name	Factor Loading	Cronbach's Alpha
24	I have gained or lost weight since I have been playing online games.	.49	
51	I have not neglected school/work/social events to play online games. (R)	.51	
<b>Factor 4: Social Connection</b>			0.72
6	In my interactions with other online game players, I am able to be myself.	.75	
29	I feel connected to other players in the online game environment.	.71	
60	I feel like I am a member of an online community during game play.	.68	
<b>Factor 5: Compulsivity</b>			0.67
17	Online games are something that I do shortly after waking up.	.51	
39	I play online games at the same time as working on other tasks.	.75	
58	I have logged out of an online game only to log back in a few minutes later.	.63	
<b>Factor 6: Intrusive Thoughts</b>			0.59
45	I do not think about online games when I am doing other things. (R)	.79	
53	When I am working on other tasks, I do not think about my online games. (R)	.68	
57	Playing the online games is boring. (R)	.56	

*Note:* Extraction Method: Principal Component Analysis. Rotation Method: Varimax with Kaiser Normalization.

## **POGS Relationship with other Instruments**

The POGS and its subscales were compared to similar as well as dissimilar instruments to determine whether it had convergent and discriminant validity. The results of this examination are discussed below.

**Hypothesis 2.** This hypothesis suggested that the POGS total scale score would demonstrate convergent validity by being significantly and positively correlated with the Problematic Internet Use Questionnaire (PIUQ; Demetrovics et al., 2008) as well as with the Problematic Online Game Use scale (POGU; Kim & Kim, 2010). This hypothesis was partially supported, as a significant positive relationship was found for the POGS total scale with the POGU (Kim & Kim, 2010) was found  $r = .77, p < .001$  for the total scale. A significant positive relationship between the total score for the POGU (Kim & Kim, 2010) was also found for each one of the seven factors listed consecutively,  $r = .75, p < .001, r = .65, p < .001, r = .56, p < .001, r = .41, p < .001, r = .45, p < .001,$  and  $r = .37 < .001$ . Additionally, significant positive relationships were found with all subscales in the POGS and the POGU with the exception of factor 4, social connection, where it is noted that the feeling of being socially connected when playing online games seemed to have no relationship to health problems.

However, a significant negative relationship was found for the PIUQ (Demetrovics et al., 2008) and the POGS total scale  $r = -.61, p < .001$ , as well as six of

the individual factors found for the POGS, excluding the fourth factor, social connection, listed consecutively,  $r = -.58, p < .001, r = -.52, p < .001, r = -.58, p < .001, r = -.12, p = n.s., r = -.28, p < .001,$  and  $r = -.38, p < .001$  (See Table 5). Social connection was not related to two of the subscales in the PIUQ that pertained to obsession and a Control Disorder Scale.

Table 5

*Pearson's Product Moment Correlations between POGS, POGS Subscales, POGU, POGU Subscales & PIUQ and PIUQ Subscales*

	POGS	F1	F2	F3	F4	F5	F6
POGU	.77**	.75**	.65**	.56**	.41**	.45**	.37**
Euphoria	.50**	.42**	.44**	.17*	.51**	.38**	.25**
Health Prob	.49**	.58**	.39**	.50**	.11	.19**	.17*
Conflict	.71**	.76**	.55**	.61**	.27**	.36**	.31**
Fail of SC	.72**	.61**	.66**	.52**	.34**	.49**	.40**
Pref of VR	.62**	.66**	.49**	.42**	.38**	.31**	.30**
PIUQ	-.61**	-.58**	-.52**	-.58**	-.12	-.28**	-.38**
Obsess	-.58**	-.49**	-.55**	-.46**	-.15*	-.31**	-.31**
Neglect	-.58**	-.57**	-.48**	-.60**	-.11	-.25**	-.31**
CDS	-.52**	-.55**	-.40**	-.55**	-.06	-.20**	-.31**



Note: \*  $p < .01$ ; \*\*  $p < .001$ ; Health Prob = health problems; Fail of SC = Failure of Self-Control; Pref of SC = Preference of Virtual Relationship; Obsess = Obsession; CDS = Control Disorder Scale

**Hypothesis 3.** This hypothesis stated that the POGS total scale score would demonstrate discriminant validity by being unrelated (i.e., not significantly correlated) with the M-C Form C. This hypothesis was not supported, as there was a significant positive relationship found between the POGS total scale score with this scale,  $r = .29, p < .001$ , as well as five of the individual factors, excluding the fourth and fifth, social connection and tolerance, listed consecutively,  $r = .23, p < .001, r = .29, p < .001, r = .27, p < .001$ , and  $r = .20, p < .002$  (See Table 6).

Table 6

*Pearson's Product Moment Correlations between POGS, POGS Subscales & M-C Form C*

	POGS	F1	F2	F3	F4	F5	F6
M-C	.29**	.23**	.29**	.27**	.07	.12	.20*

Note: \*  $p < .01$ ; \*\*  $p < .001$ ; M-C = Marlow-Crowne Social Desirability, Form C

### Exploratory Analyses

Numerous exploratory analyses were conducted to examine the relationships between the two populations that were surveyed (Facebook recruited vs. undergraduate recruitment) and the demographic variables as well as an analysis of the total population and the relationship between the POGS and the POGS subscales. Table 7 displays the

mean, standard deviation, and the range of scores for the total survey population, participants recruited from Facebook, and those participants who were recruited from an undergraduate population. Table 8 reflects independent T-test analyses of the differences in these two populations. Finally, Table 9 provides the age, education, income, and specific Facebook gaming characteristics in relation to the total POGS scale as well as the six individual factors.

Table 7

*Descriptive Statistics for Facebook Gaming Characteristics*

	Mean	SD	Range	Min	Max
Total survey					
Age	31.35	13.08	50	18	68
Education	13.63	4.09	21	1	22
FBhrs	2.48	2.36	16	0	16
FBdays	4.91	2.24	14	1	15
FBgames	3.24	2.65	14	1	15
FBgameswk	2.54	1.89	12	0	12
FBgift	16.20	21.09	90	0	90
FBmoney	28.92	116.73	1000	0	1000
FBgroups	2.46	4.56	50	0	50
FBhrswk	13.60	15.99	99	0	99
Facebook					
Age	39.64	11.09	48	20	68
Education	13.29	5.13	21	1	22
FBhrs	2.81	2.44	15.8	.2	16
FBdays	5.86	1.67	6	1	7
FBgames	3.72	3.04	14	1	15
FBgameswk	3.03	2.18	12	0	12

Table 7

*Descriptive Statistics for Facebook Gaming Characteristics*

	Mean	SD	Range	Min	Max
FBgift	19.85	21.68	90	0	90
FBmoney	40.23	123.361	1000	0	1000
FBgroups	2.94	3.92	20	0	20
FBhrswk	18.61	18.25	99	0	99
		Undergraduate			
Age	19.91	3.31	18	18	36
Education	14.08	1.85	8	12	20
FBhrs	1.99	2.16	15	0	15
FBdays	3.59	2.26	6	1	7
FBgames	2.57	1.82	9	1	10
FBgameswk	1.86	1.09	5	0	5
FBgift	11.12	19.22	90	0	90
FBmoney	15.34	107.36	1000	0	1000
FBgroups	1.81	5.27	50	0	50
FBhrswk	6.64	8.14	45	0	45

*Note:* FBhrs = Hours a day on Facebook games; FBdays = Number of days in a week when Facebook games are played; FBgames = Number of Facebook games played; FBgameswk = Facebook games played per week; FBgift = time spent sending/receiving Facebook gifts; FBmoney = Amount of money spent on Facebook online games in the last month; FBgroups = Facebook gaming groups currently in; FBhrswk = Time spent playing online Facebook games in a week.

Table 8

*Independent t-test Analyses of Differences: Surveys Responses via Facebook vs. an Undergraduate population*

	FB	Undergrad	Levene's	<i>df</i>	<i>t</i>	sig
Age	39.64	19.91	.000	160.56	16.80	.000
Edu	13.62	14.08	.000	169.89	-1.45	.106
FBhrs	2.84	1.99	.008	212.63	2.75	.007
FBdays	5.86	3.59	.037	163.91	8.29	.000
FBg	3.72	2.57	.000	215.23	3.53	.001
FBg/w	3.03	1.86	.000	201.85	5.30	.000
FBgift	19.85	11.12	.067	225.00	3.14	.002
FBm	40.23	15.34	.053	196.00	1.50	.131
FBgr	2.94	1.81	.146	224.00	1.85	.080
FBh/w	18.61	6.64	.000	192.91	6.67	.000

*Note:* Edu = Education; FBhrs = Hours a day playing Facebook games; FBdays = Days a week playing Facebook games; FBg = Number of Facebook online games played; FBg/w = Number of different Facebook games played in a week; FBgift = Time in a day spent sending Facebook gifts; FBm = Money spent on Facebook games in the last 3 months; FBgr = Membership in Facebook gaming groups; FBh/w = Time spent playing Facebook online games in a week

The independent t-test analyses of differences in the Facebook recruited population versus the undergraduate population revealed that there were significant differences between these two populations in age,  $t(160.56) = 16.80, p < .001$ ; number of hours playing Facebook games,  $t(212.63) = 2.75, p = .007$ ; number of days playing Facebook games,  $t(163.91) = 8.29, p < .001$ ; number of Facebook games played,  $t(215.23) = 3.53, p = .001$ ; number of Facebook games played per week,  $t(201.85) = 5.30, p < .001$ ; amount of time spent sending gifts in Facebook games,  $t(225) = 3.14, p = .002$ ; and amount of time spent playing Facebook games each week,  $t(192.91) = 6.67, p < .001$ .

Table 9

*Pearson's Product Moment Correlations between POGS, POGS Subscales, and demographic variables*

	POGS	F1	F2	F3	F4	F5	F6
Age	.11	-.06	.15*	.06	.36**	.21**	-.05
Edu	-.07	-.10	-.04	.01	-.12	-.05	-.13
Income	-.07	-.04	-.05	-.08	-.04	.16*	.01
FBhrs	.30**	.18**	.33**	.11	.26**	.33**	.17*
FBdays	.37**	.10	.30**	.20**	.35**	.59**	.13*
FBgames	.15*	.13	.11	.14*	.16*	.08	.08
FBgames/wk	.30**	.20**	.26**	.16*	.26**	.23**	.23**

Table 9

*Pearson's Product Moment Correlations between POGS, POGS Subscales, and demographic variables cont.*

	POGS	F1	F2	F3	F4	F5	F6
FBgift	.24**	.09	.23**	.16*	.22**	.20**	.11
FBmoney	.15*	.17*	.20**	.10	.08	.01	-.01
FBgroups	.27**	.28**	.24**	.07	.23**	.18**	.07
FBhrs/wk	.43**	.30**	.40**	.23**	.38**	.42**	.15*

*Note:* \* =  $p < .01$ ; \*\* =  $p < .001$ ; Edu = Education; FBhrs = Hours a day playing Facebook games; FBdays = Days a week playing Facebook games; FBgames = Number of Facebook online games played; FBgames/wk = Number of different Facebook games played in a week; FBgift = Time in a day spent sending Facebook gifts; FBmoney = Money spent on Facebook games in the last 3 months; FBgroups = Membership in Facebook gaming groups; FBhrs/wk = Time spent playing Facebook online games in a week

### **Age, Education, Income and Facebook Gaming Characteristics**

In order to examine the effects of age, education, income, and specific Facebook gaming characteristics in relation to the total POGS scale as well as the seven individual factors that were found, a Pearson's product moment correlation was run to examine the relationship between these criteria. Overall, it can be noted that education did not seem to have an overall effect in relationship to the scale as a whole or any of the individual

factors. The POGS as a scale did have significant relationship with the total number of hours spent playing Facebook games in a day and during the week ( $r = .30, p < .001$ ;  $r = .43, p < .001$ ), the number of days played ( $r = .37, p < .001$ ), the number of games played overall and per day ( $r = .15, p < .01$ ;  $r = .30, p < .001$ ), the number of Facebook gaming groups joined ( $r = .27, p < .001$ ), the number of gifts that were sent in Facebook games ( $r = .24, p < .001$ ) as well as the amount of money that was spent playing those games ( $r = .15, p = .007$ ). Additionally, number of Facebook games played per week as well as number of hours playing Facebook games contributed to six of the individual factors, number of hours playing Facebook games per day and number of days playing Facebook games contributed significantly to five of the factors, number of Facebook gifts sent and number of Facebook gaming groups contributed to four of the factors, while number of overall Facebook games and the money spent on Facebook games contributed to two factors each.

### **Gender Differences**

In order to examine potential gender differences on the total POGS score and its seven factors, a one-way (gender: female vs. male) MANOVA was conducted. The univariate analyses revealed that there was only a significant result for gender difference in the fifth factor, Compulsivity,  $F(1, 224) = 5.10, p = .02$ . Post hoc comparisons using Tukey's test revealed that women were more likely to develop a compulsive behaviors ( $M = 11.51, SD = 4.193$ ) for online Facebook gaming than men ( $M = 10.16, SD = 3.47$ ).



### **Sexual Orientation Differences**

Analyses were also conducted to examine the data for potential differences due to sexual orientation. However because a majority of the sample identified as heterosexual ( $n = 210, 93\%$ ) and because some groups had fewer than two cases, the sexual orientation variable was dummy coded so that heterosexual was set to 1, and all other sexual orientations were set to 2 for comparison. A one-way (sexual orientation: heterosexual vs. other) MANOVA was conducted on the seven factors using the recoded sexual orientation variable as a between subjects effect. Differences in scores were found on the factor Salience,  $F(1, 224) = 7.14, p = .008$  where Tukey's test revealed that heterosexuals had a greater desire to play online games and neglect other activities ( $M = 23.01, SD = 50.31$ ) than did those that were recoded into the other category ( $M = 19.31, SD = 5.77$ ).

### **Race/Ethnicity Differences**

In order to examine the potential relationship between race/ethnicity and scores on the POGS and its subscale, a one-way (race/ethnicity: African American vs. Caucasian vs. Asian vs. Native American vs. Hispanic vs. other) MANOVA was conducted. The other category consisted of those individuals who responded bi-racial, multi-racial, or other and these categories were combined due to the low number of participants who responded within these categories. There was a significant effect for race/ethnicity on Social Connection,  $F(5, 220) = 5.18, p < .001$ , and Compulsivity,  $F(5, 220) = 3.56, p = .006$ . Post hoc comparisons using Tukey's test revealed that there were ethnic group

differences in how online Facebook gamers felt connected to others where connection was perceived greatest in the Native American group ( $M = 12.50$ ,  $SD = .74$ ), followed by African Americans ( $M = 12.41$ ,  $SD = .70$ ), Caucasians ( $M = 11.43$ ,  $SD = .82$ ), other ( $M = 11.33$ ,  $SD = .89$ ), Asians ( $M = 9.58$ ,  $SD = .33$ ) and the least amount of social connection was perceived by Hispanics ( $M = 7.5$ ,  $SD = 2.67$ ). Tukey's test indicated that the greatest amount of intrusive thoughts about gaming was experienced by Native Americans ( $M = 13.31$ ,  $SD = 4.21$ ), Caucasians ( $M = 12.14$ ,  $SD = 3.29$ ), African Americans ( $M = 12.14$ ,  $SD = 4.56$ ), others ( $M = 11.56$ ,  $SD = 4.13$ ), Hispanics ( $M = 11.5$ ,  $SD = .71$ ) with the least amount of intrusive thoughts about gaming being experienced by Asians ( $M = 10.26$ ,  $SD = 3.81$ ).

## CHAPTER V

### DISCUSSION

#### **Summary of Major Findings**

This chapter provides a discussion of the results for the present study. The aim of this study was to investigate a method of measurement that would be able to identify individuals who had problematic online gaming characteristics. In the following section, the findings from each of the three hypotheses are discussed, including possible interpretations for them. Next, summary results from the exploratory analyses are presented. Limitations, directions for future research, and implications for clinical training and practice, and online gaming theory are presented subsequently. Finally, a conclusion of the study is provided.

#### **Hypothesis I: Factor Structure of the POGS**

A series of three factor analyses revealed that a seven factor solution was the most viable and psychometrically and conceptually sound model of the items developed for the POGS and thus supported the first hypothesis. However, the seventh factor only contained two items and therefore did not contain enough information to make a decision on what that factor might represent and thus was deleted from further analysis (Thompson, 2004). The first and second factors, conflict and mood modification had internal consistencies that were good (.88 and .87 respectively) with conflict representing 8 items and mood modification having six items. The third and fourth factors, salience

and social connection had acceptable internal consistencies (.71 and .72) having five and three items respectively. The fifth factor, compulsivity, had a questionable internal consistency (.67) with three items and the last factor, intrusive thoughts, had a poor internal consistency (.59) with three items as well. Although the internal consistencies of the fifth and sixth factors are not what would typically be described as acceptable (Cortina, 1993) they can still provide useful information for future research.

The first factor found in the model, Conflict, contained eight items and appears to discuss conflict in the job environment “*I have missed out on a job or career opportunity as the result of online game play,*” with peers and/or family “*I have had fights with others regarding my online game play,*” and with social events “*I have left an event early to go play online games,*” but also includes a hiding the amount of time spent online “*I hide the amount of time that I spend online*” which could be conceptualized as a defensive strategy to avoid conflict (Charlton & Danforth, 2007; Griffiths, 1996, 2000a, 2000b, 2008). Cronbach’s alpha was .88 for this subscale demonstrating a strong internal consistency for these eight items.

The second factor, Mood Modification, included six items that discussed anger “*I feel angry when I am not able to log onto an online game,*” agitation “*When not able to play online games I get agitated*” and frustration “*I get frustrated when a computer cannot access my online game*” when not able to play online games, but also included one item that describes playing online for longer periods of time “*I find myself saying (thinking) just a few more minutes when playing an online game,*” perhaps to avoid

negative mood states. In this instance, the mood modification may have either been used to experience a state of euphoria (Brown, 1993; Griffiths, 1996) or as a way for participants to escape their emotions (Charlton & Danforth, 2007; Griffiths, 2000a, 2000b, 2008). Cronbach's alpha was .87 for this subscale demonstrating a strong internal consistency for these six items.

The third factor, Saliency, contained five items that describe the importance of online gaming by addressing the neglect an individual has experienced at home "*I neglect household chores to play online games,*" a reverse coded item that reflected neglect for school, work, and social events, "*I have not neglected school/work/social events to play online games*" as well as an item that reflects neglect of health "*I have gained or lost weight since I have been playing online games.*" The survey questions that fell into this category seemed to all reflect behaviors and did not address affect or cognitions (Charlton & Danforth, 2007; Griffiths, 1996, 2000a, 2000b, 2008). Cronbach's alpha was .71 for this subscale demonstrating a moderate internal consistency for these five items.

The fourth factor, Social Connection, which is new to a behavioral addictions model, had three items and indicated that individuals who play online games feel more able to be themselves while gaming "*In my interactions with other online game players, I am able to be myself*" as well as a sense of connection to an online community "*I feel like I am a member of an online community during game play.*" These questions seem to support that some of the social aspects of online gaming may actually contribute to or

support addictive behaviors (Brotsky & Giles, 2007; Giles, 2006). Cronbach's alpha was .72 for this subscale demonstrating a moderate internal consistency for these three items.

The fifth factor, Compulsivity, had three items that described logging on to play games first thing in the morning "*Online games are something that I do shortly after waking up,*" playing online games while working on other tasks "*I play online games at the same time as working on other tasks,*" and quitting game play only to log back in to continue game play "*I have logged out of an online game only to log back in a few minutes later.*" Each of these activities seem to reflect individual's compulsive behaviors around their online game play (Charlton & Danforth, 2007; Griffiths, 1996, 2000a, 2000b, 2008) and this compulsivity along with the impacts it might have should be examined in further detail in future studies. Cronbach's alpha was .67 for this subscale demonstrating a questionable internal consistency for these items. Cortina (1993) indicated that items with an alpha level of less than .70 typically should not be interpreted, therefore, this factor should be viewed with caution and explored further.

The sixth factor, Intrusive Thoughts, had three items, all reverse coded, which reflected thinking about online games while doing other projects "*I do not think about online games when I am doing other things*" and "*When I am working on other tasks, I do not think about my online games*" and another item that could result in these intrusive thoughts "*Playing the online games is boring.*" Several researchers (Griffiths, 2010; Young, 2009) have discussed how individuals have preoccupation with gaming and how this may lead to intrusive thinking about them. These items could also reflect a form of

withdrawal (Charlton & Danforth, 2007; Griffiths, 1996, 2000a, 2000b, 2008) from online games and further research should be done to examine both of these possibilities. Cronbach's alpha was .59 for this subscale, demonstrating a poor internal consistency for these items. Again, Cortina (1993) would suggest that this factor should not be interpreted.

### **Hypotheses 2 and 3: Relationships with Measures Examining Scale Validity**

The POGS and its subscales were compared to instruments that were both conceptually and theoretically similar as well as to a scale that was conceptually dissimilar. The results of this examination are discussed below.

**Hypotheses 2.** Correlation statistics were computed in order to examine convergent validity between the POGS and other conceptually and theoretically similar instruments. When examining the convergent validity between the POGS and the Problematic Online Game Use scale (POGU; Kim & Kim, 2010), a significant positive relationship was found between overall scores. A significant positive relationship was also found for the POGU and each of the six different subscales of the POGS. Additionally, each of the subscales of the POGU, euphoria, health problems, conflict, failure of self-control, and preference of virtual relationship (Kim & Kim, 2010), also had positive significant relationships with each of the POGS subscales with the exception of health problems and the fourth factor of the POGS, social connection. This would indicate that the POGS and each of its subscales is consistent with a measurement of problematic online gaming that has been used to examine fifth, eighth, and eleventh

graders and their problematic online gaming use (Kim & Kim, 2010). Hypothesis two was partially supported by this finding.

Correlational statistics were also computed to examine convergent validity between the POGS and the Problematic Internet Use Questionnaire (PIUQ; Demetrovics et al., 2008). Overall, a significant negative relationship was found between the POGS and the PIUQ for both the total scale and five of the six factors, excluding social connection. Additionally, two of the subscales of the PIUQ, neglect and the Control Disorder Scale (Demetrovics et al., 2008), had no significant relationship to social connection. Only the obsession scale from the PIUQ (Demetrovics et al., 2008) had a significant negative relationship with social connection. This would suggest that those who endorse problematic internet gaming do not generalize those thoughts, feelings and behaviors to the internet in a general way. Another possible reason for this large negative correlation between the PIUQ and the POGS is that individuals may have given responses that are accurate in regards to their Facebook online game use, but they may be in denial whenever they are answering questions that assess their online game use in the context of their internet use in general. The one factor that did not have a negative relationship with the PIUQ was Social Connection. The second hypothesis indicating that convergent validity would be found between the POGS and the PIUQ was not supported. This may suggest that the POGS is significantly positively related to other measures of online gaming and that online gaming actually serves as a barrier to those individuals



when thinking about the internet in a generic fashion as the result of denial (Shaffer et al., 2000).

**Hypotheses 3.** It was hypothesized that social desirability would not be related to the POGS. Correlation statistics were computed in order to examine divergent validity between the POGS and a theoretically and conceptually dissimilar instrument. However, the analysis revealed that there were significant positive relationships between the subscales conflict, mood modification, salience, and intrusive thoughts. One interpretation of this finding is that perhaps those who play online games feel an online gamer loyalty to online games and that they are satisfied with immersion in these games (Teng, 2010), and that this loyalty to specific online games is associated with problematic online game play. This can be seen in advertisements on Facebook, where several of the games propose that they are perhaps the most addictive game on Facebook. An alternate explanation is that those who answer in more socially desirable ways are more susceptible to becoming addicted to Facebook online games. Hypothesis three was not supported by this studies finding.

### **Exploratory Analyses**

Data collection initially was done recruiting from the Facebook platform and after a month of recruitment a total of 182 participants had been recruited. Because a desired total of 300 participants to run the exploratory factor analysis, additional participants were recruited from several undergraduate classes, where an additional 204 participants were recruited. Of the 383 participants that responded to the survey, only 226 were

retained due to acquiescence response bias (Cronbach, 1946) and not having played any Facebook games. Several independent t-tests were used to analyze the differences between the individuals who were recruited via Facebook and those that were recruited from the undergraduate population. It was found that the two populations differed significantly in regards to age, number of hours a day playing Facebook games, number of days a week playing Facebook games, number of overall Facebook games played, number of games played within a week, number of Facebook game gifts sent to others, and number of hours playing Facebook games in a week. Because these populations differed significantly on these demographic variables, further evaluation is needed on the POGS within various populations.

A variety of exploratory analyses were then conducted to examine the impact of different demographic variables on the overall POGS scale as well as each of the six factors that were found. The last factor, intrusive thoughts will not be discussed in this section due to low internal consistency that might result in misinterpretation. With regard to age, significant positive relationships were found with mood modification, compulsivity and social connection. This could indicate that as individuals get older, they are more likely to play Facebook online games as a method to modify their mood and connect socially with others and as a result they are likely to increase their use of online games to continue both escaping from negative mood states (Charlton & Danforth, 2007; Griffiths, 2000a, 2000b, 2008; Hussain & Griffiths, 2009) and to use this venue to connect with others (Koo, 2009; Liu & Peng, 2009). Although Kim and Kim (2010)

found that online game use may have resulted in euphoria in fifth through eleventh graders, this scale explores the negative state feelings that may result from inability to connect to the internet or online games. Education did not seem to play a role specific to any of the six factors and income had only a weak relationship with compulsivity.

In the study, gender and ethnic differences were further examined. When examining gender in online gaming, female participants who played Facebook games were found to have a greater tendency to develop compulsive behaviors around online Facebook gaming than men. This greater tolerance could lead to increased time playing Facebook games and/or a greater number of Facebook games played. This greater compulsivity level for adult females is the opposite of what was found in adolescent populations where males were found to have significantly higher compulsivity (Ko et al., 2005). However, the greater compulsivity being a source of increased gaming is consistent with Yee and Caplan's study (2008) that found that women who played an online game reported that they played slightly more hours a week than their male counterparts.

Ethnicity/race also demonstrated some significant differences when examining Facebook gaming characteristics. When individuals answered questions that were related to social connection, this survey found that the highest level of social connection was perceived by Native Americans, followed by African Americans, Caucasians, and Asians, while the least amount of social connection perceived by Hispanics. There were also significant differences noted in individuals from different ethnicities in their responses to

questions that reflected intrusive thoughts about Facebook online gaming where it was found that Native Americans had the greatest number of intrusive thoughts followed by Caucasians, African Americans, and Hispanics with the least amount of intrusive thoughts being attributed to those of Asian descent. Although there were some slight ethnic differences between social connection responses and intrusive thoughts, Yee and Caplan (2008) also found that Caucasian and Native Americans seemed to play online games more than those who were African American, Asian or Hispanic. Because the ethnic group responses were different for social connection and intrusive thoughts, it can be noted that there is not necessarily a direct connection between these two constructs when examining online Facebook game playing. Nonetheless, a desire for social connection may have some connection with intrusive thoughts, this should be explored further to determine what other characteristics may be responsible for this as well.

Although this study did not examine many of the demographic factors that might have helped to further determine why these differences might exist, researchers who have examined cultural and ethnic differences in disordered gambling have found that demographic variables such as poverty, low educational attainment, discrimination, alcohol use, drug use, mood, anxiety, and personality disorders as well as general medical health conditions were correlated with higher levels of disordered gambling (Alegria et al., 2009). Future studies that continue to examine the racial and cultural differences in those who have problematic online gaming use should examine some of these factors as a possible way to explain these differences.

The number of online games that an individual plays in a week as well as the number of hours that an individual plays in a week has significant positive relationships with each of the first five factors, conflict, mood modification, salience, social connection and compulsivity. The fact that all of these factors have a significant positive relationship with the number of games and the number of hours spent playing these games gives credence to researchers who discuss amount of time as being an important factor when examining online game play (Tobin & Grondin, 2009; Wood & Griffiths, 2007; Young, 2009). These two dimensions of online game play, number of games and time spent in a week playing, may speak to the importance of online gaming in these individuals lives as a method of modifying their mood and connecting socially with others (Koo, 2009) regardless of the conflict that it also generates in their lives.

Number of hours spent in a day playing Facebook games was significantly related to conflict, mood modification, social connection, and compulsivity. These significant positive relationships also seem to indicate that online game players may use games to modify their mood (Charlton & Danforth, 2007; Griffiths, 2000a, 2000b, 2008; Hussain & Griffiths, 2009) and connect socially with others (Koo, 2009) while developing a higher compulsivity for online games. These gamers may acknowledge that increased number of hours spent in a day pursuing this activity may cause conflict in their lives but may be willing for the sake of the connections that they have developed. These same four factors are found to be significantly positively related to the number of online gaming Facebook groups that individuals belong to as well. When thinking about the desire to

belong to groups, virtual social connection with others (Koo, 2009; Liu & Peng, 2009; Mahfouz, Philaretou, & Theocharous, 2008) would be the main focus of online game play and would serve as a medium to modify mood (Charlton & Danforth, 2007; Griffiths, 2000a, 2000b, 2008; Hussain & Griffiths, 2009) via social connection.

The number of days that an individual plays online games and the amount of gifts that an individual sends to other online game players has significant positive relationships with mood modification, salience, social connection and compulsivity. Because of the lack of positive significant relationship with conflict some online game players may have a different underlying motivation for online game play. It might make sense to conceptualize these individuals as having social connection as their primary motivation for game play (Koo, 2009; Liu & Peng, 2009; Mahfouz, Philaretou, & Theocharous, 2008). In this manner, they would be able to avoid conflicts in real life by not feeling it necessary to play online games when other events were more important, but might be motivated to play when in a state of boredom or agitation with nothing else to do (Charlton & Danforth, 2007; Griffiths, 2000a, 2000b, 2008; Hussain & Griffiths, 2009). This could account for the importance of online game play as a way to socially connect, reduce boredom or negative mood states that would also lead to more compulsive behavior in regards to online game play.

The total number of games that individuals play has a significant positive relationship with salience (Charlton & Danforth, 2007; Griffiths, 1996, 2000a, 2000b, 2008) and social connection. In this instance, it could be that individuals are motivated to

play a larger number of games so that they are able to have either a wider range of individuals that they are exposed to or that they are able to experience a greater variety of experiences with the same individuals. In either case, it seems that the importance of the online gaming for this particular characteristic is motivated by perceived social connection to others (Koo, 2009; Liu & Peng, 2009; Mahfouz, Philaretou, & Theocharous, 2008).

Finally, individuals who reported that they spend money when playing Facebook online games endorsed items that reflected mood modification and conflict. In this instance, it may be that online game player's mood modification (Charlton & Danforth, 2007; Griffiths, 1996, 2000a, 2000b, 2008) is the result of or is enhanced by spending money on these games. By spending money, players are more likely to experience a state of euphoria (Brown, 1993; Griffiths, 1996) due to their gaining experience faster in the game and by achieving more recognition and power in the game (Griffiths, 2008; Yee, 2006). However, spending money in this way on an online game is something that may lead to more conflict in their lives, especially when others feel like the money that has been spent could be used in a more appropriate manner.

### **Strengths, Limitations and Future Research Directions**

The development of this scale was grounded in behavioral addictions theory and principles (Brown, 1993; Carnes, 1983; Jacobs, 1986; Miller, 1980) as well as an examination of an additional component, social connection, that should be considered when conceptualizing problematic online gaming (Koo, 2009; Liu & Peng, 2009;

Mahfouz, Philaretou, & Theocharous, 2008). One strength of this study that should be noted is related to the population that was sampled. The method of sampling for this study included snowball sampling from friends and/or gaming communities on Facebook combined with sampling from an undergraduate population in a predominately female southwestern university. Although, this sampling method may have overrepresented women in the gaming population ( $n = 164$ ; 73%), there were significant differences found in the two populations surveyed, including age, number of hours playing Facebook games in a day and in a week, number of days in a week that Facebook games were played, number of overall Facebook games played, number of overall Facebook games played in a week, and the total number of Facebook game gifts that were sent in a day. These differences contributed to a greater variability of the population surveyed and may be more generalizable to a variety of populations.

While the development of this scale was grounded in behavioral addictions theory and principles, there are some limitations of this study that should be noted. First, the differences that contributed to a greater variability of the population surveyed may have had an effect on the results of the data that could lead to misinterpretation of those individuals who have problematic online gaming. Thus, future researchers may want to sample exclusively from specific populations to determine if the factors that were found contribute significantly to the problematic gaming in each of these populations separately as well as combined.



A second limitation that should be noted in this study was that a large proportion of the surveyed population was Caucasian ( $n = 130$ ; 58%). Although there was some variation in the ethnic groups represented, a more comprehensive analysis of different ethnic groups is desired if a true understanding of how online gaming may impact individuals in a general way to minimize random error sampling (Assael & Keon, 1982). Future researchers may want to explore online gaming in several different ways in future studies. First, an examination of various ethnic demographics together would be important to note the universal constructs of online gaming as they apply to any individuals who chose to play online games. Secondly, a separate analysis of specific geographic locations (i.e., the United States, China, etc.) could be analyzed to assess for any specific local geographic variables that might be pertinent to the examination of online gaming.

A third limitation to this study can be linked to the specificity of the items that have loaded on specific factors. In regards to specificity within the items themselves, four of the eight items in the first factor, conflict, discuss the conflict in terms of others. Additional information could be gathered as to with whom game players have conflict in their lives. Others may be connected to family, friends, work relationships, or all of the above and it would be important to have this information when thinking of ways to prevent and/or treat this problematic behavior. In the second factor, mood modification, this study discusses the mood state that individuals have around not being able to connect to the online game for some reason, but it does not examine what being able to connect

and play does for the individual in regards to mood state. Previous research has noted that online game play may also be associated with a state of euphoria (Brown, 1993; Griffiths, 1996) and this aspect of mood modification should continue to be examined. In the third factor, salience (Charlton & Danforth, 2007; Griffiths, 1996, 2000a, 2000b, 2008), each of the items could all be viewed as behaviors that were tied to the importance on online gaming in individual's lives and it will be important to examine whether there are affective and cognitive components to this importance as well.

A fourth limitation can be attributed to the small number of survey items that compromised some of the factors, specifically social connection and compulsivity which only had three items each. Additional items should be examined so that researchers might have a better understanding of how these constructs fit within the overall role of problematic online gaming. Items that further examine online communities, gaming groups and how individuals connect with each other could be important when examining how social connection plays a role in problematic online gaming (Koo, 2009; Liu & Peng, 2009; Mahfouz, Philaretou, & Theocharous, 2008). Additional items that explore the construct of compulsivity, including the increase of play time from a longitudinal perspective would be valuable. Additionally, factor six, which was labeled intrusive thoughts, only had three items and could be further explored in a manner which might lead to a better understanding of what these factors truly represent.

A fifth limitation to this study was the findings in regards to convergent and divergent validity. Although this questionnaire's convergent validity to another measure

of problematic online gaming was found to be expected, the expected perceived connection to the problematic use of the internet was not found. It would behoove researchers to explore the perceived differences between online gaming over the internet and the use of the internet in a general way so that these differentiations can be analyzed in a systematic fashion. Additionally, the perception that online gaming may be an acceptable addiction to have, as noted by the Marlowe-Crowne social desirability scale, will be an important part of future research that will aid in the understanding of how individuals may be resistant to change in their online gaming behaviors.

A sixth limitation of the study that should be noted pertains to the sample size of the study. While the study met the sample sizes suggested by some researchers (DeWinter, et al., 2009; Hair, et al., 1979; MacCallum, 1999) they did not meet the conservative estimates suggested by Gorsuch (1983). Although the KMO measure of sampling adequacy demonstrated sufficiency for satisfactory factor analysis and Bartlett's test of sphericity indicated that the strength of the relationship among the sample variables was sufficient to proceed with factor analysis, the overall sample size was not what was desired using the conservative end of 3-5 participants for each of the survey questions suggested by Gorsuch (1983). Future research with larger sample sizes would possibly provide additional evidence that would support the factor structure of the POGS.

### **Implications for Clinical Training and Practice**

The results of this study have important implications for applied clinical training programs, especially in a world in which the internet and internet gaming is becoming an increasing phenomenon. Although training programs typically address addictions from a substance abuse perspective, it has become increasingly important for clinicians in training to study behavioral addictions, their symptoms, and treatments (Karim & Chaudhri, 2012). Currently many of these behavioral addictions do not have specific diagnostic criteria in the *DSM-IV-TR* (American Psychiatric Association, 2000) but have been grouped under other categories including impulse control disorders with behaviors simply classified under impulse control disorder NOS. As researchers begin to better understand behavioral addictions and their etiology, prevalence and their neurobiological underpinnings, it will become increasingly important for those who are in training to understand ways in which to diagnose and treat these disorders (Griffiths, 2010; Griffiths & Meredith, 2009; Young, 2009). Graduate programs in counseling psychology could potentially integrate the findings of this study into their coursework, practicum training and skills assessment in order to educate psychology trainees on behavioral addictions, including online gaming.

In addition to training psychologists to identify and treat behavioral addictions in training programs, findings from this study would also have important implications for therapists who are practicing. United States researchers have estimated that as many as 10% to 15% of all video game players may be affected by problematic game playing

(Chak & Leung, 2004). Tejeiro and Moran (2002) have indicated that time spent playing and social disruption/dysfunction appears in patterns that are similar to other addictive disorders. Grüsser, Thalemann, and Griffiths (2007) further state that dependence-like behaviors are more likely for those who started playing video games at younger ages. Consistent with this study, many authors (Wood & Griffiths, 2007; Young, 2009) have discussed that one of the most important factors when looking at online gaming behaviors is that of time. With this information, clinicians can assist their clients in reduction of time playing online games while addressing other salient components such as social connection and ways to achieve these gains without resorting to online games to obtain those connections. Clearly, all of the implications for training and clinical application have not been empirically explored, however, it is hoped that this study may act as a springboard for additional research with the POGS that will allow trainers and clinicians more insight into the particular etiology, prevalence and neurobiological factors that contribute to problematic online gaming.

### **Implications for Research**

A current limitation of the current literature that examines online game playing is that the focus has been on those individuals who play Massively Multiplayer Online Role-Playing Games (MMORPGs; e.g., Caplan et al., 2009; Chappell, Eatough, Davies, & Griffiths, 2006; Charlton & Danforth, 2007, 2010; Dauriat et al., 2011; Hsu, Wen, & Wu, 2009; Hussain & Griffiths, 2009; Kim & Kim, 2010; Liu & Peng, 2009; Ng & Wiemer-Hastings, 2005; Peters & Malesky, 2008; Smahel, Blinka & Ledabyl, 2008, Wan

& Chiou, 2006). This study examined a new type of online game play that has evolved on Facebook, which has some of the same components of social environment, character generation and naming, and choice of character role, but has the additional incentive of being free to play (MacMillan & Stone, 2011).

Although these games are free to play, game players have the option of paying for additional services which include purchase of unique items and getting additional bonuses that allow players to become more powerful and level faster in the game (MacMillan & Stone, 2011). Because the dynamics of game play are changing, it is important for future researchers to consider new and unique ways in which this game play may lead to additional psychological consequences and the underlying mechanisms that allow them to become problematic to individuals who play them.

### **Implications for Theory**

Previous theory for behavioral addictions, such as sex (Carnes, 1983; Garcia & Thibaut, 2010), shopping (Clark & Calleja, 2008; Lejoyeux & Weinstein, 2010), tanning (Kouros, Harrington, & Adinoff, 2010) and gambling (Griffiths, 1995; Jacobs 1986; Wareham & Potenza, 2010) have used a six component model that has included the criteria of salience, mood modification, compulsivity, withdrawal symptoms, conflict, and relapse. This study, along with studies that have examined internet addiction, indicated that an important additional component that should be considered is that of social connection (Chou & Tsai, 2007; Lo, Wang, & Fang, 2005; Sanders, Field, Diego, & Kaplan, 2000). From this perspective, problematic online game use may have

characteristics that cannot be adequately measured by scales that have been created to measure problematic behaviors in sex, shopping, gambling, and other behavioral addictions.

An additional component that was noted in this study was that of intrusive thoughts. Several researchers have noted that online gamers seem to have a preoccupation with gaming (Griffiths, 2010; Young, 2009) and that this preoccupation could account for intrusive thoughts. Another explanation is that these intrusive thoughts are a component of withdrawal symptoms that have been noted in both behavioral addictions research (Carnes, 1983; Clark & Calleja, 2008; Garcia & Thibaut, 2010; Griffiths, 1995; Jacobs 1986; Kourosh et al., 2010; Lejoyeux & Weinstein, 2010; Wareham & Potenza, 2010) as well as previous studies examining problematic online gaming (Charlton & Danforth, 2007; Griffiths, 1996, 2000a, 2000b, 2008). Clarification of this construct will be important when addressing theory as it applies to problematic online gaming.

### **Conclusion**

The purpose of this study was to develop a psychometrically reliable and valid measure of problematic online gaming in an adult population, the Problematic Online Gaming Scale (POGS). This measure was conceptualized as the result of examining previous literature that examined behavioral addictions and how those behavioral addictions have been previously been measured (Brown, 1993; Carnes, 1983; Jacobs, 1986; Miller, 1980), along with a base of literature that has examined video games and

online gaming behaviors (Charlton & Danforth, 2007; Griffiths, 1996, 2000a, 2000b, 2008). This study attempted to contribute to the online gaming literature by providing a quantitative means for measurement of problematic online gaming behaviors on the Facebook platform. A six factor model emerged from the data with four of the six having a structure that was supported by previous literature. One of those factors, social connection, has been noted in the literature in regards to online gaming but has not previously been a part of the behavioral addictions literature (Brown, 1993; Carnes, 1983; Jacobs, 1986; Miller, 1980). Significant, positive relationships between the POGS and the POGU provided preliminary evidence of convergent validity of this measure of problematic online gaming on Facebook. Future research is necessary to examine the factors that had few items as well as those that did not have alpha levels that were consistent with strong psychometric properties. This future research would further clarify the existing POGS scale and assist in strengthening its reliability and validity. Notwithstanding these limitations, this study has made an original contribution to the field of behavioral addictions, specifically problematic online gaming behaviors, as well as to Counseling Psychology, by examining the relationship between demographic variables and factors within the POGS that can highlight some of the important underlying motivations for online gaming as well as the problematic outcomes that may result.



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APPENDIX A  
Demographics Questionnaire

Age: \_\_\_\_  
Sex: \_\_\_\_ Male \_\_\_\_ Female \_\_\_\_ Intersex  
Gender: \_\_\_\_ Woman \_\_\_\_ Man \_\_\_\_ Transgender

Sexual Orientation: \_\_\_\_ Heterosexual \_\_\_\_ Gay \_\_\_\_ Lesbian \_\_\_\_ Bisexual  
\_\_\_\_ Transsexual

Race/Ethnicity:

- \_\_\_\_ 1) African American/Black
- \_\_\_\_ 2) Caucasian/European American
- \_\_\_\_ 3) Asian/Asian American/Pacific Islander
- \_\_\_\_ 4) Native American/Alaskan Native
- \_\_\_\_ 5) Hispanic/Latina/Latino
- \_\_\_\_ 6) Bi Racial
- \_\_\_\_ 7) Multi racial
- \_\_\_\_ 8) Other: \_\_\_\_\_

Where do you currently live?

\_\_\_\_\_ Country

How many years of formal education do you have? \_\_\_\_\_

Income per year \_\_\_\_\_ (Monetary unit for your country) \_\_\_\_\_

### Facebook Online Gaming Questions

How many hours a day do you spend playing Facebook online games? \_\_\_\_\_

How many days out of the week do you play Facebook online games? \_\_\_\_\_

How many different Facebook online games do you play? \_\_\_\_\_

How many different Facebook online games do you play at least once a week? \_\_\_\_\_

How much time in a day do you spend responding to gift request/sending gifts? \_\_\_\_\_

How much money have you spent on Facebook online games in the last 3 months? \_\_\_\_\_

How many Facebook gaming groups do you belong to? \_\_\_\_\_

How much time do you spend playing online games each week? \_\_\_\_\_



## APPENDIX B

### The Problematic Online Gaming Scale (POGS)

In the following you will read statements about your Facebook online game use. Please indicate on a scale from 1 to 6 how much these statements characterize you.

Strongly	Moderately	Mildly	Mildly	Moderately	Strongly
Agree	Agree	Agree	Disagree	Disagree	Disagree
1	2	3	4	5	6

1. I have gotten up early to play an online game
2. I become annoyed if someone bothers me while playing online games
3. I am in a bad mood when I am not able to play my online game for a while
4. I have not tried to reduce the amount of time I spend on online games
5. My friends/family tell me that I spend too much time playing online games
6. In my interactions with other online game players, I am able to be myself
7. I feel angry when I am not able to log onto an online game.
8. I feel more connected to my online game community than I do to others in my life
9. I get excited when logging onto the internet to play an online game
10. Work and other activities have not suffered because of playing games online
11. I find online game playing more exciting than real life
12. I neglect other things in my life as a result of playing online games
13. When an online game is running slow I get angry
14. I have missed out on a job or career opportunity as the result of online game play
15. I am able to escape from my troubles for a while when playing online games
16. I do not think about online games when I am not playing
17. Online games are something that I do shortly after waking up
18. I neglect household chores to play online games
19. I have had arguments with others about my online game play
20. Online games are something that I do before going to bed
21. I do not get stressed when I cannot play online games
22. I feel misunderstood by those who do not understand my online game play
23. I have felt unable to stop playing online games once I begin
24. I have gained or lost weight since I have been playing online games.
25. Others tell me that I play online games too much
26. I do not play online games at work
27. I feel agitated if I am not able to get online to play my games for several days
28. I tend to spend increasingly amounts of time playing online games

29. I feel connected to other players in the online game environment
30. After stopping online game play for a while, I feel a need to play
31. I feel that playing online games creates problems in my life
32. I have not stayed up late to play an online game
33. When not able to play online games I get agitated
34. I have spent too much money on online games
35. I stay online until the last minute when I must leave to go somewhere
36. Playing online games gives me a lot of pleasure
37. I have had fights with others regarding my online game play
38. I feel disconnected from others when playing online games
39. I play online games at the same time as working on other tasks
40. I play online games more than I did a month ago
41. I have left an event early to go play online games
42. At random times I think about playing online games
43. I have had a loss of a significant relationship as the result of online game play
44. I feel that I should limit my time playing online games
45. I do not think about online games when I am doing other things
46. I think about ways to be more successful in my online game play during the day
47. It does not bother me to not play online games for weeks at a time
48. I find myself saying (thinking) just a few more minutes when playing an online game
49. My sleep has not suffered as the result of online game play
50. I hide the amount of time that I spend online
51. I have not neglected school/work/social events to play online games
52. It does not bother me when I cannot access my online game
53. When I am working on other tasks, I do not think about my online games
54. I only play online games for the amount of time that I intended
55. I become defensive when others ask me what I do online
56. I get frustrated when a computer cannot access my online game
57. Playing the online games is boring
58. I have logged out of an online game only to log back in a few minutes later
59. I have tried to cut down on the amount of time that I play but have been unable to
60. I feel like I am a member of an online community during game play

## APPENDIX C

Marlowe-Crowne Form C (M-C; Reynolds, 1982)

Listed below are a number of statements concerning personal attitudes and traits. Read each item and decide whether the statement is *true* or *false* as it pertains to you personally.

1. It is sometimes hard for me to go on with my work if I am not encouraged.
2. I sometimes feel resentful when I don't get my way.
3. On a few occasions, I have given up doing something because I thought too little of my ability.
4. There have been times when I felt like rebelling against people in authority even though I knew they were right.
5. No matter who I'm talking to, I'm always a good listener.
6. There have been occasions when I took advantage of someone.
7. I'm always willing to admit it when I make a mistake.
8. I sometimes try to get even rather than forgive and forget.
9. I am always courteous, even to people who are disagreeable.
10. I have never been irked when people expressed ideas very different from my own.
11. There have been times when I was quite jealous of the good fortunes of others.
12. I am sometimes irritated by people who ask favors of me.
13. I have never deliberately said something that hurt someone's feelings.

## APPENDIX D

The Problematic Internet Use Questionnaire (PIUQ; Demetrovics et al., 2008)

In the following you will read statements about your internet use. Please indicate on a scale from 1 to 5 how much these statements characterize you.

Never	rarely	sometimes	often	always
1	2	3	4	5

1. How often do you fantasize about the internet, or think about what it would be like to be online when you are not on the internet?
2. How often do you neglect household chores to spend more time online?
3. How often do you feel that you should decrease the amount of time spent online?
4. How often do you daydream about the internet?
5. How often do you spend time online when you'd rather sleep?
6. How often does it happen to you that you wish to decrease the amount of time spent online but you do not succeed?
7. How often do you feel tense, irritated, or stressed if you cannot use the internet for as long as you want to?
8. How often do you choose the internet rather than being with your partner?
9. How often do you try to conceal the amount of time spent online?
10. How often do you feel tense, irritated, or stressed if you cannot use the internet for several days?
11. How often does the use of internet impair your work or your efficacy?
12. How often do you feel that your internet usage causes problems for you?

13. How often does it happen to you that you feel depressed, moody, or nervous when you are not on the internet and these feelings stop once you are back online?
14. How often do people in your life complain about spending too much time online?
15. How often do you realize saying when you are online, “just a couple of more minutes and I will stop”?
16. How often do you dream about the internet?
17. How often do you choose the internet rather than going out with somebody to have some fun?
18. How often do you think that you should ask for help in relation to your internet use?



## APPENDIX E

The Problematic Online Game Use scale (POGU; Kim & Kim, 2010)

In the following you will read statements about online game use. Please indicate on a scale from 1 to 6 how much these statements characterize you.

Strongly	Moderately	Mildly	Mildly	Moderately	Strongly
Agree	Agree	Agree	Disagree	Disagree	Disagree
1	2	3	4	5	6

1 I feel unrestricted when playing online games

2 I feel good and very interested while playing online games

3 I experience a buzz of excitement while I play online games

4 Playing online games is when I feel the most pleasure

5 My health has gotten worse from playing online games

6 I get headaches from over-playing online games

7 My eyesight has declined from overplaying online games

8 I have broken appointments because of playing online games

9 My family often tells me that I spend too much time playing online games

10 My school/work and other activities suffer because of playing online games

11 Playing online games is a priority

12 Playing online games often interfere with my school/work

13 When playing online games, I tend to play longer than originally intended

14 I imagine playing online games when I am not playing

15 I find myself saying “just a few more minutes” when playing online games

16 I make efforts to reduce time playing online games, but I often fail

17 I tend to spend increasing amounts of time playing online games

18 I feel more intimate with people who I know from online games than people in reality

19 I feel that many people playing online games acknowledge my skills than in real life

20 People I meet in online games are easier to understand than real life people

APPENDIX F  
Informed Consent



anonymous. Only the principal investigator and the research advisor will have access to any data that you give in response to survey questions. That information will be stored in a fireproof safe in the principal investigators home office. Any identifiable information will be destroyed one year after the completion of this study. It is anticipated that the results of this study will be published in the investigator's dissertation as well as other research publications. However, no names or other identifying information will be included in any publication.

The researchers will try to prevent any problem that could happen because of this research. You should let the researchers know at once if there is a problem and they will help you. However, TWU does not provide medical services or financial assistance for injuries that might happen because you are taking part in this research.

### Participation and Benefits

Your involvement in this research study is completely voluntary, and you may discontinue your participation in the study at any time without penalty. The only direct benefit of this study to you is that at the completion of the study a summary of the results will be sent to you upon request. We will ask for this contact information at the end of the study as well.

### Questions Regarding the Study

If you have any questions about the research study you may ask the researchers; their phone numbers are at the top of this page. If you have questions about your rights as a participant in this research or the way this study has been conducted, you may contact the Texas Woman's University Office of Research and Sponsored Programs at 940-898-3378 or via email at [IRB@twu.edu](mailto:IRB@twu.edu).

Thank you for participating in this study

[Click here to give informed consent and continue with the survey](#)

APPENDIX G

IRB Approval Letter



**Institutional Review Board**  
Office of Research and Sponsored Programs  
P.O. Box 425619, Denton, TX 76204-5619  
940-898-3378 FAX 940-898-4416  
e-mail: IRB@twu.edu

January 31, 2012

Mr. Stacey Smith  
5850 Belt Line Rd., #117  
Dallas, TX 75254

Dear Mr. Smith:

Re: *The Development and Validation of the Problematic Online Gaming Scale (POGS): An Analysis of Facebook Gamers (Protocol #: 16893)*

The above referenced study has been reviewed by the TWU Institutional Review Board (IRB) and appears to meet our requirements for the protection of individuals' rights.

If applicable, agency approval letters must be submitted to the IRB upon receipt PRIOR to any data collection at that agency. A copy of the approved consent form with the IRB approval stamp and a copy of the annual/final report are enclosed. Please use the consent form with the most recent approval date stamp when obtaining consent from your participants. The signed consent forms and final report must be filed with the Institutional Review Board at the completion of the study.

This approval is valid one year from January 31, 2012. Any modifications to this study must be submitted for review to the IRB using the Modification Request Form. Additionally, the IRB must be notified immediately of any unanticipated incidents. If you have any questions, please contact the TWU IRB.

Sincerely,

  
Dr. Rhonda Buckley, Co-Chair  
Institutional Review Board - Denton

enc.

cc: Dr. Shannon Scott, Department of Psychology & Philosophy  
Dr. Jenelle Fitch, Department of Psychology & Philosophy  
Graduate School