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Duration of Time Spent Playing Online Video Games, Interpersonal Skills, and Introversion Personality Traits as Predictors for Social Anxiety Symptoms

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DURATION OF TIME SPENT PLAYING ONLINE VIDEO GAMES, INTERPERSONAL SKILLS, AND INTROVERSION PERSONALITY TRAITS AS PREDICTORS FOR SOCIAL ANXIETY SYMPTOMS

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This study sought to determine if time spent engaging in online gaming, interpersonal communication skills, and introvert personality traits are predictors of an individual's likelihood of experiencing symptoms of social anxiety. A sample of 128 participants (82 males and 46 females) completed measures of demographics, interpersonal communication skills, problematic online gaming, social anxiety, and introversion. Participants were recruited through *Amazon Mechanical Turk.* There were significant correlations among social anxiety and interpersonal communication skills, problematic online gaming, and introversion. There was no significant correlation among social anxiety and time spent playing Massively Multiplayer Online Role-Playing Games (MMORPG), a specific form of online video game. It was also found that interpersonal communication skills, problematic online gaming, and introversion were all significant predictors of social anxiety. However, time spent playing MMORPGs was not a significant predictor of social anxiety.

Introduction

Individuals with social anxiety disorder suffer from a variety of symptoms that makes it difficult for them to function effectively in society (Stein & Stein, 2008). Unfortunately, only about half of the individuals diagnosed with social anxiety disorder seek treatment, with the other half managing their symptoms on their own. Many individuals with the disorder use substances to cope with their anxiety. It has been found that individuals with social anxiety disorder often turn to drugs and alcohol to cope with their symptoms (Stein & Stein, 2008). However, recently studies have shown that individuals who claim that they spend an excessive duration of their time playing online video games report having symptoms of social anxiety disorder (Lo, Wang, & Fang, 2005). Along with experiencing symptoms of social anxiety disorder, these individuals also report having a lack of interpersonal skills and tend to have a more introverted personality type (Lo et al., 2005). It is hypothesized that time spent engaging in online gaming, high levels of introvert personality traits, and low levels of interpersonal communication skills are predictors of an individual's likelihood of experiencing symptoms of social anxiety.

Social Anxiety Disorder and Interpersonal Communication

Anxiety disorders are one of the most prevalent psychological disorders in America today, with social anxiety disorder being the most common anxiety disorder (Stein & Stein, 2008). The disorder has an early age of onset, in which 50% of individuals who develop the disorder have it by 11 years of age and 80% develop it by 20 years of age. The 12-month prevalence estimate of social anxiety disorder for the United States is approximately 7%. Prevalence rates decrease with age. The 12-month

prevalence for older adults ranges from 2% to 5%. It is more common for females to develop the disorder compared to males and the disorder is also more pronounced in adolescents and young adults, compared to older individuals (Stein & Stein, 2008).

According to *The Diagnostic and Statistical Manual of Mental Disorders* (5th ed.; DSM-5; American Psychiatric Association [APA], 2013), the essential feature of social anxiety disorder is a marked, or intense, fear or anxiety of social situations in which the individual may be scrutinized by others. The individual fears a negative evaluation when in certain social situations. This anxiety stems from a fear that he or she will be judged as anxious, weak, crazy, stupid, boring, intimidating, dirty, or unlikable. The individual fears that he or she will act or appear in a specific way or that he or she might show anxiety symptoms. These symptoms include: blushing, trembling, sweating, having trouble while speaking, or staring. This fear and anxiety is judged to be out of proportion to the actual risk of being negatively evaluated or to the consequences of such negative evaluation (APA, 2013).

Individuals with social anxiety disorder may be shy or withdrawn, and they may be less open in conversations and disclose little about themselves compared to others who do not have social anxiety disorder (APA, 2013). They often seek employment in jobs that do not require social contact. They might live at home longer than the average individual. They also often self-medicate with substances, such as drinking alcohol before going to a party (APA, 2013).

It has been found that social anxiety disorder is associated with elevated rates of school dropout and with decreased well-being, employment, workplace productivity, socioeconomic status, and quality of life (APA, 2013). The disorder is also associated

with being single, unmarried, or divorced and with not having children, particularly among men. Despite the amount of distress and social impairment associated with social anxiety disorder, only about half of individuals with the disorder in Western societies ever seek treatment, and they tend to do so only after 15 to 20 years of experiencing symptoms (APA, 2013).

One reason that these negative outcomes occur with individuals with social anxiety disorder is due to poor interpersonal communication skills. Clark and Arkowitz (1975) conducted a study in which they examined how men who had high and low social anxiety levels rated their interactions after conversing with a female participant. The individuals rated themselves based on social skill, anxiety, and the female's response. It was found that men in the high socially anxious group rated their social skill significantly lower than the men in the low socially anxious group. These findings emphasize the potential role of self-evaluation as a mediator of social anxiety, independent of actual level of social skill (Clark & Arkowitz, 1975). This suggests that men with higher levels of social anxiety think that their interpersonal communication skills are lower compared to men with low social anxiety or no social anxiety at all.

Another study by Cuming and Rapee (2010) found that individuals with higher social anxiety revealed less information about themselves in interactions with strangers. This is a self-protective strategy that they use in situations in which the risk of negative evaluation is judged to be particularly high (Cuming and Rapee, 2010). Since some individuals with social anxiety use self-protective strategies in social situations, they are less likely to divulge personal information or speak their mind if another individual asks

for their opinion. This makes communication with others difficult, causing poor social relationships.

A study done by Cash, Theriault, and Annis (2004) studied a possible reason individuals become socially anxious. They examined how body image effects social anxiety. They found that body image dissatisfaction, dysfunctional, investment in appearance, and situation body image dysphoria were all moderately associated with higher levels of social-evaluation anxiety for both men and women. They also found that a negative body image entailed greater discomfort and concerns about approval and acceptance in social interactions (Cash et al., 2004). This indicates that individuals with a negative body image experience high levels of anxiety about social-evaluation and experience distress about social approval and acceptance.

Individuals with social anxiety experience a number of symptoms that cause them to be shy in public and reserved in public (APA, 2013). They have a fear of being ridiculed and due to that, they tend to not self-disclose personal information to others. This causes poor interpersonal communication skills and prevents them from forming deep relationships with others (Cuming and Rapee, 2010).

Coping with Social Anxiety by Using the Internet

Rather than seek treatment, many individuals with social anxiety find ways to cope with their various symptoms in order to fulfill their social needs while avoiding the negative effects that play a part in their social interaction (Stein & Stein, 2008). Some individuals turn to drugs and alcohol as a coping mechanism, while others turn to various forms of social interaction that do not require them to have face-to-face interactions with others. One way that individuals are coping with their symptoms is that they are turning

to the Internet as a way of having social interaction (Amichai-Hamburger, Wainapel, & Fox, 2002).

But why do individuals turn to the internet as a way to cope with their social anxiety? A study done by Amichai-Hamburger et al. (2002) examined how an individual's personality characteristics affect the meaning and importance of Internet social interaction in comparison with "real life," face-to-face interactions. The study explained that a person achieves personal social satisfaction by being able to express his or her real self in social interaction and receives social recognition for it. They defined a term, "real me," as the degree of ability to express fully the real self in a social environment. The study found that introverted and neurotic people locate their "real me" on the Internet, while extroverts and non-neurotic people locate their "real me" through traditional social interaction (Amichai-Hamburger et al., 2009).

These findings were explained by the social services provided on the Internet (Amichai-Hamburger et al., 2009). The Internet provides anonymity, lack of need to reveal physical appearance, rigid control of information revealed in the interaction, and makes it easily possible to find like-minded people. All of these factors provide an excellent answer to people who experience great difficulty in forming social relationships due to their introverted personality (Amichai-Hamburger et al., 2009).

A study done by Caplan (2007) examined the extent to which social anxiety attributed to loneliness as a predictor of preference for online social interaction and problematic Internet use. In Caplan's (2007) study, he found that socially anxious individuals may develop a preference for online social interaction because they perceive greater control over self-presentation online than they do in face-to-face encounters. The

results of the study supported the idea that social anxiety should diminish as an individual experiences greater self-presentational confidence in a communication situation. Along with these findings, Caplan found other significant results. His research suggests that social anxiety was a significant direct predictor of problematic online social interaction. His research findings also support that problematic online social interaction was a strong predictor of negative outcomes. These negative outcomes refer to problems in an individual's life as a result of his or her Internet use. Some of these problems included: missing class or work because of online activities; getting into trouble with an employer or school because of being online; and having missed social engagements because of online activities. All of these findings are significant in that they indicate that one's interpersonal communicative preferences and perceived self-presentational efficacy may play an important role in the etiology of problematic internet use. An individual's thoughts and attitudes about face-to-face and online social interaction are important mediators of the relationship between social anxiety and the negative outcomes associated with Internet use (Caplan, 2007).

Another study done by Milani, Osualdella, and Blasio (2009) examined the relationship among problematic Internet use, the quality of interpersonal relationships, and the cognitive strategies habitually used by adolescents to face daily problems. The study found that adolescents who showed signs of problematic Internet use have a lower mean quality in interpersonal relationships compared to those who do not show signs. They also found that adolescents with problematic Internet use seem to use the Internet mostly for socializing purposes rather than for reasons such as learning or collecting information. According to the study, it is precisely the social function of the Internet that

could explain the dependence on the medium. Adolescents who use the Internet with the aim of socialization are those more exposed to the development of problematic Internet use (Milani et al., 2009).

Individuals who are introverted have a hard time expressing their "real me" in face-to-face interactions, so in some cases they use services provided on the internet to express their "real-me" there (Amichai-Hamburger et al., 2009). They do this because they have a greater control over their self-presentation. However, while these individuals have the benefit of expressing their "real-me" online, some experience negative outcomes as a result. These negative outcomes include missing class, work, and social engagements in order to spend more time online (Caplan, 2007). So while there is a benefit of expressing their "real-me" online, there social relationships outside of the internet suffer as an outcome.

Coping with Social Anxiety Using MMORPGs

There are a variety of tools and services on the Internet that provide social interaction to an individual. One of the main sources used are massively multiplayer online role-playing games (MMORPGs). MMORPGs are a combination of role-playing video games (RPGs) and massively multiplayer online games in which a very large number of players interact with one another within a virtual world (Cole & Griffiths, 2007). In RPGs, the player assumes the role of a character and takes control over many of that character's actions. MMORPGs are distinguished from single-player or small multi-player online RPGs by the number of players able to interact together, and by the game's persistent world, which continues to exist and evolve while the player is offline and away from the game (Cole & Griffiths, 2007).

MMORPGs almost always have tools to facilitate communication between players (Cole & Griffiths, 2007). Many MMORPGs offer support for in-game guilds or clans. Also, most MMORPGs require some degree of teamwork for parts of the game. These tasks usually require players to take on roles in the group, such as those protecting other players from damage, healing damage done to other players, or damaging opponents (Cole & Griffiths, 2007).

In MMORPGs, the players develop avatars to represent themselves in the game (Cole & Griffiths, 2007). Avatars are characters that represent online players in the game. Avatars are able to be customized in many different ways depending on the MMORPG being played. In some MMORPGs, a player can construct a wholly customized portrait that allows for several changes to facial structure as well as hairstyles, skin tones, etc. (Cole & Griffiths, 2007). Depending on the game, an individual has a lot of freedom on how they create their avatars appearance. This aspect could be appealing to an individual who suffers from social anxiety because of his or her body image. Since they are able to choose how their avatar looks, it would be assumed that social anxiety due to body image would decrease as the individual interacted with MMORPGs.

A study done by Cole and Griffiths (2007) explored the social interactions that occur both within and outside of MMORPGs. Results indicated that the mean age of individuals who played MMORPGs was 23.6 years, with 71% of them being male. The mean number of hours spent playing per week in the study was 22.85, with the number of hours decreasing as the individual's age increased. The study also found that 76.2% of male and 74.7% of female players had made good friends within the game. This suggests that MMORPGs are highly socially interactive. Furthermore, the mean number of good

friends made within an MMORPG was seven, with males making significantly more online friends than females (Cole & Griffiths, 2007). When asked, two-fifths of participants (39.3%) said they would discuss sensitive issues with their online gaming friends that they would not discuss with their real life friends. This suggests that online relationships provide an outlet to safely discuss serious matters that may be difficult to talk about with real life family and friends. The appeal of discussing personal issues lies in the ease and anonymity with which online seekers can obtain advice and reassurance, particularly regarding sensitive topics (Cole & Griffiths, 2007).

Not only do individuals develop friendly relationships through MMORPGs, 31.3% of their participants found themselves attracted to another player (26.2% males compared to 42.3% females). This finding suggests that MMORPGs offer a safe environment for players to become emotionally involved with others. Overall, 10.1% of players developed a physical relationship with another player, indicating that online gaming can be a highly sociable activity (Cole & Griffiths, 2007).

Due to the symptoms that go along with Social Anxiety Disorder, some individuals are turning to the internet as a way of meeting their social needs (Amichai-Hamburger et al., 2009). They use the internet because it allows them to interact with others while maintaining anonymity and allowing them to choose what information they would like to disclose about themselves (Amichai-Hamburger et al., 2009). One of the main services that the internet provides for social interaction are MMORPGs (Cole and Griffiths, 2007). MMORPGs allow individuals to interact with others in a virtual world. In MMORPGs, an individual can take on roles, have a lot of freedom of how their avatar looks, and be part of a team or guild. MMORPGs allow individuals to form close

friendships and even in some cases form physical relationships (Cole and Griffiths, 2007). All of these are beneficial aspects for a person who experiences social anxiety.

Problematic Online Gaming

While MMORPGs provide benefits for individuals with social anxiety, these benefits can cause an individual to spend an excessive time online. Some individuals are able to spend an excess time online and have it not affect their daily lives, while others could have problems occur due to their excessive gaming, causing problematic use. Charlton and Danforth (2007) examined the distinction of addiction and high engagement in the context of online game playing. They discussed the six criteria needed to define a behavior as addictive: salience, euphoria, tolerance, withdrawal symptoms, conflict, and relapse and reinstatement. Salience is the domination of a person's life by the activity. Euphoria is a buzz or high that is delivered from the activity. Tolerance means that the activity has to be undertaken to a progressively greater extent to achieve the same buzz. Withdrawal symptoms occur when the cessation of the activity leads to the occurrence of unpleasant emotions or physical effects. Conflict is when the activity leads to conflict with others or self-conflict. Finally, relapse and reinstatement is the resumption of the activity with the same vigor subsequent to attempts to abstain. All of these criteria have to be met for a positive addiction diagnosis to be made (Charlton & Danforth, 2007).

High engagement in online video gaming is different than addiction in that it involves a high degree of computer usage, but this usage is non-pathological because it usually does not have negative consequences for the individual (Charlton & Danforth, 2007). It is possible that exactly the same high degree of computer use exhibited by two

people might be considered either pathological or non-pathological depending upon the impact that this has upon their lives (Charlton & Danforth, 2007).

In the study conducted by Cole and Griffiths (2007), one in five (20.3%) of their participants believed that playing MMORPGs had a negative effect on their relationships with people with whom they did not play. To support the possibility that playing MMORPGs for many hours a week has a negative effect on relationships with those who do not play the same game, a significant but weak negative correlation was found between the effect playing the game has had on relationships and the number of hours played per week (Cole & Griffiths, 2007).

A study done by Lo et al. (2005) examined whether online games were a source of social problems. They found that the heaviest users of online games in their sample had less fulfilling interpersonal relationships compared to light and non-users, and that light users had less fulfilling interpersonal relationships compared to nonusers. They also found that social anxiety increased with greater usage on online games. Although online games may temporarily soften feelings of social anxiety, they do nothing to improve real-world social relationships. The brief sense of satisfaction from playing an online game encourages overindulgence in virtual social relationships at the expense of real world friendships. Many of the online players enter a cycle of experiencing social anxiety due to poor interpersonal relationships, which leads to increased time spent online, causing further deterioration of real-world interpersonal relationships (Lo et al., 2005).

Caplan, Williams, and Yee (2009) examined problematic Internet use among people who play Massively Multiplayer Online (MMO) games and sought to determine whether aspects of the MMO experience are useful predictors of problematic Internet use.

The study sought to determine whether game-related variables could predict problematic Internet use scores after accounting for their relationships with psychosocial well-being. One of the key findings in this study was that loneliness, introversion, and addiction were significant predictors of problematic Internet use and that loneliness was the single most influential predictor in the model. The MMO games provide the participants with a source to engage in social interaction to ease their feelings of loneliness (Caplan et al., 2009).

Another study done by Hussain and Griffiths (2008) looked at the psychological and social effects of online gaming. They found that 41% of gamers played online to escape real world stressors and 7% were classified as dependent individuals who were at risk of developing psychological and behavioral dependence for online gaming. Not only do individuals use MMORPGs as a way to ease their feelings of loneliness, some individuals use them as a way to escape real world stressors, such as work or family problems. They found that dependent gamers appear to possess some core components of addiction to MMORPGs. Some of these components include feeling detached from their real life, thinking about gaming when they were not gaming, and feeling irritable when they are not gaming (Hussain & Griffiths, 2009).

A study conducted by Rehbein, Psych, Kleimann, Mediasci, and Moble (2010) examined the prevalence and risk factors of video game dependency in adolescence. Their study was conducted in Germany in 2007 and 2008. There was a controlled sample of 44,610 male and female ninth graders. Every third participant (N = 15,168) was presented with a screening instrument to measure his or her video game dependency. In the study, 3% of the male and 0.3% of the female students were diagnosed as being

dependent on video games. The data collected indicated a clear dividing line between extensive gaming and video game dependency. They found that video game dependency is accompanied by increased levels of psychological and social stress in the form of lower school achievement, increased truancy, reduced sleep time, limited leisure activities, and increased thoughts of committing suicide. This shows that individuals who have a dependency to video games have more than just problems with their social lives; their dependency can also affect their sleep and cause depressive thoughts, leading to thoughts of committing suicide (Rehbein et al., 2010).

Another study conducted by Van Rooij, Kuss, Griffiths, Shorter, Schoemakers, and Van De Maheen (2014) explored the nature of problematic video gaming and the association with game type, psychosocial health, and substance use. They had a sample of 8,478 adolescents to whom they administered scales that measured game use, game type, Video game Addiction Test (VAT; Van Rooij et al., 2012), depressive mood, negative self-esteem, loneliness, social anxiety, education performance, and use of cannabis, alcohol and nicotine. They found that problematic gaming is most common amongst adolescent gamers who play multiplayer online games. Boys (60%) were more likely to play online games than girls (14%) and problematic gamers were more likely to be boys (5%) than girls (1%). High problematic gamers showed higher scores on depressive mood, loneliness, social anxiety, negative self-esteem, and self-reported lower school performance. Nicotine, alcohol and cannabis using boys were almost twice more likely to report high problematic video gaming than non-users. This could be explained by individuals with social anxiety turning to substances to treat their symptoms. Not only are

they using online gaming to help with their social anxiety, they are also potentially using nicotine, alcohol, and cannabis to self-medicate as well (Van Rooij et al., 2012).

Loton, Borkoles, and Lubman (2015) examined the mediating role of coping between one measure of problematic video gaming and engagement, and mental health. The study had 552 adult participants with a mean age of 24.9 years; 52.3% of the sample was Australian. They completed an online survey, including the Computer Engagement/Addiction Scale, Depression, Anxiety Stress Scale and Approach/Avoidance Coping Questionnaire. They found that coping explained a significant portion of the relationship between problematic online gaming and symptoms of depression, anxiety and stress. However, even after accounting for coping, a direct relationship remained. Video game engagement, on the other hand, indicated full mediation with no direct connection to a decline in mental health, except in the case of anxiety. Less use of approach coping strategies and particularly more use of resignation and withdrawal coping strategies were related to poorer mental health. The overall finding identified maladaptive coping as a partial explanation of the relationship between problematic online gaming and poorer mental health (Loton et al., 2015).

Another study conducted by Mehroof and Griffiths (2010) examined the relationship between a number of personality traits (sensation seeking, self-control, aggression, neuroticism, state anxiety, and trait anxiety) and problematic online gaming. They used a sample of 123 university students at an East Midlands university in the United Kingdom. The gamers completed an online questionnaire, which included the Game Addiction Scale, Self-Control Scale, Buss Perry Aggression Questionnaire, Arnett Inventory of Sensation Seeking, State-Trait Anxiety Inventory for Adults and the

Eysenck Personality Questionnaire (Revised Short Scale). They found trait and state anxiety were both significantly associated with problematic online gaming scores. This suggests that both internal and external anxiety factors encourage excessive online gaming. In order to decrease anxieties, individuals may use online gaming as a coping strategy to reduce tension (Mehroof & Griffiths, 2010).

Online video game play has been shown to affect social competence as well. Kowert and Oldmeadow (2013) conducted a study that examined the extent to which online video game involvement may support, or undermine, the development and maintenance of traditional social skills. In this study, they found that more involved game players display different social profiles than their less involved counterparts. The broad game playing population exhibited linear relationships between increased involvement and greater emotional expressivity, emotional control and social hesitancy. It was found that individuals with social hesitancy choose to engage within online gaming communities more than their counterparts who do not engage in online game play (Kowert & Oldmeadow, 2013).

Are some video games associated with more life interference and psychopathology than others? A study conducted by Berle, Starcevic, Porter, and Fenech (2015) sought to compare players of MMORPGs with players of other types of video games in terms of problematic use, life interference, and levels of psychopathology. The study had a sample of 1,945 video game players who completed a series of questionnaires online. Results indicated that, while MMORPG players reported increased rates of problematic use and life interference compared with non-MMORPG players, there were no differences in levels of psychopathology. The amount of time spent playing appeared

to mediate the relationship, the type of game played, and both problematic use and life interference associated with video game use. Their findings suggest that the increased rates of problematic use and life interference reported by MMORPG players are contributed to by the increased amount of time that they play for, rather than other characteristics of the games themselves. Addressing factors that increase game playing duration might be the key to reducing problems and life interference associated with video game use. It was suggested that the multiplayer aspect of MMORPGs might increase a sense of social obligation to play or to keep playing when one otherwise would engage in other activities (Berle et al., 2015).

Another study conducted by Griffiths, Davies, and Chappell (2004) compared adolescent gamers with adult gamers to examine the differences between the two. Results indicated that the younger the player the longer the individual spent each week playing online video games. They also found that adolescent gamers were significantly more likely to be male, significantly less likely to gender swap their characters, and significantly more likely to sacrifice their education and work. The biggest difference between the two that was found was that significantly more adolescents than adults claimed their favorite aspect of playing was the violence in the game (Griffiths et al., 2004).

Another study done by Wan and Chiou (2006) investigated the conscious and unconscious psychological motivations of individuals with problematic online gaming. Data was analyzed across four realms. The data was collected using a sentence completion test and semi-structure interviews. The realms included: surface motivations, source motivations, self-conception, and interpersonal relationships in real life. Most of

the subjects reported that playing online games was the focus of their life. Some of the participants noted that, without online games, life would become “dark” and “bored.” Most of the subjects in the study showed strong interest in the role-playing aspect of online games, in which they often do things that they dare not to do in real life. Many people who experience problematic internet use might attempt to escape from the limitations brought by real life in order to obtain the space for survival and security. In online games, the players might be pursuing the satisfaction of achievement and power on the surface; however, in real life, they are not able to face these challenges, hence leading to contradictions between their surface motivations and source motivations (Wan & Chiou, 2006).

Individuals with social anxiety experience a wide variety of symptoms with some being: fear of negative evaluation when in certain social situations; a fear of being judged as anxious, weak, crazy, stupid, intimidating, or unlikable; and fearing that they will act or appear in a specific way that might show their anxiety symptoms (APA, 2013). Many individuals with social anxiety have poor interpersonal communication skills, making it harder for them to interact in face-to-face social situations (Clark & Arkowitz, 1975). Some individuals use various forms of coping mechanisms to deal with their social anxiety (Stein & Stein, 2008). One way that individuals are coping with their social anxiety is by using the internet to have social interactions (Amichai-Hamburger et at., 2009). Since the internet provides a place to have social interactions with anonymity and greater control over self-presentation, individuals that have introverted personalities are using it more to feel comfortable expressing themselves (Caplan et al., 2009). Main sources of social interaction on the internet are online video games, specifically

MMORPGs (Cole & Griffiths, 2007). These games allow an individual to interact with other individuals in a virtual world, using avatars that they create. They are able to take on roles and accomplish tasks in the virtual world with others (Cole & Griffiths, 2007). Many individuals with social anxiety are turning to MMORPGs in order to have social interactions with others, without the fear of face-to-face ridicule or judgement (Lo et al., 2005). While MMORPGs are a great way for individuals to interact with each other, some individuals spend an excess amount of time playing them that they develop problematic online gaming. Individuals are spending an excess time playing MMORPGs that they are having less fulfilling interpersonal communication with others compared to those who do not have problematic online gaming (Lo et al., 2005). They also attempt to escape real world struggles by playing MMORPGs (Wan & Chiou, 2006). Even though MMORPGs are a great source of communication, some individuals with social anxiety are using them in an unhealthy way to cope with their symptoms (Wan & Chiou, 2006).

The Present Study

The connection between online video gaming, social anxiety, interpersonal skills, and introversion is still an area which requires more research to be conducted. While there are a variety of articles examining the effects of excessive online video game use, the studies examine various mental disorders and a majority of them have findings that are significant, yet still slightly weak. This study will help build on the research that suggests that individuals who play an excess of online video games have an increase in social anxiety symptoms and a decrease in interpersonal skills.

As previously stated, individuals with social anxiety disorder turn to various substances and activities to cope with their symptoms. It has been suggested that some

individuals are turning to online video games in order to cope with their symptoms. These individuals are turning to online video games because of the social interaction provided in them while also having the ability to remain anonymous. Individuals with social anxiety disorder also believe that they have poor interpersonal communication skills. Online video games allow individuals to be less critical of their interpersonal skills by promoting anonymity and using an avatar to represent themselves. Finally, it has been shown that individuals who spend an increased amount of time playing online video games are more likely to have introvert personality traits.

It is hypothesized that time spent engaging in online gaming, high levels of introvert personality traits, and low levels of interpersonal communication skills are predictors of an individual's likelihood of experiencing symptoms of social anxiety.

Method

Participants

Participants, who were at least 18 years old, were recruited through *Amazon Mechanical Turk,* a crowdsourcing Internet marketplace. *Mechanical Turk* is a platform that allows individuals and businesses to coordinate the use of human intelligence to perform various tasks. Requestors are able to post jobs known as Human Intelligence Tasks, such as choosing the best among several photographs of a storefront, writing product descriptions, or taking surveys. Workers can then browse among existing jobs and complete these in exchange for a monetary payment set by the requestor. All participants received a $2.00 compensation for their participation. The sample was collected during June of 2016.

Participants included 131 *Amazon Mechanical Turk* workers, consisting of 84 males (64%) and 47 females (36%). This sample had more males relative to the US 2015 census of 49.2% males and 50.8% females. Three participants were removed from the data set, due to leaving a majority of the responses blank. Therefore, these three participants were excluded from the data for a final *N* of 128 (82 males and 46 females).

The mean age of the final sample was 30.65 years (*SD* = 7.08), with the median age being 29 years. The overall sample of participants mostly self-identified as Caucasian (*n* = 79; 61.7%; see Table 1).

Table 1

Ethnicity – Total Sample, N=128

Ethnicity	Number Selecting	Percent	US Percent*
Asian	14	10.9%	5.6%
Black or African American	15	11.7%	12.6%
Hispanic or Latino	12	9.4%	17.6%
Two or more races	7	5.5%	2.9%
White or Caucasian	79	61.7%	77.1%
Declined to Answer	1	0.8%	

Note. *Adapted from U.S. Census Bureau. (2015, July 1). *United States Quickfacts.* Retrieved July 7, 2016, from http://quickfacts.census.gov

All but one of the sample indicated that the United States of America was their country of origin (*n* = 127; 99.2%). Jamaica was listed as the country of origin for one participant.

All participants indicated that they were native English speakers (*n* = 128; 100%). The majority of the sample reported that they were college graduates with a Bachelor's degree (*n* = 50; 39.1%; see Table 2).

Table 2

Education – Total Sample, N = 128

Education	Number Selecting	Percent
High School Diploma	24	18.6%
Some College	27	21.1%
Associates Degree	12	9.4%
Bachelor's Degree	50	39.1%
Graduate Degree	10	7.8%
Other	5	3.9%

The majority of the sample reported that they play single-player video games (*n* = 111; 86.7%; see Table 3).

Table 3

Type of Video Games Played – Total Sample, N = 128

Type of Video Game Played	Number Selecting	Percent
Single Player Game	111	86.7%
Offline Multiplayer Video Game	32	25.0%
Online Multiplayer Video Game	99	77.3%
Role Playing Game (RPG)	77	60.2%
Massively Multiplayer Online Role Playing Game (MMORPG)	47	36.7%
Mobile Game	72	56.3%
Social Networking Game	20	15.6%
Other	7	5.5%

Note. Participants had the option to select more than one type of video game; therefore, percentages will add up to greater than 100.

Measures

Participants were asked to complete a randomly ordered sequence of self-report questionnaires, including a measure on interpersonal communication skills, a questionnaire measuring problematic online gaming, a measure on social anxiety, and a questionnaire measuring introversion. They were also asked to complete demographic information, which was presented after the questionnaires. Questionnaires were administered through Qualtrics, a website which allows researchers to upload assessments to the internet.

The two-page demographic questionnaire (see Appendix A) covered information about age, gender, ethnicity, country of origin, native language, education level, types of video games played, names of the three most common video games played, hours spent playing video games in a typical week, and hours spent playing MMORPGs in a typical week. An option of "other" was provided for the gender and ethnicity categories.

The Interpersonal Communication Inventory (ICI) is a questionnaire developed for this study to measure an individual's interpersonal communication skills (see Appendix B). The questionnaire consists of seven Likert Scale items in which an individual rates his or her communication skills with others (e.g., "I can detect the mood of others by looking at them as we converse"). Response options ranged from 1 (*Never*) to 5 (*Always*). Scores on the ICI can range from 7 to 35. High scores indicate good interpersonal communication skills. Cronbach's alpha for the ICI items was .85. Previous research has found significant relationships between interpersonal communication skills and social anxiety, as well as introversion personality traits (Clark & Arkowitz, 1975). In the current study there was a -.41 correlation between the Interpersonal Communication Scale and the Liebowitz Social Anxiety Scale. This score indicates that as interpersonal communication skills decrease in an individual, social anxiety increases. There was a .40 correlation between the Interpersonal Communication Inventory and the Eysenck Personality Inventory. This score indicates that as interpersonal communication skills decreases, an individual's introversion personality traits increase. Both of these correlations suggest a high degree of validity for the ICI.

The Liebowitz Social Anxiety Scale (LSAS; Liebowitz, 1987) assesses the range of social interaction and performance situations feared by individuals, in order to identify

the magnitude of their social anxiety (see Appendix C). The LSAS is a 24-item scale divided into two subscales. Amongst the questions, 13 of them inquire about performance anxiety and 11 relate to social situations (e.g., "Telephoning in public"). Participants are asked to rate both their fear and avoidance for all situations, with fear responses ranging from 0 (*None*) to 3 (*Severe*) and avoidance responses ranging from 0 (*Never*) to 3 (*Usually*). Scores on the LSAS can range from 0 to 144, with high scores indicating Social Anxiety Disorder. A study done by Mennin et al. (2002) examined the effectiveness of the LSAS as well as the optimal cutoff values for the LSAS and subscale scores for the diagnosis of social anxiety disorder. The study was conducted on 398 participants, 364 of whom were previously diagnosed with social anxiety disorder. All of the participants were given the assessment by an independent assessor. The area under the curve (AUC), which provides a summary index of a test's ability to correctly classify individuals, was .98 and was significant versus chance. The vast majority (93.28%) of patients with social anxiety disorder were correctly identified, and only 5.88% of persons without social anxiety disorder were misclassified with a LSAS score of 30 (Mennin et al., 2002). Cronbach's alpha for the LSAS items was .97.

The Problematic Online Gaming Questionnaire (POGQ; see Appendix D; Demetrovics et al., 2012) is a scale that measures the problematic nature of gaming that an individual might be experiencing. The scale consists of 18-items (e.g., "How often do you daydream about gaming?"), two items measuring preoccupation, three items measuring overuse, four items measuring immersion, three items measuring social isolation, two items measuring interpersonal conflicts, and four items measuring withdrawal. Response options range from 1 (*Never*) to 5 (*Always*). Scores on the POGQ

can range from 18 to 90, with scores of 65 and higher indicating problematic online gaming. A study done by Demetrovics et al. (2012) found that the POGQ seems to be an adequate measurement tool for the differentiated assessment of gaming related problems on six subscales. An exploratory factor analysis (EFA) revealed a six-factor structure in the background of problematic online gaming that was also supported by a confirmatory factor analysis (CFA). For the assessment of the identified six dimensions the 18-item POGQ proved to be exceedingly suitable (Demetrovics et al., 2012). Cronbach's alpha for the POGQ items was .94.

The Eysenck Personality Inventory (EPI; Eysenck & Eyesenck, 1965) is a self-report instrument designed to measure two central dimensions of personality, extraversion and neuroticism (see Appendix E). The instrument is comprised of 57 yes/no items (e.g., "Are you usually carefree?") and yields total scores for extraversion and neuroticism, as well as a validity score. For the purposes of this study, only items concerning extroversion (24 items) and lie items (9 items) were included, resulting in 33 total questions on the EPI-Extraversion (EPI-E). Persons high in extraversion are seen as social, carefree, and optimistic, while persons with low scores are generally quiet, introspective, and reserved. Items are scored either 0 (*No*) or 1 (*Yes*) on the extroversion items. The score can range from 0 to 24, with lower scores indicating a person with introverted personality traits and higher scores indicating a person with extroverted personality traits. Cronbach's alpha for the extroversion items was .85.

Procedure

Prior to the study, Institutional Review Board (IRB) approval was obtained (see Appendix F). Participants participated online via personal computer; they were electronically given an informed consent form prior to testing (see Appendix H). These individuals were informed about confidentiality policies, the procedure of the study, and that they could discontinue the study at any time. Next, the participants completed a randomly ordered battery of self-report measures, including the ICI, the POGQ, the LSAS, and the EPI-E. Finally they responded to demographic questions. Once the battery of self-report measures was completed the participants received a code to enter into *Amazon Mechanical Turk* to receive their $2.00 compensation. The participants also received a debriefing statement about the purpose of the study (see Appendix I). All participants were approved for the $2.00 compensation, regardless of questionnaire completion.

The researcher was a Clinical Psychology graduate student who had read the directions on how to administer and score the assessments, and had practiced giving the assessments. Participants completed each assessment remotely through the internet, so the environment in which they answered the questions was unknown. It took the participants an average of 21.45 minutes to complete the questionnaire. Missing values were replaced by the mean scores of the questionnaire for which the data was missing.

Results

Descriptive Statistics

In order to identify typical performance and the range in performance, means and standard deviations were calculated for all measures (See Table 4).

Table 4

Descriptive Statistics for Measures – Total Sample, N = 128

Variable	*n*	*M(SD)*	95%CI	Range	Potential Range
ICI	128	21.60 (4.06)	[20.90, 22.30]	10-30	7-35
LSAS	128	46.70 (29.73)	[41.55, 51.85]	0-125	0-144
POGQ	128	40.21 (12.42)	[38.06, 42.36]	19-75	18-90
EPI-E	128	9.06 (5.14)	[8.17, 9.95]	1-21	0-24

Note. CI = confidence interval; ICI = Interpersonal Communication Inventory; POGQ = Problematic Online Gaming Questionnaire; LSAS = Liebowitz Social Anxiety Scale; EPI-E = Eysenck Personality Inventory-Extraversion Scale Only.

The total sample indicated that they play some form of video game (*n* = 128; 100%). The majority of the sample reported that they play single-player video games (*n* = 111; 86.7%; see Table 3). Participants who played MMORPGs, played an average of 7.55 hours per week (SD = 8.71), with a range of .5 hours to 40 hours. Six participants played greater than or equal to 25 hours per week.

Of the six participants who played greater than or equal to 25 hours of MMORPGs per week, two were probable for having a Social Anxiety Disorder and one was highly probable.

Of the total sample, three participants met the cutoff for having problematic online gaming. All three participants also scored as being very probable for having Social

Anxiety Disorder. Of the three participants, one played 15 hours of video games per week, including 10 hours of MMORPGs per week; another played 28 hours of video games per week with no MMORPG play per week; the third participant played 20 hours of video games per week, including one hour of MMORPG play per week.

Correlations

A Pearson Product-Moment Correlation Coefficient matrix was calculated. Significant correlations were noted among: LSAS and ICI; LSAS and POGQ; LSAS and EPI-E; POGQ and MMORPG Time; and ICI and EPI-E (see Table 5). There was no significant correlations ($r = .04$, $p = .67$) between time spent playing MMORPGs and an individual's social anxiety symptoms. There were no significant correlations between ICI and POGQ; ICI and MMORPG Time; POGQ and EPI-E; and EPI-E and MMORPG time

Table 5

Pearson's Correlation Coefficients for the Parameters Studied – Total Sample, N = 128

Measure	1	2	3	4	5
1. LSAS	–				
2. ICI	-.41**	–			
3. POGQ	.41**	-.10	–		
4. EPI-E	-.50**	.40**	.04	–	
5. MMORPG Time	.04	-.09	.20*	-.02	–

**Correlation is significant at the 0.01 level (2-tailed).
*Correlation is significant at the 0.05 level (2-tailed).
Note. ICI = Interpersonal Communication Inventory; POGQ = Problematic Online Gaming Questionnaire; LSAS = Liebowitz Social Anxiety Scale; EPI-E = Eysenck Personality Inventory-Extraversion Scale Only; MMORPG = Massively Multiplayer Online Role Playing Game.

Multiple Regression

A multiple regression was conducted to see if time spent engaging in online gaming, high levels of introvert personality traits, and low levels of interpersonal communication skills were predictors of an individual's likelihood of experiencing symptoms of social anxiety.

The analysis showed that ICI, Beta = -1.450, t(127) = -2.738, $p < .01$; POGQ, Beta = .996, t(127) = 6.170, $p < .01$; and EPI-E, Beta = -2.561, t(127) = -6.159, $p < .01$, significantly predict LSAS scores. However, MMORPG Time, Beta = -.301, t(127) = -1.043, ns; did not significantly predict LSAS scores (see Table 6).

Table 6

Results of the Multiple Regression Analysis Predicting Social Anxiety from Introversion, Interpersonal Communication, Problematic Online Gaming and Time Spent Playing MMORPGs

ANOVA

Model	Sum of Squares	df	Mean Square	F	Sig.
Regression	52750.128	4	13187.532	27.276	.000
Residual	59468.990	123	483.488		
Total	112219.117	127			

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
EPI-E	.504	.254	.248	25.772
ICI	.553	.306	.295	24.962
POGQ	.682	.465	.452	21.996
MMORPG Time	.686	.470	.453	21.988

Coefficients

	Unstandardized Coefficients		Standardized Coefficients		
Model	B	Std. Error	Beta	t	Sig.
(Constant)	62.168	12.977		4.791	.000
EPI-E	-2.561	.416	-.443	-6.159	.000
ICI	-1.450	.530	-.198	-2.738	.007
POGQ	.996	.161	.416	6.170	.000
MMORPG Time	-.304	.291	-.070	-1.043	.299

Note. df = Degrees of freedom; Sig. = Significance. Std. Error = Standard Error; ICI = Interpersonal Communication Inventory; POGQ = Problematic Online Gaming Questionnaire; LSAS = Liebowitz Social Anxiety Scale; EPI-E = Eysenck Personality Inventory-Extroversion; MMORPG = Massively Multiplayer Online Role Playing Game.

Discussion

This study sought to understand the relationships between time spent playing MMORPGs, a specific type of online video game, with interpersonal skills, introversion, and social anxiety. Previous research has shown that individuals who spend more time playing online video games were more likely to have higher social anxiety and a decrease in interpersonal communication skills, compared to those who spend less time playing online video games or do not play online video games at all (Lo et al., 2005). In contrast to previous research, the data from this study did not support the hypothesis that time spent playing MMORPGs is a predictor of social anxiety symptoms. A possible explanation might be that excessive time does not equate to addiction. An individual might be able to play MMORPGs for long periods of time, but still retain a good social, family, and work life. On the other hand, it is important to note that only six participants stated that they played greater than or equal to 25 hours of MMORPGs during an average week, with the highest number of hours played being 40.

While no significant relationship was found between time spent playing online video games or MMORPGs and severity of social anxiety, positive correlations were found between problematic online gaming and social anxiety. This finding was consistent with previous research (Lo et al., 2005). Thus, as an individual's degree of problematic online gaming increases, so does his or her likelihood of experiencing social anxiety symptoms. Simple time did not but a constellation of behaviors did predict social anxiety. If Internet Gaming Disorder becomes a recognized disorder then clinicians would be wise to be broader than time spent gaming in their identification of problem behaviors.

Significant relationships were also noted among social anxiety symptoms, interpersonal communication skills, and introversion. These findings suggest that, as a person's social anxiety symptoms increase, his or her interpersonal communication skills decrease. The findings also suggest that, as an individual's introversion increases, his or her level of social anxiety symptoms also increases. It seems logical that this constellation would occur in association with gaming behaviors, at least based on stereotypes. The exact nature of the relationship and moderating variables is yet to be established.

As of now Internet Gaming Disorder is listed in the DSM-5 under the section "conditions for further study." This research has the potential to be timely if this disorder is adopted in the next edition of the DSM. Clinicians are always looking for new techniques to benefit their clients. This research could suggest that treating social anxiety and training interpersonal communication skills, could be beneficial for an individual suffering from Internet Gaming Disorder. If the client learns good interpersonal communication skills and feels less anxious in social settings, he or she might be more likely to not rely on online video games as a source of social interaction.

One limitation of this study was that there was a small sample size of individuals who played MMORPGs excessively. This small sample size could contribute to the lack of a significant relationship between time spent playing online video games and social anxiety. Another limitation of the study was that time spent playing MMORPGs was the only type of online game that was analyzed in terms of duration of time spent playing per week. It would have been useful to examine the variable of how much time a person spent playing online video games overall, not just MMORPGs.

In the future, it will be useful for research to examine the relationship between MMORPGs and social anxiety with a larger sample of MMORPG players. It would also be useful for a study to examine how online gaming as a whole affects social anxiety and not just MMORPGs. Finally, it would be interesting to examine if there are any benefits of integrating social anxiety and interpersonal communication skills treatment with the treatment of Internet Gaming Disorder.

Overall, the study had significant findings. While time spent playing MMORPGs was not a significant predictor of social anxiety, problematic use of online gaming was. The findings also suggest that MMORPGs are not the only type of video game that leads to problematic use. Of the three participants who scored high on the Problematic Gaming Questionnaire, only two of them played MMORPGs and the two who did play reported that they played other types of video games as well. This indicates that overall gaming needs to be examined when discussing problematic use, not just MMORPGs. Finally, it will be beneficial to examine these results when treating a patient with Internet Gaming Disorder, because there was a strong correlation among problematic online gaming, social anxiety, and interpersonal skills.

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Appendix A: Demographics

What is your age?

With what gender to you identify?

Male	Female	Other

With what racial or ethnic background do you identify?

American Indian or Alaska Native	Two or more races
Asian	White or Caucasian
Black or African American	Other
Hispanic or Latino	Decline to answer
Native Hawaiian or Other Pacific Islander	

What is your country of origin?

Are you a native English speaker?

Yes	No

What is your highest level of education?

Now I would like you to complete some questions on video game play. For the purpose of this study please refer to the following definitions:

Video game - a **game played by electronically** manipulating images produced by a computer program on a television screen or other display screen. **This category includes all of the following types.**

Single-player video game - a video game where input from **only one player** is expected throughout the course of the gaming session.

Offline multiplayer video game - a video game in which **more than one person can play in the same game environment** at the same time, where the individuals are in the same location playing the video game.

Online multiplayer video game - a video game in which **more than one person** can play in the same game environment at the same time, where the individuals are **playing from separate locations** via the internet.

Mobile game - a video game played on a feature **phone, smartphone, smartwatch, tablet, portable media player or calculator**.

Social network game - a type of online game that is played through **social networks**, such as Facebook.

Massively Multiplayer Online Role Playing Game (MMORPG) - an online role-playing video game in which **a very large number of people participate simultaneously**.

Other Role Playing Games (RPGs) - a genre of video game where the gamer controls a **fictional character (or characters) that undertakes a quest** in an imaginary world. For this choice, please exclude MMORPGs that you may participate in.

Other video games - video games that you participate in that are **not listed among these choices**.

What types of video games do you play? (Choose all that apply)

Single-Player Video Game	Offline Multi-Player Video Game
Online Multiplayer Video Game	Mobile Game
Social Network Game	MMORPG
RPG	Other

List the names of the top three video games you spend the most time playing in a typical week. Please put '0' in the spaces not used if you play less than three video games.

1.)
2.)
3.)

In a typical week, about how much time do you spend playing video games?

Hours____	Minutes____

In a typical week, about how much time do you spend playing MMORPGs?

Hours____	Minutes____

Is there anything else you would like to mention about your video game use? If not, please type in 'no.'

Appendix B: Interpersonal Communication Inventory

Rate yourself on the following six statements as they relate to the last 2 weeks of your life:

I can detect the mood of others by looking at them as we converse.

Never	Rarely	Sometimes	Often	Always

I can tell when someone doesn't understand what I'm saying.

Never	Rarely	Sometimes	Often	Always

I manage to express my ideas clearly.

Never	Rarely	Sometimes	Often	Always

I am completely at ease when a conversation shifts to the topic of feelings.

Never	Rarely	Sometimes	Often	Always

When talking to people, I pay attention to their body language.

Never	Rarely	Sometimes	Often	Always

When I answer this item I will choose the choice 'Always.' Select 'Always' for this item.

Never	Rarely	Sometimes	Often	Always

I have great interpersonal communication skills.

Never	Rarely	Sometimes	Often	Always

Appendix C: Problematic Online Gaming Questionnaire

Please read the statements below regarding *online gaming.* The Questionnaire REFERS TO ONLINE GAMES exclusively, but we use the expression 'game' in each statement for simplicity's sake.

Please indicate on the scale from 1 to 5 to what extent, and how often, these statements apply to you!

1. When you are not gaming, how often do you think about playing a game or think about how would it feel to play at the moment?				
Never **1**	**Seldom** **2**	**Occasionally** **3**	**Often** **4**	**Always** **5**
2. How often do you play longer than originally planned?				
Never **1**	**Seldom** **2**	**Occasionally** **3**	**Often** **4**	**Always** **5**
3. When you are not gaming, how often do you think about playing a game or think about how would it feel to play at the moment?				
Never **1**	**Seldom** **2**	**Occasionally** **3**	**Often** **4**	**Always** **5**
4. How often do you feel depressed or irritable when not gaming only for these feelings to disappear when you start playing?				
Never **1**	**Seldom** **2**	**Occasionally** **3**	**Often** **4**	**Always** **5**
5. How often do you feel that you should reduce the amount of time you spend gaming?				
Never **1**	**Seldom** **2**	**Occasionally** **3**	**Often** **4**	**Always** **5**
6. How often do the people around you complain that you are gaming too much?				
Never **1**	**Seldom** **2**	**Occasionally** **3**	**Often** **4**	**Always** **5**
7. How often do you fail to meet up with a friend because you were gaming?				
Never **1**	**Seldom** **2**	**Occasionally** **3**	**Often** **4**	**Always** **5**
8. How often do you daydream about gaming?				
Never **1**	**Seldom** **2**	**Occasionally** **3**	**Often** **4**	**Always** **5**
9. When I answer this item I will choose the choice 'Often.' Select 'Often' for this item.				
Never **1**	**Seldom** **2**	**Occasionally** **3**	**Often** **4**	**Always** **5**
10. How often do you lose track of time when gaming?				
Never **1**	**Seldom** **2**	**Occasionally** **3**	**Often** **4**	**Always** **5**
11. How often do you get irritable, restless or anxious when you cannot play games as much as you want?				
Never **1**	**Seldom** **2**	**Occasionally** **3**	**Often** **4**	**Always** **5**
12. How often do you unsuccessfully try to reduce the time you spend on gaming?				
Never **1**	**Seldom** **2**	**Occasionally** **3**	**Often** **4**	**Always** **5**
13. How often do you argue with your parents and/or your partner because of gaming?				
Never **1**	**Seldom** **2**	**Occasionally** **3**	**Often** **4**	**Always** **5**

14. How often do you neglect other activities because you would rather game?				
Never **1**	**Seldom** **2**	**Occasionally** **3**	**Often** **4**	**Always** **5**
15. How often do you feel time stops while gaming?				
Never **1**	**Seldom** **2**	**Occasionally** **3**	**Often** **4**	**Always** **5**
16. How often do you get restless or irritable if you are unable to play games for a few days?				
Never **1**	**Seldom** **2**	**Occasionally** **3**	**Often** **4**	**Always** **5**
17. When I answer this item I will choose the choice 'Often.' Select 'Often' for this item.				
Never **1**	**Seldom** **2**	**Occasionally** **3**	**Often** **4**	**Always** **5**
18. How often do you feel that gaming causes problems for you in your life?				
Never **1**	**Seldom** **2**	**Occasionally** **3**	**Often** **4**	**Always** **5**
19. How often do you choose gaming over going out with someone?				
Never **1**	**Seldom** **2**	**Occasionally** **3**	**Often** **4**	**Always** **5**
20. How often are you so immersed in gaming that you forget to eat?				
Never **1**	**Seldom** **2**	**Occasionally** **3**	**Often** **4**	**Always** **5**
21. How often do you get irritable or upset when you cannot play?				
Never **1**	**Seldom** **2**	**Occasionally** **3**	**Often** **4**	**Always** **5**

Appendix D: Liebowitz Social Anxiety Scale

This measure assesses the way that social phobia plays a role in your life across a variety of situations. Please base your ratings on the way that **the situations** have affected you **in the last week**.

Read each situation carefully and answer **two questions** about that situation.

1. The first question asks how **anxious or fearful** you feel in the situation.
2. The second question asks **how often you avoid** the situation.

If you come across a situation that you ordinarily do not experience, imagine "what if you were faced with that situation," and then, rate the degree to which you would fear this hypothetical situation and how often you would tend to avoid it.

1. Telephoning in public.				
Fear or Anxiety:	0-None	1-Mild	2-Moderate	3-Severe
Avoidance:	0-Never (0%)	1-Occasionally (1-33%)	2-Often (33-67%)	3-Usually (67-100%)
2. Participating in small groups.				
Fear or Anxiety:	0-None	1-Mild	2-Moderate	3-Severe
Avoidance:	0-Never (0%)	1-Occasionally (1-33%)	2-Often (33-67%)	3-Usually (67-100%)
3. Eating in public places				
Fear or Anxiety:	0-None	1-Mild	2-Moderate	3-Severe
Avoidance:	0-Never (0%)	1-Occasionally (1-33%)	2-Often (33-67%)	3-Usually (67-100%)
4. Drinking with others in public places.				
Fear or Anxiety:	0-None	1-Mild	2-Moderate	3-Severe
Avoidance:	0-Never (0%)	1-Occasionally (1-33%)	2-Often (33-67%)	3-Usually (67-100%)
5. Talking to people in authority.				
Fear or Anxiety:	0-None	1-Mild	2-Moderate	3-Severe
Avoidance:	0-Never (0%)	1-Occasionally (1-33%)	2-Often (33-67%)	3-Usually (67-100%)
6. Choose options '3-Severe' and '2-Often' for this item.				
Fear or Anxiety:	0-None	1-Mild	2-Moderate	3-Severe
Avoidance:	0-Never (0%)	1-Occasionally (1-33%)	2-Often (33-67%)	3-Usually (67-100%)
7. Acting, performing or giving a talk in front of an audience.				
Fear or Anxiety:	0-None	1-Mild	2-Moderate	3-Severe
Avoidance:	0-Never (0%)	1-Occasionally (1-33%)	2-Often (33-67%)	3-Usually (67-100%)

8. Going to a party.				
Fear or Anxiety:	0-None	1-Mild	2-Moderate	3-Severe
Avoidance:	0-Never (0%)	1-Occasionally (1-33%)	2-Often (33-67%)	3-Usually (67-100%)
9. Working while being observed.				
Fear or Anxiety:	0-None	1-Mild	2-Moderate	3-Severe
Avoidance:	0-Never (0%)	1-Occasionally (1-33%)	2-Often (33-67%)	3-Usually (67-100%)
10. Writing while being observed.				
Fear or Anxiety:	0-None	1-Mild	2-Moderate	3-Severe
Avoidance:	0-Never (0%)	1-Occasionally (1-33%)	2-Often (33-67%)	3-Usually (67-100%)
11. Calling someone you don't know very well.				
Fear or Anxiety:	0-None	1-Mild	2-Moderate	3-Severe
Avoidance:	0-Never (0%)	1-Occasionally (1-33%)	2-Often (33-67%)	3-Usually (67-100%)
12. Talking with people you don't know very well.				
Fear or Anxiety:	0-None	1-Mild	2-Moderate	3-Severe
Avoidance:	0-Never (0%)	1-Occasionally (1-33%)	2-Often (33-67%)	3-Usually (67-100%)
13. Meeting strangers.				
Fear or Anxiety:	0-None	1-Mild	2-Moderate	3-Severe
Avoidance:	0-Never (0%)	1-Occasionally (1-33%)	2-Often (33-67%)	3-Usually (67-100%)
14. Urinating in a public bathroom.				
Fear or Anxiety:	0-None	1-Mild	2-Moderate	3-Severe
Avoidance:	0-Never (0%)	1-Occasionally (1-33%)	2-Often (33-67%)	3-Usually (67-100%)
15. Entering a room when others are already seated.				
Fear or Anxiety:	0-None	1-Mild	2-Moderate	3-Severe
Avoidance:	0-Never (0%)	1-Occasionally (1-33%)	2-Often (33-67%)	3-Usually (67-100%)
16. Being the center of attention.				
Fear or Anxiety:	0-None	1-Mild	2-Moderate	3-Severe
Avoidance:	0-Never (0%)	1-Occasionally (1-33%)	2-Often (33-67%)	3-Usually (67-100%)
17. Speaking up at a meeting.				
Fear or Anxiety:	0-None	1-Mild	2-Moderate	3-Severe
Avoidance:	0-Never (0%)	1-Occasionally (1-33%)	2-Often (33-67%)	3-Usually (67-100%)

18. Taking a test.				
Fear or Anxiety:	0-None	1-Mild	2-Moderate	3-Severe
Avoidance:	0-Never (0%)	1-Occasionally (1-33%)	2-Often (33-67%)	3-Usually (67-100%)
19. Expressing a disagreement or disapproval to people you don't know very well.				
Fear or Anxiety:	0-None	1-Mild	2-Moderate	3-Severe
Avoidance:	0-Never (0%)	1-Occasionally (1-33%)	2-Often (33-67%)	3-Usually (67-100%)
20. Looking at people you don't know very well in the eyes.				
Fear or Anxiety:	0-None	1-Mild	2-Moderate	3-Severe
Avoidance:	0-Never (0%)	1-Occasionally (1-33%)	2-Often (33-67%)	3-Usually (67-100%)
21. Giving a report to a group.				
Fear or Anxiety:	0-None	1-Mild	2-Moderate	3-Severe
Avoidance:	0-Never (0%)	1-Occasionally (1-33%)	2-Often (33-67%)	3-Usually (67-100%)
22. Trying to pick up someone.				
Fear or Anxiety:	0-None	1-Mild	2-Moderate	3-Severe
Avoidance:	0-Never (0%)	1-Occasionally (1-33%)	2-Often (33-67%)	3-Usually (67-100%)
23. Choose options '1-Mild' and '3-Usually' for this item.				
Fear or Anxiety:	0-None	1-Mild	2-Moderate	3-Severe
Avoidance:	0-Never (0%)	1-Occasionally (1-33%)	2-Often (33-67%)	3-Usually (67-100%)
24. Returning goods to a store.				
Fear or Anxiety:	0-None	1-Mild	2-Moderate	3-Severe
Avoidance:	0-Never (0%)	1-Occasionally (1-33%)	2-Often (33-67%)	3-Usually (67-100%)
25. Giving a party.				
Fear or Anxiety:	0-None	1-Mild	2-Moderate	3-Severe
Avoidance:	0-Never (0%)	1-Occasionally (1-33%)	2-Often (33-67%)	3-Usually (67-100%)
26. Resisting a high pressure salesperson.				
Fear or Anxiety:	0-None	1-Mild	2-Moderate	3-Severe
Avoidance:	0-Never (0%)	1-Occasionally (1-33%)	2-Often (33-67%)	3-Usually (67-100%)

Appendix E: Eysenck Personality Inventory

Here are some questions regarding the way you behave, feel and act. Try to decide whether YES or NO represents your usual way of acting or feeling. Then check either YES or NO. Work quickly, and don't spend too much time over any question, we want your first reaction, not a long drawn-out thought process. The whole questionnaire shouldn't take more than a few minutes. Be sure not to omit any questions. Start now, work quickly and remember to answer every question. There are no right or wrong answers, and this isn't a test of intelligence or ability, but simply a measure of the way you behave.

1. Do you often long for excitement?	
Yes____	**NO____**
2. Are you usually carefree?	
Yes____	**NO____**
3. Do you stop and think things over before doing anything?	
Yes____	**NO____**
4. If you say you will do something do you always keep your promise, no matter how inconvenient it might be to do so?	
Yes____	**NO____**
5. Do you generally do and say things quickly without stopping to think?	
Yes____	**NO____**
6. Would you do almost anything for a dare?	
Yes____	**NO____**
7. Once in a while do you lose your temper and get angry?	
Yes____	**NO____**
8. Do you often do things on the spur of the moment?	
Yes____	**NO____**
9. Generally do you prefer reading to meeting people?	
Yes____	**NO____**
10. Do you like going out a lot?	
Yes____	**NO____**
11. Do you occasionally have thoughts and ideas that you would not like other people to know about?	
Yes____	**NO____**
12. Choose 'No' for this item.	
Yes____	**NO____**
13. Do you prefer to have few but special friends?	
Yes____	**NO____**
14. When people shout at you do you shout back?	
Yes____	**NO____**
15. Are all your habits good and desirable ones?	
Yes____	**NO____**
16. Can you usually let yourself go and enjoy yourself a lot at a lively party?	
Yes____	**NO____**
17. Do other people think of you as being very lively?	
Yes____	**NO____**
18. Are you mostly quiet when you are with other people?	
Yes____	**NO____**
19. Do you sometimes gossip?	
Yes____	**NO____**

20. If there is something you want to know about, would you rather look it up in a book than talk to someone about it?	
Yes____	**NO____**
21. Do you like the kind of work that you need to pay close attention to?	
Yes____	**NO____**
22. Would you always declare everything at customs, even if you knew you could never be found out?	
Yes____	**NO____**
23. Do you hate being with a crowd who play jokes on one another?	
Yes____	**NO____**
24. Do you like doing things in which you have to act quickly?	
Yes____	**NO____**
25. Are you slow and unhurried in the way you move?	
Yes____	**NO____**
26. Have you ever been late for an appointment or work?	
Yes____	**NO____**
27. Do you like talking to people so much that you never miss a chance of talking to a stranger?	
Yes____	**NO____**
28. Would you be very unhappy if you could not see lots of people most of the time?	
Yes____	**NO____**
29. Choose 'Yes' for this item.	
Yes____	**NO____**
30. Of all the people you know, are there some whom you definitely do not like?	
Yes____	**NO____**
31. Would you say that you were fairly self-confident?	
Yes____	**NO____**
32. Do you find it hard to really enjoy yourself at a lively party?	
Yes____	**NO____**
33. Can you easily get some life into a dull party?	
Yes____	**NO____**
34. Do you sometimes talk about things you know nothing about?	
Yes____	**NO____**
35. Do you like playing pranks on others?	
Yes____	**NO____**

Appendix F: IRB Approval

INSTITUTIONAL REVIEW BOARD OFFICE OF RESEARCH INTEGRITY

DATE: June 13, 2016

TO: James Bender
FROM: Western Kentucky University (WKU) IRB

PROJECT TITLE: [921379-1] Duration of time spent playing online video games, interpersonal skills, and introversion personality traits as predictors for social anxiety symptoms

REFERENCE #: IRB 16-505
SUBMISSION TYPE: New Project

ACTION: APPROVED
APPROVAL DATE: June 13, 2016

REVIEW TYPE: Exempt from Full Board Review

Thank you for your submission of New Project materials for this project. The Western Kentucky University (WKU) IRB has APPROVED your submission. This approval is based on an appropriate risk/benefit ratio and a project design wherein the risks have been minimized. All research must be conducted in accordance with this approved submission.

This submission has received Exempt from Full Board Review based on the applicable federal regulation.

Please remember that informed consent is a process beginning with a description of the project and insurance of participant understanding followed by an *implied* consent form. Informed consent must continue throughout the project via a dialogue between the researcher and research participant. Federal regulations require each participant receive a copy of the consent document.

Please note that any revision to previously approved materials must be approved by this office prior to initiation. Please use the appropriate revision forms for this procedure.

All UNANTICIPATED PROBLEMS involving risks to subjects or others and SERIOUS and UNEXPECTED adverse events must be reported promptly to this office. Please use the appropriate reporting forms for this procedure. All FDA and sponsor reporting requirements should also be followed.

All NON-COMPLIANCE issues or COMPLAINTS regarding this project must be reported promptly to this office.

This project has been determined to be a Minimal Risk project.

Please note that all research records must be retained for a minimum of three years after the completion of the project.

If you have any questions, please contact Paul Mooney at (270) 745-2129 or irb@wku.edu. Please include your project title and reference number in all correspondence with this committee.

Appendix G: Informed Consent

INFORMED CONSENT DOCUMENT

Project Title: Duration of time spent playing online video games, interpersonal skills, and introversion personality traits as predictors of social anxiety symptoms

Investigator: James D. Bender, WKU Department of Psychology **Email:** james.bender076@topper.wku.edu
Dr. Sally Kuhlenschmidt **Email:** sally.kuhlenschmidt@wku.edu

You are being asked to participate in a project conducted through Western Kentucky University. The University requires that you give your agreement to participate in this project.

You must be 18 years old or older to participate in this research study.

The investigator will explain to you in detail the purpose of the project, the procedures to be used, and the potential benefits and possible risks of participation. You may ask any questions you have to help you understand the project. A basic explanation of the project is written below. Please read this explanation and discuss with the researcher any questions you may have. You should keep a copy of this form for your records.

Purpose:
The purpose is to examine the relationship among time spent playing online video games, interpersonal skills, introversion and social anxiety.

Procedures:
Participation in this study will involve answering a few demographic items and completing questionnaires with a total of 88 items. Based on pretesting, we anticipate that your involvement will require approximately 25-35 minutes. You will be compensated financially for participating. Participants must be at least 18 years of age to participate, speak English and be located in the United States.

Risks and Benefits:
We anticipate minimal risks other than any personal response to questions about anxiety. A resource to help with any discomfort is the Lifeline Crisis Chat (www.crisischat.org). You will be paid for participation through Amazon's Mechanical Turk. Further, we hope that our results will add to scientific knowledge about people's patterns of anxiety.

Payment:
You will earn $2.00 for your participating in the study.

Confidentiality:
Your identity will not be collected and thus will not be tied to the data. Only the researchers involved in this study and those responsible for research oversight will have access to the information you provide and that information will contain no identifying information.

Refusal/Withdrawal:
Refusal to participate in this study will have no effect on any future services you may be entitled to from the University. Anyone who agrees to participate in this study is free to withdraw from the study at any time with no penalty.

You understand also that it is not possible to identify all potential risks in an experimental procedure, and you believe that reasonable safeguards have been taken to minimize both the known and potential but unknown risks.

Your continued cooperation with the following research implies your consent.

THIS PROJECT HAS BEEN REVIEWED AND APPROVED BY
THE WESTERN KENTUCKY UNIVERSITY INSTITUTIONAL REVIEW BOARD
Paul Mooney, Human Protections Administrator
TELEPHONE: (270) 745-2129

Appendix H: Debriefing Statement

Thank you for your participation in this experiment. The goal of this study was to examine the relationships among time spent playing online video games, interpersonal skills, introversion and social anxiety. In this experiment, you were asked to complete a variety of surveys inquiring about video game play, interpersonal skills, introversion, and social anxiety symptoms. Your participation is not only greatly appreciated by the researchers involved, but the data collected could possibly aid people working with individuals suffering from social anxiety symptoms. If you experienced discomfort from answering these questions you may contact the Lifeline Crisis chat (www.crisischat.org) for assistance.