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Prevalence and Correlates of Internet Addiction in Undergraduate Students as Assessed by Two Different Measures

by

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Abstract

The current study addressed some of the methodological shortcomings of previous studies on internet addiction. The main purpose of the study was to determine if two different internet addiction assessments would identify the same individuals as addicted to the internet. A total of 224 undergraduate internet users were surveyed using a stratified sampling plan based on the proportional allocation technique to procure as diverse a sample as possible. The assessments used were Young’s Internet Addiction Test (IAT), Caplan’s Generalized Problematic Use Scale (GPIUS), a demographic questionnaire, and a reasons-for-use questionnaire. Results showed that about 0.9% of the sample could be considered addicted to the internet according to both the IAT and GPIUS, which is a smaller percentage than found in previous studies. There were too few participants identified as addicted to the internet to determine if these two assessments identified the same individuals as addicted, however, it was shown that over a third of the sample was identified as “at risk” for addiction by one assessment and not the other. These results lead to the conclusion that the assessment measure used is of extreme importance when diagnosing internet addiction. Also, more robust sampling procedures may lead to fewer internet addicts identified, which could be a more accurate reflection of internet addiction in the target population. Regression results indicated that demographic and psychological predictor variables could more successfully explain the variance in IAT scores over GPIUS scores, although a similar pattern of direction and effects were shown for both criterion variables. Hierarchical regression revealed that the demographic variable “age” may be particularly important when attempting to predict internet addiction scores.
Chapter 1: Introduction

This chapter will introduce the relatively recent phenomenon of internet addiction and discuss why it is a topic that warrants study. The main purpose of this study is to examine the prevalence and contributing factors to the reported prevalence of internet addiction among undergraduate students. Since different researchers use different assessments to identify the prevalence and study the effects of internet addiction, the current study is intended to determine if reported variations in internet addiction are related to the assessments used to measure the phenomenon. In addition, since different researchers use different sampling methods to examine internet addiction, this study is also intended to examine the possible role of such variations to reported prevalence rates. The stratified random sampling plan intended for use in this study differs from sampling methods used in existing studies in estimating the prevalence and effects of internet addiction. It is with the focus on possible variation in both assessment instrument and sampling method that this study is intended to make its contribution to the current understanding of internet addiction among college students.

Why Study Internet Addiction?

Use of the internet has increased dramatically over the past several years. Recent estimates of the number of people online indicate that approximately 729 million people have online access around the world (global-reach.biz/globstats). Originally, in the early 1990’s, the main users of the internet were a small group of researchers and academics mostly in the technology field, but for many people use of the internet has now become part of their daily lives. The benefits of the internet have been widely researched and include keeping in touch with friends, making vacation plans, managing finances,
assisting with educational needs, etc. However, despite the benefits due to the
tremendous increase in use, speed, interactivity, and access over the past decade, a
proportion of the internet user population experiences some negative consequences of
excessive internet use, as well as symptoms that can mirror an addiction. In its most
general form, researchers have called this phenomenon “internet addiction”. Chak and
Leung (2004) report that hospitals with internet recovery services can be found in many
parts of the United States, citing examples such as the McLean Hospital in Massachusetts
and the Illinois Institute for Addiction Recovery at Proctor Hospital. Also, studies
investigating aspects of the concept of internet addiction have been conducted in many
countries around the world including Taiwan (Chou, 2001; Lin & Tsai, 2002; Tsai & Lin,
2003; Yen, et al., 2007), China (Cau, Su, Liu, & Gau, 2007), Korea (Hur, 2006; Kim,
2007; Whang, Lee, & Chang, 2003; Yoo, et al., 2004), Pakistan (Suhail & Bargees,
2006), India (Nalwa & Anand, 2003), Norway (Johansson and Götestam, 2004), Turkey
(Ceyhan, Ceyhan, & Gurcan, 2007), Italy (Ferraro, Caci, D’Amico, & Di Blasi, 2007),
England (Griffiths, 2001; Niemz, Griffiths, & Banyard, 2005), the Czech Republic
(Simkova & Cincera, 2004), Finland (Kaltiala-Heino, Lintonen, & Rimpela, 2004), and
South Africa (Thatcher & Goolam, 2005). These facts indicate that the concept of
internet addiction is a growing concern across this county as well as the world.

Estimates of the prevalence of internet addiction indicate that about 5-10% of the
world-wide general population may suffer from this type of disorder (Young, 1999).
Based on a variety of studies conducted over several years prior to their study, Hall and
Parsons (2001) conservatively estimate the prevalence to be about 6% in the general
population. Empirical investigations have confirmed these estimates indicating that the
prevalence rate falls somewhere between 3.5% (Whang, Lee, & Chang, 2003) and 13% (Scherer, 1997).

**Why Focus on Two Internet Addiction Scales?**

Since a variety of different assessments have been used and there is a considerable amount of variation in existing studies in estimating the prevalence and effects of internet addiction, it is hypothesized that this variation can be attributed to the assessment used to measure the construct. The development of different assessments to measure internet addiction is guided by a researcher’s hypothesized notion of how internet addiction develops, and as such, may identify different individuals as addicted to the internet. If different internet addiction assessments yield different conclusions about who is addicted to the internet, comparisons across studies that use alternate assessments will be substantially limited.

The current study will investigate if the variations seen in the prevalence and effects of internet addiction are due to actual variations in the population or simply due to the assessment used to measure the construct. As such, the present study will use two internet addiction assessments to identify the prevalence rate and effects of internet addiction. The first assessment that will be used is Young’s Internet Addiction Test. This assessment was chosen because it was found to have good internal consistency reliability as well as concurrent validity. Also, this assessment is the most widely used instrument in existing studies to measure internet addiction. The second assessment that will be used is Caplan’s Generalized Problematic Internet Use Scale. Rather than focusing on the behaviors associated with excessive internet use, as in Young’s Internet Addiction Test, Caplan’s Scale focuses on the associated cognitions as well as the
behaviors and negative consequences of excessive internet use. Also, Caplan’s Generalized Problematic Internet Use Scale has a high degree of psychometric integrity. Through a factor analysis, this scale was found to have seven unique sub dimensions, all with good internal consistency reliability. Caplan (2002) also reports that this scale is conceptually valid. The fact that these two instruments differ in their conceptual basis also makes these two particular assessments ideal for comparison. Results from these two assessments will be analyzed to determine if the variation seen in the prevalence and effects of internet addiction can be attributed to type of internet addiction assessment used.

This investigation differs from previous studies on this topic in that two internet addiction assessments will be used and a major purpose is to examine if type of assessment used is related to variations seen in internet addiction. Also, two separate regression analyses will be used to examine issues of prevalence and predictors, one using each internet addiction assessment measure. This approach will show if some predictor variables thought to be related to internet addiction can more successfully explain the variance in one internet addiction assessment over the other. Again, this data will assist in determining if variations in internet addiction are related to the type of assessment used to measure the construct.

**Why Focus on a Stratified Sampling Technique?**

As well as using different assessments to measure internet addiction, different researchers use a variety of different sampling techniques. It is hypothesized that different sampling techniques will lead to different conclusions about the prevalence and effects of internet addiction. In existing studies on internet addiction in college students,
some researchers recruit participants through email, a school’s email message board, and postings on websites designed for internet or other addicts (Niemz, Griffiths, & Banyard, 2005; Yuen & Lavin, 2004). These recruitment techniques will lead to a self selecting sample of participants who have some interest or psychological investment in the topic and therefore will be more likely to participate leading to a biased sample. Other researchers have recruited participants from only courses that require internet usage (Morahan-Martin & Schumacher, 2000) or only from a limited number of courses. For example, Kubey, Lavin, and Barrows (2001) recruited participants from only three courses on a rather large campus. Obviously, these sampling techniques limit the ability to generalize from the results due to the lack of a representative sample. A question that the above information brings to light is whether the reported prevalence and effects of internet addiction are limited by the sampling technique used and if results would be different if a more robust sampling technique was employed.

Due to the above information and the pitfalls of the poor sampling methods seen in existing studies, a major goal of the present study is to determine if sampling method plays a role in prevalence and effects of internet addiction. As such, this study will employ a stratified random sampling plan to include as representative a sample as possible.

Why College Students?

Lanthier and Windham (2004) believe that whether or not the internet becomes adaptive or maladaptive for college students lies in personal factors and attitudes toward internet use. They believe that the internet may serve as an important developmental element in emerging adulthood, particularly in social interactions, discovery, and
communication. Several studies have found that college students with a high degree of social anxiety can successfully use the internet to form intimate relationships and that these relationships can be just as strong as face to face relationships (McKenna & Bargh, 1999; McKenna & Bargh, 2000; Parks & Floyd, 1996). Suhail and Bargees (2006) also report some benefits of internet access for college students. They indicate that internet use impacts education in a positive way by increasing communication with classmates and professors, increasing access to libraries and educational databases, and improving study hours and study habits. Despite these benefits of internet use, researchers have maintained that college students are at particularly high risk for developing internet addiction.

College aged students, especially males, are the heaviest users of the internet (Morahan-Martin & Schumacher, 2000). Scherer (1997) found that 73% of college students accessed the internet at least once a day and spent approximately 8.1 hours a week online. Anderson (2001) found that students spent approximately 1.6 hours a day on the internet. Some reasons why college students may be particularly at risk include the fact that adapting to college life may be challenging and lead to loneliness, anxiety, depression and stress. Some students may use the internet to alleviate these feelings. Another reason why college students may be particularly at risk is because internet behavior is characterized by disinhibition so it is a good outlet for shy people or people with low self confidence to form relationships. Since there is a great deal of anonymity associated with some internet applications, for example in chat rooms, some people can gain the confidence to form social relationships on the internet that they might otherwise avoid because of shyness and low self confidence. Also, there is free and easy internet
access across college campuses (Niemz, Griffiths, & Banyard, 2005). Young (2003) also suggests some reasons why college students may be particularly vulnerable to this form of addiction. Some of these reasons, other than those that overlap with those mentioned above include unlimited internet access, huge blocks of unstructured time, newly experienced freedom from parental control, no monitoring or censoring of what they say or do online, full encouragement from faculty and administrators, social intimidation and alienation, and a higher legal drinking age (relevant to the Americans only). Because of the higher legal drinking age in America, students must seek other outlets for stress reduction and relaxation. All of the aforementioned reasons indicate that college students in particular may be vulnerable to internet addiction. Because of this, the present study will focus on the college student population.

Based on the information presented in the above review as well as the method reviewed in chapter 2, the present study will use a stratified sampling technique so as not to inflate results or significantly limit generalization with poor sampling or a self selecting sample of internet users. Also, as was previously mentioned, two separate internet addiction assessments will be used to determine if the variation seen in internet addiction is related to the measures used.

**Research Questions**

1. Do Young’s Internet Addiction Test (IAT) and Caplan’s Generalized Problematic Internet Use Scale (GPIUS) (a) differ in assessing the prevalence rate of internet addiction in the university student population and (b) identify the same individuals as addicted to the internet?
2. Can (a) the demographic predictor variables age, gender, GPA, previous addiction, and previous psychological disorder, and (b) the internet use variables reasons for internet use, hours online per week, and years online explain the variance on Young’s Internet Addiction Test and Caplan’s Generalized Problematic Use Scale?
Chapter 2: Literature Review

This chapter will discuss how the concept of internet addiction has previously been dealt with and studied in the literature. This will include a more detailed introduction to the phenomenon, a theoretical framework of addiction in general as well as specifically internet addiction, some important background information and a section reviewing the methods and assessments used in previous studies, since they are quite diverse and important when studying this phenomenon.

Definitions and Terminology

The term “internet addiction” was originally proposed by Dr. Ivan Goldberg as a parody of an actual disorder (Goldberg, 1996). Goldberg defined this term as pathological compulsive use of the internet. Although Goldberg meant this as a parody of an actual disorder, many took it seriously which led to an investigation into whether this construct actually existed. Since internet addiction is not recognized as a legitimate mental disorder in the DSM-IV and there is no standard definition of the term, many researchers have attempted to define this disorder. Of all the diagnoses in the DSM-IV, Young (1996) viewed pathological gambling as most similar to the pathological nature of internet abuse and as such, she defined internet addiction as “an impulse control disorder which does not involve an intoxicant” (Young, 1999, p. 2). Kandell (1998) defined internet addiction as “a psychological dependence on the internet, regardless of the type of activity once logged in” (p. 12). Beard and Wolf (2001) define the term as “…use of the internet that creates psychological, social, school, and/or work difficulties in a person’s life” (p. 378). Hall and Parsons (2001) view internet addiction, or what they call “internet behavior dependence”, as a “maladaptive cognitive coping style that can be
modified through basic cognitive behavioral intervention” (p. 314). Griffiths (2000) argues that internet addiction is a subset of a behavioral addiction and as such contains the core components of an addiction, including salience, mood modification, tolerance, withdrawal, conflict, and relapse. Davis (1999) proposed that internet addiction can be split into two categories: Specific Pathological Internet Use (SPIU) and Generalized Pathological Internet Use (GPIU). Specific Pathological Internet Use describes using the internet to heighten a preexisting addiction (gambling, pornography). Davis argues that this type of addiction would exist even without access to the internet. Generalized Pathological Internet Use describes using the internet in a general way (browsing, chatting), usually associated with the social aspects of the internet. With all of these definitions taken together, internet addiction can be summarized as a maladaptive pattern of internet usage that significantly interferes with a person’s normal daily routines or activities, including but not limited to relationships (friends, family, and loved ones), one’s work or school environment, and one’s psychological well being.

Since researchers use different definitions based on their hypothesized etiology of the disorder, different terms for the construct of internet addiction have been used. Terms such as internet addiction disorder (Goldberg, 1996), internet addiction (Young, 1996), internet pathological use (Davis, 2001), pathological internet use (PIU) (Young, 1999), problematic internet use (Beard & Wolf, 2001), internet dependency (Scherer, 1997), and internet behavior dependence (IBD) (Hall & Parsons, 2001) all refer to the same phenomenon.

**Prevalence**

Original estimates of the prevalence of internet addiction come from Young’s (1996) seminal work on the construct. In this study, Young found the prevalence of
internet addiction in her sample to be about 80%. This number has since been criticized due to poor sampling techniques resulting in an overrepresentation of self reported “internet addicts” (Morahan-Martin & Schumacher, 2000). Due to this fact and more recent investigations into this construct, Young estimates that about 5-10% of the general population suffers from this form of addiction. Hall and Parsons (2001) conservatively estimate the prevalence rate to be about 6% based on the results of a variety of studies conducted within the past 10 years up to that point. Johansson and Gotestam (2004) indicate that on average, in all of the studies they examined about internet addiction, including their own about Norwegian youth, the prevalence rate appears to be about 8-10% of participants studied, which is consistent with the present review. Because of the growing rate of use of the internet in recent years, it is becoming increasingly difficult to estimate the prevalence rate of internet addiction, although the above figures give some indication of the extent of the disorder. A more recent review of the literature on internet addiction found the overall prevalence to be around 0.3% to 38% (Chakraborty, Basu, & Kumar, 2010). This wide prevalence range emphasizes the need to create a universal definition of internet addiction as well as an assessment that can be used across studies to get a more accurate picture of the prevalence of this phenomenon.

The smoking rate among the general population is about 33% (WHO). Gambling addiction prevalence is about 2-3% in the general population (Massachusetts Council on Compulsive Gambling) and twice or three times that number in college students (Stinchfield, Hanson, & Olson, 2006). In terms of heavy alcohol use or alcohol addiction, the World Health Organization estimates that approximately 76 million people around the world suffer from diagnosable alcohol use disorders (2004). The National
Association of Sexual Addiction Problems estimated the prevalence of sex addiction to be about 6-8% in the general population. In comparison with these numbers, internet addiction seems to be more prevalent than gambling addiction and about as prevalent as alcohol and sex addiction, which indicates that internet addiction is a legitimate topic for study.

**Theoretical Framework**

There are many different theories or conceptualizations of addiction. Addiction is currently defined as “a behavior over which an individual has impaired control with harmful consequences” (West, 2001, p. 3). Addiction typically involves initial exposure to a stimulus, followed by behaviors looking to repeat the initial experience. The addiction becomes established after repeated behavior stimulus sequences. Stimuli that give pleasure, relief, or excitement are more likely to become the focus of an addiction. It is well accepted that addictive drugs “usurp” some of the pathways in the brain related to pleasure, learning, and incentive motivation (Robinson & Berridge, 2003). According to Robinson and Berridge, addiction is defined as, “a compulsive pattern of drug-seeking and drug-taking behavior that takes place at the expense of most other activities” (p. 26). Drug induced neuroadaptations are thought to be critical in the transition to addiction; that is, the drug changes some of the neural pathways and neurochemistry of the brain which consequently is responsible for the addiction. The major theories about the transition to addiction all revolve around the idea that the drug changes the brain in some fundamental way and thereby changes some aspect of psychological functioning.

**Theories of addiction.** One view of drug addiction is that drugs are taken, at first, because they are pleasant. Through repeated use of the drug, a tolerance and
dependency develops through neuroadaptations in the brain, where unpleasant withdrawal symptoms come about when the drug is stopped. Compulsive drug use occurs to avoid the unpleasant withdrawal symptoms. This theory of drug addiction, that the drug is taken initially for the pleasure and then after addiction to avoid the withdrawal symptoms or the “lows”, is known by several names which include: pleasure-pain, positive-negative reinforcement, opponent processes, hedonic homeostasis, hedonic dysregulation, reward allostasis, etc. (Koob et al. 1997; Koob & Le Moal 1997, 2001; Solomon 1977; Wikler 1948). Research has shown that the avoidance of withdrawal symptoms is not a particularly strong motivator for continued drug use (Stewart & Wise 1992). Also, elimination of withdrawal symptoms does not seem to prevent future relapse, indicating that the aforementioned theory of drug addiction does not completely explain the phenomenon.

Because of these shortcomings, several researchers have hypothesized that the transition to addiction results from the ability of drugs to create aberrant learning. Most of these theories suggest that drugs produce abnormally strong associations, known as aberrant associations, involved in reward learning that are more powerful than natural reward associations. These associations could be stimulus-response, act-outcome, stimulus-stimulus, or could be implicit or explicit. According to this theory, which discusses addiction within a behavioral learning context, drug addiction results from a destructive pattern of learned associations.

Another theory of addiction is known as the incentive-sensitization theory of addiction. This theory focuses on how drug cues trigger excessive incentive motivation for drugs, leading to compulsive drug seeking, taking, and relapse. According to this
theory, drugs alter parts of the brain that deal with incentive motivation. As a result, these parts of the brain may become hypersensitive to specific drug effects, drug cues, or associated stimuli. So this neural sensitization, as Robinson and Berridge (2003) call this phenomenon, leads to an increase in the “wanting” of drug rewards, leading to an increase in drug seeking/taking behaviors.

According to Marks (1990), addiction “denotes repetitive routines that aim to obtain chemicals and, less often, routines without that aim. The latter are behavioural addictions” (p. 1389). A common pattern among these behavioral addictions is that they include a repeated urge to engage in a behavior that is known to be counterproductive; mounting tension until the behavior is completed; rapid temporary switching off of the tension by completing the behavior, gradual return of the urge; syndrome-specific external and perhaps internal cues for the urge; secondary conditioning of the urge to external and internal cues; similar strategies for relapse prevention by cue exposure and stimulus control. The urge to complete a behavior and the discomfort resulting if prevented from completing the behavior resemble the craving and the withdrawal symptoms of substance abuse (Marks, 1990).

“Repetitive routines are not called addictions until their frequency/intensity leads to handicap, and then usually only when they aim at obtaining chemicals” (Marks, 1990, p. 1389). Behavioral addictions are disorders of impulse control and self regulation. Strong conditioning to external as well as internal cues occurs in behavioral addictions. The routines associated with engaging in the addictive activity could in and of themselves become part of the addiction; therefore external cues will vary according to the addiction. Also, feelings such as boredom or depression could lead one to engage in the addictive
behavior. These internal cues, rather than external cues, seem to be more similar across addictions. Feelings of dysphoria, for example, are likely to lead most types of addicts to indulge in their choice behavior. All of these symptoms of behavioral addictions appear to mimic the symptoms that researchers have identified for internet addiction.

**Theories of internet addiction.** Some argue that internet addiction is merely a subset of a behavioral addiction and others argue that internet addiction is a new emerging disorder. Griffiths (2000) argues that internet addiction is a subset of a behavioral addiction and as such contains the core components of an addiction, including salience, mood modification, tolerance, withdrawal, conflict and relapse. Salience occurs when a particular activity becomes the most important activity in that person’s life and begins to dominate that person’s thinking, feelings, and behavior. Mood modification refers to the subjective feelings that that particular activity arouses. Tolerance refers to the fact that increasing amounts of time with the activity are needed to obtain the former effect. Withdrawal refers to the unpleasant feelings or physical states when the activity is stopped or reduced. Conflict refers to the troubled interactions that the “addict” may experience with those around him or her as well as within his or her self. Relapse refers to going back to a previous pattern of activity, in this case internet dependent behaviors.

Beard and Wolf (2001) view internet addiction as more of an impulse control disorder rather than an addiction. They believe that the term “internet addiction” is not an accurate reflection of what the phenomena under study entails. These researchers argue that although this construct does mimic some of the symptoms of a chemical addiction, some major symptoms, such as physical withdrawal, are not seen. Instead, they argue that, according to the fact that Young used pathological gambling as a model
for internet addiction, that this phenomenon more closely fits as an impulse control disorder rather than an addiction. Due to this fact, Beard and Wolf (2001) propose that terms such as “excessive”, “problematic”, or “maladaptive” patterns of internet use should be used instead of the word “addiction” to refer to this construct.

Davis (2001) describes the maladaptive thoughts and behaviors associated with excessive internet use. He proposes that pathological internet use is best viewed through a cognitive behavioral model. Davis’s cognitive behavioral model differentiates specific pathological internet use from generalized pathological internet use. Specific pathological internet use describes individuals who use the internet to heighten a preexisting addiction. Generalized pathological use describes individuals who use the internet in a general way, such as for browsing or chatting. This model emphasizes an individual’s cognitions as the main factor promoting and maintaining the maladaptive behavior, and as such, assessments based on this model focus on an individual’s cognitions toward excessive use. In his theory, Davis advocates the diathesis-stress model of addiction. That is, an individual may have an underlying psychopathology but that this pathology will not be expressed until certain life events, or stressors are present. He argues that this underlying psychopathology does not in and of itself result in symptoms, but that use of the internet or introduction to certain applications on the internet, may bring about maladaptive behaviors and cognitions.

**Effects of Internet Addiction and Overuse**

**Major symptoms.** The major symptoms of internet addiction seem to include tolerance, or increasing amounts of time on the internet to achieve satisfaction, compulsive use and withdrawal, and consequent problems with family, friends, loved
one’s, as well as problems at work or school. Hall and Parsons (2001) identify some other symptoms of what they call internet behavior dependence (IBD). These symptoms include failure to meet major role obligations at work, home, or school; longer use with less enjoyment; restlessness, irritability, and anxiety when not using; extended use with unsuccessful attempts to cut down, control, or stop use; and continued use despite knowledge of physical, psychological, or social problems associated with excessive use. Davis (2001) reports that the associated psychopathology of internet addiction includes symptoms such as “obsessive thoughts about the internet, tolerance, diminished impulse control, inability to cease using the internet, and withdrawal symptoms” (p. 187).

**Related variables.** Internet overuse and abuse has been related to many adverse effects. Internet addiction has repeatedly been linked to increased levels of depression, loneliness, stress, and sadness (Chen, 2000; Morahan-Martin & Schumacher, 2000; Whang, Lee, & Chang, 2003). An obvious question that this information brings to light is whether psychological variables such as depression and loneliness cause internet addiction or vice versa. The results of one longitudinal study in which participants were given computers and internet access found that depression and loneliness resulted from internet abuse and not the other way around (Kraut, et al., 1998). Young (1996a) found that those classified as addicted to the internet experienced health, occupational, financial, and social problems. Academic difficulties have also been found in those diagnosed as addicted to the internet. Kubey, Lavin, and Barrows (2001) found that those who were classified as dependent on the internet were four times more likely to report academic difficulties than those who were not dependent. Brenner (1997) indicated that out of his sample of 600, 80% reported problems associated with excessive
use including time management problems, missed sleep and missed meals as well as some more serious problems such as trouble with employers and social isolation. This information begs the question that if alternate internet addiction assessments were used to identify those who were dependent on the internet, rather than the actual assessments that were used in these studies, would the data the aforementioned researchers gathered yield the same results?

Before the term “internet addiction” was used for the phenomenon under study, researchers investigated what they called “computer addiction”. Those most prone to computer addiction were young, “solitary male loners” who had a long standing interest in technology and science (Chou, Condron, & Belland, 2005). Since the immense growth of the internet, the profile of the typical internet addict has changed. Many research studies of this nature have shown that male college students are more likely to become addicted to the internet than female college students, whereas other researchers have found less consistent results. Due to this information, one might hypothesize that males have been over represented in the sampling procedures of other studies, which in turn may lead to the preponderance of male internet addicts reported. Examining samples from empirical studies on internet addiction reveals that in most of these studies the sample consists of slightly more females than males, with very few exceptions. This indicates that the preponderance of male internet addicts reported in the literature is not simply an artifact of poor gender sampling, but may be an actual difference in the general population.

One study (Chen, 2000) found that time management problems and compulsion symptoms are common predictors for both genders when it comes to time spent per week
on the internet. Chen (2000) also found that increased levels of depression (variables such as low self esteem, poor motivation, fear of rejection, need for approval) were also found to contribute to internet addiction.

Although time spent online cannot by itself predict internet dependence or addiction, it does seem to be related to the construct. A majority of the studies examined indicate that those classified as internet dependent spend significantly more time online than those with limited or no symptoms. For example, Morahan-Martin and Schumacher (2000) report that participants who were classified as pathological internet users spend on average about 8.5 hours online, while those with limited or no symptoms spend about 3.2 and 2.5 hours per week online respectively. Similarly, Young (1998) reported that internet dependents spent about 39 hours per week online, whereas non dependents spent about 5 hours per week online. Chen and Chou (1999) indicate that the “high risk” group for internet dependency spent about 20 hours per week online, while the “non high risk” group spent about 9 hours per week online. Time spent online appears to be a consequence of internet addiction rather than a symptom per se. As Caplan (2005) states, “Frequency of internet use, in and of itself, is not necessarily indicative of problematic use” (p. 1093).

The reasons that people use the internet and the specific sites used also seem to be related to the diagnosis of internet addiction. In their study, Morahan-Martin and Schumacher (2000) included 11 items about the average weekly usage of various applications including email, search tools, newsgroups, WWW, software downloading, games, discussion forums, support groups, as well as other sites. The frequency of use for 19 specific reasons was also assessed. These reasons included communicating with
friends and family, required course work, research for courses, recreation or relaxation, work, meeting new people, talking to others who share interests, staying abreast of new developments in areas of interest, sharing ideas or fantasies, wasting time, finding information for own use, emotional support, job search, gambling, net resources intended for adults only, games, virtual reality, and browsing. Frequency for each reason was indicated on a Likert scale from 1-5 (1-never, 2-rarely, 3-sometimes, 4-often, 5-always). It was found that pathological users used more internet sites for more reasons than those with limited or no symptoms.

Using the internet for social reasons (meeting new people, emotional support, talking to others, sharing the same interests, etc.) consistently differentiated pathological users from non pathological users in this study. Niemz, Griffiths, and Banyard (2005) report that those classified as pathological internet users were more likely to be socially confident and socially liberated. According to these researchers, self esteem also seems to be a good predictor of internet addiction (pathological users were more likely to have lower levels of self esteem than those with limited or no symptoms). These researchers also separated their sample by major and found that those in the “hard” sciences were more likely to report patterns of problematic use, although others (Scherer, 1997) found excessive use across majors.

Stress, sadness, and depression all seem to be associated with internet dependency. According to Whang, Lee, and Chang (2003), both internet dependents and possible dependents reported internet use when stressed by people and the internet dependent group reported using the internet when stressed at work to a greater extent than those who were possible dependents or non dependents. When sad or depressed, internet
dependents reported greater use of the internet than the other two groups. Also, internet dependents reported more loneliness, depressive moods, and compulsiveness than possible dependents and non dependents. It was also found that people who were dependent on the internet reported that the first thing they did when arriving home was turn on the computer. Internet dependent individuals (77%) reported this to a greater degree than possible dependents (59%) who reported it to a greater degree than non dependents (26%) (Whang, Lee, & Chang, 2003). Scealy, Phillips, and Stevenson (2002) attempted to predict internet usage patterns as they relate to shyness and anxiety. They found that shyness tended to predict recreational use of the internet, but overall these two indicators did not seem to predict usage patterns in terms of internet communication functions. Shy or anxious individuals were found to use the communication functions of the internet just as much as individuals who were not shy or anxious.

Because of the widespread use of the internet, demographic factors do not seem to play a role in the risk factors associated with internet addiction. Beard and Wolf (2001) state that, “Problematic internet use can be found in any age, social, educational, or economic range” (p. 378). Yellowlees and Marks (2007) indicate that individuals with a history of impulse control or other addictive disorders are particularly vulnerable to using the internet in a problematic way.

Assessments Used to Measure Internet Addiction

Proper diagnosis of internet addiction is often complicated because there are no currently accepted diagnostic criteria for addiction, much less internet addiction in the DSM-IV. Early diagnosis of internet addiction consisted of creating diagnostic criteria for the identification of internet addiction, much like the diagnostic criteria for
pathological gambling, for example. As research into this construct continued, checklists were developed to assess one's level of addiction, as well as surveys with likert like items. A review of the instruments used to measure internet addiction indicated that at least 15 different assessments (several of which will be described below) have been developed and used to measure this phenomenon, each one based on different hypothesized etiologies of the disorder. As such, different individuals may be identified as addicted to the internet depending on which assessment is used. However, the psychometric properties and hypothesized etiology behind only a few of these assessments have been reported.

According to Young (1999), one meets the criteria for problematic internet use if five out of the following eight conditions are met, which were adapted from the DSM – IV diagnostic criteria for pathological gambling, which was seen as most similar to internet addiction or pathological internet use. Use includes preoccupation with the internet, need for longer amounts of time online, repeated attempts to reduce internet use, withdrawal when reducing use, time management issues, environmental distress, deception around time spent online, and mood modification through the internet. Young developed an eight item diagnostic questionnaire (DQ) based on the eight aforementioned criteria. Beard and Wolf (2001) propose that Young’s diagnostic criteria for internet addiction should be modified. They propose that instead of five out of the eight criteria used by Young to diagnose internet addiction, that a proper diagnosis should include all of the first five criteria mentioned above and one of the next three. So according to Beard and Wolf, one would have to answer “yes” to questions 1-5 of Young’s diagnostic criteria and answer “yes” to only one of questions 6-8, in order to be diagnosed as
addicted to the internet. They believe that this is a more accurate reflection of internet addiction because criteria 1-5 (preoccupation with the internet, need for longer amounts of time online, repeated attempts to reduce internet use, withdrawal when reducing use, and time management issues) could account for numerous behaviors that may not have a negative impact or may not necessarily disrupt one’s life.

Due to this fact and continued investigations into the phenomenon of internet addiction, the aforementioned diagnostic criteria have since been developed into an internet addiction test (Young, 1998) that consists of 20 likert-like items scored 1-5. Scores range from 20-100 and a higher score indicates a tendency toward addictive usage. From this scheme, three patterns of usage can be identified: Internet Addicts (IA), Possibly Internet Addicts (PA), and Non-Addicts (NA). Diagnosis into one of these three categories is determined by total score on the internet addiction test. The IAT consisted of Young’s original eight criteria, plus twelve new items to assess whether internet addiction was affecting certain areas of the user’s life. The IAT has a high degree of face validity and through psychometric testing by Widyanto and McMurran (2004) was found to have good internal consistency and concurrent validity. These researchers conclude that the IAT is a reliable and valid instrument for collecting and interpreting internet addiction data. Young’s initial diagnostic questionnaire and the more recent internet addiction test are the most widely used instruments to assess internet addiction and have been adapted and used in many countries around the world including Italy (Ferraro, Caci, D’Amico, & Di Blasi, 2007), the Czech Republic (Simkova & Cincera, 2004), Korea (Jang, Hwang, & Choi, 2008; Whang, Lee, & Chang, 2003), Hong Kong (Leung, 2004), China (Cao, Su, Liu, & Gao, 2007), and South Africa (Thatcher & Goolam, 2005).
Yuen and Lavin (2004) adapted the criteria for substance dependence in the DSM-IV to apply to internet addiction, which led to seven questions about internet dependent behaviors. If participants answered “agree” or “strongly agree” to three out of the seven questions, they were categorized as internet dependent. No psychometric information was reported about this assessment and there was no evidence provided that internet dependence is similar to substance dependence. In fact, as was reported earlier, internet addiction and dependence seem to be more related to a behavioral addiction or impulse control disorder rather than substance dependence. Similarly, Nichols and Nicki (2000) developed an Internet Addiction Scale based on the seven criteria for substance abuse found in the DSM-IV as well as the two additional criteria of salience and mood modification proposed by Griffiths (1998). This scale consisted of 36 items rated on a five point Likert scale and was further developed based on volunteer interviews as well as some items adapted from other internet addiction assessments found in the literature. These researchers conclude that this scale has good reliability as indicated by a Cronbach’s alpha of .95 and good validity indicated by the fact that the scale was adapted from the DSM-IV criteria as well as included Griffiths suggestions. However, as was stated earlier, it is not clear whether the symptoms of internet addiction actually mirror the symptoms of substance dependence, and as such, the validity of this scale is in question.

Suhail and Bargees (2006) developed what they called the Internet Effects Scale (IES) for their study on the effects of excessive internet use in undergraduates in Pakistan. The scale was developed based on information the researchers collected from students, parents, and the literature about internet use. The final scale consisted of 28
yes/no questions with seven sub dimensions encompassing interpersonal problems, physical problems, psychological problems, behavioral problems, educational problems, internet abuse, and positive effects of internet use, however no psychometric information was reported about this assessment putting into question its validity and reliability as an effective internet addiction assessment. The Internet Usage Questionnaire was designed to measure the frequency that participants accessed the internet as well as the reasons they did so (Fortson, et al., 2007). Although this scale showed a moderate level of internal consistency (Cronbach’s alpha of .62) it was not specifically designed to measure internet addiction and thus is not appropriate for the present study. Ceyhan, Ceyhan, and Gurcan (2007) developed what they call the Problematic Internet Use Scale for their study of internet addiction in Turkey. This scale was formed on the basis of expert opinions and suggestions and as such, the researcher’s hypothesized etiology of internet addiction was not reported or incorporated into the scale. Although the authors report that the scale has good reliability, according to these researchers, this scale is not intended to diagnose internet addicts, but rather to identify healthy and unhealthy patterns of internet usage.

Morahan-Martin and Schumacher (2000) developed a pathological internet use scale consisting of 13 items which assesses whether the internet was causing academic, work or interpersonal problems, personal distress, withdrawal symptoms, or mood altering use. Participants who reported four or more symptoms were classified as pathological internet users. This assessment was found to have high internal reliability indicated by a standardized item alpha coefficient of 0.8761 as well as face validity indicated by the fact that the assessment was developed based on some of the symptoms
of a behavioral addiction. Whether the assessment accurately measures the construct of internet addiction is less clear.

Caplan (2002) developed a Generalized Problematic Internet Use Scale (GPIUS) based on Davis’s (2001) work on the distinct pattern of cognitions and behaviors associated with internet addiction. Davis believes that internet addiction is more than a simple behavioral addiction and as such developed a theory of internet addiction that focuses on “a distinct pattern of internet related cognitions and behaviors that result in negative life outcomes” (Caplan, 2002, p. 556). Since Davis’s theory of internet addiction was well conceptualized and operationalized, Caplan was able to develop an assessment based on Davis’s hypothesized etiology of internet addiction that was very different from the other assessments in the literature that were merely adapted from certain diagnoses in the DSM-IV or based on expert opinions. The GPIUS was designed to measure the cognitions, behaviors, and negative outcomes associated with generalized pathological internet use as described by Davis (2001) and consists of 29 items measured on a likert scale from 1 (strongly disagree) to 5 (strongly agree). This assessment was found to be both a reliable and valid measure of internet dependent behavior and due to the fact that the etiology behind this assessment differs considerably from the other assessments described, it will be one of the assessments used in the present study. The GPIUS has since been revised and updated into the GPIUS2 (Caplan, 2010). The original GPIUS was an exploratory assessment that significantly predicted some negative outcomes of generalized problematic internet use. Subsequent research (Caplan, 2003; LaRose et al., 2003) has identified additional information that might help add to our understanding of this phenomenon such as the importance of social benefits and social
control factors as well as the idea that compulsive internet use and preoccupation with the internet are both related to deficient self-regulation. All of these factors were incorporated into the new GPIUS2. Since this assessment was published well into work on the current study and the validity and reliability of the assessment still need to be further researched, the original GPIUS was used as an internet addiction assessment in this study.

Method Review

**Online studies.** The various research methods used to evaluate internet addiction consist of checklists, diagnostic questionnaires, surveys, interviews, and case studies. Young’s diagnostic questionnaire was posted online and she recruited participants through newspaper announcements, posters distributed at colleges, online postings on forums aimed toward internet addiction, and search engines. The participants that were recruited were in her words “avid internet users”. Through this method, Young identified 396 individuals out of a sample of 496 that, according to her criteria, were addicted to the internet.

Greenfield (1999) conducted one of the largest online studies to date, at that time. Through the ABC news website, she recruited 17,251 participants that responded to a posting about a cover story on internet addiction. Through this method, Greenfield identified 6% of her sample as addicted to the internet. Niemz, Griffiths, and Banyard (2005) emailed a Pathological Internet Use Survey to university students in England and through this self selecting sample found that 18.3% of their participants could be considered pathological internet users. Other, smaller online studies have used similar recruitment methods to those previously discussed, such as postings on sites for internet
or other addicts (Brenner, 1997; Egger, 1996; Petrie & Gunn, 1998; Thompson, 1996; Young, 1997a,b, 1998; Young & Rodgers, 1998) or through email at small universities (Lavin, et al., 1999). These online studies have several benefits including the ability to gain information about a large group of people in a small amount of time and targeting the specific population of interest (internet users); however the methodological limitations of these studies outweigh the benefits.

One of the major limitations of the studies that recruit participants online or through email is the inherent bias of the self selected sample. Since recruitment announcements are posted online, usually on websites visited by heavy internet users or other addicts, those individuals who feel they might have a problem with internet use are likely to respond. That fact, in and of itself, biases the sample towards heavy internet users and might inflate results. For example, Morahan-Martin (2001) reports that two online studies (Thompson, 1996; Young, 1998) found that 74-80% of internet users might suffer from this form of addiction, while offline studies show incidences ranging from 6-13%. Other limitations of these studies and all internet addiction studies in general lie in the assessment instruments used to diagnose internet addiction. As was stated earlier, Young used most of the DSM-IV criteria for pathological gambling to develop her assessment because she felt that those criteria most closely matched the phenomenon of internet addiction. Some have argued that since Young decided to leave out two of the criteria found in the DSM-IV and due to the arbitrary nature of likening internet addiction to pathological gambling, that Young’s assessment lacks validity. Young herself even admits that further psychometric testing is needed to validate her assessment. Since this is the case, results from studies that use Young’s initial diagnostic questionnaire should
be interpreted with caution. Since the psychometric aspects of Young’s Internet Addiction Test have been evaluated more rigorously than has been the case with her diagnostic questionnaire (Widyanto and McMurran, 2004), it is suggested that this instrument should be used rather than the diagnostic questionnaire in future studies to assess internet addiction. Some of these online studies have also been limited by relatively small sample sizes, which greatly reduce how the results can be generalized.

**Offline studies.** Offline investigations have also been conducted to study the construct of internet addiction, most notably in college students. Morahan-Martin and Schumacher (2000) investigated what they call pathological internet use in a sample of 277 college students who, as part of course requirements, had to use the internet. For this study, they constructed a pathological use scale consisting of 13 items, as was mentioned earlier, assessing evidence that internet use was causing “… academic, work, or interpersonal problems, personal distress, withdrawal symptoms, or mood altering use” (p. 16), where four or more symptoms indicated pathological use and distributed it to students in class. Through this method, 8.1% of their sample were found to be pathological users. Scherer (1997) also used offline survey methods to assess internet addiction and found 13% of undergraduates who used the internet at least once a week to be dependent users.

The benefits of the survey method have been well researched. These benefits include the fact that surveys are easy to use and distribute, allow one to gain valuable information in a relatively short amount of time, as well as provide a variety of useful information in a comprehensive, compact way. There are also some drawbacks to the survey methods discussed above, most notably the reliance on the convenience sample of
college students. Since most of the offline studies conducted have examined internet addiction in college students, results of these studies obviously will only be able to generalize to college students, who are a relatively small and unique population not representative of the general public. Also, these studies have used relatively small sample sizes which also limit how the results should be interpreted. Another limitation inherent in any type of survey methodology is the “lie factor”. Researchers can never be sure if participants are being truthful in their responses, especially in this case, since one of the items asks if participants have ever lied about their internet use. If participants are in denial about the extent of their addiction, they are at least likely to be untruthful about whether or not they have lied about their internet use, if not untruthful on the entire assessment. For this reason, these types of survey assessments should be examined for obvious false reporting. Another limitation of these offline survey methods is again the validity of the instruments. As was mentioned before, Morahan-Martin and Schumacher (2000) developed their assessment instrument based on some common symptoms of behavioral addictions such as salience, mood modification, and tolerance, so the pathological internet use scale has a good degree of face validity, but whether it accurately measures the construct of internet addiction is less clear. Again, for this reason, a goal of the current study is to cross-validate some of the existing assessments.

**Interview studies.** Both face to face and online interviews have also been used to investigate aspects of internet addiction. Tsai and Lin (2003) followed up on an initial investigation about internet addiction in Taiwanese adolescents with in depth interviews. From their previous sample, they analyzed the results of their questionnaires and selected 10 individuals who met the criteria for internet addiction. Results of these interviews
revealed that all of these adolescents exhibited most, if not all, of the symptoms of internet addiction identified in the literature including compulsive use and withdrawal, tolerance, and related problems at school, work, or at home. These results indicate that follow up interviews are ideal to assess the validity of one’s chosen internet addiction assessment. Since interview studies of this nature are few and far between, more are needed to verify these results, and as such, these findings should be interpreted with caution. Also, this study was conducted with a limited sample of Taiwanese adolescents which in no way is representative of the larger internet addicted population.

**Case study.** There are also anecdotal reports in the literature describing the behaviors of dependant internet users (Griffiths, 2001; Hall & Parsons, 2001). These case studies help researchers to gain a complete picture of internet addiction. Since every case is unique, this method allows researchers to see the actual impact of this form of addiction on the lives of those who are addicted. Instead of analyzing numbers and hypothesizing based on those numbers concerning the detrimental effects of internet addiction, case study evidence gives a personal touch to internet addiction research. The fact that case study evidence on internet addiction can be compiled validates the concept. These are based on real people who are actually experiencing real life problems because of their dependency. However, because of the nature of case study evidence and the limited case studies available, they act as more of a “snapshot in time” of evidence and cannot be generalized to the population at large.

**College Students: A Unique Population**

College students seem to be a special population when studying the phenomenon of internet addiction. As was discussed earlier, Lanthier and Windham (2004) believe
that the internet may serve as an important developmental element in emerging adulthood, particularly in social interactions, discovery, and communication. Several studies have found that college students with a high degree of social anxiety can successfully use the internet to form intimate relationships and that these relationships can be just as strong as face to face relationships (McKenna, 1999; McKenna & Bargh, 2000; Parks & Floyd, 1996).

Some reasons that college aged students may be at particular risk for internet addiction include the fact that adapting to college life may be challenging and can lead to loneliness, anxiety, depression and stress. Some students may use the internet to alleviate these feelings. Another reason why college students may be particularly at risk is because internet behavior is characterized by disinhibition, so as was previously stated, it is a good outlet for shy people or people with low self confidence to form relationships. Since there is a great deal of anonymity associated with some internet applications, for example in chat rooms, some people can gain the confidence to form social relationships on the internet that they might otherwise avoid because of shyness and low self confidence. Also, there is free and easy internet access across college campuses (Niemz, Griffiths, & Banyard, 2005) as well as a great deal of free time.

Young (2003) also suggests some reasons why college students may be particularly vulnerable to this form of addiction. Some of these reasons, other than those that overlap with those mentioned above include unlimited internet access, huge blocks of unstructured time, newly experienced freedom from parental control, no monitoring or censoring of what they say or do online, full encouragement from faculty and administrators, social intimidation and alienation, and a higher legal drinking age.
(relevant to the Americans only). Because of the higher legal drinking age in America, students must seek other outlets for stress reduction and relaxation, in this case, use of the internet. All of the aforementioned reasons indicate that college students in particular may be vulnerable to internet addiction. Because of this, the present study will focus on the college student population.

Based on the information presented in the above review, the present study will use offline surveys and more robust sampling methods so as not to inflate results with a self-selecting sample. Also, Young’s Internet Addiction Test and Caplan’s Generalized Problematic Internet Use Scale will be used to assess the extent of internet addiction for this study due to the fact that each proposes a vastly different etiology behind the disorder as well as the fact that the psychometric properties of each of these assessments have been tested and reported.

Based on the above review, the following research questions will be examined in the present study.

**Research Questions**

1. Do Young’s Internet Addiction Test (IAT) and Caplan’s Generalized Problematic Internet Use Scale (GPIUS) (a) differ in assessing the prevalence rate of internet addiction in the university student population and (b) identify the same individuals as addicted to the internet?

2. Can (a) the demographic predictor variables age, gender, GPA, previous addiction, and previous psychological disorder, and (b) the internet use variables reasons for internet use, hours online per week, and years online
explain the variance on Young’s Internet Addiction Test and Caplan’s Generalized Problematic Use Scale?
Chapter 3: Method

This chapter will specify and justify the participants, instruments, procedure, and data analysis that are used in this study.

Participants

Sample size. For the present study, a power analysis was conducted to determine an appropriate sample size. It was determined that for a power of .80, and an alpha of .05, approximately 140 subjects were needed for a medium effect size, $R^2$ (Cohen, 1988).

Sampling plan. Undergraduate students were recruited from a mid sized public university in eastern New York. The target population was undergraduate university students from public universities in the Northeastern United States. Participants were recruited in their classes, with the permission of the instructors, from a variety of courses around the campus to avoid the pitfalls of previous studies using only a few homogenous courses or only those that require computer use. A multistage stratified sampling technique was used to recruit participants in this study. More specifically, a variation of a proportional allocation technique was used in which “each stratum’s sample size is proportional to the relative size of that stratum in the target population” (Light, Singer, & Willett, 1990, p. 60). Since for the present study the main researcher randomly selected courses from which to recruit participants rather than randomly selecting the actual participants themselves, the proportional allocation refers to the proportional number of academic subjects offered by each school as opposed to the more traditional proportional number of participants per stratum. The strata in this study were eight out of the nine different schools that make up the university. One school was omitted from the study due to the limited number of students accepted there, which the main researcher felt would
not be indicative of the target population. Using the printed master course schedule as a blueprint, within each of these eight schools the number of academic subjects offered from which to pick undergraduate courses was identified and examined. Using the proportional allocation technique, an appropriate number of academic subjects from each school were identified and then randomly selected. More specifically, while the first school offered 47 subject areas from which to pick undergraduate courses, the most any of the other schools offered was eight. Therefore, the main researcher rounded up and worked with a 5:1 ratio and selected 5 subject areas and therefore courses from the largest school while selecting only one course from the each of the remaining schools. From within the selected academic subjects, a random sample of undergraduate courses was selected and students within the resulting course selections were given the opportunity to participate in this study. In the case where there was only one academic subject listed for a particular school, the main researcher went straight to random selection of an undergraduate course or section of an undergraduate course, rather than random selection of an academic subject. This procedure was continued throughout several semesters until an appropriate sample size was obtained. This sampling procedure should yield a representative sample of college students and therefore facilitate better ability to generalize from the results than previous studies of this nature. Also, since many previous studies have found a gender imbalance in those addicted to the internet, with a preponderance of males, this carefully designed sampling procedure should avoid any gender bias and produce a more accurate reflection of internet addiction in the target population.
**Instruments**

A wide variety of assessments have been developed and used in the literature to measure extent of internet addiction. Each assessment is based on the researcher’s hypothesized etiology of the disorder. For the present study, the assessments chosen to measure internet addiction were based on the psychometric properties of the assessment, the underlying conceptual basis of the assessment, and the frequency of use in the literature. Young’s IAT was the first assessment selected to be utilized in the present study due to its frequency of use and psychometric integrity. The process used to select the second internet addiction assessment was as follows. First, the assessments with no reported psychometric information were rejected immediately as inappropriate for the present study. Then, those assessments in which the theoretical basis was very similar to Young’s (ex: pathological gambling/impulse control) were rejected due to the common theoretical background. Next, assessments in which the validity was in question (ex: based on substance abuse) were deemed inappropriate due to the lack of evidence and thus rejected. After that, assessments that were specifically designed to measure online behavior rather than internet addiction or excessive internet use, per se, were seen as inappropriate for the present study and rejected. After this process, the resulting assessment with good psychometric integrity that differed considerably in its theoretical basis from Young’s IAT was Caplan’s Generalized Problematic Use Scale (GPIUS).

Young’s IAT consists of 20 items rated on a five point Likert scale, indicating the degree to which internet usage affects aspects of the user’s daily life. Scores range from 20 to 100 and a higher score indicates a greater number of problems caused by use of the
internet. Young suggests ranges of scores that indicate whether the internet user is an
average user and has complete control over internet use (20-39), whether the user has
frequent problems related to internet usage (40-69), and whether internet use significantly
interferes with the user’s life (70-100). This assessment is based on the behaviors
associated with internet addiction. Widyanto and McMurrum (2004) conducted a study to
investigate some of the psychometric properties of the IAT. These researchers
conducted a factor analysis of this instrument and found six main factors including
salience, excessive use, neglecting work, anticipation, lack of control, and neglecting
social life that all showed good internal consistency and concurrent validity. Therefore,
Widyanto and McMurrum conclude that the Internet Addiction Test is “a valid and
reliable instrument that may be used in further research on internet addiction” (p. 443).
Due to the psychometric integrity of this measure as well as the fact that it is the most
widely used instrument to measure internet addiction, the IAT was one of the instruments
used to assess internet addiction in the present study.

Caplan (2002) developed a Generalized Problematic Internet Use Scale (GPIUS)
based on Davis’s work on the cognitions associated with excessive internet use, rather
than the associated behaviors. This scale is designed to measure, “the prevalence of
cognitions, behaviors, and negative outcomes” (p. 560) of what Davis (2002) calls
generalized problematic internet use. This assessment consists of 29 items scored on a
five point Likert scale. Caplan reports that a factor analysis identified seven unique sub-
dimensions, including mood alteration, social benefits, negative outcomes, compulsive
use, excessive time online, withdrawal, and social control, which all showed a high
degree of internal consistency with alpha coefficients ranging from .78-.85. Due to this
factor analysis, Caplan suggests that this scale does “validly operationalize” (p. 564) Davis’s conception of generalized problematic internet use and concludes that the GPIUS is a reliable and valid measure. Although this assessment was used in only one study, the fact that it possess a high degree of psychometric integrity as well as the fact that its conceptual basis differs considerably from that of Young’s Internet Addiction Test, makes it ideal for the second internet addiction assessment to be used in this study.

Due to the information stated above, Young’s Internet Addiction Test (IAT) and Caplan’s Generalized Problematic Internet Use Scale (GPIUS) were used to measure the extent of internet addiction. For all the instruments used in this study, please see Appendices A-E.

**Procedure**

The internet addiction and demographic instruments were distributed in several classes around campus over several semesters, using a stratified sampling procedure, covering a variety of majors to incorporate as representative a sample as possible. The instruments were distributed in class, with the permission of each instructor, and participation was voluntary. A line was added to the script in reference to those participants who may have had more than one opportunity to participate in the study cautioning them to only complete the questionnaire once. The script the main researcher read to the potential participants was as follows:

“My name is Daniel Schoenfeld, I’m a doctoral student in Educational Psychology and Methodology, and am currently collecting data for my dissertation research. I will be investigating any possible relationships between excessive internet use and potentially related variables. Participation is voluntary, will not affect your grade in
this course, and is expected to take approximately 15 minutes. By participating in this study, consent will be implied. If you have already completed the survey packet, please refrain from doing so a second time. Thank you for your time.”

**Data Analysis**

The first research question of the study was *Do Young’s Internet Addiction Test (IAT) and Caplan’s Generalized Problematic Internet Use Scale (GPIUS) (a) differ in assessing the prevalence rate of internet addiction in the university student population and (b) identify the same individuals as addicted to the internet?*

The first part of this research question addresses the problem of how individuals are identified as addicted to the internet, or more simply, how is prevalence rate determined? The purpose of this question is to determine if the difference in reported prevalence rates can be explained by type of assessment used. Specifically, this question can be answered based on the results of the instruments used in this study designed to identify internet users who are addicted to the internet or are at risk for addiction. On Young’s IAT, if a student scores from 70-100, that student can be considered addicted to the internet and scores that fall between 40-69 could indicate a student who is at risk for developing internet addiction. Although Caplan does not indicate cutoff scores for those who suffer from pathological use and those who don’t, it can be deduced from the design of the assessment that higher scores indicate a higher degree of pathological use. Therefore for the present study, using Young’s IAT as a model in which scores in the upper 30 point range (70-100) are indicative of problematic use, it can extrapolated that scores from approximately 102-145 on the GPIUS indicate that one has a high degree of
pathological internet use and may be experiencing negative consequences from this disorder and scores from approximately 59-101 indicate one who is at risk for addiction.

The second part of this question addresses the problem of whether variations seen in internet addiction scores are related to the different assessments used to measure the construct. Specifically, each of these instruments uses a different approach to determine the extent of internet addiction, and as such may identify different individual internet users considered addicted to or dependent on the internet as well as at risk for addiction. A descriptive table was used to answer this question in which the frequency of individuals identified as addicted to the internet or at risk by both assessments was compared to the frequency of individuals identified by only one assessment.

The second research question of this study is: *Can (a) demographic predictor variables such as age, GPA, gender, previous addiction and previous psychological disorder, and (b) internet use variables such as reasons for internet use, years online, and time spent online explain the variance on Young’s Internet Addiction Test and Caplan’s Generalized Problematic Internet Use Scale?*

Scores on the internet addiction instruments were measured on a continuous scale with the goal of determining how much of the variation in these scores could be accounted for by the variables mentioned above. For the first part of this research question, the independent or predictor variables, were the demographic factors “age”, “GPA”, “gender” and the psychological variables “previous addiction” and “previous psychological condition”. The dependent or criterion variable was the score on each individual internet addiction instrument. Two regression analyses were most appropriate to analyze this data. One regression analysis used the IAT scores as the criterion variable
and the other used the GPIUS scores as the criterion variable. This type of analysis was also used to determine whether the demographic predictor variables noted above can more successfully explain the variance in one assessment over the other and if in fact the variance seen can be attributed to the different assessments used. A hierarchical linear regression was also run to determine specifically which of these predictors, if any, can significantly add to the predictive power of the model. As discussed by Cohen, Cohen, West, and Aiken (2003), causal priority is one of the basic principles underlying the ordering in hierarchical entry. As such, the predictor variable that was added first to the model was the one found to account for the most variation in internet addiction scores in previous studies. The next variable added was the one found to account for the second most variation, and so on until the last variable was added the regression model. This type of analysis was used to determine if any of these variables individually can significantly add to the explained variance in internet addiction scores. As was the case with the previous regression analysis run, two hierarchical regression analyses were run, one using the IAT as the criterion variable and one using the GPIUS.

The second part of this question addresses some internet use variables that might be related to internet addiction and if type of assessment used plays a role in the variance. Participants were asked to indicate approximately how many hours per week they spent online, how many years they had been using the internet and were asked to indicate the extent of agreement about reasons for internet use on a 1-5 Likert scale with 18 items such as “communicating with friends”, “maintaining relationships”, and “online gaming”. The total reasons score ranges from 18-90 in which higher scores indicate more reasons for use. Multiple regression techniques were focused on examining the relationship
between the extent of internet addiction and time online (hours per week and years using the internet) as well as reasons for use. In this case, the predictor variables are hours online per week, years online, and reasons for use. The criterion variable was the score on the individual internet addiction assessment. The purpose of this type of analysis is to determine how much of the variance seen in the internet addiction assessment scores can be attributed to the predictor variables previously mentioned as well as if differences emerge based on type of internet addiction assessment used. Again, as was the case in the first part of this question, two regression analyses were conducted. One of the analyses used the IAT scores as the criterion variable and the second regression analysis used the GPIUS scores as the criterion variable. A hierarchical linear regression was also run to determine which of these internet use variables adds significantly to the predictive power of the regression model. Again, the variable found in the literature to contribute most to the variability was entered first, followed by the variable found to contribute the second most to the variability, and then third most.
Chapter 4: Results

Sample Description

A total sample of 224 students was surveyed. The mean age of the participants was 20.46 years with a standard deviation of 2.67 years. Of the participants, 111 (49.5%) were male, while 113 (50.4%) were female. The average GPA of the participants was 3.2 with a standard deviation of 0.41. Grade levels were as follows: Freshman; 46 (20.6%), Sophomore; 46 (20.6%), Junior; 62 (27.8%), Senior; 69 (30.9%), with no significant differences in internet addiction scores. A breakdown of major is as follows: Hard Sciences; 15 (6.7%), Soft Sciences; 55 (24.6%), Criminal Justice; 45 (20.1%), Humanities; 29 (13%), Political Science; 33 (14.8%), Business; 19 (8.5%), Other; 28 (12.5%), also with no significant differences in scores between majors. All participants indicated that they used the internet. The average length of time participants indicated they have used the internet was for 9.84 years with a standard deviation of 2.64 and an average of 20.56 hours per week with a standard deviation of 16.6 hours. Most participants accessed the internet from their rooms, mobile phones, or the library. A number of participants indicated that at some point in time they had been treated for a psychological condition (43; 19%), while only 3 (1.3%) indicated that at some point they had been treated for an addiction.

Do Young’s Internet Addiction Test and Caplan’s Generalized Problematic Internet Use Scale (a) differ in assessing the prevalence rate of internet addiction in the university student population and (b) identify the same individuals as addicted to the internet?

A) Prevalence Rate
The Internet Addiction Test had a mean score of 33.3 with a standard deviation of 9.7, whereas the Generalized Problematic Internet Use Scale had a mean score of 60.2 with a standard deviation of 16.5. Upon examination of Table 1, it can be seen that according to both the Internet Addiction Test and the Generalized Problematic Internet Use Scale, only two participants, or 0.89% of the sample, were identified as addicted to the internet. However, a large part of the sample was identified as at risk for developing internet addiction or problems related to excessive internet use. According to the IAT, 18.3% of the sample may be experiencing some internet use related problems, whereas according to the GPIUS, 50.4% may be at risk for internet addiction. These results indicate that while the number of people suffering from internet addiction may be quite low in the given population, many people may be at risk for developing this condition.

Table 1

*Internet Addiction Prevalence Rate Using Two Different Assessments (N = 224)*

<table>
<thead>
<tr>
<th>Assessment</th>
<th>N</th>
<th>Prevalence</th>
</tr>
</thead>
<tbody>
<tr>
<td>IAT</td>
<td></td>
<td></td>
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<tr>
<td>Addicted</td>
<td>2</td>
<td>.89%</td>
</tr>
<tr>
<td>At risk</td>
<td>41</td>
<td>18.3%</td>
</tr>
<tr>
<td>GPIUS</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Addicted</td>
<td>2</td>
<td>.89%</td>
</tr>
<tr>
<td>At risk</td>
<td>113</td>
<td>50.4%</td>
</tr>
</tbody>
</table>
B) Are the Same Individuals Identified By Each Assessment?

Only one participant was identified as addicted to the internet by both assessments, however, the IAT identified one participant as addicted to the internet that the GPIUS did not, and vice versa. So using the data from both internet addiction assessments, if one adds the participant that was identified by both assessments and the participants that were only identified by one assessment, a total of 3 participants, or around 1% of the sample, was identified as addicted to the internet in this study. Due to this relatively low number, it is difficult and inappropriate to draw conclusions about whether or not these 2 different assessments can identify the same people as addicted to the internet. However, as was the case in the previous research question, a much larger group of individuals was found to be at risk for developing problems due to their internet use habits. Upon examination of Table 2, it can be seen that about 37% of the sample was identified as being at risk for developing internet use related problems by only one assessment (N = 82). This group includes the individuals that were only identified as at risk by either the IAT or the GPIUS, but not by both assessments. An examination of this group reveals that the GPIUS identified 80 individuals as at risk that were not identified by the IAT. On the other hand, the group identified as at risk by the IAT revealed only 2 individuals that were not also identified by the GPIUS (please refer to figure 1 for a visual representation).
Figure 1

*Diagram of Participants Identified as At Risk for Internet Addiction by Only One Assessment*

About 16.5% of the sample was identified as at risk by both assessments (N = 37). However, as was mentioned earlier, a little more than a third of the sample was identified as being at risk for experiencing some negative consequences related to internet use habits by one assessment and not the other indicating that an individual may or may not be diagnosed as at risk for developing internet addiction depending on which internet addiction assessment is used.
Table 2

Number of Participants Identified as Addicted to the Internet by Both Assessments as Opposed to Only One (N = 224)

<table>
<thead>
<tr>
<th>Individuals identified</th>
<th>N</th>
<th>% of sample</th>
</tr>
</thead>
<tbody>
<tr>
<td>Both assessments</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Addicted</td>
<td>1</td>
<td>.4%</td>
</tr>
<tr>
<td>At risk</td>
<td>37</td>
<td>16.5%</td>
</tr>
<tr>
<td>Only one assessment</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Addicted</td>
<td>2</td>
<td>.89%</td>
</tr>
<tr>
<td>At risk</td>
<td>82</td>
<td>36.6%</td>
</tr>
</tbody>
</table>

Can (a) demographic predictor variables such as age, GPA, gender, previous addiction and previous psychological disorder, and (b) internet use variables such as reasons for internet use, years online, and time spent online explain the variance on Young’s Internet Addiction Test and Caplan’s Generalized Problematic Internet Use Scale?

A) Demographic Predictor Variables

The correlations shown in Table 3 indicate that IAT scores and GPIUS scores are significantly correlated with most of the predictor variables mentioned above, specifically “age”, “GPA”, and whether or not the participant had been treated for a psychological condition in the past. There are also several significant correlations among the predictor variables indicating multicollinearity. Since there is some degree of multicollinearity
among predictor variables, results of the regression analyses should be interpreted with caution.

Table 3

*Correlations Among Measures*

<table>
<thead>
<tr>
<th>Variables</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Age</td>
<td>--</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2. GPA</td>
<td></td>
<td>.073</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3. Gender</td>
<td></td>
<td></td>
<td>-.072</td>
<td>.125*</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4. Previous Addiction</td>
<td></td>
<td>.084</td>
<td>-.096</td>
<td>-.040</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>5. Previous Psych. Disorder</td>
<td></td>
<td>.108</td>
<td>.058</td>
<td>.159*</td>
<td>.252*</td>
<td></td>
<td></td>
</tr>
<tr>
<td>6. IAT score</td>
<td></td>
<td>-.144*</td>
<td>-.157*</td>
<td>.046</td>
<td>.209*</td>
<td>-.007</td>
<td></td>
</tr>
<tr>
<td>7. GPIUS score</td>
<td></td>
<td>-.133*</td>
<td>-.126*</td>
<td>.017</td>
<td>.224*</td>
<td>.058</td>
<td>.707*</td>
</tr>
</tbody>
</table>

*p<.05

As can be seen in Table 4, the results of the first regression analysis using the demographic variables as predictors indicate that taken together, they can account for about 5% of the total variation seen in IAT scores, indicating a good model fit, F(5, 202) = 2.3, p < .05. Also, the predictor variables “age” and “previous addiction” individually could significantly predict the criterion variable IAT score. More specifically, the regression results indicate that for every one point increase in IAT scores, “age” can be predicted to decrease by around 0.6 years, or in general, those who scored higher on the
IAT were younger than those who had lower scores, $\beta = -0.172$, $p > .05$. Also, those who reported suffering from an addiction in the past had an average IAT score that was approximately 14 points higher than those who reported no previous addiction, $\beta = 0.150$, $p > .05$. This significant difference indicates that the variable “previous addiction” could be an important predictor of internet addiction scores when using the IAT as a criterion variable. The results of the second regression analysis indicate that the aforementioned predictor variables account for about 4.6% of the total variation seen in GPIUS scores, $F(5, 202) = 1.934$, $p = .09$. Since the $R^2$ in this case was found to approach significance, yet failed to reach the threshold of .05, it can be deduced that the aforementioned predictor variables taken together can explain some of the variance in GPIUS scores. Also, the parameter estimates showed a similar pattern and direction of effects to the first regression analysis run that used IAT scores as the criterion variable, indicating that these two assessments are related. However, since the traditional significance cutoff of $p > .05$ was used in this study, the aforementioned $R^2$ was classified as not significant. As was the case when the IAT was used as the criterion variable, the predictors “age” and “previous addiction” proved to be significant in this analysis. More specifically, for every one point increase in score on the GPIUS, age can be expected to decrease be about a year, $\beta = -0.169$, $p > .05$. Also, those who had been treated for an addiction at some point in the past scored about 25 points higher than those who weren’t, $\beta = 0.149$, $p > .05$. By examining normal probability plots, plots of standard residuals against standardized predicted values, and by identifying outliers, all assumptions of the general linear model have been met. The residuals are normally distributed, they are homoscedastic (equal variances of $y$ at each value $x$), independently
distributed, and the relationship is linear. These results indicate that about 5% of the variation in internet addiction scores, as measured with the IAT, can collectively be accounted for by the predictor variables “age”, “GPA”, “gender”, “previous psychological condition”, and “previous addiction”. Using the GPIUS as the internet addiction measure in this analysis yields no significant results.

Table 4

Summary of Linear Regression Analysis for Variables Predicting IAT Scores and GPIUS Scores as separate Criterion Variables (N = 224)

<table>
<thead>
<tr>
<th>Predictor Variable</th>
<th>IAT</th>
<th></th>
<th>GPIUS</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>B</td>
<td>S.E.</td>
<td>β</td>
<td>B</td>
</tr>
<tr>
<td>Age</td>
<td>-.601*</td>
<td>.244</td>
<td>-.172*</td>
<td>-1.024*</td>
</tr>
<tr>
<td>GPA</td>
<td>-.024</td>
<td>1.571</td>
<td>-.001</td>
<td>-1.269</td>
</tr>
<tr>
<td>Gender</td>
<td>1.031</td>
<td>1.322</td>
<td>.054</td>
<td>.075</td>
</tr>
<tr>
<td>Previous Addiction</td>
<td>14.502*</td>
<td>6.849</td>
<td>.150*</td>
<td>25.165*</td>
</tr>
<tr>
<td>Previous Psych. Condition</td>
<td>-1.609</td>
<td>1.747</td>
<td>-.066</td>
<td>.894</td>
</tr>
</tbody>
</table>

Note. For criterion variable IAT: $R^2 = .054$, Adjusted $R^2 = .03$, $F(5, 202) = 2.3$, $p<.05$  
*p<.05

For criterion variable GPIUS: $R^2 = .046$, Adjusted $R^2 = .022$, $F(5, 202) = 1.934$, $p = .090$  
*p<.05
A hierarchical regression analysis was then run (Table 5) to determine in what way the predictor variables above added to the overall predictive power of the regression model and the variance seen in internet addiction scores. As was the case with the first regression analyses two separate hierarchical regressions were run, one using the IAT scores as the criterion variable and one using the GPIUS scores as the criterion variable. As can be seen in Table 5, using the IAT as the criterion variable, the only model that proved to be significant was model five, indicating a good model fit and meaning that that unique set of variables could successfully explain some of the variance in IAT scores. More specifically, the change in R squared was significant for only model five as well indicating that the variable “age” may be particularly important when trying to predict internet addiction scores using the IAT. When the GPIUS was used as the criterion variable, similar results were found. Model five was the only one which proved to be statistically significant and have a good model fit, as well as the only model to have a significant change in R squared. As was the case when the IAT was used as the criterion variable, these results indicate that the variable “age” may add a significant amount to the prediction of GPIUS scores.

Table 5

Summary of Hierarchical Linear Regression Analysis for the Variables Age, Gender, GPA, Psychological Condition, and Addiction Predicting IAT and GPIUS Scores

(N=224)

<table>
<thead>
<tr>
<th>IAT</th>
<th>Step</th>
<th>B</th>
<th>SE B</th>
<th>R²</th>
<th>ΔR²</th>
</tr>
</thead>
</table>

52
<table>
<thead>
<tr>
<th></th>
<th>Model fit</th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1. Model fit</td>
<td>0.014</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Previous Addiction</td>
<td>11.325</td>
<td>6.710</td>
<td></td>
</tr>
<tr>
<td>2. Model fit</td>
<td>0.020</td>
<td>0.006</td>
<td></td>
</tr>
<tr>
<td>Previous Addiction</td>
<td>12.917</td>
<td>6.856</td>
<td></td>
</tr>
<tr>
<td>Psychological Condition</td>
<td>-1.928</td>
<td>1.732</td>
<td></td>
</tr>
<tr>
<td>3. Model fit</td>
<td>0.020</td>
<td>0.000</td>
<td></td>
</tr>
<tr>
<td>Previous Addiction</td>
<td>12.858</td>
<td>6.910</td>
<td></td>
</tr>
<tr>
<td>Psychological Condition</td>
<td>-1.925</td>
<td>1.736</td>
<td></td>
</tr>
<tr>
<td>GPA</td>
<td>0.131</td>
<td>1.588</td>
<td></td>
</tr>
<tr>
<td>4. Model fit</td>
<td>0.026</td>
<td>0.006</td>
<td></td>
</tr>
<tr>
<td>Previous Addiction</td>
<td>13.073</td>
<td>6.908</td>
<td></td>
</tr>
<tr>
<td>Psychological Condition</td>
<td>-2.194</td>
<td>1.752</td>
<td></td>
</tr>
<tr>
<td>GPA</td>
<td>0.199</td>
<td>1.588</td>
<td></td>
</tr>
<tr>
<td>Gender</td>
<td>1.469</td>
<td>1.326</td>
<td></td>
</tr>
<tr>
<td>5. Model fit</td>
<td>0.054*</td>
<td>0.028*</td>
<td></td>
</tr>
<tr>
<td>Previous Addiction</td>
<td>14.502</td>
<td>6.849</td>
<td></td>
</tr>
<tr>
<td>Psychological Condition</td>
<td>-1.609</td>
<td>1.747</td>
<td></td>
</tr>
<tr>
<td>GPA</td>
<td>-0.024</td>
<td>1.571</td>
<td></td>
</tr>
<tr>
<td>Gender</td>
<td>1.031</td>
<td>1.322</td>
<td></td>
</tr>
<tr>
<td>Age</td>
<td>-0.601*</td>
<td>0.244</td>
<td></td>
</tr>
</tbody>
</table>

*Note. *p < .05
<table>
<thead>
<tr>
<th>Step</th>
<th>B</th>
<th>SE B</th>
<th>$R^2$</th>
<th>$\Delta R^2$</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Model fit</td>
<td></td>
<td></td>
<td>0.017</td>
<td></td>
</tr>
<tr>
<td>Previous Addiction</td>
<td>22.257</td>
<td>11.659</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2. Model fit</td>
<td></td>
<td></td>
<td>0.017</td>
<td>0.0</td>
</tr>
<tr>
<td>Previous Addiction</td>
<td>22.194</td>
<td>11.949</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Psychological Condition</td>
<td>0.076</td>
<td>3.018</td>
<td></td>
<td></td>
</tr>
<tr>
<td>3. Model fit</td>
<td></td>
<td></td>
<td>0.018</td>
<td>0.001</td>
</tr>
<tr>
<td>Previous Addiction</td>
<td>22.564</td>
<td>12.033</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Psychological Condition</td>
<td>0.070</td>
<td>3.024</td>
<td></td>
<td></td>
</tr>
<tr>
<td>GPA</td>
<td>-0.868</td>
<td>2.761</td>
<td></td>
<td></td>
</tr>
<tr>
<td>4. Model fit</td>
<td></td>
<td></td>
<td>0.018</td>
<td>0.000</td>
</tr>
<tr>
<td>Previous Addiction</td>
<td>22.688</td>
<td>12.064</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Psychological Condition</td>
<td>-0.082</td>
<td>3.061</td>
<td></td>
<td></td>
</tr>
<tr>
<td>GPA</td>
<td>-0.836</td>
<td>2.769</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Gender</td>
<td>0.828</td>
<td>2.316</td>
<td></td>
<td></td>
</tr>
<tr>
<td>5. Model fit</td>
<td></td>
<td></td>
<td>0.046*</td>
<td>0.027*</td>
</tr>
<tr>
<td>Previous Addiction</td>
<td>25.165*</td>
<td>11.970</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Psychological Condition</td>
<td>0.894</td>
<td>3.053</td>
<td></td>
<td></td>
</tr>
<tr>
<td>GPA</td>
<td>-1.269</td>
<td>2.743</td>
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</tr>
<tr>
<td>Gender</td>
<td>0.075</td>
<td>2.310</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Age</td>
<td>-1.024*</td>
<td>0.427</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Note: *p < .05

B) Internet Use Variables

Table 6 indicates that “time spent online” and “reasons for internet” use are each significantly correlated with both internet addiction assessments. These two variables can also individually predict both IAT and GPIUS scores and are significantly correlated with each other indicating some degree of multicollinearity, which again would urge one to use caution when interpreting these regression results.

Table 6

Correlations Among Measures

<table>
<thead>
<tr>
<th>Variables</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Reasons for use</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2. Years used</td>
<td>.032</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3. Time spent online</td>
<td>.478*</td>
<td>.042</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4. IAT score</td>
<td>.496*</td>
<td>-.006</td>
<td>.475*</td>
<td></td>
<td></td>
</tr>
<tr>
<td>5. GPIUS score</td>
<td>.537*</td>
<td>-.035</td>
<td>.414*</td>
<td>.707*</td>
<td></td>
</tr>
</tbody>
</table>

*p<.05

The first regression analysis in Table 7 shows that the predictor variables “reasons for internet use”, “years online”, and “time spent online per week” collectively account for about 32% of the variation in IAT scores, F(3, 201) = 31.412, p < .05, with a good
model fit. An examination of Table 7 reveals that for every one point increase in IAT score, one can expect a 0.419 increase in total reasons for use score ($\beta = 0.349$, $p < .05$) as well as an increase of hours online by about 0.19 hours ($\beta = 0.310$, $p < .05$). The second regression analysis depicted in Table 7 also shows a good model fit in that these same three predictor variables (“years”, “reasons”, and “time”) collectively account for about 32.3% of the variation in GPIUS scores $F(3, 201) = 32.009$, $p < .05$. More specifically, for every one point increase in GPIUS score, one can expect a 0.925 increase in total reasons score ($\beta = 0.440$, $p < .05$) and an increase of hours spent online by about 0.221 hours ($\beta = 0.206$, $p < .05$). As was the case with the first series of regression analyses (Table 4), all assumptions of the general linear model have been met. These results indicate that about 32% of the variation in internet addiction scores, whether using the IAT or the GPIUS, can be accounted for by the internet use variables “time spent online per week”, “years online”, and “reasons for online use”.

Table 7

Summary of Linear Regression Analysis for the Variables Reasons for Internet use, Years Online, and Time Spent Online Predicting IAT Scores and GPIUS Scores (N = 224)

<table>
<thead>
<tr>
<th>Predictor Variable</th>
<th>IAT</th>
<th></th>
<th>GPIUS</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>B</td>
<td>S.E.</td>
<td>$\beta$</td>
<td>B</td>
</tr>
<tr>
<td>Reasons</td>
<td>.419**</td>
<td>.080</td>
<td>.349**</td>
<td>.925**</td>
</tr>
<tr>
<td>Years used</td>
<td>-.113</td>
<td>.214</td>
<td>-.031</td>
<td>-.370</td>
</tr>
<tr>
<td>Time</td>
<td>.190**</td>
<td>.041</td>
<td>.310**</td>
<td>.221**</td>
</tr>
</tbody>
</table>
Note. For criterion variable IAT: $R^2 = .320$, Adjusted $R^2 = .310$, $F(3, 200) = 31.412$, $p<.05$

*p<.05; **p<.01

For criterion variable GPIUS: $R^2 = .323$, Adjusted $R^2 = .313$, $F(3, 201) = 32.009$, $p<.05$

*p<.05; **p<.01

Next a series of hierarchical regression analysis were run (Table 8) to determine which of the aforementioned internet use variables contributed most to the predictive power of the regression model. As was the case with the previous regression analyses, one analysis used the IAT as the criterion variable and one used the GPIUS as the criterion variable. The first variable entered into the hierarchical regression was “time spent online” since this variable was determined to be the most predictive of internet addiction scores, followed by “reasons for use”, and then “years online”. Results indicate that there was a significant change in R squared from models 1 to 2 in both hierarchical analyses, meaning that both the variable “time spent online” by itself and “time spent online” along with “reasons for use” both significantly contribute to the predictive power of the regression models. The change in R squared when the variable “years online” was added to the model was not significant, indicating that this variable does not add much to predicting IAT or GPIUS scores. However, each individual model proved to be significant in both analyses, indicating a good model fits for each one. In model 1, it can be seen that the predictor variable “time spent online” could significantly predict both IAT and GPIUS scores. In model 2, it can be seen that the variables “time spent online” and “reasons for use” taken together can significantly predict internet addiction scores.
In model 3, it can be seen that although there was no significant change in R squared when the variable “years online” was added, when this variable was taken together with “time spent online” and “reasons for use”, a significant predictive model emerged. With all this information taken together, it appears that “time spent online” and “reasons for use” can both significantly predict internet addiction scores on both assessments, while the variable “years online” adds little, if anything to the predictive power of the model.

Table 8

*Summary of Hierarchical Linear Regression Analysis for the Variables Time Spent Online, Reasons for Use, and Years Online Predicting IAT and GPIUS Scores (N=224)*

<table>
<thead>
<tr>
<th>Step</th>
<th>B</th>
<th>SE B</th>
<th>R²</th>
<th>ΔR²</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Model fit</td>
<td>0.226***</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Time Spent Online</td>
<td>0.291***</td>
<td>0.038</td>
<td></td>
</tr>
<tr>
<td>2.</td>
<td>Model fit</td>
<td>0.319***</td>
<td>0.094***</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Time Spent Online</td>
<td>0.189***</td>
<td>0.041</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Reasons</td>
<td>0.419***</td>
<td>0.08</td>
<td></td>
</tr>
<tr>
<td>3.</td>
<td>Model fit</td>
<td>0.32***</td>
<td>0.001</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Time Spent Online</td>
<td>0.19***</td>
<td>0.041</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Reasons</td>
<td>0.419***</td>
<td>0.08</td>
<td></td>
</tr>
<tr>
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*Note.* *p < .05. **p < .01. ***p < .001
### GPIUS

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<td>0.171***</td>
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*Note. *p < .05. **p < .01. ***p < .001*
Chapter 5: Discussion

Some previous studies have shown that certain individuals may be particularly at risk for internet addiction. For example, males and individuals with a long standing interest in technology and science (Chou, Condon, & Belland, 2005) and individuals who major in the “hard sciences” (Niemz, Griffiths, and Banyard, 2005) may be more susceptible to internet addiction, while other studies report excessive use across majors (Scherer, 1997). The present study found no difference between genders or majors in internet addiction scores indicating that males may be just as susceptible to developing internet addiction as females regardless of major. Due to the relatively even breakdown of gender in the present study, this result could be a more accurate reflection of the target population that other studies of this nature. Kubey, Lavin, and Barrows (2001) found that those who were classified as dependent on the internet were four times more likely to report academic difficulties than those who were not dependent. In the present study academic success, as measured by GPA, was not related to internet addiction score. This could be due to the fact that a more robust sampling method was used in this study and because of this the results are more representative of the target population than other studies of this nature with less robust sampling methods. Yellowlees and Marks (2007) indicate that those with a history of impulse control or other addictive disorders may be particularly vulnerable to internet addiction. The present study confirms this assertion in that those who indicated that they had been treated for a previous addiction scored significantly higher on both internet addiction assessments than those who had not.

The first research question of this study addressed the prevalence rate of internet addiction in the university student population as well as the concurrent validity of two
internet addiction assessments. More specifically, the question focused on whether or not two different internet addiction assessments would identify the same individuals as addicted to or as possibly addicted to the internet. In this study the prevalence rate of internet addiction was found to be about 0.9% by each assessment. A recent review of the literature on internet addiction by Chakraborty, Basu, and Kumar (2010) reported that in all the studies that they reviewed, the overall prevalence rate appears to range from 0.3% to 38%. In other words, the lowest prevalence rate these authors found in their review was 0.3% and the highest rate found was 38%. Clearly this huge range leads to an obvious question: Is this the actual range in the population or did the sampling method and internet addiction assessment measure used influence these numbers? Based on the results of the present study, the internet addiction assessment measure and sampling procedure used in the various studies reviewed could very well have influenced these prevalence numbers.

The prevalence rate found in this study, while low, does fall within the aforementioned range. One reason for the low prevalence found in the present study may be that a stratified random sampling procedure was used in order to procure a more diverse sample and therefore generate a more accurate picture of internet addiction in the target population. This sampling procedure was more robust than other studies of this nature and as such the prevalence rate reported here may be a more accurate reflection of the actual rate in the target population. The prevalence of those who may be “at risk” was much higher with about 18% of the sample identified as “at risk” by the IAT and about 50% identified by the GPIUS. These results suggest that while the rate of internet addiction may be quite low in the target population, numerous individuals may be
experiencing some negative consequences due to excessive internet use. One can also
see from these results that the internet addiction assessment measure used clearly had an
impact on the diagnosis of possible addicts or those who are “at risk” for addiction. The
IAT was able to identify 18% of the sample as possible addicts, while according to the
GPIUS, about 50% of the sample was identified, so obviously the internet addiction
assessment measure used plays a major role in classification and diagnosis.

There was only one individual (representing 0.4% of the study participants) who
was identified as addicted to the internet by both measures and 37 individuals
( representing about 16.5% of the study participants) identified as “at risk” for addiction
by both. Two different individuals ( representing 0.89% of study participants) were
identified as addicted and 82 individuals ( representing about 37% of the study
participants) as “at risk” by only one assessment. Since there were so few individuals
identified as addicted to the internet in this study, not much can be concluded about
whether these two internet addiction assessments identify the same people as addicted to
the internet. On the other hand, these numbers do indicate that over one third of the
sample was identified as addicted to the internet or “ at risk” for addiction albeit by only
one assessment and not the other. Based on this information, again it seems that the
assessment used to diagnose internet addiction can have a major impact on whether or not
one is identified as addicted to the internet, “ at risk” for addiction, or as having no
internet use related problems. This is additional evidence the assessment measure used
does seem to play an important role in classification.

The second research question addressed the contribution of some demographic
and internet use variables to internet addiction. The first regression analysis revealed that
the variables “age”, “GPA”, “gender”, “previous addiction”, and “previous psychological condition” could successfully explain some of the variation in IAT scores. When GPIUS scores were used as the criterion variable, the result approached statistical significance but did not pass the threshold. This indicates that these collective variables could be successful in attempting to explain some of the variation in GPIUS scores, but for the purposes of the present study this result was deemed not significant. Also, the parameter estimates showed the same pattern and direction of effects as when IAT scores were used as the criterion variable, indicating that the IAT and GPIUS could be measuring some important aspects of the same construct. Again, this difference indicates the disparity one can get when using different internet addiction assessments as a criterion measure. These results indicate that collectively, the predictor variables mentioned above can more successfully account for the variance in IAT scores over GPIUS scores. In other words, one can get a better idea of what a person’s IAT score will be, rather than a person’s GPIUS score, purely based on the collective variables “age”, “GPA”, “gender”, “previous addiction”, and “previous psychological condition”.

So, a brief answer to the first part of this research question is that yes, the aforementioned demographic and psychological predictor variables can more successfully explain the variance in one internet addiction assessment (IAT) over the other (GPIUS). A hierarchical regression revealed that for both the IAT and the GPIUS, the variable “age” may be most important when attempting to predict internet addiction scores. More specifically, younger individuals tended to score slightly higher than their older counterparts on both measures.
The second part of this question focused on the internet use variables “hours online”, “years online”, and “reasons for use” with the same goals as the first part of this question. It was found that the above internet use variables could successfully explain approximately the same amount of variance in both IAT and GPIUS scores. Specifically, “hours” and “reasons” could predict scores on both assessments, while the variable “years online” could not. These results suggest that the three internet use variables mentioned above cannot more successfully account for the variance in IAT scores over GPIUS scores. In this case, the assessment used to measure internet addiction does not appear to influence the predictive power of the three internet use variables chosen. This may be due to the fact that the variables “hours online” and “reasons for use” are highly correlated with internet addiction scores and each other, so the assessment used to measure internet addiction may be inconsequential. When a person scores high on an internet addiction assessment, that person is more likely, almost necessarily, to spend more time online and use the internet for more reasons than a person who doesn’t score as high. Consequently, it would seem that these variables will always contribute to the variability in internet addiction scores regardless of the assessment used, which can explain the results reported above. Not surprisingly, a hierarchical regression revealed that the variables “hours online” and “reasons for use” both individually and collectively significantly added to the predictive power of the regression model for both IAT scores and GPIUS scores, while the variable “years online” added nothing, again indicating that these two variables are highly predictive of internet addiction score. Morahan-Martin and Schumacher (2000) found that pathological internet users used the internet for more reasons than non pathological users, a finding that was replicated in the present study.
Also, several previous studies of this nature indicate that hours online consistently differentiated those suffering from internet addiction and those who are “at risk” or experiencing no internet related problems (Chen & Chou, 1999; Morahan-Martin & Schumacher, 2000; Young, 1998). The present study was no different in that those individuals who spent more time online tended to have higher internet addiction scores than those who spent less time online. This finding should be interpreted with caution because as Caplan (2005) reports, “Frequency of internet use, in and of itself, is not necessarily indicative of problematic use” (p. 1093). So, although time spent online in and of itself is not necessarily evidence of problematic use, it can be a clue that problems related to excessive internet use may be near.

Several important findings emerged from this study. First, although the prevalence of internet addiction was found to be quite low, the prevalence of those who may be “at risk” or “possible internet addicts” was surprisingly high, regardless of which assessment was used (18% for the IAT; 50% for GPIUS). This indicates that there may be a significant number of people in the target population who are experiencing some negative consequences from their internet use habits. Identification of this “at risk” population is important because once a person realizes that he or she is at risk for internet addiction, that person could change internet use habits to avoid becoming addicted.

One can clearly see some potential problems that might arise simply due to the assessment used to diagnose internet addiction. For example, in this study the IAT was able to identify 18% of the sample as “at risk” while the GPIUS was able to identify about 50% of the sample as “at risk”. This is a huge discrepancy. If the IAT was the sole internet addiction assessment used in this study, only 18% of the sample would realize
that they might have to change some of their internet use habits to avoid some of the problems associated with internet addiction. Since the GPIUS was also used in this study, it was determined that approximately half of the sample may be “at risk” and consequently may want to change some of their internet use habits to avoid addiction. As was stated earlier, this is quite a large difference and merely one potential problem that can be encountered when attempting to diagnose internet addiction due to the myriad assessments available. This discrepancy can also cause problems for internet addiction researchers. If prevalence rates differ depending on which internet addiction assessment is used then it makes it very difficult to compare prevalence rates across studies that use different assessments. Clearly a single internet addiction assessment would solve the aforementioned issues, although this is highly unlikely to happen due to the differing opinions about the basis of the disorder. However, due to the information above, an important conclusion of the present study is that there should be collaboration between internet addiction researchers in an effort to produce not a single, universal assessment per se, but several standardized, definitive assessment measures each of which draws upon a different background framework. Through these means, researchers would be able to compare results across studies that use the same assessment measure. Although it can be argued that researchers can do this now, reducing the amount of assessment measures presently available to several definitive instruments would allow for comparison of results across many studies rather than just the few that happened to use the same internet addiction assessment as well as alert researchers to the extreme importance of the assessment used to measure internet addiction. Since this method
would lead to more valid comparisons of results across studies, it would vastly improve the collective knowledge about internet addiction.

In the present study, because of the different results generated by the two internet addiction measures, it was not possible to draw conclusions about predictor variables such as “GPA” or “gender” without reference to the measure used. However, the regression analyses run in this study did result in some interesting findings. The collective demographic predictor variables “age”, “GPA”, “gender”, “previous addiction”, and “previous psychological condition” were able to explain the variance in the IAT more successfully than the GPIUS. This seems to indicate that these two assessments measure slightly different constructs or different aspects of the same, complex construct. They may both be measuring some of the important aspects of internet addiction, as evidenced by the substantial agreement in size and direction of the parameter estimates from the regression analysis, but those aspects are different enough that the aforementioned predictor variables can more successfully explain the variance in one assessment over the other. This finding makes sense given the vastly different ideas about internet addiction that went into producing these two assessments. The GPIUS uses a cognitive framework. The items on this assessment focus on the maladaptive cognitions and behaviors associated with excessive internet use. This model emphasizes that an individual’s cognitions are the main factor in promoting and maintaining maladaptive internet use behavior and therefore the assessment based on this model focuses on how negative thoughts toward excessive internet use lead to negative behaviors. The IAT initially was adapted from the model for pathological gambling in the DSM-IV and later items were added about how negative internet use behaviors
impact a user’s life. This assessment measure tends to focus on the negative behaviors associated with excessive internet use and whether those behaviors are impacting certain areas of an internet user’s life. Although the frameworks for these two assessments are somewhat similar, they are different enough that there is a high likelihood that different individuals will be identified by each one, which is exactly what was found in the present study. This is further evidence that different internet addiction assessments may not measure the same aspects of what is collectively known as “internet addiction”, indicating that this construct may be quite complex. Obviously, this leads to some important implications.

One major implication from these findings is that any information obtained about internet addiction should not be compared across studies unless the same or a very similar internet addiction assessment measure is used in each study. Since the present study found that different internet addiction assessment instruments could yield different information about who may potentially be addicted to the internet, comparisons across studies that use different measures will be severely limited and perhaps meaningless. Not much useful information can be obtained when attempting to compare results from two different internet addiction assessment instruments that may measure different aspects of the construct. Creating several definitive assessment instruments, as discussed earlier, would be one way to reconcile this problem.

A practical implication of these findings emerges as well. The likelihood for success of a particular treatment option may differ based on what assessment measure is used. If a person is identified as addicted to the internet by a specific assessment measure, that person may be more likely to respond to some treatment options rather than
others. For example, if a person is diagnosed as addicted to the internet by the GPIUS, that person may be likely to respond very well to cognitive behavioral therapy whereas a person diagnosed by the IAT may not respond as well. Since the GPIUS was designed with a cognitive framework in mind, it makes sense that cognitive behavioral therapy may be the best treatment option for those diagnosed specifically by that instrument. Those individuals identified by a different instrument may respond better to treatments based within the framework of that specific assessment.

There were two main goals of the present study. The first was to use a more robust sampling procedure than other studies of this nature in order to yield a more representative sample and therefore a more accurate picture of internet addiction in the target population. This sampling plan was also used to avoid some of the pitfalls found in previous studies such as a self selecting or biased sample, or only using a few homogeneous classes around campus. The sampling method used in the present study was successful in producing a more diverse sample than previous studies of this nature as evidenced by parity across gender, major, class year, and GPA. Through this superior sampling method, fewer individuals were identified as addicted to the internet than had been concluded in previous studies that use less sound sampling methods. Regardless of the number of individuals identified as addicted to the internet in the present study, in future studies researchers should use sound methods that yield diverse samples and that avoid the potential pitfalls of poor sampling that has plagued internet addiction research in the past.

The second goal was to determine if two different internet addiction assessment measures would identify the same individuals as addicted to the internet. This
information clearly has important implications for future research in the field. If different individuals are identified by each different assessment measure, then cross study comparisons that use different internet addiction assessment measures will be severely limited. If there were several definitive assessment measures available for researchers to use, as was discussed earlier, it would drastically reduce this problem. Researchers would be able to choose an assessment that matches their beliefs about internet addiction and fits their needs for their current research and then compare results across studies that use similar ideas. This would be a great way and important step to advance knowledge in this field.

The limitations of previous studies of this nature have been well documented and previously discussed. The present study successfully attempted to avoid some of these limitations with a more robust sampling plan and by using two internet addiction assessment measures with a high degree of psychometric integrity. Inevitably, as is the case with every research study, there were some limitations of the present study. The most important of these limitations was the survey method used to gather data. Some inherent limitations of the survey method, present study included, are the “lie” factor and the subjective nature of surveys. Since a survey is a self report measure, even on completely anonymous surveys, there is always a chance that a participant will misrepresent the truth to portray him or herself in a more favorable light. Because of this, survey data should always be interpreted with caution. Also, the nature of some of the items on the internet addiction assessment measures used in the present study was very subjective. For example, an item on one of the internet addiction surveys used asks about how often the user stays online for longer than intended, with the choices, “rarely”,

70
“occasionally”, “frequently”, “often”, and “always”. With these answer choices it may be hard for the participant to distinguish between some of these options such as, “rarely” and “occasionally” or between “frequently” and “often”. This may lead different individuals to select different options for the same items even though they may have the same or similar levels of preoccupation when not online. This can obviously lead to inaccurate results and consequently, inaccurate interpretations and implications.

Another important limitation of the present study concerns the sample. Since the sample was recruited from a mid-sized public university in the Northeastern United States, the results will only be able to generalize to that population. This is not a severe limitation, although it is an important one. In addition, a larger sample size would yield more confidence in results and consequently greater ability to compare across studies and generalize to target populations.

Despite these limitations, the present study made some important contributions to internet addiction research. In the future, internet addiction researchers should attempt to procure more diverse samples as well as pay particular attention to the assessment measure chosen. These small but important changes could vastly improve the collective knowledge about the construct of internet addiction and lead to more accurate diagnosis and more effective treatment.


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Appendix A

Demographic Characteristics

1. Age:

2. Gender: M  F

3. Major:

4. Estimated GPA:

5. Year in college: Freshman  Sophomore  Junior  Senior

6. Do you use the internet?

7. For how long have you used the internet?

8. On average, how much time per week do you spend on the internet?

9. From where do you usually access the internet?

10. Have you ever been treated for a psychological condition (depression, anxiety, etc.)?

11. Have you ever been treated for an addiction?
Appendix B

Internet Addiction Test

Instructions: Please answer questions 1-20 using the following scale:

1 = Rarely; 2 = Occasionally; 3 = Frequently; 4 = Often; 5 = Always

1. How often do you find you stay online longer than you intended?
   1 = Rarely; 2 = Occasionally; 3 = Frequently; 4 = Often; 5 = Always

2. How often do you neglect household chores to spend more time online?
   1 = Rarely; 2 = Occasionally; 3 = Frequently; 4 = Often; 5 = Always

3. How often do you prefer the excitement of the internet to intimacy with your partner?
   1 = Rarely; 2 = Occasionally; 3 = Frequently; 4 = Often; 5 = Always

4. How often do you form new relationships with fellow online users?
   1 = Rarely; 2 = Occasionally; 3 = Frequently; 4 = Often; 5 = Always

5. How often do others in your life complain to you about the amount of time you spend on-line?
   1 = Rarely; 2 = Occasionally; 3 = Frequently; 4 = Often; 5 = Always

6. How often do your grades or school work suffer because of the amount of time you spend on-line?
   1 = Rarely; 2 = Occasionally; 3 = Frequently; 4 = Often; 5 = Always

7. How often do you check your e-mail before something else that you need to do?
   1 = Rarely; 2 = Occasionally; 3 = Frequently; 4 = Often; 5 = Always

8. How often does your job performance or productivity suffer because of the Internet?
1 = Rarely; 2 = Occasionally; 3 = Frequently; 4 = Often; 5 = Always

9. How often do you become defensive or secretive when anyone asks you what you do on-line?

1 = Rarely; 2 = Occasionally; 3 = Frequently; 4 = Often; 5 = Always

10. How often do you block out disturbing thoughts about your life with soothing thoughts of the Internet?

1 = Rarely; 2 = Occasionally; 3 = Frequently; 4 = Often; 5 = Always

11. How often do you find yourself anticipating when you will go on-line again?

1 = Rarely; 2 = Occasionally; 3 = Frequently; 4 = Often; 5 = Always

12. How often do you fear that life without the Internet would be boring, empty, and joyless?

1 = Rarely; 2 = Occasionally; 3 = Frequently; 4 = Often; 5 = Always

13. How often do you snap, yell, or act annoyed if someone bothers you while you are on-line?

1 = Rarely; 2 = Occasionally; 3 = Frequently; 4 = Often; 5 = Always

14. How often do you lose sleep due to late-night log-ins?

1 = Rarely; 2 = Occasionally; 3 = Frequently; 4 = Often; 5 = Always

15. How often do you feel preoccupied with the Internet when off-line, or fantasize about being on-line?

1 = Rarely; 2 = Occasionally; 3 = Frequently; 4 = Often; 5 = Always

16. How often do you find yourself saying "just a few more minutes" when on-line?

1 = Rarely; 2 = Occasionally; 3 = Frequently; 4 = Often; 5 = Always

17. How often do you try to cut down the amount of time you spend on-line and fail?
1 = Rarely; 2 = Occasionally; 3 = Frequently; 4 = Often; 5 = Always

18. How often do you try to hide how long you've been on-line?

1 = Rarely; 2 = Occasionally; 3 = Frequently; 4 = Often; 5 = Always

19. How often do you choose to spend more time on-line over going out with others?

1 = Rarely; 2 = Occasionally; 3 = Frequently; 4 = Often; 5 = Always

20. How often do you feel depressed, moody or nervous when you are off-line, which goes away once you are back on-line?

1 = Rarely; 2 = Occasionally; 3 = Frequently; 4 = Often; 5 = Always
Appendix C

Generalized Pathological Internet Use Scale

Instructions: For questions 1-29, please indicate your extent of agreement using the following scale:

1 = strongly disagree; 2 = disagree; 3 = neutral; 4 = agree; 5 = strongly agree

1. I use the internet to talk to others when I feel isolated.

1 = strongly disagree; 2 = disagree; 3 = neutral; 4 = agree; 5 = strongly agree

2. I seek others online when I feel isolated.

1 = strongly disagree; 2 = disagree; 3 = neutral; 4 = agree; 5 = strongly agree

3. I use the internet to make myself feel better when I’m down.

1 = strongly disagree; 2 = disagree; 3 = neutral; 4 = agree; 5 = strongly agree

4. I go online to make myself feel better when I’m down.

1 = strongly disagree; 2 = disagree; 3 = neutral; 4 = agree; 5 = strongly agree

5. I’m treated better online than in face-to-face relationships.

1 = strongly disagree; 2 = disagree; 3 = neutral; 4 = agree; 5 = strongly agree

6. I feel safer relating to others online rather than face to face.

1 = strongly disagree; 2 = disagree; 3 = neutral; 4 = agree; 5 = strongly agree

7. I am more confident socializing online than offline.

1 = strongly disagree; 2 = disagree; 3 = neutral; 4 = agree; 5 = strongly agree

8. I am more comfortable with computers than people.

1 = strongly disagree; 2 = disagree; 3 = neutral; 4 = agree; 5 = strongly agree

9. I am treated better online than offline.

1 = strongly disagree; 2 = disagree; 3 = neutral; 4 = agree; 5 = strongly agree
10. I have gotten in trouble in work or school because of being online.
   1 = strongly disagree; 2 = disagree; 3 = neutral; 4 = agree; 5 = strongly agree

11. I have missed class or work because I was online.
   1 = strongly disagree; 2 = disagree; 3 = neutral; 4 = agree; 5 = strongly agree

12. I feel worthless offline, but I am someone online.
   1 = strongly disagree; 2 = disagree; 3 = neutral; 4 = agree; 5 = strongly agree

13. I have missed social events because of being online.
   1 = strongly disagree; 2 = disagree; 3 = neutral; 4 = agree; 5 = strongly agree

14. I have had unsuccessful attempts to control internet use.
   1 = strongly disagree; 2 = disagree; 3 = neutral; 4 = agree; 5 = strongly agree

15. I have been unable to reduce time online.
   1 = strongly disagree; 2 = disagree; 3 = neutral; 4 = agree; 5 = strongly agree

16. I have guilt about time spent online.
   1 = strongly disagree; 2 = disagree; 3 = neutral; 4 = agree; 5 = strongly agree

17. I have tried to stop using the internet for long periods of time.
   1 = strongly disagree; 2 = disagree; 3 = neutral; 4 = agree; 5 = strongly agree

18. I lose track of time spend online.
   1 = strongly disagree; 2 = disagree; 3 = neutral; 4 = agree; 5 = strongly agree

19. I use the internet for longer time then I expect to.
   1 = strongly disagree; 2 = disagree; 3 = neutral; 4 = agree; 5 = strongly agree

20. I spend a deal of time online.
   1 = strongly disagree; 2 = disagree; 3 = neutral; 4 = agree; 5 = strongly agree

21. I go online for longer time than I intend.
1 = strongly disagree; 2 = disagree; 3 = neutral; 4 = agree; 5 = strongly agree

22. I become preoccupied with the internet if I can’t connect for some time.
1 = strongly disagree; 2 = disagree; 3 = neutral; 4 = agree; 5 = strongly agree

23. I miss being online if I can’t go on.
1 = strongly disagree; 2 = disagree; 3 = neutral; 4 = agree; 5 = strongly agree

24. When not online, I wonder what is happening online.
1 = strongly disagree; 2 = disagree; 3 = neutral; 4 = agree; 5 = strongly agree

25. I feel lost if I can’t go online.
1 = strongly disagree; 2 = disagree; 3 = neutral; 4 = agree; 5 = strongly agree

26. I find it hard to stop thinking about what is waiting for me online.
1 = strongly disagree; 2 = disagree; 3 = neutral; 4 = agree; 5 = strongly agree

27. I don’t worry about how I look to others when socializing online.
1 = strongly disagree; 2 = disagree; 3 = neutral; 4 = agree; 5 = strongly agree

28. I don’t worry about relationship commitment when socializing online.
1 = strongly disagree; 2 = disagree; 3 = neutral; 4 = agree; 5 = strongly agree

29. I have control over how others perceive me online.
1 = strongly disagree; 2 = disagree; 3 = neutral; 4 = agree; 5 = strongly agree
Appendix D

Reasons for Internet Use

Instructions: Please indicate the frequency you use the internet for the following reasons, using this scale:

1 = never, 2 = rarely, 3 = sometimes, 4 = often, 5 = always

1. Communicating with friends and family.

1 = never, 2 = rarely, 3 = sometimes, 4 = often, 5 = always

2. Required course work.

1 = never, 2 = rarely, 3 = sometimes, 4 = often, 5 = always

3. Research for courses.

1 = never, 2 = rarely, 3 = sometimes, 4 = often, 5 = always

4. Recreation or relaxation.

1 = never, 2 = rarely, 3 = sometimes, 4 = often, 5 = always

5. Work

1 = never, 2 = rarely, 3 = sometimes, 4 = often, 5 = always


1 = never, 2 = rarely, 3 = sometimes, 4 = often, 5 = always

7. Talking to others who share interests.

1 = never, 2 = rarely, 3 = sometimes, 4 = often, 5 = always

8. Staying abreast of new developments in areas of interest.

1 = never, 2 = rarely, 3 = sometimes, 4 = often, 5 = always

9. Sharing ideas or fantasies.

1 = never, 2 = rarely, 3 = sometimes, 4 = often, 5 = always
10. Wasting time.

1 = never, 2 = rarely, 3 = sometimes, 4 = often, 5 = always

11. Finding information for your own use.

1 = never, 2 = rarely, 3 = sometimes, 4 = often, 5 = always

12. Emotional support.

1 = never, 2 = rarely, 3 = sometimes, 4 = often, 5 = always


1 = never, 2 = rarely, 3 = sometimes, 4 = often, 5 = always


1 = never, 2 = rarely, 3 = sometimes, 4 = often, 5 = always

15. Adult only content.

1 = never, 2 = rarely, 3 = sometimes, 4 = often, 5 = always


1 = never, 2 = rarely, 3 = sometimes, 4 = often, 5 = always

17. Virtual reality.

1 = never, 2 = rarely, 3 = sometimes, 4 = often, 5 = always

18. Browsing.

1 = never, 2 = rarely, 3 = sometimes, 4 = often, 5 = always
Appendix E

Internet Sites Used

Instructions: Please report your average weekly use in minutes and hours for each of the following internet sites or applications as well as the frequency per week that you access each site or application.

<table>
<thead>
<tr>
<th>Site/application</th>
<th>Average time per week</th>
<th>Frequency</th>
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</thead>
<tbody>
<tr>
<td>1. E-mail</td>
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<td>2. Search tools</td>
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<td>3. Newsgroups</td>
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<tr>
<td>4. World Wide Web (WWW)</td>
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<td>5. IRC</td>
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<td>6. FTP downloading of software</td>
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<td>7. Games (MUDs)</td>
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<td>8. Discussion forums</td>
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<td>9. Remote support communications software (RSCS)</td>
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<td>10. Support groups</td>
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<tr>
<td>11. YouTube</td>
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<td>12. MySpace</td>
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<td>13. Facebook</td>
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<tr>
<td>14. Other: _____________________</td>
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</tbody>
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