

Problem Internet use and locus of control among college students: Preliminary findings¹

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Abstract

Rapid growth and easy access to the Internet have facilitated its influence on the American way of life. Aside from the numerous benefits of this now ubiquitous technological tool, the problem of over use and the resulting 'Internet Addiction' is becoming increasingly apparent. College students represent a particularly vulnerable group for problem Internet use. The present study investigated the relationship between problem Internet use and locus of control among 706 undergraduate college students who completed questionnaires. Results indicated that a large proportion of students reported feelings of dissociation and symptoms of tolerance, withdrawal and escape. Moreover, frequent interpersonal and academic conflicts, and physical health-threatening risks related to problem Internet use were found. While men reported more Internet-related problems overall, women were more likely to attempt to cut back or stop their Internet use. A significant positive correlation between external locus of control and problem Internet use was found. Finally, men were seven times more likely to gamble online.

Since the mid-1990s, the Internet has experienced unprecedented growth in both its size and number of users. Approximately 160 million people in the United States have access to the Internet, representing a 24% share of the world's Internet user population, and this number continues to increase (Computer Industry Almanac Inc., 2002). Among the Internet-using population, the fastest growing group is the category of adults aged 55 and over, while individuals ranging from 18-34 years of age represent the "most active online users" (Pastore, 2000). Additionally, it is estimated that by 2004, almost 91% of this age group will be online (Pastore, 2000). College students in particular represent a substantial part of this growth.

The Internet affects individuals on varying levels of occupational, academic, interpersonal, financial, and physical health. The American population is becoming increasingly reliant on computer applications, especially the Internet and related products and services. For example, new technologies

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are now being marketed that are essentially mini-computers whose only function is to be a portable Internet-accessing device (e.g., for use in the kitchen while cooking).

The results of frequent Internet use, particularly among college students, has become a highly controversial issue (Anderson, 2001; Davis, Smith, Rodrigue, & Pulvers, 1999; Grayson & Schwartz, 2000; Kandell, 1998; Leon & Rotunda, 2000). Still, there remains a paucity of research on the subject, including the types and reasons for use, and their consequences. Given the rapid level of growth, both professionals and researchers must recognize the issue as one worth investigating, particularly with respect to the mental health professions. For example, while depression among adolescents is relatively common, recent studies among college students and high school seniors have found an association between heavy Internet use and increased levels of depression (Sanders, Field, Diego, & Kaplan, 2000; Young & Rogers, 1998). Moreover, another recent study at a Denver Public Health HIV Counseling and Testing site found that of the 856 heterosexual male clients (age range: 20-50) studied, those who sought sexual partners on the Internet were at greater risk for sexually transmitted diseases than clients who did not seek sex on the Internet (McFarlane, Bull, & Rietmeijer, 2000). This study attempts to add to the literature by examining Internet use and its relationship to a personality variable, locus of control, among college students.

The vulnerability of college students

College students are among the most at-risk populations in terms of demographics. Kandell (1998) suggests two lines of reasoning for increased use among college students, including access and expectation of computer and Internet use.

The majority of college students own or have ready access to a computer. Current incoming students have been raised with modern Internet technology, and computers are not perceived as negatively as they use to be, particularly among males (Morahan-Martin, 1998). In terms of their daily lives, college student schedules provide them with a lot of flexibility and free time resulting in the flexibility to spend long epochs on various Internet applications. Moreover, college students have easy access through direct Internet connections in dorms, libraries, and computer labs (Kandell, 1998). It is now commonplace for college students to check their email at friends' apartments, cyber cafes, and even at shopping mall computer terminals while they are on vacation (which are relatively inexpensive).

Institutions of higher education encourage use of the Internet through several means. Increasingly, incoming students automatically get an email address and Internet access account. Access to the school's network is often provided free of charge or for a nominal fee. This makes it an affordable and convenient option. Moreover, most college campuses have the latest technologies in their computer labs, which usually have high-speed connections, allowing for faster downloads and Internet surfing (Scherer, 1997). At the very least, these terminals are being used for email when the student is not engaged in academic work. Additionally, colleges are increasingly relying on the Internet as a method of disseminating information. Professors increasingly use the Internet as a means of distributing assignments, readings, grades, and course syllabi. Some programs now require students (e.g., Harvard MBA students) to purchase a computer, often a laptop, as part of the admissions and educational process.

With increasingly more students receiving instruction on Internet use (e.g., beginning in elementary school), by the time they reach college, they are proficient users. Even students who did not use the Internet at young ages are fast becoming "experts" on Internet use. The basics of the Internet are easy to learn and exploring the Internet can be a highly positive experience.

Upon moving away from home, college students often encounter intimidating circumstances as they try to fit in. The Internet makes it easy to procrastinate from studying, especially when students are undergoing elevated stress levels from their course work. Internet users have a high degree of control over their computer and Internet environments which can be seductive (Kandell, 1998), especially for college students whose social relationships may be faltering. Use of the Internet is a highly individualized activity. It is an anonymous endeavor that does not require coordination with friends or anyone else, nor does it require any planning ahead (Scherer, 1997). As such, frequent or excessive use of the Internet may become problematic.

Problem Internet use

Several terms have been used to describe excessive Internet use that leads to problems in various contexts of an individual's life, including Internet addiction, Internet abuse, and compulsive

Internet use (Greenfield, 1999). However, Davis (1999) argued that pathological Internet use makes the most sense. The term 'problem Internet use' is employed for this study in recognition that intensive Internet use can lead to problems but not necessarily severe pathology as implied by many of the other terms currently in use which lack sufficient empirical evidence and theoretical support.

Problem Internet use is in actuality being considered as more of an impulse-control disorder than an addiction. Regardless of terminology, problem Internet use appears to have many features of impulse control disorders, particularly the criteria outlined for pathological gambling (American Psychiatric Association, 1994; Davis, 1999; Greenfield, 1999). The DSM-IV lists necessary features of compulsive substance abuse (i.e., addiction) as including tolerance; withdrawal; dependence; persistent attempts at decreasing or discontinuing use; obtaining, using or recovering from use of the substance; and in some cases, abandoning social, occupational, or recreational activities and responsibilities (APA, 1994). Conversely, the essential features of impulse control disorders include succumbing to persistent drives or temptations, leading the individual to act in ways that are harmful personally or toward others; feelings of tension or arousal just before committing the act; feelings of relief, gratification, or pleasure after the act has been committed; and occasional feelings of regret or guilt afterwards (APA, 1994). A review of the extant literature revealed an assortment of possible criteria that either integrate or go beyond these definitions.

Use of the Internet itself may bring on disordered behavior more readily. For example, when an alcoholic sobers up, or when a gambler runs out of money, the individual must face reality. These are similar to the problem Internet use issues. However, in the Internet user's case, it is merely a matter of accessing the nearest computer with online capability. While there is little by way of direct spending as in gambling and alcohol or drug use, similar negative life consequences have been associated with problem Internet use. Among college students, excessive use has been associated with missing classes, course failure and dismissal from college. For example, an Alfred University study found that 43% of dropouts in a given semester had been staying up until early morning hours using the Internet, more than double the rate of academic dismissal (Young, 1998). With college students at high risk for developing Internet-related problems, it is imperative that investigators gather information and examine correlates of Internet use behavior.

While symptomatology associated with problem Internet use varies widely (Grohol, 1999), there does appear to be two main trends that help advance assessment of the problem. First, excessive Internet use has been associated with the same gamut of negative life consequences (e.g., social, familial) that has been documented among individuals with substance addictions (Armstrong, Phillips, & Saling, 2001). Secondly, there is a consistent loss of control over the amount of time spent online or engaged in Internet-related activities (Armstrong, Phillips, & Saling, 2001). At a time when college students are undergoing major life changes, these factors play an especially crucial role and should not be overlooked.

Internet use among college students

A handful of studies on patterns of college student Internet use have been published in recent years. The general results seem to indicate that the rate of problem Internet use among college students is somewhere between 8-13% (Anderson 2000; Scherer, 1997). However, this number may be misleading because the students with severe symptoms may not have gone to class or completed the surveys when they were distributed.

Scherer (1997) examined patterns of Internet use among 531 (51.5% male) students using mail-in questionnaires at the University of Texas at Austin – a large public university. Approximately 65.5% of the students were Caucasian, 12.5% Hispanic American, and 10% Asian American. Students were classified as either dependent or nondependent Internet users. The author found that 73% of the students accessed the Internet at least once a week, 13% of which reported that they believed their Internet use to be excessive and significantly interfered with personal functioning. The study also found that 71% of the Internet-dependent users were male, even though both males and females access the Internet on a regular basis. Moreover, the group of dependent users access the Internet for the same amount of time than nondependent students for activities such as academic and professional work the dependent group spent twice as long online for leisure activities.

Davis et al. (1999) used a questionnaire to compare Internet use at a small, private liberal arts university and a medium-size, public state university. The liberal arts university group consisted of 184 undergraduate students (101 women, 83 men), while 349 undergraduate students (242 women, 107 men)

participated at the state university. They found that while 91% of students on both campuses had Internet access, students (especially men) reported extensive use (defined as greater than 25 hours per week) at the public institution. Students who abused the Internet admitted that it interfered with their work, school, and interpersonal relationships. The authors concluded that it is possible that small, private liberal arts colleges stress learning and educational experiences more than larger universities, thereby making it less likely for students to spend time engaged in other activities, such as use of the Internet. Moreover, they believe that greater anonymity may have led to students to answer the questionnaire more truthfully at the larger institution.

Anderson (2001) studied 1,302 college students (649 men, 647 women) from seven colleges in the northeastern U.S. and one in Ireland using a 69-question survey. Two hundred and twenty four participants indicated that they did not use the Internet and so were not used in the analyses. Results indicated that on average, students spent about 100 minutes per day using the Internet. The two most frequent and time-consuming activities were browsing the Internet and checking email. Using adapted DSM-IV criteria for dependence (APA, 1994), 9.8% (93 men, 13 women) of the students "fit" the criteria for Internet dependence. Moreover, those classified as dependent spent significantly more time using the Internet each day, averaging 229 minutes/day as compared to 73 minutes/day for nondependent. The dependent group also reported significantly more problems with school work, meeting new people, and sleep patterns. When the dependents were classified by school major, the hard science group accounted for 74% of the group, while 16% were in the arts and science group, and 10% were in the liberal arts group. The author concluded that the results clearly indicated a disproportionate number of students among the hard science majors who were pathological Internet users.

In sum, there is empirical evidence that problem Internet use on college campuses is an emerging concern. While an investigation of Internet use among college students is a worthwhile endeavor in its own right, it is even more valuable to study the relationship of such use to personality variables. Examination of personality characteristics can yield valuable information that may aid in better identification of students who are at-risk for developing Internet-related problems. One personality variable that should be considered is locus of control.

Locus of control

Rotter (1966) originally described the psychological construct of locus of control as an element of personality. Locus of control refers to the perception of the extent to which individuals can control events in their lives. Individuals with an internal locus of control judge outcomes of events to be internally controllable. That is, they believe that their own personal efforts, behaviors, or skills will influence and determine outcomes, and they take responsibility for their actions. Individuals with an external locus of control attribute events to external sources. They believe and behave as if forces beyond their control such as chance, luck, fate, or others with greater power represent the important factors in determining the occurrence of reinforcing events (Rotter, 1966). As such, their own effort or abilities are perceived to have little effect on how events play out. An important feature of locus of control is that it is not reality that is being measured but rather an individual's perception of control over reality. So, if they think they can control what happens in their lives, they behave as though they can (Wallace, 1999). Most people lie somewhere in between these two extremes, believing that both personal effort and outside circumstances will affect the outcomes in their lives.

The relationship between locus of control and risk-taking behavior among adolescents and college students has been investigated. Most of the studies in the next section used Rotter's Internal-External Locus of Control Scale (1966).

Locus of control and risk-taking behavior among college students

Although there exists contradictory findings, among the general population, individuals with an external expectancy orientation are more frequently associated with health-threatening behavior and higher incidence of pathology (Schneider & Busch, 1998). Research among high school and college students has also yielded mixed results.

Lapp (1984) investigated the relationship between locus of control, personality factors, and alcohol and drug use among 216 undergraduate students (132 female, 84 male) in Canada. Results indicated that males who frequently used non-medical drugs (e.g., marijuana and hashish) were associated with having an internal locus of control. Moreover, male students and a French-speaking female group with a higher external locus of control used tobacco more frequently. Cox and Luhrs (1978)

examined risk-taking behavior and locus of control among 280 high school students (grades 7, 9, 10, and 12). They found that a higher proportion of students with an external rather than internal locus of control consumed alcohol. Jih, Sirgo, and Thomure (1995) compared the alcohol consumption and locus of control of 104 college students (mean age of 21 years) from a private, midwestern university and 104 public high school students (mean age of 17 years). They found that students with an external locus of control in both groups claimed to consume alcohol more frequently in hypothetically unpleasant and pleasant events and for actual pleasant and neutral events than those with a neutral or internal locus of control. Cox and Baker (1982) investigated the relationship between locus of control and the quantity and frequency of beer, wine, and liquor consumption among 46 male and 51 female undergraduates in the United Kingdom. Results indicated that male students who reported heavier wine consumption were significantly associated with an internal locus of control. In a study of 202 (112 females, 90 males) undergraduates, Schneider and Busch (1998) concluded that students experiencing alcohol-related problems viewed their drinking as due to external factors. Moreover, smoking addicts were associated with more external scores. Moore and Ohtsuka (1999) investigated gambling behavior and locus of control in 1,017 (435 males, 577 females) high school students and freshman college undergraduates (age range 14 to 25 years) from a working class population in Australia. Their results provide significant but weak to moderate support for a relationship between internal locus of control and problem gambling. Moreover, Lester (1980) found that undergraduate students with a belief in an external locus of control gambled more at games in which luck played a part and less at games in which skill and judgment played a part.

In sum, several studies have investigated the relationship between risk-taking behavior and locus of control among high school and college students. Over the past 3 decades, studies from around the world have looked for a relationship between locus of control and alcohol consumption, drug use, and gambling. Taken together, the overall results appear to be inconclusive, with different studies reporting variations by country, gender, and internal versus external associations.

Locus of control and Internet use among college students

Wallace (1999) theorized that Internet users were more likely than nonusers to have an internal locus of control because of the high degree of controllability inherent in utilization of the device. While studies of users versus nonusers are rare, limited research has focused on comparisons between problem Internet users and typical users.

An extensive review of the literature has shown that there is a paucity of research on the relationship between locus control and the Internet. It is likely that the novelty of the Internet as a widespread phenomenon has limited the research up to this point. Understandably, it is even more difficult to locate empirical studies that examine this relationship among college students.

Bellamy and Hanewisz (2001) explored the effect of personal relationships and communications in Internet chat rooms to what they termed 'Internet Predisposition' (or Internet addiction). The study also examined the possible moderating effects of gender, locus of control, and sociability on the relationship between these relations and communications, and Internet addiction. Participants included 114 undergraduate and graduate students from technology-related classes in a relatively large university in Southeastern Michigan. Sixty-four percent was white and 32 percent was black. Internet addiction was measured by the Internet Predisposition scale which consists of a 4-item questionnaire with a five-point likert scale ranging from agree to disagree. Total scores were operationalized for the analyses. A second measure of Internet Predisposition consisted of measuring the number of hours per week that the participants reportedly spent online. Locus of control was measured through the use of a 10-item scale developed by Burger (1986). Results indicated that both measures of Internet addiction were significantly correlated with locus of control for women but not for men, thereby showing that there is a moderating influence of gender. The authors interpreted this finding as revealing that women who are more inclined to use computer-mediated communication tend to be more externally oriented and less confident. Limitations of this study include a biased and small sample. It is biased in that the participants were students drawn from a university that was technologically oriented in its academic programming.

In her doctoral dissertation, Welsh (1999) investigated the relationship between Internet use, coping style, expectancies, and locus of control among undergraduates at a large private university in the northeast. Internet dependence was defined as students demonstrating at least 3 criteria from a list of 7 items. From an initial sample of 1006 participants, 83 students were identified as scoring in the Internet dependent range, 42 of which completed the entire study. Using the Rotter (1966) internal-external

control scale, no difference was found between the 42 dependent and a matched sample of 42 nondependent Internet users. However, there was a tendency for dependent users to have a more external locus of control, a finding which approached significance.

In sum, the relationship between locus of control and problem Internet use remains uncertain. The studies discussed may have suffered from methodological impediments (e.g., sample size, measurement tools not being sufficiently sensitive) that could have limited their findings.

Rationale for research

Given the rapidly increasing use of the Internet throughout college student daily activities, it is important to learn more about who is at risk for problem use and possible dependence on this increasingly popular activity. Since schools can adopt new policies, control dorm Internet use, and make changes that affect incoming students, it is important to have a thorough understanding of the risk factors during this formative time in their development as young adults. Moreover, colleges have a responsibility to take care of their students and maintain a healthy student body while they are away from home, thus giving them a vested interest in problem Internet use research.

The purpose of the present study was to generate initial data and describe the relationship between Internet use and behaviors, and locus of control among an undergraduate college student population. The findings could be used to guide intervention programs for school health service providers, such as college counseling services. Moreover, this information could prove useful in adapting professional resources and eventually, if needed, the design prevention programs.

This study will improve on the study by Bellamy and Hanewisz (2001) and Welsh (1999) through the use of a well-known and more psychometrically sound measure of locus of control. It will also benefit from the investigation of a more diverse student body and larger sample size.

Research questions and hypotheses

The present study investigates the relationship between locus of control and Internet use among college students. Although this is an exploratory study, two main research questions and associated hypotheses were developed. The first research question has to do with the patterns of Internet use that can be associated with college students. It is hypothesized that participants will report frequent use of the Internet as being associated with at least minimal deficiency in their lives, either socially, academically, job-related or lifestyle-wise. A second research question involves the relationship between Internet use and locus of control. It is hypothesized that the more students report symptoms of problem Internet use, the more likely they will be associated with an external locus of control. A third hypothesis is that there students will demonstrate a significant correlation between associated risk-taking activities (alcohol use and gambling) and locus of control.

Method

Sample

Questionnaires were distributed to a total of 788 undergraduate students drawn from various classes in a medium-sized private university in the northeastern United States.

Measures

The entire questionnaire consisted of 71 questions among three sections, including a demographic segment, the Problem Internet Use Survey, and the Nowicki-Strickland Locus of Control Scale.

Demographics section. This measure consisted of 13 questions, focusing on age, academic status, academic achievement, ethnicity, living situations, and computer use in general.

Problem Internet Use Survey (Rotsztein, 2002). The identification of Internet behaviors among college students has never been systematically studied, with the few extant studies having been carried out using different questionnaires. The questions on this survey were chosen after a systematic review of existing surveys revealed common themes which were isolated and modified for use in this one. Participants were asked to respond to the 18 questions by choosing one of four options on a likert scale including: strongly agree, agree, disagree, and strongly disagree.

Questions were developed in order to assess specific areas of functioning. Dissociation is related to the Internet-user's tendency to lose track of time and simultaneous conscious or unconscious feelings of being separate and disconnected to their surroundings. Tolerance refers to the need for Internet users to spend increasing amounts of time online in order to achieve satisfaction and/or the significantly diminished effect with continued use of the same amount of time spent online. Withdrawal refers to changes which the Internet user undergoes after cessation or reduction of internet use. This can be seen in the impairment of the individual's ability to function as they typically would under given social, personal, academic, or work-related circumstances. Specific symptoms could include feelings of distress and obsessive fantasies, dreams, or thoughts about the Internet. The idea of escape is that individuals engage in online behavior in order to avoid responsibilities or unpleasant affective states. Other questions were devised to tap into the effects of students' Internet use on their interpersonal relationships, health, and academic and social activities. Finally, questions on gambling activities and alcohol consumption were included as other forms of risk-taking behavior.

Nowicki-Strickland Locus of Control Scale (Nowicki & Duke, 1974). This is an established measure with well-known acceptable psychometric properties. It consists of 40 questions that can be answered in a yes or no format. Each 'yes' is scored as external and each no is counted as internal. The total scores range from 0 (high internal) to 40 (high external). The higher the score, the greater degree of external locus of control.

Procedure for data collection

Courses were randomly selected from various departments around the university. Professors agreed to allow the author to distribute the questionnaire during the last few minutes of class. It was explained to the students that this is a study of their Internet use habits. They were informed both orally and on the consent form that was attached to the questionnaire that they did not have to participate, could leave questions out, and were free to stop at any time. In order to add incentive to complete the questionnaires, students were entered in a draw to win one of two randomly drawn prizes of fifty-dollar gift certificates to music and book stores. When they turned in their questionnaires, students could voluntarily write their email addresses on a slip of paper to be entered in the draw. At the end of the data collection stage, two email addresses were randomly drawn. In order to ensure as much anonymity as possible, the winning students were emailed and collected their prize in an office that was unaffiliated with the author.

Results

Several steps were taken to help ensure that the final data set was of high quality. First, participants were asked to avoid writing on the questionnaire and instead to darken the appropriate circles on a scantron form. The use of scantrons helped reduce the number of fictitious responses used in the final data set because students who did not read the entire questionnaire were not aware that the scales changed partway through. Once data collection for a given class was complete, the author manually sorted through the scantron forms in search of indications that the participant did not complete the questionnaire appropriately, darkening circles that did not correspond to specific options on the questionnaire, for example. Using this method, 38 questionnaires were immediately destroyed. Next, any scantron forms that did slip by during this first iteration but were clearly fabricated or incomplete were deleted from the data set.

Final sample

The final sample consisted of 706 undergraduate students (384 women, 322 men). The demographic breakdown of the sample is provided in Table 1. The rest of the results have been divided into two main sections. The first section discusses the overall results of problem Internet use survey and the second covers the relationship between Internet use and locus of control.

Problem Internet Use Survey

The internal consistency of the Problem Internet Use Survey was assessed with Cronbach's Alpha. The alpha was .89 which is considered highly reliable. Descriptive statistics for the areas of possible problems related to Internet use are displayed in Table 2. Overall, over 30% of both women and men in the sample reported losing track of time while they were online and remaining online longer that

they originally intended, ignoring responsibilities at school, work, or home, and having lost or avoided sleep due to Internet use. Pearson Chi Square analyses were performed in order to assess any differences between men and women.

Men showed significantly higher levels of remaining online for longer periods of time in order to feel more satisfied, lying to conceal their Internet use, arriving late, missing class, skipping meals and avoiding sleep to remain online, and using the Internet instead of spending time with friends and family than women.

Women reported significantly higher levels of dissociation (i.e., losing track of time or remaining online longer than originally intended) than men. However it is noteworthy that both men and women displayed high levels of dissociation. Women also attempted to cut back or stop their Internet use significantly more often than men. This finding suggests that while women are reporting fewer Internet-related problems overall, they do appear to be recognizing their behavior as problematic and actively trying to cut back on their Internet use more frequently than men.

Correlations between Internet use and locus of control

Pearson correlation coefficients were used to examine the relationships between the questions on the Problem Internet Use Survey and the locus of control scores. The results revealed a significant positive correlation ($r = .22$, $p < .01$) between Internet use and external locus of control. This finding suggests that the higher (external) locus of control score (i.e., those who feel that events in their lives are out of their hands) that a student has, the more likely they were to have reported problems due to Internet use. Although this result is statistically significant, it should be noted that a correlation coefficient of .22 is considered to be low.

Associated risky behavior

Approximately 67% of male and 56% of female undergraduate students reported that they typically consume alcohol at least two nights per week. These rates are particularly alarming given that the legal drinking age is 21 years. Men claimed to consume alcohol significantly more frequently than women. Men were also seven times more likely than women to gamble online.

A significant positive correlation ($r = .07$, $p < .05$) was found among students who reported consuming alcohol at least two nights per week and having an external locus of control. While this result is significant, the correlation is considered to be negligible. No significant correlations were found between students who visit online casinos and locus of control. It is possible that more sensitive measures of online gambling activity would yield different results.

Discussion

This study investigated the relationship between Internet use and locus of control among college students. The first hypothesis that students would report frequent use of the Internet as being associated with at least minimal deficiency in their lives, either socially, academically, at work, or lifestyle-wise, was confirmed. The students displayed high rates of dissociative experiences, building a tolerance, interpersonal social, work, and academic conflicts, and physical health risks all related to problem Internet use. Overall, men appear to be more likely to experience problems associated with their Internet use. While the majority of women reported feelings of dissociation, they were more likely to attempt to cut back or stop their Internet use. This finding suggests that they have a higher level of conscious awareness regarding their Internet use than men. However, given that one fifth of men have tried to curtail or cease their Internet use, another possible explanation could be that men are equally aware of their problems but cannot get out of their situation. The findings in this study are consistent with previous research by Davis et al. (1999) and Scherer (1997).

The rate of problem Internet use may be alarming but it should be noted that the students may have engaged in alternate activities which could have resulted in similar outcomes. For example, television watching could result in students arriving late to class. However, the highly interactive, controllable nature, ease of access, and lack of discontinuities (e.g., commercials) make it unlikely that television viewing could lead to the number of problem behaviors reported here. Another perspective in consideration of these results is that perhaps frequent Internet use as a form of risk-taking behavior can be viewed as a relatively safe outlet (as opposed to alcohol consumption or gambling) in that it may serve to relieve tension and stress. Further research could focus on specific moderators and mediators of frequent Internet use.

The second hypothesis that the more students report symptoms of problem Internet use, the more likely they will be associated with an external locus of control was confirmed. A weak correlation between these areas was found. This finding is consistent with previous research by Bellamy and Hanewicz (2001) and Welsh (1999) and goes against Wallace's (1999) theoretical view.

The hypothesis that students would demonstrate a significant correlation between associated risk-taking activities (alcohol use and gambling) and locus of control was partially confirmed but negligible. It is noteworthy however that high rates of alcohol consumption were reported for both men and women, and men were seven times more likely to gamble online.

Institutions of higher education should take note of the findings of these preliminary analyses. As the Internet continues to pervade the lives of undergraduate college students, preventative measures can be taken to avoid future complications related to this powerful tool. The results also add a piece to the larger picture of the dimensions of personality involved in problem behaviors among college students. When integrated with studies of depression, loneliness, sensation-seeking and other areas of personality, it is possible that a profile for problem Internet users will emerge.

Limitations

In light of the results presented here being preliminary, several limitations are noteworthy. First, it is possible that students whose lives were significantly affected by the Internet were not in attendance while the questionnaire was distributed. Next, future analyses will involve the separation of participants into a problem Internet use group and a typical Internet use group which can then be compared.

Moreover, there is a slightly disproportionate number of freshmen in the sample, a group which may have had less time to accumulate Internet-related problems (e.g., missing class to remain online). Additionally, this study focused on a medium-sized private university which limits its generalizability. Next, locus of control is a relatively limited personality variable in and of itself. Use of other measures could yield information about problem Internet users that is richer. Finally, this study did not ask participants to estimate the amount of time they spend online. The argument was used that the amount of time per se is not necessarily reflective of a problem. It is only when excessive use which varies by individual impedes typical functioning and gets in the way of daily life activities that such behavior becomes problematic.

Future Directions

This study should be viewed as a starting point from which future research could take place. It is suggested that future studies employ more varied personality variables such as self-esteem, sensation-seeking, introversion-extroversion, personality type, affective states while using the internet, reasons for behaviors (e.g., 'why do you avoid sleep to remain online?') and combinations of behaviors (e.g., 'do you consume alcohol while using the Internet?'). A qualitative analysis could also add to the paucity of literature in this area. Moreover, co-morbid disorders could be taken into account.

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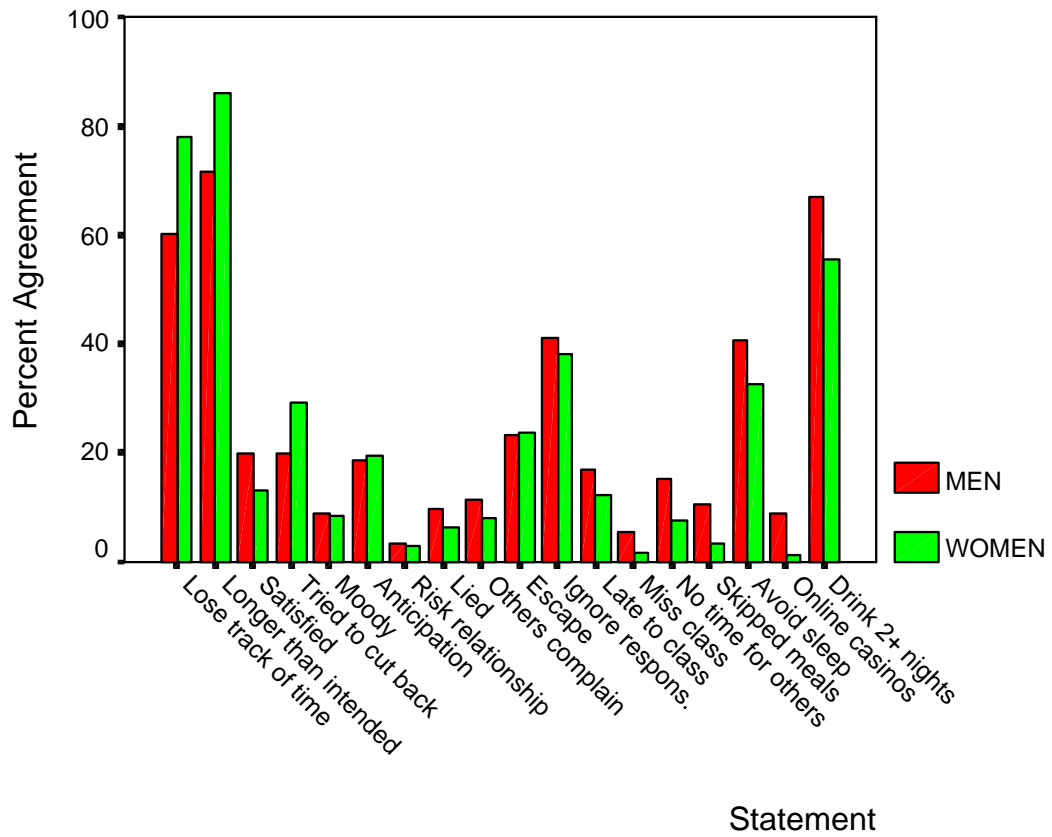


Figure 1. Statements pertaining to problem Internet use and the associated percentage of participants who responded that they agree or strongly agree to the statements, divided by gender.

Table 1

Demographic breakdown of participants

Area	Percent of Sample
Gender	
Male (n=322)	45.6
Female (n=384)	54.4
Academic level	
Freshman	29.7
Sophomore	23.1
Junior	23.8
Senior	22.8
Other	0.6
Major	
Arts	31.0
Business/Management	20.7
Science	17.7
Education	15.6
Nursing	2.7
Law	1.0
Social Work	0.7
Other	10.6
Ethnicity	
Caucasian	75.8
Asian	8.8
Black	5.9
Hispanic	5.7
Other	3.8

Table 2

Statements pertaining to problem Internet use and the associated percentage of participants who responded that they agree or strongly agree to the statements. Statements are divided into areas that may be indicative of problem Internet use.

Areas/Statements	Agreement (%)		
	Male (n=322)	Female (n=384)	Total (n=706)
Dissociation			
I often lose track of time while I'm online.	60.2	77.9	69.8*
I often remain online longer than I originally intended.	71.7	85.9	79.5*
Tolerance			
When I stay online longer, I feel more satisfied.	19.9	13.3	16.3**
Withdrawal			
I have attempted to cut back or stop my Internet use.	19.9	29.2	24.9*
I often feel restless, moody, depressed, or irritable when attempting to cut down or stop using the Internet.	9.0	8.3	8.6
I often find myself thinking about previous online activity or anticipating my next online session.	18.6	19.5	19.1
Interpersonal conflict			
I have risked the loss of a significant relationship because of the Internet.	3.4	3.1	3.3
I have lied to friends, family, or others to conceal the amount of time I spend online.	9.9	6.5	8.1***
Friends, family, or other people often complain about the amount of time I spend online.	11.5	8.1	9.6
Escape			
I have used the Internet as a way of escaping from problems or relieving negative moods (such as feelings of helplessness, guilt, anxiety, or depression).	23.3	23.7	23.5
I have ignored responsibilities at school, work, or home due to Internet use.	41.3	38.3	39.7
Reduced activities (academic and social)			
I have come to class late because I was online.	17.1	12.5	14.6***
I have missed class entirely because I was online.	5.6	1.6	3.4*
I use the Internet instead of spending time with friends, family, or others.	15.2	7.8	11.2*
Health-threatening risks			
I have skipped a meal in order to spend more time online.	10.6	3.6	6.8*
I have lost or avoided sleep in order to stay online.	40.7	32.8	36.4**
Associated risky behavior (online and offline)			
I visit online casinos.	9.0	1.3	4.8*
I typically drink at least 2 nights per week.	66.8	55.6	60.7*

Significant male/female difference at the: * p<0.01 level, ** p<0.05 level, *** p<0.10 level (two-tailed)