WHO IS ADDICTED TO USE OF THE INTERNET: STEREOTYPES AND DATA ANALYSIS

Lori Soule, Nicholls State University, lnrsoule@cajunnet.com
L. Wayne Shell, Nicholls State University, mnmk-lws@Nicholls.edu
Betty A. Kleen, Nicholls State University, is-bak@Nicholls.edu

ABSTRACT

As the number of Internet users increases, so does the number of Internet addicts. Some addicts are failing in school, losing their jobs, and divorcing their families. The value of this research is in the possible identification of candidates for addiction, so that their behavior can be interdicted and treated. Tests on data from the GVU 10th survey showed approximately ten percent of Internet users were compulsive users, and that the early stereotype—young white computer-savvy males—is no longer valid.

Keywords: Internet addiction, Internet user stereotypes, Internet demographics

INTRODUCTION

With the increased role of the Internet in society and commerce, some of its users have become addicted, resulting in a variety of negative outcomes. The most common symptom of Internet dependence is the amount of time spent online. Expert estimates of the extent of this addiction range from 5 to 10 percent of Internet users. Since the number of users is estimated to be over 100 million and rising, several million Americans may be addicted.

The researchers analyzed a well-known and publicly available dataset to determine which independent variables explain the amount of time spent online. This report discusses general addiction types, as well as symptoms of Internet addiction. If the researchers' models point to a "profile" of behaviors and attributes that lead to addiction, counselors, human resource managers, IT managers and IT trainers will have additional tools with which to identify and to interdict problems. The analysis is limited to Internet users in the U.S, and uses 1998 data. The data were collected from online respondents, who were self-selected. The data analysis covers only variables and attributes related to time spent online, and does not cover cross-addiction or the criteria of compulsion.

PATHOLOGICAL INTERNET USE

Previous research suggests Internet use is related to gender, education, income, race, occupation, and even geographic region; males are more likely than females to use the Internet, whites are more likely to use the Net, and people with higher socioeconomic status are also more likely to use the Net (16).

The phrases "Internet addiction," "pathological Internet use," "Internet addiction disorder," and "compulsive Internet user" are used interchangeably. Young uses "pathological Internet use" in clinical settings, but "Internet addiction" in casual settings (15). Others cannot decide if "pathological Internet use" is a disorder, addiction, or a symptom of an addictive personality (6). "Dependence" has replaced "addiction" in some venues (14). By 1997, Internet Addiction Disorder (IAD) was officially in the medical vocabulary (22, 23).

One symptom exhibited by Internet addicts is long hours of use, up to and over forty hours per week (3). Others include lying about the level of use, preoccupation with the Net, and using the Internet to escape other problems (11, 22). These symptoms follow the necessary components for any addition: increased tolerance, loss of control, and withdrawal (10). One publication proposed a list of ten indicative behaviors; a person was an Internet addict if he or she displayed four or more in a twelve-month period (4). Internet addicts cut back on the time they spend talking to family and friends (5). Divorce, unemployment, academic failure, financial and legal difficulties, and child neglect are some of the issues being faced by people who become addicted to online activity (21, 23). Orzack has found that Internet addicts, like other addicts, allow computers to dominate them rather than serve them (8). Physical symptoms such as skipped meals, repetitive stress injuries, dry eyes, headaches, backaches, and loss of sleep are often present (9). Internet addiction in the workplace may result in reduced productivity, poor job satisfaction, low profit margins, decreased efficiency, potential disability claims, and risk of unemployment services (17).

Armstrong (2) believes that Internet Addiction Disorder (IAD) includes five components. They are cybersexual addiction (to adult chat rooms or online pornography), cyberrelationship addiction (friendships made in chat rooms or cyberporn sites), Internet compulsions (gambling, day trading, or auction shopping), information overload (compulsive Web or database surfing), and computer addictions (compulsive game playing or programming). Therapists note that the incidence of cross-addiction seems very common among Internet addicts. Orzack states all her Internet-addicted patients have at least one other problem: "Depression, social phobia, impulse control disorder, and attention deficit disorder are commonest." She also states, "There is no single pattern: different people are Internet-dependent for different reasons" (5).

There are conflicting, perhaps dynamic or changing, images of who is addicted to the Internet. Young and Rodgers (26) state that most addicts are not of the "computer nerd" type. Instead, they are successful and outgoing. Orzack states that some older addicts and women are drawn to chat rooms, often on sexual themes. She also states that younger users and men are drawn to games and pornographic websites (5). She also finds that Internet addicts tend to be lonely, bored, depressed, introverted, or lacking in self-esteem. A Stanford study finds gay men to be at risk for becoming "cybersex compulsives" (7). Children and college students are populations at special risk (2). Anderson found male students majoring in the hard sciences to be at risk for Internet dependence (1). Thirty-something women were more likely addicted to the Internet than stereotyped shy, male teenagers (24).

The estimated number of compulsive Internet users varies. Greenfield estimates about six percent of people online are compulsive users and that the growth of broadband will increase the percentage of addicted Internet users (25). Young estimates five to ten percent of online users are addicted (11, 20). Jupiter Communications, Inc., a New York-based research firm, agrees with Young's estimates (10). Over two million Internet addicts are Internet sex addicts (19).

DATA AND METHODOLOGY

Data for this study came from two data sets within The Graphic, Visualizations, and Usability Center (GVU) 10th survey conducted in the fall of 1998. The respondents to the survey were self-selected and self-reported. The data were used in accordance with policies published by GVU (12). Five hundred records from the Web and Internet Usage dataset were merged with matching records in the General Use dataset. Gender, age, race, marital status, family household

income, and hours of use were analyzed to determine whether correlations or causal relationships exist among the variables.

The researchers used a model in which the dependent variables were Total Hours Online and Recreational Hours Online. The demographic, economic, and behavioral variables are independent variables. Descriptive statistics and variable frequencies were prepared for all variables; correlation and cross-tabulation were used in preparation of the descriptive statistics. ANOVA and regression were used to determine causation where appropriate. Where ANOVA could not be used, the hypotheses were simplified and independent samples t-tests were used.

DESCRIPTIVE STATISTICS AND ANALYSIS

This section first summarizes the essential facts and interrelationships among the variables. Cross-tabulations and Chi-square tests further explore variable relationships. In the final subsections, ANOVA, t-tests, and regression models are used to analyze the behavior of the heaviest users of the Internet.

Independent Variables

Six percent of the 500 respondents were 20 years or younger. Thirty-one percent were ages 21 to 30, 23% were ages 31 to 40, 20% were ages 41 to 50, 13% were ages 51 to 60, and 7% were ages 61 and over. Males outnumbered females more than two to one (338 to 162). Nine percent had a high school education or less, almost 34% had vocational-tech/some college, 33% had a college degree, 18% had a master's degree, and 6% had a doctoral/professional degree. Fifty percent were married; 30% of the respondents were Single. The category Divorced/Separated/Widowed was 10% of those responding, and the remaining 8% marked "Other" as their marital status.

Nearly 4% of the respondents reported an annual Household Income of under $10,000; 7% reported $10,000 to $19,000. At the other extreme, 11% reported from $75,000 to $100,000, and 14% had income over $100,000. The modal income was $50,000 to $74,000 (28%). Over 91% of respondents were White; African-American users were almost 2% of users. Asian users comprised 3%. The ethnicity of the remaining 4% was classified as "Other."

A little over one percent of respondents used the Internet under 1 hour per week. Nine percent spent 2 to 4 hours online. Thirteen percent had a usage time of 5 to 6 hours. Almost 14% reported 7 to 9 hours per week. The largest cell, over 34%, had a usage time of 10 to 20 hours. Almost 18% had 21 to 40 hours of usage. Ten percent (51 of 500) spent over 40 hours per week online. Recreational Hours Online used the same categories, with these results: 63 of the 500 (12.6%) spent less than one hour online per week; 36% spent between 2 and 4 hours per week; 19% spent between 5 and 6 hours per week; 19% spent between 7 and 9 hours per week; 9% spent between 10 an 20 hours per week; and 4% spent over 20 hours per week.

Correlations in the Independent Variables

Education level and Gender are positively correlated with household income (0.309** and 0.122**). Age is positively associated with income (0.171**) and educational level (0.133**). Total Hours Online is not strongly correlated with any independent variable.

Describing Those Who Use the Internet the Most

The heaviest users of the Internet--40 or more hours per week--represented 51 of the 500 respondents. This group included 35 males and 16 females, about the same proportions as in the full study group of 500. Among these 51 cases, the income distribution is almost uniform in the five higher income classes, with smaller frequencies in the three lowest income classes. Twenty-three of the 51 indicated less than a college degree; 26 indicated a college degree or higher. About 10 percent of these heaviest users are under 20 years old. About 30 percent each are in the following categories: between 21 and 30 years old, between 31 and 40 years old, and over 40. Those who spend 40 or more hours online per week are younger than other classes of users.

Cross-Tabulations

The researchers conducted cross-tabulations and Chi-square tests on selected pairs of variables. The variables were Total Hours Online, Recreational Hours Online, Gender, Age, Household Income, Educational Level, Marital Status, and Race. Cross-tabulation tables appear only where Chi-square indicates lack of independence between variables.

Hours used versus age. Is the variable Total Hours Online independent of the variable age? Is the variable Recreational Hours Online independent of age? The appropriate hypotheses were

H_o: *Total* Hours is independent of Age H_o: *Recreational* Hours is independent of Age
H_a: *Total* Hours is dependent upon Age H_a: *Recreational* Hours is dependent upon Age

Pearson Chi-square was used to test whether hours online was independent of age. The significance level for Total Hours Online (0.185) was greater than **a** = 0.05; this led to failure to reject the null hypothesis. The Recreational Hours Online test also failed to reject the null hypothesis (sig. = 0.686).

Hours used versus gender. Chi-square was used to determine whether Total Hours Online and Recreational Hours Online were independent of gender. For Total Hours Online, the significance level was .094. For Recreational Hours Online, it was 0.122. In both cases the researchers failed to reject the null hypothesis.

Marital status. The researchers tested whether Total Hours Online, and Recreational Hours Online, were independent of Marital Status. Using Chi-square, the researchers could not reject the hypothesis that Marital Status is independent of Total Hours Online (0.083). However, Marital Status and Recreational Hours Online are not independent (0.015). As hours online rises, the percent of "Married" respondents falls--from 69% at the lowest usage rates to 35% at the highest. The lowest usage category was 10.6% of all respondents, but "Marrieds" were over-represented—14.6% of this category. In the 21-40 hours category, "Divorced-Separated-Widowed" were 28% of the category, compared to 18% of all cases. See Table 1.

The remaining variables. The researchers were unable to reject a null hypothesis of independence for the pairs of variables Household Income versus Total Hours, Household Income versus Recreational Hours, Educational Level versus Total Hours, Educational Level versus Recreational Hours, Race versus Total Hours, and Race versus Recreational Hours.

The Heaviest Users of the Internet

Do those Internet users who spend the most time online differ from other users? The Total Hours Online variable was grouped into those under 40 hours per week, and those 40 hours and more. Using independent samples t-test, the researchers found only one distinction. The two groups differed with respect to age—the heaviest users are a younger collection of respondents than other user groups. They did not differ on gender, education, or income.

Table 1

Crosstabulation: Marital Status versus Total hours Online

			Total Hours Online					
			0 - 4	5 - 9	10 - 20	21 - 40	Over 40	Total
Marital Status	Other	Count	1	13	14	9	4	41
		% within Marital Status	2.4%	31.7%	34.1%	22.0%	9.8%	100.0%
		% within Hours Used	1.9%	9.9%	8.3%	10.3%	7.8%	8.4%
		% of Total	.2%	2.7%	2.9%	1.8%	.8%	8.4%
	Div/Sep/Widowed	Count	2	14	18	15	4	53
		% within Marital Status	3.8%	26.4%	34.0%	28.3%	7.5%	100.0%
		% within Hours Used	3.8%	10.7%	10.7%	17.2%	7.8%	10.8%
		% of Total	.4%	2.9%	3.7%	3.1%	.8%	10.8%
	Married	Count	36	72	82	38	18	246
		% within Marital Status	14.6%	29.3%	33.3%	15.4%	7.3%	100.0%
		% within Hours Used	69.2%	55.0%	48.5%	43.7%	35.3%	50.2%
		% of Total	7.3%	14.7%	16.7%	7.8%	3.7%	50.2%
	Single	Count	13	32	55	25	25	150
		% within Marital Status	8.7%	21.3%	36.7%	16.7%	16.7%	100.0%
		% within Hours Used	25.0%	24.4%	32.5%	28.7%	49.0%	30.6%
		% of Total	2.7%	6.5%	11.2%	5.1%	5.1%	30.6%
Total		Count	52	131	169	87	51	490
		% within Marital Status	10.6%	26.7%	34.5%	17.8%	10.4%	100.0%
		% within Hours Used	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%
		% of Total	10.6%	26.7%	34.5%	17.8%	10.4%	100.0%

Gender and Age Differences

Do males spend the same Total Hours Online as females? Males spent 19.02 hours online, females, 18.7. There was no evidence that Total Hours Online by males and females were different (0.838). For Recreational Hours, mean hours for males was 6.29 hours; females, 6.28. The researchers found no difference between male and female Recreational Hours (sig. = .950).

Do younger users spend the same hours online as older users? Specifically, are recreational hours equal between those 20 and younger versus those over 20? Recreational Hours by users 20 and younger averaged 6.08. Recreational Hours by users over 20 averaged 8.79. Equal variances was assumed (0.236); and the hypothesis of equal hours of use was rejected (0.024).

New Users of the Internet

One stereotype in the literature suggested that "newbies" spent more time online than more experienced Internet users. The researchers established hypotheses to test whether Total Hours Online is equal across all levels of Internet experience, and whether Recreational Hours Online is equal across all levels of Internet experience. These hypotheses would be tested with ANOVA, if appropriate assumptions were met. For both hypotheses, equal variances could not be assumed, and no ANOVA was conducted.

The researchers compared hours online between those with less than one year of Internet experience and those with a year or more. This simplified test used independent samples t-test. For Total Hours Online, those with less than one year's experience spent 14.6 hours online weekly; other users spent 19.4. This difference was significant (0.006), but the finding contradicts the stereotype--experienced users were heavier users of the Internet, not the "newbies." For Recreational Hours Online, there was no difference.

Usage Patterns of Female respondents

Based on the literature concerning "middle-aged female" compulsive users, the researchers tested with one-way ANOVA for differences in Internet usage rates among female respondents only. The researchers established hypotheses to test whether Recreational Hours Online in female users is equal among all age categories, and whether Total Hours Online in female users is equal among all age categories. For the recreational hours test, equal variances was assumed, but H_o could not be rejected (sig. = 0.366). For the total hours test, equal variances could not be assumed, and no ANOVA was performed. There was no evidence that middle-aged women were more likely to be among the heaviest users of the Internet.

ANOVA

The researchers established eight ANOVA tests, where Total Hours Online and Recreational Hours Online were the factors, and Age, Gender, Household Income, and Education were the variables. Of the eight hypotheses, equal variances could be assumed only for "2. Mean age is the same across all categories of Recreational Hours Online," and "4. Mean educational level is the same across all categories of Recreational Hours Online." For hypothesis 2, the ANOVA revealed no differences in the respondents' age mix as Internet usage varied. For hypothesis 4, a significant variation was found. The mean educational level of respondents is significantly higher among those using the Internet 4 hours weekly or less, than for those using the Internet 5 - 9 hours or 10 - 20 hours weekly.

Linear Regression

The researchers modeled Total Hours Online, and Recreational Hours Online, with linear regressions. The dependent variable in each case was usage; the independent variables were Age, Gender, Educational Level, and Household Income. For Recreational Hours Online, the regression equation was

Recreational Hours = 8.582 + .029 Age - 1.058 Education -.141 Gender - .005 Income

R-square is small (0.031), but the regression is significant (0.002). Of the independent variables, only educational level is significant. For Total Hours, the regression was not significant.

SUMMARY, CONCLUSIONS, AND FURTHER RESEARCH

Internet dependence, or Internet Addiction Disorder, is a pathological condition that may affect several million Americans. The negative consequences of this behavior reach into their personal lives and into their workplaces. Early research on this phenomenon suggested young, computer-savvy males were the most vulnerable; later research suggested that middle-aged women, college students, gays, and children were also at risk. This study attempted to determine which stereotype, if any, was substantiated by data in a publicly available database of Internet users.

This study concluded that the respondents' attributes—including race, gender, and age—were consistent with data in related studies. This study found that 10 percent of respondents reported 40 or more hours of online activity weekly—an amount labeled an important signal of addictive behavior. That percentage also is consistent with results from related studies.

Those who spend the most hours online are younger than other users, but do not differ on other attributes. There is no link between gender and level of use; this contradicts older stereotypes. Internet participation by married users falls as the quantity of hours online increases. Those users with more Internet experience spent less time online than less experienced users; this also contradicts the stereotype. There is no evidence that middle-aged women are more likely to be among the heaviest users of the Internet. The level of education is higher among those Internet users who use it the least. Regression models were of limited value; only education level stood out as a significant explanatory variable.

The researchers are concerned first, that the phenomenon of Internet dependence is growing, and second, that no reliable set of attributes and variables has been found that would identify an Internet addict. Those concerns prompt the researchers to call for additional surveys patterned after the GVU survey which provided the data used here. The researchers ask for two improvements in such surveys. First, the variables need smaller, more finely-tuned categories, or need to be true interval data. Second, the surveys need to include questions specifically oriented to the symptoms and behaviors of Internet addiction.

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