



Contents lists available at ScienceDirect

Computers & Education

journal homepage: www.elsevier.com/locate/compedu

Academic self-efficacy and academic procrastination as predictors of problematic internet use in university students[☆]

Hatice Odaci*

Karadeniz Technical University, Fatih Faculty of Education, Department of Educational Sciences, 61335 Söğütü, Trabzon, Turkey

ARTICLE INFO

Article history:

Received 14 November 2010

Received in revised form

26 December 2010

Accepted 6 January 2011

Keywords:

Adult learning

Computer-mediated communication

Media in education

ABSTRACT

Although computers and the internet, indispensable tools in people's lives today, facilitate life on the one hand, they have brought new risks with them on the other. Internet dependency, or problematic internet use, has emerged as a new concept of addiction. Parallel to this increasing in society in general, it is also on the rise among university students and is widely believed to have a negative impact on their lives. The aim of this study was to investigate whether academic self-efficacy and academic procrastination can act as predictors of problematic internet use among university students. The study group consisted of 398 students attending education, medicine, architecture and economics programs at the Karadeniz Technical University in Turkey. The Problematic Internet Use Scale, Academic Self-efficacy Scale, Academic Procrastination Scale and a Personal Data Form were used as scaling instruments. Pearson's correlation coefficient, multiple regression analysis, independent samples *t*-test and one-way ANOVA were used to analyze the data collected. The results show a significant negative correlation between academic self-efficacy and problematic internet use, while the relation between problematic internet use and academic procrastination was not statistically significant. Furthermore, academic self-efficacy was determined to be a significant predictor of problematic internet use. The results also show a significant difference in problematic internet use in terms of students' programs, though levels of problematic internet use did not differ in terms of sex or ownership of a computer. These findings are discussed in the light of the relevant literature and some new directions for further studies are suggested.

© 2011 Elsevier Ltd. All rights reserved.

1. Introduction

The internet, widely used in educational environments, is an important teaching and learning resource when used in a manner appropriate to its aims. Thanks to the internet, students can easily access the materials they need for their work and obtain information by different routes (Chou & Tsai, 2002; Chuang & Tsai, 2005; Houle, 1996). However, as with all technologies, in addition to facilitating individuals' lives to a considerable extent the internet also brings problems with it; in particular, unhealthy or improper use of the internet may be described as a negativity that has begun affecting social life. "Healthy internet use" has been described as internet use in order to achieve a specific purpose, within an appropriate time frame, involving no emotional or behavioral disorder (Davis, 2001; Odaci & Kalkan, 2010). However, the number of "problematic internet users" to whom the concept of health provided in this definition does not apply is also too great to ignore. Researchers have at various time referred to this in the literature as "internet dependence" (Lin & Tsai, 2002), "internet addiction" (Douglas, Mills, Niang, Stepchenkova, Byun, Ruffini et al., 2008; Scherer, 1997), "pathological internet use" (Davis, 2001) and "problematic internet use" (Davis, Flett, & Besser, 2002; Odaci & Kalkan, 2010). The common point in these descriptions involves such indicators as spending excessive time on the internet, a state of distress and irritability in situations when internet use is not available and feeling the need to spend even more time on line (Young & Rodgers, 1998).

Internet use is highest in the 16–24 age groups (Kandell, 1998; Öztürk, Odabasioglu, Eraslan, Genç, & Kalyoncu, 2007), and this suggests that university students, at a critical time in terms of their social and emotional development, are a potential risk group for

[☆] This study was presented as oral presentation at the World Conference on Learning, Teaching and Administration, Egypt, Cairo, October 29–31, 2010.

* Tel.: +90 462 377 70 77; fax: +90 462 248 73 44.

E-mail addresses: hatodaci@hotmail.com, eodaci@hotmail.com.

internet dependence (Odacı & Kalkan, 2010). The fact that internet access is easier and faster in the university environment increases the likelihood of university students being affected by the negative consequences of the internet. Remaining on line for a long period of time, without being aware of the passage of time, in other words, problematic internet use, can soon lead to tasks the individual needs to complete being postponed in an unrealistic manner (Lay, 1988). There are major inconsistencies between the aims and behavior of individuals with postponement problems. Such people appear to approach the tasks to be performed with good intentions and determination, but they fail to make good their intentions over the long-term and even to embark on them on time (Schouwenburg, Lay, Pychyl, & Ferrari, 2004). Academic procrastination, one variant of general procrastination, is a problem in such areas as preparing for exams in school, doing homework and holding meetings with student counselors and completing projects (Lay, 1988; Milgram, Mey-Tal, & Levison, 1998).

Academic success is very important for students, whose aim in attending university is to obtain the diploma necessary to enter a profession. Students' belief in their academic self-efficacy and their ability to begin and continue their studies is also highly important. Academic self-efficacy is a belief regarding the student's ability to successfully complete an academic task (Solberg, O'Brien, Villareal, Kennel, & Davis, 1993; Tsai & Tsai, 2010; Zimmerman, 1995). Academic self-efficacy is one important variable in the estimation of student success (Elias & Loomis, 2002; Wood & Locke, 1987). In the light of the above, we think that students need to use the internet in a healthy way, otherwise they will encounter difficulties in displaying a good academic performance and that their belief in their academic self-efficacy will be impaired and academic procrastination behavior may increase.

Studies have examined the correlation between problematic internet use and depression (Ceyhan & Ceyhan, 2008; Fortson, Scotti, Chen, Malone, & Del Ben, 2007; Kim, Ryu, Chon, Yeun, Choi, Seo et al., 2006; Shapira, Goldsmith, Keck, Khosla, & McElroy, 2000; Yen, Ko, Yen, Wu & Yang, 2007; Young & Rodgers, 1998), anxiety and psychomotor agitation (Ferraro, Caci, D'Amico, & Di Blasi, 2007), loneliness and social anxiety (Caplan, 2007; Kraut et al., 1998; Nalwa & Anand, 2003; Whang, Lee, & Chang, 2003), hostility (Yen et al., 2007), intolerance and obstinacy (Yang, Choe, Baity, Lee, & Cho, 2005), shyness (Yang & Tung, 2007; Yuen & Lavin, 2004), locus of control, antisocial trends and social adaptation (Ceyhan & Ceyhan, 2008), social self-efficacy and academic locus of control (İskender & Akin, 2010), dating anxiety (Odacı & Kalkan, 2010), academic performance (Kandell, 1998), psychiatric symptoms (Jang, Hwang, & Choi, 2008; Shapira et al., 2000; Whang et al., 2003; Yang et al., 2005; Yen et al., 2008), parent-adolescent conflict (Yen, Yen, Chen, Chen, & Ko, 2007), low family function (Armstrong, Phillips, & Saling, 2000), psychological well-being (Kraut et al., 1998), anger, strain and tiredness (Beard & Wolf, 2001) but we encountered no studies setting out the relationship between problematic internet use and academic self-efficacy and academic procrastination. Bearing in mind the negative impacts of problematic internet use on academic success (Young, 2004), we hypothesized it would also be correlated with academic self-efficacy and academic procrastination. The findings obtained will make a significant contribution to the determination of therapeutic measures directed toward young people. This study was intended to investigate, in the light of a number of problematic internet use variables, whether a belief in academic self-efficacy and academic procrastination are predictive of problematic internet use.

2. Methods

2.1. Study group

The study group consisted of 398 students studying at the Karadeniz Technical University, Turkey, Faculties of Medicine, Education, Architecture and Economic and Administrative Sciences. Two hundred sixteen (54.3%) were female and 182 (45.7%) male. Ages ranged between 18 and 28, with a mean of 20.34 (SD: 1.47).

2.2. Data collection

2.2.1. Problematic internet use scale (PIUS)

The PIUS was developed by Ceyhan, Ceyhan, and Gürçan (2007) to measure problematic internet use levels among university students, the PIUS was developed as a dimensional, quantitative scale based on individual self-assessment showing a spectrum of internet use from normal to pathological. The scale consists of 33 items. Possible scores range from 33 to 165, higher scores indicating that individuals' internet use is increasingly unhealthy, that is it has a negative impact on their lives and may give rise to a tendency to pathology, such as internet dependence. Scale factor analysis results revealed the three sub-factors of which it consists, "negative consequences of the internet," "social benefit/social comfort" and "excessive use." Together, these three factors constitute 48.96% of total variance. Scale internal consistency coefficient was (α) 0.94. The internal consistency coefficient of the scale regarding the data collected from our study group was (α) 0.93, while those of the three factors constituting the scale were 0.93, 0.84 and 0.73, respectively (Ceyhan et al., 2007).

2.2.2. Academic self-efficacy scale (ASS)

The ASS was developed by Jerusalem and Schwarzer (1981) (cited in ref. Yılmaz, Gürçay & Ekici, 2007) to measure university students' self-efficacy with regard to academic learning, the scale was adapted into Turkish by Yılmaz et al., (2007). The ASS is a one-dimensional Likert-type scale consisting of 7 items. Possible scores range from 7 to 28. High scores indicate that subjects have a high level of belief in their self-efficacy regarding learning. The original scale has a Cronbach Alpha reliability value of 0.87, while that adapted into Turkish has a value of 0.79.

2.2.3. Academic procrastination scale (APS)

The APS was developed by Çakıcı (2003) with the aim of determining students' academic procrastination behavior, the scale consists of 19 statements, 12 negative and 7 positive, involving tasks students have a responsibility to perform in their academic lives. The APS has a Cronbach Alpha reliability coefficient of 0.92. Cronbach Alpha coefficients calculated for the scale's first and second factors are 0.89 and 0.84, respectively.

Table 1

Correlation between problematic internet use and academic self-efficacy and academic procrastination.

	PIU	AS	AP	Mean	Sd
PIU	1	−0.51**	0.09	93.44	42.28
AS		1	−0.11*	17.70	4.12
AP			1	54.23	11.27

* $p < .05$, ** $p < .01$, PIU = Problematic internet use, AS = Academic self-efficacy, AP = Academic procrastination.

2.2.4. Personal Data Form

The Personal Data Form was developed by the authors and consists of questions about age, sex, faculty attended and computer ownership.

2.3. Data collection and analysis

Scales were administered to students in groups, in a class environment. Before administration of the scales, students were given the requisite information about the aim of the research and how the measurement scales should be answered. Firstly, the relations between students' problematic internet use and academic self-efficacy and academic procrastination were investigated. Then, it was investigated whether problematic internet use differed significantly according to the independent variables in the personal information form. Data were analyzed using SPSS 15.00. Pearson's Product Moments Correlation Coefficient, multiple linear regression analysis, the independent t -test and one-way ANOVA were used for data analysis. Significance was set at a minimum of 0.05, while other significance levels (0.01 and 0.001) are also shown.

3. Results

As shown in Table 1, there was a negative correlation ($r = -0.51$, $p < 0.01$) between problematic internet use and academic self-efficacy, while no significant correlation was determined between problematic internet use and academic procrastination. According to the multiple linear regression analysis results, academic self-efficacy and academic procrastination account for 26% of problematic internet use variance ($F_{(2,395)} = 70.90$, $p < 0.05$) (Table 2). Academic self-efficacy made a positive contribution to the model ($\beta = -0.51$, $p < 0.05$) while academic procrastination made no significant contribution. The independent t -test showed that university students' problematic internet use scores did not differ significantly according to sex ($t = -0.92$, $p < 0.05$) or computer ownership ($t = -0.72$, $p > 0.05$) (Table 3). At one-way ANOVA, university student problematic internet use varied according to the faculty attended ($F_{(3,394)} = 64.97$) (Table 4). According to the results of Scheffe's test, performed in order to determine which groups these differences originate from, problematic internet use scores for education and economic administrative sciences students were higher than those for medicine and architecture faculty students, and architecture faculty students' problematic internet use scores were significantly higher than those of medical faculty students.

4. Discussion and recommendations

The data obtained from this investigation into the relations between problematic internet use and academic self-efficacy and academic procrastination show a significant negative correlation between problematic internet use and academic self-efficacy, but no significant correlation between problematic internet use and academic procrastination. In addition, we concluded that academic self-efficacy could account for problematic internet use but that academic procrastination made no significant contribution to problematic internet use. The literature contains studies that directly and indirectly support our findings. Studies on this subject have reported that because of the attractive nature of the internet the more time many people who spend a large part of their time on line the more their productivity in their school or working lives decreases (Young and Rodgers, 1998; Young, 2004). In a study of 572 university students, Kubey, Lavin, and Barrows (2001) determined that just over 9% of students were internet dependent and that the academic performance of dependent students was four times lower than that of non-dependent students, and also those dependent students were significantly lonelier than other students. In another study, Young (2008) reported problems such as impaired organization, reduced study success and having to take years again in 58% of students with internet use dependency. Bölükbaşı (2003) reported that cyber cafe users were to a large extent students and that 67.3% spent more time than planned on line, one of the main internet dependency criteria. Since students who exhibit problematic internet use are constantly concentrated on the net and spend a very large part of their time on line, we think they are unable to devote sufficient time to their academic work and studies and that they constantly postpone the academic work they should be doing, as a result of which the academic failure they experience causes a decline in their belief in their academic self-efficacy.

Another finding from the study is that there is no sex difference between university student problematic internet use levels. Alongside studies in the literature showing no difference between the sexes in problematic internet use (Chak & Leung, 2004; Hardie & Tee, 2007) there are also studies revealing greater problematic internet use among females than males (Bölükbaşı, 2003; Ceyhan & Ceyhan, 2008; Kubey

Table 2

Multiple linear regression analysis results for the prediction of problematic internet use.

Variables	B	β	t	p	R	R ²	ΔR^2	F
Fixed	180.38	–	14.28	0.001	0.51	0.26	0.26	70.90
AS	−5.23	−.51	−11.74	0.001				
AP	0.10	0.03	0.64	0.524				

AS = Academic self-efficacy, AP = Academic procrastination.

Table 3
Problematic internet use variations on the basis of sex and computer ownership.

		<i>n</i>	Mean	Sd	<i>t</i>	<i>P</i>
Sex	Female	216	91.67	45.09	−0.92	0.358
	Male	182	95.53	38.69		
Computer ownership	Yes	273	92.42	40.53	−0.72	0.470
	No	119	95.95	45.90		

Table 4
Problematic internet use variations according to faculty attended.

Source	SS	df	MS	<i>F</i>	<i>p</i>
Between groups	234832.9	3	78277.62	64.97	.001
Intra-group	474711.1	394	1204.85		
Total	709543.9	397			

SS = sum of squares, df = Degree of freedom, MS = Mean squares.

et al., 2001; Morahan-Martin & Schumacher, 2000; Odacı & Kalkan, 2010; Öztürk et al., 2007; Scherer, 1997). There is currently an increase in computer use among university students of both sexes. Because easy access to computers and the internet thanks to the increasing technological progress being made every day and the meeting of every-day needs by means of the internet in various spheres, such as education, entertainment, communications and shopping have made the computer an indispensable tool for both male and female students.

The findings in our study show that problematic internet use does not vary in terms of computer ownership. No similar or conflicting findings were encountered in the literature. Studies performed have more shown a correlation with length of computer use (Scherer, 1997). There is no need for university students to possess a computer to be able to access the internet. They can do this from friends' computers, university laboratories or cyber cafes.

Another variable considered in this study is the faculty attended. A significant difference in terms of problematic internet use was determined among the faculties included in the study. Medicine was the faculty with the lowest problematic internet use scores, followed by architecture. The faculties with the highest problematic internet use scores were education and economic management sciences. Özcan and Buzlu (2007) also determined a higher level of problematic internet use among students of social sciences. The findings in the literature support those from this research. This may be ascribed to the academic and practical intensity of medical faculty students' school programs and to their therefore having less free time available. The favorable result from the faculty of architecture may be interpreted as due to the intense nature of project and drawing assignments involved. Education and economic management sciences faculties, which bear a close affinity to social science, are less intensive compared to medical and architectural faculties and the projects and assignments given are more suited to being carried out in a computer environment, which suggests that these findings may be ascribed to this.

The conclusion from this study is that as problematic internet use rises, academic self-efficacy declines. In addition, no significant correlation was determined between academic procrastination and problematic internet use. These findings clarify the relationship between academic self-efficacy and academic procrastination and problematic internet use.

There are some limitations to this study. In particular, the participants were university students, and this research could be repeated with other student populations. This study has established one fact, that there is a need to research to investigate and determine the reasons for problematic internet use. We investigated the relations between problematic internet use and academic self-efficacy and academic procrastination, and those between other variables and problematic internet use could also be investigated. We hope that our findings will contribute to the preparation of programs to prevent problematic internet use among university students in the future. Bearing in mind that problematic internet use is a cognitive feature, we also think that cognitive-behavioral therapies will play a role in overcoming this condition.

References

- Armstrong, L., Phillips, J. G., & Saling, L. L. (2000). Potential determinants of heavier internet usage. *International Journal of Human-Computer Studies*, 53, 537–550.
- Bölükbaş, K. (2003). Internet kafeler ve internet bağımlılığı üzerine sosyolojik bir araştırma [A sociological research on internet cafes and internet addiction]. Unpublished master thesis. Institute of Social Sciences, Dicle University, Diyarbakır, Turkey.
- Beard, K. W., & Wolf, E. M. (2001). Modification in the proposed diagnostic criteria for internet addiction. *CyberPsychology & Behavior*, 4, 377–383.
- Çakıcı, D. Ç. (2003). Lise ve üniversite öğrencilerinde genel erteleme ve akademik erteleme davranışının incelenmesi [An Examination of the general procrastination behavior and academic procrastination behavior in high-school and university students]. Unpublished master thesis. Institute of Education Sciences, Ankara University, Ankara, Turkey.
- Caplan, S. E. (2007). Relations among loneliness, social anxiety and problematic internet use. *CyberPsychology & Behavior*, 10, 234–242.
- Ceyhan, A. A., & Ceyhan, E. (2008). Loneliness, depression and computer self-efficacy as predictors of problematic internet use. *CyberPsychology & Behavior*, 11, 699–701.
- Ceyhan, E., Ceyhan, A. A., & Gürçan, A. (2007). The validity and reliability of the problematic internet usage scale. *Educational Sciences: Theory & Practice*, 7, 411–416.
- Chak, K., & Leung, L. (2004). Shyness and locus of control as predictors of internet addiction and internet use. *CyberPsychology & Behavior*, 7, 559–570.
- Chou, C., & Tsai, C. C. (2002). Developing web-based curricula: issues and challenges. *Journal of Curriculum Studies*, 34, 623–636.
- Chuang, S. C., & Tsai, C. C. (2005). Preferences toward the constructivist internet-based learning environments among high school students in Taiwan. *Computers in Human Behavior*, 21, 255–272.
- Davis, R. (2001). A cognitive-behavioral model of pathological internet use. *Computers in Human Behavior*, 17, 187–195.
- Davis, R. A., Flett, G. L., & Besser, A. (2002). Validation of a new scale for measuring problematic internet use; implications for pre-employment screening. *CyberPsychology & Behavior*, 15, 331–347.
- Douglas, A. C., Mills, J. E., Niang, M., Stepchenkova, S., Byun, S., Ruffini, C., et al. (2008). Internet addiction: meta-synthesis of qualitative research for the decade 1996–2006. *Computers in Human Behavior*, 24, 3027–3044.
- Elias, S., & Loomis, R. (2002). Utilizing need for cognition and perceived self efficacy to predict academic performance. *Journal of Applied Social Psychology*, 32, 1687–1702.
- Ferraro, G., Caci, B., D'Amico, A., & Di Blasi, M. (2007). Internet addiction disorder: an Italian study. *CyberPsychology & Behavior*, 10, 170–175.
- Fortson, B. L., Scotti, J. R., Chen, Y. C., Malone, J., & Del Ben, K. S. (2007). Internet use, abuse and dependence among students at a southeastern regional university. *Journal of American College of Health*, 56, 137–144.
- Hardie, E., & Tee, M. Y. (2007). Excessive internet use: the role of personality, loneliness and social support networks in internet addiction. *Australian Journal of Emerging Technologies and Society*, 5, 33–47.

- Houle, P. A. (1996). Toward understanding student differences in a computer skill course. *Journal of Educational Computing Research*, 14, 25–48.
- İskender, M., & Akin, A. (2010). Social self-efficacy, academic locus of control, and internet addiction. *Computers & Education*, 54, 1101–1106.
- Jang, K. S., Hwang, S. Y., & Choi, J. Y. (2008). Internet addiction and psychiatric symptoms among Korean adolescents. *Journal of School Health*, 78, 165–171.
- Kandell, J. J. (1998). Internet addiction on campus: the vulnerability of college students. *CyberPsychology & Behavior*, 1, 11–17.
- Kim, K., Ryu, E., Chon, M. Y., Yeun, E. J., Choi, S. Y., Seo, J. S., et al. (2006). Internet addiction in Korean adolescents and its relation to depression and suicidal ideation: a questionnaire survey. *International Journal of Nursing Studies*, 43, 185–192.
- Kraut, R., Patterson, M., Lundmark, V., Kiesler, S., Mukopadhyay, T., & Scherlis, W. (1998). Internet paradox: a social technology that reduces social involvement and psychological well-being? *American Psychologist*, 53, 1017–1031.
- Kubey, R. W., Lavin, M. J., & Barrows, J. R. (2001). Internet use and collegiate academic performance decrements: early findings. *Journal of Communication*, 51, 366–382.
- Lay, C. H. (1988). The relationship of procrastination and optimism to judgments of time to complete an essay and anticipation of setbacks. *Journal of Social Behavior and Personality*, 3, 201–214.
- Lin, S. S. J., & Tsai, C. C. (2002). Sensation seeking and internet dependence of Taiwanese high school adolescents. *Computers in Human Behavior*, 18, 411–426.
- Milgram, N., Mey-Tal, G., & Levison, Y. (1998). Procrastination, generalized or specific, in college students and their parents. *Personality & Individual Differences*, 25, 297–316.
- Morahan-Martin, J., & Schumacher, P. (2000). Incidence and correlates of pathological internet use among college students. *Computers in Human Behavior*, 16, 13–29.
- Nalwa, K., & Anand, A. P. (2003). Internet addiction in students: a cause of concern. *CyberPsychology & Behavior*, 6, 653–656.
- Özcan, N. K., & Buzlu, S. (2007). Internet use and its relation with the psychosocial situation for a sample of university students. *CyberPsychology & Behavior*, 10, 767–772.
- Öztürk, Ö., Odabasoglu, G., Eraslan, D., Genç, Y., & Kalyoncu, Ö. A. (2007). Internet addiction: clinical aspects and treatment strategies. *Journal of Dependence*, 8, 36–41.
- Odaci, H., & Kalkan, M. (2010). Problematic internet use, loneliness and dating anxiety among young adult university students. *Computers & Education*, 55, 1091–1097.
- Scherer, K. (1997). College life online: healthy and unhealthy internet use. *Journal of College Student Development*, 38, 655–664.
- Schouwenburg, H. C., Lay, C. H., Pychyl, T. A., & Ferrari, J. R. (2004). *Counseling the procrastinator in academic settings*. Washington: American Psychological Association.
- Shapira, N. A., Goldsmith, T. D., Keck, P. E., Khosla, U. M., & McElroy, S. L. (2000). Psychiatric features of individuals with problematic internet use. *Journal of Affective Disorders*, 57, 267–272.
- Solberg, V. S., O'Brien, K., Villareal, P., Kennel, R., & Davis, B. (1993). Self-efficacy and Hispanic college students: validation of the college self-efficacy instrument. *Hispanic Journal of Behavioral Sciences*, 15, 80–95.
- Tsai, M. J., & Tsai, C. C. (2010). Junior high school students' internet usage and self-efficacy: a re-examination of the gender gap. *Computers & Education*, 54(4), 1182–1192.
- Whang, L. S. M., Lee, S., & Chang, G. (2003). Internet over-users' psychological profiles: a behavior sampling analysis on internet addiction. *CyberPsychology & Behavior*, 6, 143–150.
- Wood, R. E., & Locke, E. A. (1987). The relation of self-efficacy and grade goals to academic performance. *Educational and Psychological Measurement*, 47, 1013–1024.
- Yılmaz, M., Gürçay, D., & Ekici, G. (2007). Adaptation of the academic self-efficacy scale to Turkish. *Hacettepe University Journal of Education*, 33, 253–259.
- Yang, C. K., Choe, B. M., Baity, M., Lee, J. H., & Cho, J. S. (2005). SCL-90-R and 16PF profiles of senior high school students with excessive internet use. *Canadian Journal of Psychiatry*, 50, 407–414.
- Yang, S. C., & Tung, C. J. (2007). Comparison of internet addicts and non-addicts in Taiwanese high school. *Computers in Human Behavior*, 23, 79–96.
- Yen, J. Y., Ko, C. H., Yen, C. F., Chen, S. H., Chung, W. L., & Chen, C. C. (2008). Psychiatric symptoms in adolescents with internet addiction: comparison with substance use. *Psychiatry and Clinical Neurosciences*, 62, 9–16.
- Yen, J. Y., Ko, C. H., Yen, C. F., Wu, H. Y., & Yang, M. J. (2007). The comorbid psychiatric symptoms of internet addiction: attention deficit and hyperactivity disorder, depression, social phobia and hostility. *Journal of Adolescent Health*, 41, 93–98.
- Yen, J. Y., Yen, C. F., Chen, C. C., Chen, S. H., & Ko, C. H. (2007). Family factors of internet addiction and substance use experience in Taiwanese adolescents. *CyberPsychology & Behavior*, 10, 323–329.
- Young, K. S. (2004). Internet addiction: a new clinical phenomenon and its consequences. *American Behavioral Scientist*, 48, 402–415.
- Young, K. S. (2008). *What makes internet addictive: Potential explanations for pathological internet use*. Retrieved June 16, 2010, from: <http://www.netaddiction.com/articles/habitforming.pdf>.
- Young, K. S., & Rodgers, R. (1998). The relationship between depression and internet addiction. *CyberPsychology & Behavior*, 1, 25–28.
- Yuen, C. N., & Lavin, M. J. (2004). Internet dependence in the collegiate population: the role of shyness. *CyberPsychology & Behavior*, 7, 379–383.
- Zimmerman, B. J. (1995). Self-efficacy and educational development. In A. Bandura (Ed.), *Self-efficacy in changing societies* (pp. 202–231). New York: Cambridge University Press.