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Research Article

Problematic Internet Use, Depression, Anxiety and Metacognitions in an Iranian Sample

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Abstract

Objective: This study examined the relationships of problematic Internet use (PIU), anxiety, depression, and metacognitions, and investigated the role of gender in these constructs.

Method: Participants were 100 undergraduate university students from Arsanjan City, Iran. A demographic questionnaire and four self-rating measures were used.

Results: Resulting data showed that mood alteration and social benefit factors of PIU were related to trait anxiety, depression and cognitive self-consciousness. Excessive PIU was correlated to uncontrollability and danger, and to cognitive confidence subscales and the total score of metacognitions. Furthermore, trait and state anxiety were positively correlated to depression and metacognitions. Females had higher rates of excessive use than males, and males had higher depression rates than females. Depression and metacognitions predicted 20 percent of the social benefit variation in the total sample. Trait anxiety, metacognitions and depression predicted 6, 7 and 5 percent, respectively, of compulsivity, excessive time and the PIU in the total sample.

Conclusions: This study adds to the psychology of the Internet because it explores the relationship of PIU, anxiety, depression and metacognitions with regard the role of gender, and the predictive role of mood and metacognitions in Internet use.

Keywords: Problematic internet use; Anxiety; Depression; Metacognitions; Gender

Introduction

The Internet is a powerful technology that influences human cognition, emotion, social and interpersonal behavior in different ways. Wallace indicated that people might use synchronous spaces such as the Internet excessively [1]. Several studies showed that Internet users experiencing aloneness, depression and problematic internet use spend most of their time online in search of interpersonal relations, emotional support and psychological needs; and this type of behavior can influence their social interactions in the real world in a negative way [2-4].

Problematic internet use (PIU) refers to maladaptive cognitions and behaviors involving Internet use that result in negative academic, professional, and social consequences, the compelling use, the inclination of online social exchanges, the cognitive preoccupations with virtual spaces and some incident of negative outcomes in emotions and behaviors linked with Internet use [5,6]. PIU may include both cognitive and behavioral symptoms, and may have many unfavorable psychosocial outcomes in dependent users [7-9]. Many international studies have reported significant relationships between PIU, depression and anxiety in adolescents and young adults [10-16].

Spada and colleagues [14], for instance, found that using the Internet can be an apparatus for diminution of some negative emotional drives [15,16]. In contrast, many investigations indicated that online relationships and interactions may turn out some degrees of stress in Internet users; PIU may decrease the types of close relations in the real world; and PIU may amplify the risk of depression and emotional problems [17-19].

Additionally, studies have found sociocultural factors, such as gender, may have a role in Internet use and its underline psychopathology [20]. This study will investigate the relationship of PIU, depression, anxiety and metacognition as influenced by gender in a sample of university students in Iran.

Theoretical Frameworks

Several theoretical frameworks may inform this investigation. First, the cognitive-behavioral model would suggest that diverse types of emotional problems such as depression and anxiety may predispose problematic internet users (PIUs) to show signs of greater maladaptive cognitions and emotions in the actual world [8-9]. Davis [8] speculated that the presence of emotional disturbances in Internet users can raise the risk of PIU in the future. Davis proposed that PIU involves some uncontrollable use of the Internet to the point that the individual suffers from negative outcomes in interpersonal affairs at work, school and personal life [8]. According to the cognitive-behavioral model, the existence of premorbid psychopathology such as depression and anxiety may be main precursors of PIU. Based on a psychopathology hypothesis of Internet use, both anxiety and depression may be two main symptoms for the diagnosis of PIU in clinical settings [13,21-23]. For example, the current draft of the Diagnostic and Statistical Manual of Mental Disorders (DSM-5) includes non-substance addictions in substance abuse disorders, and described PIU as an substance abuse-like behavioral disorder with affective symptoms such as depression and anxiety [24].

Second, Caplan [2] conceptualized an online social interactions model wherein user penchant for online social interactions is a means of coping with worries about security, wellbeing, efficiency, self-assurance and comfort with interpersonal interactions and relationships, and is related with PIU. Caplan suggested that social isolation has a superior role in the behavioral symptoms of PIU than the presence of psychopathologies. For instance, Caplan showed that predilection for online socialization connections is a key contributor to PIU, and that psychosocial and emotional problem such as being alone, depression, and gripping use particularly in college and university students is mediated by tendency for online socialization. Thereby,

Caplan replaced the term "pathological Internet use" with "problematic Internet use". Caplan indicated that any deficits of social skills in face to face relationships might help clinicians to recognize how the lack of these skills predisposes an individual to develop PIU.

Third, LaRose, Lin, and Eastin [11] in applying social cognitive theory assumed that PIU involves degrees of online relationships to improve some negative moods, particularly in the relief of depression and anxiety. They suggested that PIU might drop off depression when there is an increase of personal experience and utilize of e-mail exchanges with known associates. The Internet can help people achieve more social support in the factual world [25]. Also, this theory showed the possible roles of sociocultural factors such as gender in Internet use in relation to the underlying psychopathology of PIU [25].

Finally, a recent trend in understanding PIU applies a metacognitive approach. Metacognition refers to higher order thoughts that involve a dynamic control over the cognitive processes in some continuing tasks [26]. Planning how to come up to a given task, monitoring understanding, and evaluating progress toward the completion of a task are examples of metacognition. Brown suggested that metacognition encompasses the use of metacognitive strategies or regulations that may be supportive in any psychological issue [27]. For example, individuals build up greater skills in making explanations about their emotional state, self-observations, awareness of coping styles, problem-solving, and use of metacognition and emotional regulations during adolescence [28,29].

Metacognitive theory suggested that accurate evaluation of threatening situations and good expectancy about the future can assist people prevent emotional problems in interpersonal interactions [30,31]. Tsai showed that the Internet can help students to achieve more suitable epistemological commitments, and higher metacognitive and critical thinking skills [32]. Because the Internet transforms the nature of education, learning and knowledge construction, it might prompt some mental challenges with multiple dimensions in students [32,33]. Johnson suggested that the Internet is an interactive media, and requiring more complex cognitive functions than associated with typical computer use [34]. He suggested that language centers of the brain are active throughout Internet use, and metacognitive abilities are essential for different online actions. Johnson speculated that the Internet improves cognitive processes and helps the development of metacognition [34]. A recent study indicated all dimensions of metacognition are positively correlated to PIU [14].

The Present Study

The present study is based on application of the cognitive-behavioral model [8,9], the preference of online social interactions model [2], social cognitive theory [20], and metacognitive theory [35] in the field of the Internet use. Theoretically, these conceptualizations expect that PIU produces some degree of emotional problems such as anxiety and depression, as well as use of metacognition in Internet users from different cultures. The aforesaid theories suggest that there are significant relationships between PIU, depression, anxiety and metacognition in general. Also, the aforesaid theories suggest that gender influences PIU, depression, anxiety and metacognition. However, the current literature in this field is mostly restricted to the Western world.

This study is important because there is a lack of evidence on the concurrent correlations of PIU, depression, anxiety and metacognition; and the role of gender on these constructs in undergraduate students, particularly in Iran. The first hypothesis of this study is that PIU, anxiety, depression and metacognition have significant positive correlations. The second hypothesis is that gender plays a significant role in PIU, anxiety, depression and metacognition. The third hypothesis is that anxiety, depression and metacognition can predict variations in PIU.

Method

Sample

Participants were 100 undergraduate students (M=50 and F=50) from the Arsanjan Branch-Islamic Azad University, Arsanjan City, Fars province, Iran. Participants were selected by a random sampling method within a survey design. All participants had successfully passed at least one year of the undergraduate program in the university. The mean and standard deviation of age for males and females were M=22.825, SD=3.56, and M=22.28, SD=2.53 respectively. No participants were dropped from analysis in this study. After informed consent was acquired, all participants completed a demographic questionnaire and four inventories. All measures were administered in the Persian language.

Materials

The demographic questionnaire included items on age, gender, the name of the undergraduate program, and the school of study. The four inventories used were: (1) the Generalized Problematic Internet Use Scale (GPIUS), (2) the State-Trait Anxiety Inventory (STAI), (3) the Beck Depression Inventory (BDI), and (4) the Meta Cognitions Questionnaire (MCQ-30).

Generalized problematic internet use scale (GPIUS)

The GPIUS is a 29-item scale with seven subscales that include: Mood alteration (4 items), Social benefit (5 items), Negative outcomes (4 items), Compulsivity (4 items), Excessive time (4 items), Withdrawal (5 items), and Interpersonal control (3 items). The GPIUS was designed to assess the degree to which an individual experiences the types of cognition, behavior, and outcomes of being a PIU. Participants rated their agreement with each item on a scale ranging from 1 (Strongly disagree) to 5 (Strongly agree). Caplan reported that reliability of theses subscales ranged from .78 to .86 using Cronbach's alpha. The subscales of the GPIUS correlated positively with depression, loneliness and shyness, and negatively with self-esteem [36]. The reliability of the GPIUS in this study, using Cronbach's alpha, was: the GPIUS =.86, Mood alteration=.78, Social benefit=.85, Negative outcomes=.76, Compulsivity=.75, Excessive time=.81, Withdrawal=.79, and Interpersonal control=.77.

The state-trait anxiety inventory (STAI)

The STAI is a 40-item, self-report scale that measures state anxiety (20 items) and trait anxiety (20 items). Participants responded their agreement with each item on a scale ranging from 1 (Not at all) to 4 (Very much so). The STAI is a widely used scale of anxiety around the world [38]. The STAI-state and STAI-trait subscales were correlated to the Anxiety Sensitivity Index (ASI) [39] and the Conjugate Lateral Eye Movements test (GLEM) [40]. Reliability and validity of the STAI was affirmed in many studies [37,41].The reliability of the STAI, trait

anxiety and state anxiety in this study, using Cronbach's alpha, was .93, .89 and .89 respectively.

Beck depression inventory (BDI)

The BDI is the most widely used self-report measure of depression in the world. The BDI contains 21 multiple choice items that represent a symptom or an attitude related to depression. Each question has a set of four possible answer choices and a value of 0 to 3 is assigned for each answer. These symptoms and attitudes include: mood, cynicism and distrust, sense of breakdown, self-dissatisfaction, guilt, punishment, self-dislike, self-accusations, suicidal ideas, crying, irritability, social pulling out, indecisiveness, body image changes, work difficulty, insomnia, fatigability, loss of appetite, weight loss, somatic preoccupation and loss of libido [42]. Many studies have affirmed the reliability and validity of the BDI in different cultures [43-45]. The reliability of the BDI in this study, using Cronbach's alpha, was .89.

Meta Cognitions Questionnaire (MCQ-30)

The MCQ-30 is a 40-item scale with five subscales that include: Cognitive confidence, Positive beliefs about worry, Cognitive self-consciousness, Negative beliefs about uncontrollability of thoughts and danger, and Beliefs about the need to control thoughts. The MCQ-30 measures different beliefs about worry, intrusive thoughts, and meta-cognitive processes, and measures the worry component of anxiety in general. Participants rated their agreement with each item on a scale ranging from 1 (Never) to 4 (Almost always). The MCQ-30 showed good internal consistency and convergent validity, and test–retest reliability [46]. The reliability of the MCQ-30, cognitive confidence, positive beliefs about worry, cognitive self-consciousness, negative beliefs about uncontrollability of thoughts and danger, and beliefs about the need to control thoughts in this study, using Cronbach's alpha was .96, .88, .89, .93, .91, and .90 respectively.

Results

The first hypothesis of this study is that PIU, anxiety, depression and metacognition have significant positive correlations in this sample. To test the first hypothesis, a correlational analysis was conducted to evaluate the relationship of PIU, anxiety, depression and metacognition. This analysis involved 17 select variables and subscales from the four inventories, in an effort to assess the degree that these quantitative variables related to each other in this sample. This analysis showed significant positive correlations between subscales and the total score of the GPIUS. The mood alteration subscale of the GPIUS positively correlated to the trait anxiety subscale of the STAI. The social benefit subscale of the GPIUS positively and negatively associated to the depression and cognitive self-consciousness factors of the MCQ-30. Excessive time of the GPIUS positively correlated to uncontrollability of thoughts and danger, the cognitive confidence subscales of the MCQ-30, and the total score of the MCQ-30. Trait anxiety, state anxiety and the STAI positively correlated to the BDI and MCQ-30 and their subscales. Also, subscales and the total score of the MCQ-30 positively correlated to each other in this sample (Table 1).

Variables		2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	MCQ
Problematic Internet Use	1.Mood Alteration	.546**	.509**	.496**	.348**	.475**	.411**	.711**	.231*	.106	.182	.142	.054	.103	.119	.024	-.050	.023
	2.Social Benefit		.525**	.474**	.364**	.566**	.401**	.761**	.170	-.055	.060	.302**	.095	.038	.011	.056	-.228*	-.064
	3.Negative Outcomes			.615**	.596**	.627**	.516**	.803**	.079	-.039	.018	.184	.069	.126	.064	.072	-.041	.055
	4.Compulsivity				.611**	.633**	.553**	.807**	.184	-.017	.087	.147	.104	.134	.124	.087	.031	.120
	5.Excessive Time					.702**	.480**	.764**	.097	.084	.096	.076	.030	.258**	.200*	.135	.129	.213*
	6.Withdrawal						.536**	.851**	.152	-.021	.066	.124	.057	.160	.077	.082	-.008	.074
	7.Interpersonal Control							.658**	.100	-.004	.049	.093	.1	.1	-.0	.0	.0	.055

Group	Variable										
						.03	.22	.04	.01	.72	
	8.GPIUS	.194	.011	.108	.191	.107	.168	.127	.069	-.032	.092
Anxiety	9.Trait Anxiety		.621**	.895**	.602**	.401**	.407**	.407**	.471**	.254*	.482**
	10.State Anxiety			.905**	.292**	.438**	.453**	.432**	.468**	.402**	.533**
	11.STAI				.498**	.467**	.478**	.470**	.523**	.367**	.569**
Depression	12.Depression					.179	.140	.249*	.359**	.153	.247*
Metacognitions	13.Positive Beliefs						.543**	.479*	.561*	.484*	.749**
	14.Uncontrollability and Danger							.572**	.626**	.483*	.808**
	15.Cognitive Confidence								.596**	.477*	.799**
	16.Need to Control Thoughts									.483**	.820**
	17.Cognitive Self-consciousness										.747**

Table 1: The Correlation of Coefficients between Problematic Internet Use, Anxiety, Depression, and Metacognitions *p≤.05, **p≤.01 GPIUS = Generalized Problematic Internet Use Scale, STAI = State Trait Anxiety Inventory, MCQ=Meta Cognitions Questionnaire

The second hypothesis of this study is that gender plays a significant role in PIU, anxiety, depression and metacognition in this sample. Eighteen t-tests for independent groups were run to compare gender differences in all constructs. Findings showed that females have greater excessive Internet use time, $t(97)=-2.355$, $p<.02$, than males, and males have more indicators of depression than females, $t(87)=2.487$, $p<.01$. However, a Bonferroni correction was used to examine the role of gender as a factor to account for family wise error. This was done by dividing the overall alpha level (.05) by the total number of contrasts (17 in this study) to obtain the comparison-wise alpha (here .0029). Also, eighteen ANOVAs were computed to compare means and standard deviations between genders and within groups' differences in all dependent variables. Again, results showed significant gender differences in excessive Internet use time; $F(1,98)=5.54$; $p<.02$) and depression; $F(1,98)=6.18$; $p<.01$). Using this approach, females have higher performance in excessive Internet use time than males, and

males have more indicators of depression than females. However, results did not show significant gender differences in anxiety and metacognition (Table 2).

Dependents	Factors	Groups						F	p
		Males		**Females**		**Total sample**			
		M	**SD**	**M**	**SD**	**M**	**SD**		
Problematic Internet Use	Mood Alteration	3.60	3.21	3.74	2.67	3.67	2.94	.056	.81
	Social Benefit	4.04	3.92	3.64	3.42	3.84	3.66	.295	.58
	Negative Outcomes	1.98	2.06	2.78	2.91	2.38	2.54	2.50	.11
	Compulsivity	2.36	2.37	3.42	3.22	2.89	2.87	3.49	.06
	Excessive Time	2.24	2.22	3.59	3.37	2.90	2.92	5.54	.02
	Withdrawal	3.34	3.05	3.74	3.14	3.54	3.08	.417	.52
	Interpersonal Control	1.20	1.20	1.54	1.38	1.37	1.30	1.64	.20
	GPIUS	18.52	13.26	22.08	16.32	20.29	14.90	1.41	.23
Anxiety	Trait Anxiety	18.76	11.66	17.34	10.94	18.06	11.28	.38	.53
	State Anxiety	20.18	11.07	21.88	12.62	21.04	11.85	.50	.47
	STAI	38.97	20.13	39.14	21.88	39.06	20.91	.01	.96
Depression	Depression	14.53	10.88	9.62	7.38	12.02	9.53	6.18	.01
Metacognitions	Positive Beliefs	17.91	3.695	17.62	3.30	17.76	3.48	.18	.67
	Uncontrollability and Danger	17.26	3.669	18.34	3.97	17.80	3.84	1.99	.16
	Cognitive Confidence	19.36	4.386	18.32	4.32	18.84	4.36	1.40	.24
	Need to Control Thoughts	16.84	4.225	16.20	3.97	16.52	4.09	.59	.44
	Cognitive Self-consciousness	18.57	3.994	18.61	3.46	18.59	3.72	.03	.95
	MCQ	89.75	16.87	89.82	13.21	89.78	15.12	.01	.98

Table 2: The role of gender in problematic internet use, depression, anxiety and metacognitions

The third hypothesis is that anxiety, depression and metacognition variables can predict variations in PIU. To test the third hypothesis, 8 separate multiple regression analyses were run, one for each of the 8 dependent variables with anxiety, depression and metacognition, and all subscales as independent variables in the total sample. The BDI predicted the social benefit subscale, R^2=.119, F (1,80)=10.64, p<.002; and the GPIUS, R^2=.059, F (1,78)=4.82, p<.03, in this sample. Also, the BDI predicted social benefit in males of PIU, R^2=.263, F (1,39)=13.54, p<.001. Altogether, the MCQ-30 and BDI predicted social benefit in the total sample, R^2=.204, F (2,80)=9.98, p<.0001. However, the results from the multiple regressions did not show significant predictors for GPIUS mood alteration, negative outcomes, withdrawal, and interpersonal control subscales of PIU (Table 3).

Dependents	Predictors		R	β	t	p
Social Benefit	Depression	.345	.119	.345	3.26	.002
	Depression MCQ-30	.451	.204	.379 -.293	3.72 -2.88	.0001 .005
Compulsivity	Trait anxiety	.245	.060	.245	2.24	.005
Excessive Time	MCQ-30	.273	.074	.273	2.50	.01

| GPIUS | Depression | .513 | .059 | .243 | 2.197 | .03 |

Table 3: The Roles of Depression, Anxiety and Metacognitions in Prediction of Problematic Internet Use

Also, a Bonferroni procedure was used for trawling the present data. This was done by dividing the overall alpha level (.05) by the total number of tests (8 in this study) to yield a new alpha (here .0020). Then, this new alpha was used in all multiple regression tests. Using this approach, only depression predicted the social benefit of PIU in the total sample and in males, and only trait anxiety explained the compulsivity subscale of PIU in males.

Discussion

The results of this study as to the first hypothesis showed that mood alteration of PIU positively related to the trait anxiety subscale of the STAI. The social benefit subscale of PIU was positively and negatively associated with depression and cognitive self-consciousness subscales. The excessive time subscale of PIU was positive significantly correlated with the uncontrollability of thoughts and danger and cognitive confidence subscales and the MCQ-30 total score. These findings are in line with previous evidence of the relationship of PIU, depression, anxiety and metacognition [47].

As Young [47] and Beard [48] suggested it seems that the Internet can be used as a procedure for avoidance of emotional problems such as depression and anxiety and it might help users to relieve a dysphoric mood. Perhaps individuals with mood disturbances and loneliness look more for virtual interactions because they help them to attain higher social and emotional support [8,20,49].

In addition, the present study indicated that trait anxiety, state anxiety and STAI were positively correlated with depression and the MCQ-30 and all of its subscales. This finding can be explained by metacognition conceptualizations [33,46,50,51]. This study suggested that metacognition influences both anxiety and depression from childhood to young adulthood in general. Regarding the second hypothesis, that gender plays a significant role in PIU, anxiety, depression and metacognition, the results of this study indicated that females had significantly greater excessive Internet use time than males, and males had more depression than females. This finding highlights the role of sociocultural factors in Internet use and depression that could be explained within a social-cognitive theory 20. Women may get more social support online than men. Men may have less social support and experience more depression than females.

The results from this study addressing the third hypothesis showed that depression predicted variation of PIU on the social benefit subscale in this sample. In addition, metacognition and depression together predicted variation of PIU on the social benefit subscale in the total sample. Trait anxiety predicted the variation of the compulsivity subscale in the total sample. Metacognition predicted the variation of excessive time in Internet use in the total sample. These findings may be explained by the cognitive-behavioral, online social interactions, social cognitive and metacognition theories. As Spada et al. [14] noted that the relationship of anxiety, depression and problematic Internet use are fully mediated by metacognition, particularly by the role of positive beliefs about worry and cognitive confidence subscales. This study suggested that these subscales show low metacognitive performance and metacognition can contribute to PIU. The Internet provides some information that reduces metacognitive discomfort or dissonance in users.

Likewise, beliefs about worry and cognitive confidence can help people to monitor and control intrusive thoughts in virtual spaces. Therefore, metacognition can be applied for control of intrusive thoughts, and may lead to lower negative information about the self and a greater likelihood of utilizing the Internet to regulate personal emotional status. Eventually metacognitions serve as emotional regulation mechanisms. However, this study indicated that metacognitions and depression had a combined predictive power of Internet use, and when they operate together they can provide some social benefit for Internet users. Trait anxiety was not influential in prediction of Internet use. However, future studies are needed to investigate the role of biological factors that might help to understand how anxiety influences Internet use.

Conclusion

In conclusion, the current research adds to the psychology of the Internet because it explores the relationship of PIU, anxiety, depression and metacognitions, the role of gender in Internet use, and the predictive role of trait anxiety, depression and metacognitions in Internet use in an Iranian sample. The current study has confirmed the role of psychopathology, metacognitions and gender in Internet use.

However, the present study is limited because it only relied on correlational data in an undergraduate and a non-clinical sample. Future cross cultural studies should investigate the role of emotional problems and metacognitions on Internet use in social networks such as Facebook. Further research could use some experimental and longitudinal designs for this purpose, and to examine these constructs in clinical and non-clinical populations of different cultures.

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