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Relationship between Internet addiction levels, loneliness, and interpersonal competence in young adults: a modern health issue

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Abstract

Background. The widespread use of the Internet has significant effects on loneliness and interpersonal competence among young adults. This study examines the relationship between Internet addiction levels, loneliness, and interpersonal competence.

Material and methods. The cross-sectional and quantitative study was conducted among 339 young adults studying at a foundation university. Data were collected using the Personal Information Form, the Internet Addiction Scale (IAS), the UCLA Loneliness Scale (UCLA-LS), and the Interpersonal Competence Scale (ICS).

Results. The participants' average IAS score was 43.08±14.79, indicating a "probable addiction" level. The average UCLA-LS score was 50.80±8.34, indicating a moderate level of loneliness, while the average ICS score was 138.79±31.29, indicating a moderate level of adequacy. Gender, income status, and daily Internet use were associated with differences in IAS and ICS scores, with effects falling within the small-to-moderate magnitude range. A weak positive correlation (r=0.127) was found between IAS and UCLA-LS, while a moderate positive correlation (r=0.442) was found between UCLA-LS and ICS.

Conclusions. These findings highlight the importance of considering the magnitude of associations when interpreting the relationships among the variables. In this sample, higher Internet addiction levels were weakly associated with greater loneliness, and loneliness showed a moderate positive association with interpersonal competence.

Keywords: Internet addiction, loneliness, interpersonal relations, young adult, mental health

Introduction

In recent years, the rapid expansion of digital technologies has made the Internet an integral component of daily functioning. As of October 2024, approximately 5.52 billion people, corresponding to 67.5% of the global population, are Internet users [1]. For young adults in particular, general Internet use is embedded in academic, social, and recreational activities and constitutes one of the most accessible communication environments. However, excessive or dysregulated engagement has increasingly been recognized as a public health concern, given its potential to disrupt daily routines, interpersonal relationships, and emotional well-being [2].

University students use the Internet for various purposes, including accessing information, fulfilling academic requirements, maintaining social communication, and engaging in entertainment activities. This broad spectrum of use makes it essential to distinguish between the concepts of general Internet use and Internet addiction. While Internet

use generally refers to the amount of time spent online and the purposes for accessing digital platforms, Internet addiction describes an uncontrollable, repetitive pattern of engagement that disrupts daily functioning. Although the Internet provides significant advantages for academic and social life, intensive or dysregulated use has been shown to affect psychosocial functioning negatively and is closely associated with loneliness [3]. Prior research indicates that while meaningful online communication may temporarily reduce feelings of loneliness, excessive, superficial, or compensatory use tends to intensify social isolation over time [4]. Furthermore, digital addiction has been linked to loneliness and weak social support, and problematic use can impair interpersonal functioning by restricting individuals' ability to initiate and sustain social relationships. Evidence suggests that excessive technology engagement may erode communication skills and contribute to difficulties in managing face-to-face interactions, ultimately affecting interpersonal competence [5].

Recent studies suggest that problematic or excessive digital engagement may reduce opportunities for face-to-face interaction and weaken real-world social participation among young adults [3,4]. Such patterns have been associated with increased emotional and social isolation, which may heighten feelings of loneliness over time [4,6]. Loneliness, in turn, has been linked to reduced social confidence, heightened interpersonal sensitivity, and fewer opportunities to practice core communication skills [6,7]. Similarly, evidence indicates that problematic Internet or smartphone use may negatively affect interpersonal competence by limiting individuals' ability to initiate, maintain, and navigate social relationships [5,6]. Together, these findings suggest that Internet addiction, loneliness, and interpersonal competence may operate within a connected psychosocial pathway.

Although previous studies have examined Internet use, loneliness, and interpersonal competence separately [5,7], empirical research investigating how these constructs coexist and interact within the same framework, particularly among university students, remains limited [7]. The growing digitalization of daily life underscores the need for studies that systematically explore the interconnected effects of these psychosocial variables and contribute to understanding the broader implications of digital behavior for young adults' well-being.

Aim of the work

Therefore, the present study aimed to examine the relationship between university students' Internet addiction levels, loneliness, and interpersonal competence. As a descriptive study, the research aims to provide an integrated understanding of how these psychosocial

variables coexist within young adults' digital experiences. Based on this framework, the following research questions were formulated.

1. What are the levels of Internet addiction, loneliness, and interpersonal competence among university students?
2. Do university students' levels of Internet addiction, loneliness, and interpersonal competence differ according to sociodemographic characteristics?
3. Is there a relationship between Internet addiction levels and loneliness among university students?
4. Is there a relationship between loneliness and interpersonal competence among university students?

Material and methods

Study design

This study employed a quantitative, cross-sectional, and correlational survey design.

Participants

The study population consisted of 3,600 students enrolled in the Faculty of Health Sciences at İstanbul Gelişim University, Türkiye. Based on a power analysis with a 95% confidence interval and a 5% margin of error, the required sample size was calculated to be at least 346 students. Inclusion criteria were: being actively enrolled in the Faculty of Health Sciences, volunteering to participate, and completing the questionnaire in full. Data collection was conducted between May 10 and June 20, 2024, via an online survey. After applying these criteria, a total of 339 students were included in the study.

Data collection instruments

Personal Information Form: developed by the researchers of this study, including questions on age, gender, department, grade level, and Internet usage habits.

Internet Addiction Scale (IAS): developed by Young [8] and adapted into Turkish by Bayraktar [9]. This 20-item Likert-type instrument is used to assess levels of problematic Internet use/Internet addiction. The scale has no reverse-scored items. Scores between 70-100

indicate “addicted”, 40-69 “probable addiction”, and ≤39 “not addicted”. Cronbach’s alpha was 0.91.

UCLA Loneliness Scale (UCLA-LS): developed by Russell, Peplau, and Ferguson [10], revised in 1980, and adapted into Turkish by Demir [11]. The 20-item scale is rated on a 4-point Likert scale, with total scores ranging from 20 to 80; higher scores indicate greater loneliness. Cronbach’s alpha was 0.96.

Interpersonal Competence Questionnaire (ICQ): developed by Buhrmester et al. [12] and adapted into Turkish by Baytemir [13]. The 40-item scale is rated on a 5-point Likert scale and includes five subdimensions (initiating relationships, asserting influence, conflict resolution, self-disclosure, and providing emotional support). Cronbach’s alpha values were 0.85, 0.86, 0.86, 0.79, and 0.86, respectively, with an overall alpha of 0.94.

Data analysis

Data were analyzed using IBM SPSS Statistics 26.0. Descriptive statistics (mean, standard deviation, frequency, percentage) were calculated. Normality was assessed using the Shapiro-Wilk test, and homogeneity of variances was examined using Levene’s test. For two-group comparisons, Student’s t-test was used for normally distributed variables and the Mann-Whitney U test for non-normal distributions. For comparisons involving more than two groups, one-way ANOVA and the Kruskal-Wallis test were applied. Post hoc analyses were conducted using the Tukey test for normally distributed data and the Tamhane test for data with unequal variances; both procedures include built-in adjustments to control Type I error in multiple comparisons. Pearson and Spearman correlation analyses were performed to examine relationships between variables. Effect sizes (Cohen’s d for t-tests; eta-squared for ANOVA) were calculated to assess the magnitude of differences. A significance level of $p<0.05$ and 95% confidence intervals were used in all analyses.

Results

Descriptive statistics

The sociodemographic characteristics of the participants, along with their mean scores IAS, UCLA-LS, and ICQ, are presented in Table 1. The mean IAS score was 43.08±14.79, corresponding to the “probable addiction” category defined in the original scale. The mean

UCLA-LS score was 50.80±8.34, indicating that participants scored above the midpoint of the scale, reflecting relatively elevated loneliness levels. The mean ICQ score was 138.79±31.29, which falls near the mid-range of the instrument's total score distribution based on its possible score range.

Table 1. Sociodemographic characteristics of participants and their IAS, UCLA-LS, and ICQ subscale and total scores (n=339)

Variables	n	%
Age		
17-18	12	3.5
19-20	64	18.9
21-22	164	48.4
23 years old and above	99	29.2
Gender		
Male	70	20.6
Female	269	79.4
Year of study		
1st year	63	18.6
2nd year	73	21.5
3rd year	131	38.6
4th year	72	21.2
Living arrangement		
With family	210	61.9
Alone	26	7.7
Roommate(s)	11	3.2
Dormitory	92	27.1
Assessment of the family's economic income		
Income less than expenses	24	7.1
Income equal to expenses	224	66.1
Income greater than expenses	91	26.8
Personal monthly income (all income included)		
Very low	27	8.0
Low	40	11.8
Moderate	220	64.9
High	52	15.3
Average daily Internet usage time		
1-4 hours	53	15.6
5-7 hours	144	42.5
8-10 hours	121	35.7
more than 10 hours	21	6.2
Internet access		
Limited	115	33.9
Unlimited	224	66.1
Most common means of accessing the Internet		
Phone	314	92.6
Computer	21	6.2
Tablet	4	1.2
Main purposes of Internet use*		
Online shopping	172	50.74

Watching series and movies	214	63.13
Education/studying	165	48.67
Reading news/obtaining information	134	39.53
Social media	201	59.29
Playing games	28	8.26
IAS total score	43.08±14.79	
UCLA-LS total score	50.80±8.34	
ICQ total score	138.79±31.29	

Notes: * Individuals may make more than one choice. Descriptive statistics were expressed as mean, standard deviation, frequency, and percentage. IAS – Internet Addiction Scale; UCLA-LS – UCLA Loneliness Scale; ICQ – Interpersonal Competence Questionnaire; SD – Standard Deviation.

Group comparisons

The relationships between participants' personal characteristics and their IAS, UCLA-LS, and ICQ scores are shown in Table 2. Significant associations were found between gender and IAS scores, perceived family income and IAS scores, individual monthly income and both IAS and ICQ scores, average daily Internet use and IAS scores, and the main device used to access the Internet and IAS scores (p<0.05). The group differences in IAS, UCLA-LS, and ICQ scores across participants' personal characteristics are shown in Table 2. Statistically significant group differences were observed across gender, perceived family income, individual monthly income, average daily Internet use, and the main device used to access the Internet (p<0.05).

Table 2. Associations between participants' sociodemographic characteristics and IAS, UCLA-LS, and ICQ total scores (n=339)

Variables	IAS	*p*	UCLA-LS	*p*	ICQ	*p*
Age						
17-18	44.00±17.28	0.947	48.75±7.36	0.152	129.58±30.99	0.315
19-20	43.98±16.49		52.25±8.86		133.72±34.42	
21-22	42.81±14.61		49.93±8.94		140.92±28.78	
23 years old and above	42.83±13.78		51.57±6.83		139.65±33.09	
Gender						
Male	41.39±13.04	0.001	51.15±7.13	0.130	137.84±31.30	0.277
Female	49.57±18.88		49.46±11.86		142.41±31.20	
Year of study						
1st year	41.75±15.49	0.17	47.83±11.23	0.17	127.32±35.41	0.13
2nd year	45.40±17.60		51.77±8.65		140.77±27.66	
3rd year	40.53±13.20		51.53±6.82		140.84±30.12	
4th year	46.54±12.92		51.11±7.07		143.08±31.34	
Living arrangement						
With family	41.83±14.10	0.123	51.10±7.69	0.823	138.01±32.17	0.776
Alone	47.31±15.98		49.69±7.82		144.62±37.12	

Roommate(s)	49.00±15.93		50.73±6.48		141.36±29.92	
Dormitory	44.03±15.61		50.43±10.01		138.61±27.78	
Assessment of the family's economic income						
Income less than expenses	54.00±19.30	0.001	52.63±11.84	0.474	143.71±33.24	0.273
Income equal to expenses	41.69±13.21		50.51±8.31		136.84±31.30	
Income greater than expenses	43.62±16.02		51.04±7.29		142.29±30.64	
Personal monthly income (all income included)						
Very low	46.48±20.05	0.029	53.07±10.57	0.222	140.70±31.94	0.001
Low	48.28±14.19		50.73±6.74		128.90±30.34	
Moderate	41.52±13.54		50.22±8.56		137.02±30.72	
High	43.90±16.27		52.13±6.98		152.88±30.29	
Average daily Internet usage time						
1-4 hours	38.26±16.73	0.001	52.53±7.92	0.336	146.26±27.56	0.224
5-7 hours	39.52±12.32		50.51±7.06		137.97±31.55	
8-10 hours	47.24±13.83		50.70±8.63		135.92±31.43	
more than 10 hours	55.67±17.65		49.05±14.02		142.10±36.28	
Internet access						
Limited	42.74±15.27	0.762	49.90±9.43	0.152	134.45±28.45	0.068
Unlimited	43.25±14.56		51.27±7.70		141.01±32.49	
Most common means of accessing the Internet						
Phone	42.51±14.23	0.034	50.74±8.32	0.457	138.96±31.66	0.868
Computer	49.43±20.84		50.81±9.09		137.67±28.30	
Tablet	54.50±11.38		56.00±5.09		131.00±17.75	

Notes: Descriptive statistics were expressed as mean, standard deviation, frequency, and percentage. Student's t-test, Mann-Whitney U test, one-way ANOVA, and Kruskal-Wallis test were used for group comparisons. IAS – Internet Addiction Scale; UCLA-LS – UCLA Loneliness Scale; ICQ – Interpersonal Competence Questionnaire; SD – Standard Deviation.

Correlation analysis

Correlations between IAS, UCLA-LS, and ICQ scores are presented in Table 3. A weak positive correlation was observed between IAS and UCLA-LS (r=0.127). A moderate positive correlation was observed between UCLA-LS and ICQ (r=0.442).

Table 3. Correlations between IAS, UCLA-LS, and ICQ total scores (n=339)

Variables		IAS total	UCLA-LS total	Initiating relationships total	Asserting influence total	Conflict management total	Self-disclosure total	Emotional support total	ICQ total
IAS total	**r**	1	0.127	0.054	-0.036	-0.006	0.197	-0.046	0.036
	p	-	0.019	0.321	0.503	0.913	0.001	0.394	0.506
UCLA-LS total	**r**	0.127	1	0.415	0.408	0.386	0.300	0.437	0.442
	p	0.019	-	0.001	0.001	0.001	0.001	0.001	0.001
ICQ total	**r**	0.036	0.442	0.910	0.918	0.894	0.790	0.900	1
	p	0.506	0.001	0.001	0.001	0.001	0.001	0.001	-

Notes: Pearson and Spearman correlation analyses were applied. IAS – Internet Addiction Scale; UCLA-LS – UCLA Loneliness Scale; ICQ – Interpersonal Competence Questionnaire; r – correlation coefficient; *p* – probability value.

Post hoc analyses

Post hoc analyses were performed to compare paired groups for parameters that showed significant differences across multiple groups and scales. The results of the pairwise comparisons are presented in Table 4.

Table 4. Pairwise comparisons among multiple groups (n=339)

Variables				Mean (SS)	*p*	Difference
IAS	**Assessment of the family's economic income**	**Income less than expenses**	**Income equal to expenses**	12.308(4.03)	0.016	1-2
			Income greater than expenses	10.385 (4.28)	0.062	
		Income equal to expenses	**Income greater than expenses**	-1.923(1.89)	0.675	
IAS	**Personal monthly income (all income included)**	**Very low**	**Low**	-1.794(3.65)	0.961	-
			Moderate	4.959(2.98)	0.347	
			High	2.578(3.47)	0.880	
		Low	**Moderate**	6.752(2.52)	0.039	
			High	4.371(3.08)	0.489	
		Moderate	**High**	-2.381(2.26)	0.718	
ICQ		**Very low**	**Low**	11.804(7.65)	0.413	2-4 3-4
			Moderate	3.686(6.26)	0.936	
			High	-12.181(7.28)	0.340	
		Low	**Moderate**	-8.118(5.27)	0.416	
			High	-23.985(6.45)	0.001	
		Moderate	**High**	-15.866(4.73)	0.005	
IAS		**1-4 hours**	**5-7 hours**	-1.257(2.51)	0.997	1-3

	Average daily Internet usage time		**8-10 hours**	-8.976(2.62)	0.006	1-4 2-3 2-4
			more than 10 hours	-17.403(4.48)	0.003	
		5-7 hours	**8-10 hours**	-7.719(1.62)	0.000	
			more than 10 hours	-16.146(3.98)	0.003	
		8-10 hours	**more than 10 hours**	-8.427(4.05)	0.256	
IAS	**Most common means of accessing the Internet**	**Phone**	**Computer**	-6.919(3.31)	0.093	-
			Tablet	-11.990(7.39)	0.238	
		Computer	**Tablet**	-5.071(8.012)	0.802	

Notes: ANOVA one-way and b independent t-test were performed for statistical analyses. The pairwise comparisons were performed using a post hoc Tukey test and Tamhane test.

Discussion

In this study, the mean IAS score fell within the "probable addiction" category according to the scale's cut-off values, while the mean loneliness and interpersonal competence scores were positioned near the midpoints of their respective scale ranges. Similar results are also found in literature. Research has reported that university students' average Internet addiction scores generally fall within the "risky use" or "potential addiction" range, their loneliness scores are at moderate levels associated with social difficulties specific to young adulthood, and their interpersonal competence scores show developmental diversity [14,15]. These findings suggest that problematic Internet use may represent a psychosocial health concern among young adults rather than being limited to behavioral patterns alone.

The finding that male students' Internet addiction scores were significantly higher than those of female students is essential in the context of gender. Literature also reports that males are a higher-risk group in terms of Internet and online gaming addiction, particularly scoring higher on dimensions of loss of control and impaired functioning [16,17]. This pattern may be related to gender-specific usage motives, such as higher engagement in online gaming among males, which could increase vulnerability to addictive behaviors.

The significant relationship between an individual's monthly income and interpersonal competence is also one of the original findings of our study. While some studies in literature report weak or inconsistent socioeconomic differences in communication skills [18], other findings reveal that the relationship between income indicators and psychosocial resources may vary depending on the context [19]. In this study, it may be that students with fewer economic

resources face conditions that limit opportunities for social participation, potentially influencing interpersonal competence levels.

The effect of economic status on Internet addiction is also clearly evident in this study. Higher Internet addiction scores among individuals whose income is less than their expenses indicate that a low socioeconomic level increases the risk of addiction. Literature also reports that individuals with low socioeconomic status have a higher risk of addiction, which is reinforced by loneliness and social alienation [20,21]. These results may indicate that socioeconomic inequalities could create vulnerability to problematic Internet use among young adults.

Another noteworthy finding in the study is that longer daily Internet usage is associated with higher addiction scores. This aligns with literature, particularly as students who use the Internet for more than ten hours form the highest-risk group. Research indicates that usage exceeding two hours increases the risk of addiction, usage of five hours or more is associated with problematic Internet use, and usage exceeding ten hours is strongly linked to addiction [22,23]. This may indicate that time spent online represents a behavioral threshold that could elevate the risk for addiction-related symptoms.

When examining students' purposes for Internet use, a notable finding of the study is that watching TV series/movies, social media, and online shopping are the most frequently preferred activities. Similarly, literature suggests that passive content consumption and superficial online interactions may initially increase social satisfaction but ultimately reinforce feelings of loneliness [24]. It is possible that individual-focused and less interactive online activities may limit opportunities for face-to-face engagement and thereby influence interpersonal competence development.

The variation in dependency levels according to the means of Internet access is also one of the strong findings of our study. The fact that students who access the Internet through online games constitute the highest risk group is consistent with literature supporting the relationship between gaming addiction, loneliness, and sensation seeking [25]. The finding that smartphone use is associated with moderate levels of addiction suggests that social media-based use may provide short-term social satisfaction but may increase loneliness in the long term [26]. These differences suggest that distinct usage patterns may be associated with different psychosocial risk profiles.

This study found a positive relationship between Internet addiction and loneliness. Similar results have been reported in literature across different cultures; it has been reported that as Internet addiction increases, levels of loneliness rise, and low perceived social support

increases addiction and reinforces loneliness [23]. Furthermore, a recent meta-analysis revealed that problematic Internet use is significantly associated with social anxiety in adolescents and young adults, highlighting the multidimensional effects of this cycle on mental health [27]. Taken together, these findings suggest that problematic Internet use may contribute to feelings of social isolation among university students. However, due to the cross-sectional design of this study, it is also possible that loneliness may precede and contribute to increased Internet use; therefore, causal directions cannot be inferred.

In this study, a positive relationship was identified between loneliness and interpersonal competence. Although competence is generally reported to reduce loneliness [28], some studies show that high communication skills can reinforce loneliness by increasing social expectations [29]. Loneliness may also vary across cultural contexts, as individualistic and collectivistic cultures differ significantly in their interpersonal expectations and in the meaning attributed to social relationships [30]. Therefore, the direction of the loneliness – interpersonal competence relationship observed in our study may have been shaped by the cultural norms and social expectations surrounding young adults.

This study has several limitations. First, because the research employed a cross-sectional design, interpretations regarding the direction of the relationships between variables or potential causal mechanisms are limited. Since the data were collected through a self-report form, participants' responses may reflect their personal perceptions. The fact that the sample was drawn from a single foundation university may limit the generalizability of the findings to different institutional or cultural contexts. Given the exploratory nature of the study, the observed associations reflect the patterns specific to the present sample. For these reasons, future studies involving larger and more diverse samples, multiple institutions, and longitudinal designs are recommended to deepen understanding in this area.

Conclusions

In this study, university students' mean IAS scores corresponded to the "probable addiction" category based on the scale's cut-off values, whereas loneliness and interpersonal competence scores were positioned around the midpoints of their respective scales. These results show that the three variables do not reflect the same level of risk; rather, each one represents a different dimension of students' psychosocial functioning.

The study contributes to literature on the subject by examining Internet use, loneliness, and interpersonal competence together, variables that are often investigated separately. In

particular, the unexpected positive association between loneliness and interpersonal competence emerges as a novel finding that requires further investigation across different cultural contexts and larger samples.

Nevertheless, the study was conducted in a single foundation university, which limits the generalizability of the results. Future longitudinal and cross-cultural studies are necessary to validate these findings further.

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Before participating, students were informed about the purpose of the study, and the principles of confidentiality were emphasized. Participation was voluntary, and only those who consented were included. Written informed consent was obtained from all the participants. The study was approved by the Ethics Committee of İstanbul Gelişim University (Approval No.: 09.05.2025, decision no: 2025-07-32).

Artificial intelligence (AI)-based tools (ChatGPT, Grammarly) were used only for language editing purposes. AI assisted in grammar, spelling, and improving text flow. Literature review, reference selection, scientific interpretations, analyses, and conclusions were entirely conducted by the authors.

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