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Original Article

The Role of Social Anxiety, Self-Esteem, and Assertiveness Levels in Online Game Addiction Among Nursing Students: A Structural Equation Modeling

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What is already known on this topic?

- *University students in the risky group in terms of game addiction.*
- *Game addiction has various negative effects on health.*
- *A limited number of studies on game addiction among university students in Türkiye.*

What this study adds on this topic?

- *This study investigates the relationship between social anxiety and self-esteem and online game addiction in nursing students.*
- *There is a relationship between social anxiety and self-esteem and online game addiction.*
- *Assertiveness as a mediator variable in the correlation between online game addiction and social anxiety and self-esteem.*

ABSTRACT

Objective: This study aimed to examine the role of assertiveness level as a mediating variable in the relationship between online game addiction and social anxiety and self-esteem in nursing students.

Methods: This study is a cross-sectional, descriptive, and correlational research. The sample consisted of 181 participants. Participants filled out the "Personal Information Form," "Online Game Addiction Scale," "Liebowitz Social Anxiety Scale," "Rosenberg Self-Esteem Scale," and "Assertiveness Scale" online. Structural equation modeling (SEM) was used to analyze the data.

Results: It explains the mediating role of assertiveness as 6.2% in the effect of social anxiety and self-esteem on online game addiction. Social anxiety and self-esteem explain assertiveness as 31.4%. According to the Structural Equation Model established, the model were found to have acceptable fit values.

Conclusion: As self-esteem decreases and social anxiety increases in nursing students, assertiveness decreases. As assertiveness increases, the risk of online game addiction decreases.

Keywords: Assertiveness, online game addiction, self-esteem, social anxiety, structural equation modeling

Introduction

Internet has been increasingly used in all age groups, especially in adolescence and young adulthood periods in recent years upon the development of information technologies. According to 2020 data of TSI (Turkish Statistical Institute), the rate of internet use in the age group of 16-24 years was reported as 87.2%, 90.7%, 90.8%, and 91.8% for 2017, 2018, 2019, and 2020, respectively.[1]

With the easy access and widespread use of the internet worldwide, there has been an increase in individuals' problematic social media use, problematic pornography use, problematic online shopping, problematic online gaming, and problematic online gambling activities and YouTube addiction, especially during and after the coronavirus pandemic.[2-4]

These problematic behaviors, which have increased rapidly with the widespread use of the internet, cause addiction-related disorders. Game addiction is a type of behavioral addiction that has become a public health problem, particularly for children, adolescents, and youths over the last two decades.[5] In a study on "problematic internet use for gaming" in Türkiye, it was determined that 8.5% of the participants aged 12-19 in Istanbul province showed pathological online gaming behavior.[6]

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Online game addiction is defined as the obsessive use of online games that results in social, psychological, and professional problems of individuals.[7] It is thought that various factors such as internal, external, social, situational, and environmental factors cause game addiction. However, these possible factors are not clear and are generally explained based on cognitive-behavioral models.[8] The basis of the cognitive-behavioral model includes obsessive thoughts and maladaptive/negative beliefs about oneself, the environment, and the world.[9] A recent model, the "Four Factor Model" developed by King and Delfabbro[9] includes cognitive factors related to game addiction as determined by The diagnostic and statistical manual of mental disorders-5 (DSM-5). These are: development of tolerance, obsession, loss of interest in other activities, a tendency to continue gaming despite knowing the consequences, escape from psychological problems, lack of control, and loss of opportunities in real life. Male gender, being young (between 16-21 years), being a student, attention problems, social maladjustment, having a psychopathology, low academic performance, duration of smartphone use, socio-economic conditions, low life satisfaction, problems in family and friend relationships, and low self-esteem are risk factors for online game addiction.[10,11]

The diagnostic and statistical manual of mental disorders-5 (DSM-5) mentions online game addiction with the code 6C51 as "Internet Gaming Disorder." Online game addiction is assessed by widely using "pathological gambling" criteria within the scope of DSM-5. Diagnostic and statistical manual of mental disorders-5 defines Internet Gaming Disorder as "excessive and prolonged internet gaming behavior in which cognitive and behavioral symptoms are observed together, including progressive loss of control, tolerance development, and withdrawal symptoms similar to substance use disorder" in the last twelve months.[7]

Playing online games is used as a coping mechanism to avoid anxiety-provoking situations, environments, and unpleasant emotions. Individuals try to forget their problems by avoiding these situations and emotions. In fact, this can mean avoiding depression for addicted individuals who are trying to avoid real-life events.[12] Besides, online games offer the opportunity to interact with other players, spend free time doing stuff, obtain information, or have fun. In this sense, online games have strong motivational factors, especially in terms of socialization and self-esteem needs.[13] Online game players have a distorted sense of self and exhibit their ideal selves through the identity they create.[13] It is known that especially non-assertive/shy individuals prefer to communicate and interact in virtual environments. Non-assertive/shy individuals are afraid of being judged and excluded by others when communicating face to face. In this sense, they tend to feel insecure and experience social anxiety. The main purpose of playing online games is to have fun and communicate. These individuals can satisfy their need to be dependent on others through having fun and communicating in a virtual environment.[14] In support of this information, a study conducted with university students reported that there is a positive and significant correlation between online game addiction and shyness.[15] All of these suggest that being assertive may play a protective role in addiction by increasing face-to-face communication and interaction.

Game addiction has various negative effects on health. These are physical, cognitive, and behavioral effects. Physical effects: weight gain or loss, pain (e.g., headache, backache, etc.), fatigue, inappropriate eating habits, dry eyes. Cognitive effects: decreased attention, lower academic performance. Behavioral effects: anger, harming oneself and others.[2,16-18] Also, it is known that game addiction is associated with problems such as loneliness, social anxiety, sleep disorder, depression, anxiety, stress, and tendency to violence.[2,19]

University students, who form an important part of society, spend more time playing online games with various gaming devices, especially mobile phones, due to their independent lifestyle and ease of access to the internet. Due to the negative outcomes of today's technology and the developmental periods of university students, they are in the risky group in terms of game addiction.[20]

A limited number of studies on game addiction among university students in Türkiye mostly examine variables such as socio-demographic characteristics, characteristics related to online gaming, loneliness, and subjective happiness.[21-23] In this context, this study aimed to determine the role of assertiveness as a mediator variable in the correlation between online game addiction and social anxiety and self-esteem in nursing students.

Methods

Study Design

This study is a cross-sectional, descriptive, and correlational research among quantitative research designs.

Sampling

While the population of the study consists of students from a state university nursing department (N = 996), the sample consists of those who meet the inclusion criteria. The inclusion criteria were volunteering, being 18 and over, and played online games. The exclusion criteria were being foreign and having a limited ability to read and understand Turkish. The sample size was determined as 30-196 persons at a confidence level of 95% with the help of the formula of the sample size with an unknown population, and by taking the prevalence of online game addiction of 2%-15% as a reference.[24] The sample consisted of the students (n = 181).

Measure

Personal Information Form

The form includes seven questions about the students' descriptive characteristics.

Online Game Addiction Scale (OGAS)

The scale was developed by Kaya (2013) for adolescents and was adapted to university students by Bekir & Yıldırım (2018). The scale is a 5-Likert type scale. It consists of 21 items. The scale has three subscales: Troubles (1, 3, 5, 7, 9, 12, 14, 17, and 21), Success (2, 4, 8, 10, 13, 16, 18, and 19), and Economic Profit (11, 15, 6, and 20). The Cronbach's α was determined as 0.91.[25] In our study, it was found to be 0.90.

Liebowitz Social Anxiety Scale (LSAS)

The scale was adapted to Turkish by Dilbaz and Güz (2001). In addition to total violence, which includes 13 performance situations and 11 social interaction situations (total 24 items), the total score is obtained by summing the two subscale scores. Higher scores signify worsening of symptoms. The Cronbach's α was determined as .96.[26] In our study, it was found to be 0.95.

Rosenberg Self-Esteem Scale (RSES)

The Turkish adaptation of the scale was made by Cuhadaroğlu (1986). The scale includes 12 subscales and a total of 63 items. Rosenberg stated that subscales can be used separately in studies. Therefore, in the present study, its Self-Esteem subscale with a 4-point Likert-type rating and 10 items was employed. Five of the items are reversely coded. A high score signifies a low level of self-esteem. The Cronbach's α was determined as 0.76.[27] In our study, it was found to be 0.86.

Assertiveness Inventory (AI)

The inventory was developed by Voltan-Acar & Ogretmen (2007) and consists of two subscales (passiveness - 17 items and assertiveness - 11 items) and a total of 28 items. The total score of the scale ranges between 28 and168 points. High scores signify that the level of assertiveness increases. The Cronbach's α was determined as 0.87.[28] In our study, it was found to be 0.72.

Procedure

"Personal Information Form," which was prepared by the researchers, as well as "Online Game Addiction Scale," "Liebowitz Social Anxiety Scale," "Rosenberg Self-Esteem Scale," and "Assertiveness Inventory" were transferred into the online environment online through "Google Forms" in order to collect the data. The students were informed about the purpose and process of the study, and the "Google Forms" link was shared via e-mail and message. Before starting to complete the data collection tools, the students were asked to read the explanation about the study and mark the option "I agree to participate in the study." It took averagely 15-20 minutes to complete the data collection tools. The study was conducted between April and September 2021.

Ethical Considerations

Before conducting the study, approval from the Gazi University Ethics Commission (Approval no: 2021-17 Date: February 22, 2021) of the related university and written permission from the related institution were obtained. Informed consent was obtained from the participants online.

Statistical Analysis

The Statistical Package for Social Sciences version 20.0 (IBM Corp.; Armonk, NY, USA) and AMOS version 20.0 packaged software were used to assess the data. Descriptive statistics are shown as numbers and percentages. Scale mean scores and standard deviation values are given. A model was established showing the indirect and direct effects of RSES and LSAS on OGAS. AI score was taken as a mediating variable. The model was first evaluated using Mardia's Multivariate Normality test and variance inflation factor (VIF) and then tested with structural equation modeling (SEM). Goodness of fit indices were used to evaluate the fit of the model [χ^2/df, comparative fit index (CFI), goodness of fit index (GFI), the Tucker–Lewis index (TLI), root mean square error of approximation (RMSEA), and standardized root mean square residual (SRMR)]. Statistical significance was taken as $P < .05$.

Results

Descriptive Statistics of the Students

The mean age of the students (n = 181) was 20.55 ± 1.88. 74% of the students were female, 24.3% were first-year students, and 79.5% were living with their families. 34.2% of the students were playing online games 1-3 hours a day, and 79.5% frequently used mobile phones while playing online games (Table 1).

Table 1. Descriptive Characteristics of Students

Variables	n	%
Age (Mean ± SD) 20.55 ± 1.88		
Gender		
Female	134	74.03
Male	47	25.97
Class		
1	44	24.31
2	62	34.25
3	48	26.52
4	27	14.92
Accomodation		
Dormitory	23	12.71
With friends	14	7.73
With family	144	79.56
Online gaming time		
0-30 minutes	33	18.23
30-60 minutes	50	27.62
1-3 hours	62	34.25
3 hours and above	36	19.89
Frequently used device*		
Mobile phone	144	79.56
Computer	53	29.28
Tablet	9	4.97
Game console	4	2.20

*Multiple answers given. SD, Standard deviation.

Indirect and Direct Effects of Variables

According to the SEM, the model fit indices were found as $\chi^2 = 2.655$, GFI = 0.993, AGFI = 0.964, CFI = 0.994, TLI = 0.983, and RMSEA = 0.043. It was determined that the established model had acceptable fit values. It was determined that the model was significant by the chi-square analysis. The fit indices of the model show that the recommended model is "acceptable" and has a "strong fit" (Table 2).

Figure 1 shows the path diagrams of the model. According to this, Figure 1 shows the structural equation model that evaluates the indirect and direct effects of RSES and LSAS on OGAS using AI as an intervening variable. It was determined that the multivariate normality assumption of the data was met with Mardia's Multivariate Normality test (Mardia's = 2.787, $P = .057$). The multicollinearity assumption was determined with the VIF technique. Table 3 shows the information about the scales and sub-dimensions included in the model.

Table 4 shows the direct, indirect, and total effects of each factor in the structural equation model. The total effect of the latent variables of RSES and LSAS on AI was found to be statistically significant. Accordingly, as the RSES and LSAS scores increased, the AI score decreased. On the other hand, indirect effects of the latent variables of RSES and LSAS on OGAS were not statistically significant. The direct effect of the AI mediator variable on OGAS was found to be statistically significant. Accordingly, as the AI score increased, the OGAS score decreased (Table 4).

Table 5 shows the structural equations and explanatory coefficients of the model established according to the SEM. Accordingly, it accounted for the mediator role of AI in the effect of RSES and LSAS on online game addiction by 6.2%. Liebowitz Social Anxiety Scale and RSES, on the other hand, accounted for AI as 31.4%. It was determined that LSAS and RSES had a statistically significant negative effect on the AI mediator variable. Also, it was determined that AI had a statistically significant negative effect on the OGAS (Table 5).

The results of the study show that the established model had acceptable fit values and was significant. The fit indices of the model show that the established model has a strong fit. So, it can be applied to other populations and studies.

Discussion

The study results revealed that self-esteem and social anxiety were factors that directly affected assertiveness, while assertiveness was a direct, effective factor in online game addiction. It was determined that the model established regarding the role of assertiveness level as a mediator variable in the correlation of online game addiction with social anxiety and self-esteem in nursing students was statistically "acceptable" or had a "strong fit."

Table 2. Structural Equation Modeling Fit Indices

Model	X^2 Statistics (*df*)	*P*-Value	CMIN/df	RMSEA	90% CI for RMSEA	GFI	AGFI	CFI	TLI
Mediation model	2.655 (2)	.000	1.327	0.043	0-0.08	0.993	0.964	0.994	0.983

AGFI, Adjusted goodness of fit; CFI, Comparative fit index; CMIN, Normed chi-square; df, Degrees of freedom; GFI, Goodness of fit; RMSEA, Root mean square error of approximation; TLI, Tucker & Lewis indeks.

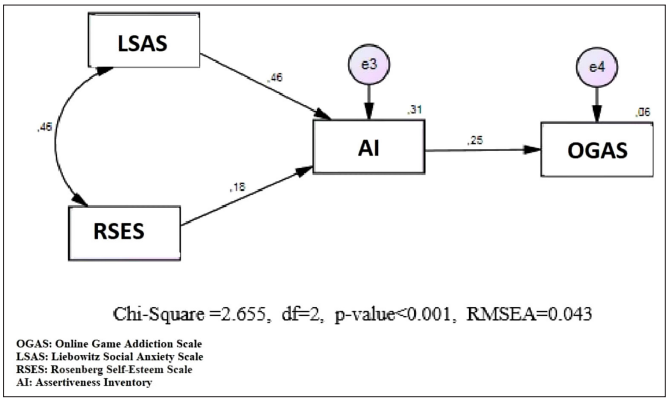

Figure 1. Path diagrams for the model.

The Role of Social Anxiety and Self-Esteem on Assertiveness

Assertiveness is defined as one's ability to speak, defend, and act for their own interests, values, preferences, and goals.[29] Individuals exhibiting assertive behavior are those who can clearly what they want to say and have empathy, respect for others, and say no. Assertiveness is an important skill for professional nursing that increases self-confidence and strengthens interpersonal communication.[30] In this study, it was found that the latent variables of self-esteem and social anxiety had a major effect on assertiveness. According to the established model, it was determined that as the self-esteem of nursing students decreased and their social anxiety level increased, assertiveness skills decreased. In the literature, it is known that the programs developed on assertiveness in nursing students are effective on self-esteem,[30] shyness and behavioral disharmony.[31] Lowness of self-esteem as a predictor of communication skills can create a sense of inadequacy and eliminate individuals' ability to be successful in social situations.[31] As a result, inability to express oneself increases social anxiety and causes dissatisfaction in social interactions.[31]

Assertiveness is one of many behavioral domains affected by social anxiety. When examining the variables that directly predicted assertive behavior on the one hand and social anxiety on the other hand, it was observed that assertive behavior was more feature-based and social anxiety was situational. In other words, assertive behavior was about how a person can adapt to various social situations.[30] Not displaying assertive behavior can also be regarded as a safety behavior or a strategic behavior used to minimize anxiety. In order to overcome an undesirable or frightening situation with minimum damage, people may prefer not to show assertive behavior as a safety behavior. In this context, not displaying assertive behaviors can be regarded as a behavioral avoidance strategy, not a lack of skill. Therefore, not showing assertive behaviors can be considered as a result of the fears of the individual with social anxiety, and non-assertive behavior can be understood as a form of social avoidance.[29] In a study focusing on the assertive behaviors of nursing students, the higher the assertiveness level, the lower the students' anxiety[30] which is similar to our study.

The Effect of Social Anxiety, Self-Esteem and Assertiveness Level on Online Game Addiction

The study shows that online game addiction increased with a decreasing level of assertiveness. Students' tendency towards game addiction decreased as they displayed assertive behavior characteristics. Individuals with assertive communication skills are generally able to establish and develop close and warm relationships with others. They can express their feelings and thoughts accurately and honestly without forcing others. They can also appreciate the feelings and thoughts

Table 3. Information Regarding Each Scale and Their Subscales

Scales	Cronbach's Alpha	Mean	SD	Minimum	Maximum
OGAS	0.90	48.7	14.12	21	94
Inconveniences	0.89	16.65	7.6	9	42
Success	0.88	26.53	7.34	8	40
Economic gain	0.80	5.53	2.91	4	19
LSAS	0.95	48.33	23.1	5	144
RSES	0.86	2.8	2.67	0	10
AI	0.72	100.8	13.26	75	152

*SD, Standard Deviation.
AI, Assertiveness Inventory; LSAS, Liebowitz Social Anxiety Scale; OGAS, Online Game Addiction Scale; RSES, Rosenberg Self-Esteem Scale; SD, standard deviation.

Table 4. Standardized Direct, Indirect, and Total Effects of Each Factor in the Structural Equation Model

		RSES			LSAS			AI		
Factor		Direct Effect	Indirect Effect	Total Effect	Direct Effect	Indirect Effect	Total Effect	Direct Effect	Indirect Effect	Total Effect
AI	SPC	0.178*	0.000	0.178*	−0.456*	0.000	−0.456	-	-	-
	t value	2.558	-	2.558	6.574	-	6.574	-	-	-
OGAS	SPC	-	0.044	0.044	-	0.114	0.114	−0.250*	0.000	−0.250*
	t value	-	0.263	0.263		1.443	1.443	3.463	-	3.463

*Significant effect values.
AI, Assertiveness Inventory; LSAS, Liebowitz Social Anxiety Scale; OGAS, Online Game Addiction Scale; RSES, Rosenberg Self-Esteem Scale; SPC, Standardized Path Coefficient.

Table 5. Structural Equations in the Structural Equation Model

Structural Equation		R^2
AI=	0.262 LSKÖ + 0.881 RBSÖ (6.574) (2.558)	0.314
OGAS=	0.266 GÖ (3.463)	0.062

t-values are presented in parentheses.
AI, Assertiveness Inventory; LSAS, Liebowitz Social Anxiety Scale; OGAS, Online Game Addiction Scale; RSES, Rosenberg Self-Esteem Scale.

of others so that assertive people can exchange experiences, thoughts, and feelings with others in their interpersonal relationships. They receive more positive reactions and feel better understood by others.[31] On the other hand, individuals who are less assertive are more likely to experience anxiety about having social interactions and they employ online gaming more frequently in their daily lives.

The studies in the literature have reported that game addiction has effects such as loneliness,[32] social anxiety and decreased social interaction, and online communication refrains individuals with high social anxiety from face-to-face communication[30] which are contrary to the results of our study. In this sense, online games offer strong motivational opportunities such as the opportunity to interact with other players, spend free time with stuff, obtain information, or have fun, especially in terms of socialization.[12] It is important to determine the presence of internal predictors in nursing students who play online games in order for students to develop assertiveness skills. According to the model established in this study, it can be stated that the assertiveness skills of students can be improved by effectively coping with low self-esteem and social anxiety, and as a result, the risk of online game addiction can be reduced.

The established model showed that the mediating role of assertiveness accounted for 6.2% of the effect of self-esteem and social anxiety on online game addiction. However, self-esteem and social anxiety accounted for 31.4% of assertiveness. It was observed that the established model had acceptable fit values. This suggests that assertiveness may directly affect online game addiction, but social anxiety and self-esteem may influence online game addiction through their high effects on assertiveness and its mediating role. Students with a high level of assertiveness can effectively cope with online game addiction.

As a result, it is recommended to carry out advanced intervention studies to reduce social anxiety levels and support self-esteem and assertive behavior characteristics in nursing students to facilitate their ability to cope with online game addiction.

Limitations

The research data was collected online and is limited to the answers given by nursing students. Our study evaluated a risky group, not a clinical sample. Assertiveness, social anxiety, and self-esteem may manifest differently in clinical groups with online game addiction. Additionally, in our research, instruments based on the ICD (International Classification of Diseases) or DSM were not used to assess game addiction. However, there are measures in the literature that were developed using ICD or DSM and assess game addiction.[33-35]

Conclusion

The results of the study showed that there was a significant correlation between self-esteem, social anxiety, and assertiveness and between assertiveness and online game addiction in nursing students. It is recommended to carry out advanced intervention studies to reduce social anxiety levels and support self-esteem and assertive behavior characteristics in nursing students to facilitate their ability to cope with online game addiction.

Implications For Practice

University students, who form an important part of society, spend more time playing online games with various gaming devices. Due to the negative outcomes of today's technology and the developmental periods of university students, they are in the risky group in terms of game addiction. Online game addiction has a negative impact on individuals, who constitute an important part of society, in terms of physical, cognitive, behavioral, and social aspects. In our study, it was determined that assertiveness plays a mediating role in the development of game addiction. It is known that especially university students have difficulties in expressing themselves and displaying assertive behavior. In this sense, it is seen that it is important to develop the assertive behavior characteristics of students and to reduce social anxiety and improve self-esteem in the fight against game addiction. In this sense, academicians can plan advanced intervention studies in the fight against game addiction, and they can include the subject of assertive behavior development, especially in the field of psychiatric nursing. Thus, nurses can contribute to community mental health.

Availability of Data and Materials: The data that support the findings of this study are available on request from the corresponding author.

Ethics Committee Approval: Ethics committee approval was received for this study from the ethics committee of Gazi University (Approval no: 2021-17 Date: February 22, 2021).

Informed Consent: Written informed consent was obtained from all students who participated in this study.

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