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Constructing and Validating a Questionnaire of Factors Affecting Victimization in Cyberspace in Teenage Girls

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A B S T R A C T

Purpose: The present study aimed to develop and validate a questionnaire assessing the factors influencing cybervictimization in adolescent girls.

Methods and Materials: The research employed a mixed-methods approach, specifically an exploratory sequential design and a tool development model. Initially, in the qualitative phase, semi-structured interviews were conducted with adolescent girls who had experienced cybervictimization at the secondary school level, as well as their parents, in Isfahan, Iran. Participants were purposefully selected, and data saturation was achieved after interviewing eight adolescents, followed by interviews with their parents. The qualitative analysis was performed using the Colaizzi method and MaxQDA software. The factors influencing cybervictimization from the perspectives of both adolescents and parents were identified, which led to the development of an initial questionnaire for the quantitative phase. The quantitative phase used a survey method, and a sample of 384 female students from secondary schools in districts 3, 4, and 6 of Isfahan, studying in the academic year 2023-2024, was selected using multi-stage cluster sampling. After a preliminary trial with 45 students, the questionnaire was administered to the main sample to evaluate its validity and reliability. Data analysis was performed using LISREL 7 and SPSS 28 software. The content validity of the questionnaire was assessed by experts, and construct validity was determined through confirmatory factor analysis.

Findings: The questionnaire showed convergent validity with the Young Internet Addiction Test (IAT) and discriminant validity with the Huebner Satisfaction with Life Scale (MSLSS). The reliability of the scale, as measured by test-retest, Cronbach's alpha, and split-half methods, was found to be 0.82, 0.93, and 0.95, respectively. The exploratory factor analysis indicated that the three-factor model had excellent fit indices (GFI = 0.67, CFI = 0.98, RMSEA = 0.080). According to confirmatory factor analysis, these three factors were labeled as intrapersonal, familial, and environmental.

Conclusion: Based on the results, the developed questionnaire is a valid and reliable tool for assessing the factors influencing cybervictimization in adolescent girls.

Keywords: *Cyber space, cybervictimization, development and validation, exploratory factor analysis, confirmatory factor analysis.*

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1. Introduction

Cyberspace is a domain of communications and behaviors in an electronic environment (Asdolahzadeh et al., 2021; Motamedi Qalati et al., 2024) that provides individuals with extensive communication tools based on the internet, removing human interactions from the constraints of time and physical space, and creating an unimaginable scope with significant potential for expanding social interactions (Faghiharam, 2019; Ghorbani, 2018). Although cyberspace cannot be synonymous with the internet, the internet is the gateway to it (Sayyah Taheri et al., 2016), enabling communication among millions of people in a fraction of a second (Memar et al., 2012). In the digital age, which is rapidly transforming into a digital society, the boundary between leisure time and other work-unrelated activities is rapidly disappearing. Additionally, with the continuous growth of information technology in the past decade, today's adolescents spend most of their time in cyberspace, to the point that they cannot imagine a day without the internet and social media (Diamanduros et al., 2007). In other words, smartphones have become an essential part of adolescents' daily lives (Del Río et al., 2017; George & Mallery, 2010; Navarro et al., 2016), and their activities in cyberspace are expanding through internet tools (internet and mobile phones) at home.

The widespread presence of the internet has enriched adolescents' lives, allowing them to benefit from online maps, chats, internet games, and access to valuable information at any time and place (Jang et al., 2014). Despite the various benefits of cyberspace, it also brings risks for adolescents, one of which is victimization in cyberspace. This refers to instances when someone uses email, chat rooms, images, and messages sent via mobile phones and online tools to humiliate, threaten, and create a sense of helplessness in others. The perpetrator is referred to as a "cyberbully," and the individual or individuals who are targeted are called "cybervictims" (Dilmac & Aydogan, 2010). Types of cybervictimization are divided into direct and indirect victimization. Direct cybervictimization involves direct attacks and the repeated receipt of offensive messages or social behaviors such as removal or blocking the victim (Buelga et al., 2012). Indirect victimization occurs without direct involvement with the victim (Veenstra, 2009) and includes behaviors such as image manipulation, identity theft, or hacking (Buelga et al., 2012). Due to the anonymity of cyberspace, adolescents can create a new identity that differs from their actual characteristics. This feature separates the virtual world from the real world (Abdollahian, 2006), leading to an imbalance of power between the bully and the victim, which increases the intensity of bullying (Mitchell & Jones, 2015). Therefore, cybervictimization is more distressing for adolescents than traditional victimization (Abdollahian, 2006), with the intensity of hostility and the nature of the relationship between the victim and the bully being factors that contribute to discomfort and stress (Mitchell & Jones, 2015).

Cybervictimization has widespread psychological consequences, such as internalizing problems, physical complaints, social anxiety, depression, and attention to problems (Gini et al., 2017; Landoll et al., 2015). Additionally, cybervictimization may lead to external problems and delinquent behaviors in adolescents (Tsitsika et al., 2015). According to a study by Mishna et al. (2012), the prevalence of cybervictimization peaks in mid-adolescence (Mishna et al., 2012), and the rate of prevalence among adolescents worldwide is significantly high (Wong et al., 2014). In various countries (such as the United States, Australia, the United Kingdom, and Germany), the percentage of adolescents reporting cybervictimization over the past few years (2013, 2014, and 2015) has been consistently around 23 to 27% (Bilic, 2013; Heiman et al., 2014; Hemphill et al., 2015; Hinduja & Patchin, 2013). In Iran, Rajabi (2018) reported that around 42% of adolescents have been victimized in cyberspace (Rajabi, 2018). Therefore, adolescents have a significant potential for cybervictimization (Wong et al., 2014). Based on the conducted studies, no questionnaire has been designed and validated to identify the factors influencing cybervictimization among adolescent girls. However, there are questionnaires available to identify individuals who have experienced cybervictimization or cyberbullying, which will be discussed here. One of these questionnaires is the Cyberbullying-Cybervictimization Experience Questionnaire, designed and validated by Antoniadou et al. (2016) to assess the experiences of cyberbullying and cybervictimization among adolescent girls. The questionnaire includes two factors: cybervictimization and cyberbullying. The results of factor analysis showed that this questionnaire has adequate validity (CFI = 0.97, GFI = 0.97, RMSEA = 0.031). The reliability coefficient of this questionnaire in the Latin version, measured by Cronbach's alpha, was reported as 0.89 for the cyberbullying factor and 0.80 for the cybervictimization factor (Antoniadou et al., 2016). In Iran, this questionnaire was translated, prepared, and implemented by Basharpour and Zardi (2019), with internal consistency for the cyberbullying factor, the cybervictimization factor, and the total scale reported as 0.75, 0.78, and 0.79, respectively (Basharpoor & Zardi, 2010).

Zandvaniyan and colleagues (2013) designed and validated the Cyberspace Harm Questionnaire, which was approved for its face validity by ten professors. Its reliability was measured using Cronbach's alpha for the components of the internet, computer games, television, satellite, and mobile phone, with values of 0.91, 0.89, 0.91, 0.93, and 0.90, respectively (Zandvaniyan et al., 2013).

Following the COVID-19 pandemic, the increased internet access provided more opportunities for experiencing cyberbullying and cybervictimization (Ayas et al., 2015; Çapan et al., 2020; Kutlu, 2005; Satan, 2006), highlighting the need for a new scale to assess cybervictimization and cyberbullying. Consequently, Bayar et al. (2023) designed and validated the Cybervictimization/Cyberbullying Questionnaire for university students. According to exploratory factor analysis, six factors were identified in the cybervictimization subscale, including substitution, verbal bullying, social exclusion, disclosure, cybervictimization with sexual content, and anonymous cybervictimization. In the cyberbullying subscale, six factors were also identified: substitution, verbal teasing, social exclusion, disclosure, internet harassment with sexual content, and anonymous internet harassment. Cronbach's alpha for the cybervictimization and cyberbullying subscales were reported as 0.81 and 0.93, respectively (Bayar et al., 2023).

Therefore, it is crucial to examine the factors affecting cybervictimization in order to identify students at risk of becoming victims in cyberspace and prevent the negative impacts and consequences. These processes require appropriate assessment tools. Since cybervictimization typically occurs virtually and often in a private environment, identifying it and the factors influencing it through direct observation or consultation with teachers or family members can be challenging. Even interviews or focus groups with adolescents may be unproductive because participants may lack awareness of the incidents or may resort to shame, fearing to report or confirm their experiences of being victimized in cyberspace, especially those who are severely at risk. Thus, using anonymous self-reporting among adolescents, where they are asked to respond to questions about themselves, their family relationships, and friendships, may be more suitable. Moreover, self-reports are more manageable as screening tools, as they can assess a large number of individuals. They allow for quicker coding or analysis of the collected information compared to other methods such as observation, interviews, or focus groups. Therefore, it is essential

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to have a tool that can measure adolescents at risk of cybervictimization in cyberspace in a coherent manner within a single scale. The tool developed for this purpose is the Questionnaire on Factors Affecting Cybervictimization in Adolescent Girls, which was created and validated by the researcher in 2023. This scale consists of three factors: individual factors (15 questions), family factors (10 questions), and environmental factors (7 questions). The results of the study showed that this scale has adequate validity and reliability.

As mentioned, cybervictimization is a harm that has emerged alongside advancements in information technology and brings negative consequences for the victims. An individual who is unknowingly victimized in cyberspace suffers from many unpleasant psychological outcomes, such as depression, anxiety, suicidal thoughts, and academic performance decline. Given the emergent nature of this harm and the need to identify adolescents at risk to prevent their victimization in cyberspace, conducting research that requires standardized tools is essential. Since no valid tools have been designed and validated in this area, the objective of the present study is to develop and validate a tool for assessing the factors influencing cybervictimization in adolescent girls.

2. Methods and Materials

The research method was a mixed approach combining exploratory research and instrument development. Researchers employ the instrument development model when there is a need to design and implement a quantitative tool based on qualitative findings. In this design, the researcher first examines the research topic qualitatively with a limited number of participants. Then, the qualitative findings are used as a guide to develop the questions for the quantitative research tool. In the second stage of data collection, the researcher executes and validates the tools quantitatively (Razavi et al., 2013). In the qualitative method, thematic analysis was used, and the study population consisted of adolescent girls who had been victimized in cyberspace, aged 16 to 18, from secondary education in Isfahan city during the second semester of the 2021-2022 academic year. The sampling method in this phase was purposeful, and theoretical saturation was reached after conducting 8 interviews with adolescent girls. Following that, interviews were conducted with their parents. Participants were selected from female secondary school students who had been victimized in cyberspace and had visited the counseling rooms in their schools in Isfahan. First, the research purpose was explained to them, and after obtaining written consent, the interviews began. Each interview lasted between 45 and 60 minutes. Four preliminary interviews were conducted, and once proficiency was gained, the main interviews took place. The interview started with demographic questions and then continued with open-ended questions. Sub-questions were also posed as needed to further approach the research objectives. The sub-questions, based on the semi-structured interview method, are questions that are asked in response to the participants' responses. When new information emerged from an interview, and the next interviewee did not mention that theme, it was raised as a question for the current and future interviewees. The process continued to determine whether the theme was applicable to them as well. The interviews continued until theoretical saturation was achieved, and no new findings were obtained in the last three interviews.

To analyze the findings, each interview was carefully listened to, and then the interviews were transcribed verbatim. Finally, using MAXQDA software, the primary, secondary, and selective codes (themes) were identified. The data analysis method in this study was based on the seven-step model proposed by Claze. The steps are as follows:

Step 1 - Creating Protocol: At the end of each interview, the recorded statements of the participants were listened to multiple times, and their statements were transcribed verbatim into a Word document. The transcribed document is referred to as the protocol. To understand the feelings and experiences of the participants, the protocol was read several times. All the responses of the participants were then carefully studied using the MAXQDA qualitative analysis software and divided into 8 protocols (8 adolescent girls and their parents).

Step 2 - Extracting Phrases: In this step, each protocol was carefully studied, and sentences and phrases directly related to the phenomenon under study were extracted.

Step 3 - Formulating Meanings: For each significant sentence, a brief description of its hidden meaning was written.

Step 4 - Forming Categories: In this step, the researcher carefully examined the concepts developed across all protocols and categorized them based on their similarities. In this way, thematic categories (themes) were formed from the developed concepts.

Step 5 - Integrating Results: In this step, by integrating the categories, a comprehensive description of the studied phenomenon was obtained. Similar categories were merged to form broader categories.

Step 6 - Revealing the Inherent Structure of the Phenomenon: In this step, the comprehensive description created in Step 5 was summarized into short, coherent sentences, retaining only the main aspects of the phenomenon.

Step 7 - Validity: In the final stage, to assess the validity of the findings, the results were compared with related articles, and the findings were presented to the participants for their feedback. The participants' opinions were sought regarding the findings.

The quantitative portion of the research was descriptive and survey-based. The study population consisted of all female secondary school students in Isfahan city who were enrolled in the 2023-2024 academic year. The research tool in this phase, given the objective of this study—developing a tool to assess the factors influencing cybervictimization in adolescent girls and validating this tool—was a researcher-designed instrument. The following steps were undertaken to create this tool: 1. Development of a preliminary scale for assessing factors influencing cybervictimization in adolescent girls, using the qualitative findings from semi-structured interviews with cybervictimized adolescent girls and their parents; 2. Presenting the preliminary scale to experts in the field and reviewing its validity; 3. Conducting a pilot test of the scale with adolescents; 4. Statistical and qualitative analysis of the data from the preliminary stage and evaluation of the scale; 5. Editing the scale based on the results from the preliminary stage; 6. Administering the revised scale to the study sample; 7. Analyzing the data obtained and evaluating the validity and reliability of the tool; 8. Finalizing the scale as the final tool for research applications. The final scale for assessing factors influencing cybervictimization in adolescent girls consists of 32 items, and the questions are based on a Likert scale.

Table 1

Items Related to Each Category in the Final Scale of Factors Influencing Cybervictimization in Adolescent Girls

Indicator	Category	Questions
Intrapersonal	Self-esteem	1 to 4
	Personality	5 to 8

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	Lack of skills	9 to 11
	Internet addiction	12 to 15
Familial	Unhealthy family relations	16 to 22
	Economic pressure	23 to 25
Environmental	Academic problems	26 to 28
	Media literacy	29 to 32

All questions are scored directly. To obtain the score for each category, the scores for each of its related questions must be summed. To obtain the total score for the questionnaire, all questions' scores should be summed. These scores will range from 32 to 160. It is evident that the higher the score, the greater the adolescent's vulnerability to cybervictimization, and vice versa.

Table 2
Interpretation of the Scores on the Questionnaire of Factors Influencing Cybervictimization in Adolescent Girls

Score Range	Interpretation
32 to 64	The adolescent girl is at low risk of cybervictimization.
64 to 96	The adolescent girl is at moderate risk of cybervictimization.
Above 96	The adolescent girl is at high risk of cybervictimization.

To administer the questionnaire, participants were assured that the results would remain confidential, and the purpose of the questionnaire was explained. Finally, participants voluntarily and knowingly completed the questionnaire. For data analysis, Cronbach's alpha coefficient, Pearson correlation coefficient, exploratory factor analysis, and confirmatory factor analysis were used. The quantitative data were analyzed using descriptive and inferential statistics, with the integration of Lisrel 7 and SPSS 28 software.

In the qualitative section, after performing qualitative analysis of the interviews using the Clancy method, it was found that the adolescent girls who were victims of cyberbullying and their parents defined the factors influencing the victimization of adolescent girls in cyberspace in three selective codes: intrapersonal, familial, and environmental. The results from the coding are presented as follows:

3. Findings and Results

Table 3
Identified Codes and Sub-codes as Factors Influencing Cybervictimization in Adolescents (From the Adolescents' Perspective)

Selective Codes	Core Codes	Open Codes
Familial	Unhealthy family relationships	Lack of friendly relationship between parents and child
		Imposing age-inappropriate restrictions by family
		Inappropriate behavior of parents toward children due to excessive phone use
		Lack of acceptance in the family
		Lack of proper relationship with siblings
		No suggestions or infrastructure for alternative activities from parents
		Comparisons with siblings and peers
Intrapersonal	Lack of self-esteem	Longing for what is not possessed and seeking it in cyberspace
		Feelings of ugliness and disrespect toward the body
		Large gap between ideal self and real self
	Lack of skills	Weak or insufficient friendships and peer relationships
		Lack of clear goals and planning in life
	Personal problems	Introversion and isolation
		Personal conflicts
	Internet addiction	Excessive time spent online and phone addiction
		Irregular sleeping hours and staying awake late
Environmental	Low media literacy	Insufficient awareness of how to use cyberspace
		Illogical trust in others in cyberspace
	Academic problems	Academic decline and reduced interest in studies
		Boring school environment for students

Table 4
Identified Codes and Sub-codes as Factors Influencing Cybervictimization in Adolescents (From the Parents' Perspective)

Selective Codes	Core Codes	Open Codes

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Familial	Lack of friendly and intimate family relationships	Lack of friendly relationship between parents and child
		Lack of proper relationship with siblings
	Insufficient social interaction and family relationships	
Economic pressure	Lack of financial resources to meet child's desires	
Parental neglect	Treating or feeling that there is a difference between children by parents	
		Insufficient planning for children's leisure time
		Lack of private time spent with parents
		Lack of awareness or insufficient monitoring of children's behavior by parents
		Imposing age-inappropriate restrictions by parents
		Inappropriate behavior of parents toward children due to excessive phone use
		Lack of acceptance or partial acceptance of children's behavior by parents
	Unawareness of daily events between parents and children	
Intrapersonal	Lack of skills	Lack of healthy friendships and adequate social relationships
	Internet addiction	Excessive time spent online and phone addiction
		Irregular sleeping hours and staying awake late
	Personal problems	Introversion and isolation
		Aggression and incompatibility
Environmental	Low media literacy	Insufficient awareness of cyberspace and its usage by parents
	Academic problems	Lack of interest in school and academic decline

Note: Items marked with an asterisk (*) reflect the perspective solely of the father.

Based on the qualitative findings, a tool to assess the factors influencing cybervictimization in adolescent girls was developed in the quantitative section. The designed questionnaire was implemented in two stages—preliminary and final—on a sample group to assess its validity and reliability. In the preliminary implementation, the initial questionnaire was administered to 45 female secondary school students in District 3 of Isfahan city. Descriptive characteristics of the questionnaire were examined to assess whether the items were understandable and whether reliability would change upon removal of any item. The Cronbach's alpha at this stage was calculated to be 0.93 for the entire questionnaire. No change in the alpha value was observed after removing any question. The results showed that the adolescent participants understood the questions correctly, and the wording and sequence of the questions were appropriately arranged. The Cronbach's alpha value was considered high and acceptable for the overall variable, which indicated that the use of this questionnaire was reliable. After the preliminary phase, the questionnaire was administered to the main research sample, which consisted of 384 female secondary school students in Isfahan city. To gather data, coordination was made with the Isfahan Department of Education, school principals, and teachers. The researcher then employed a multi-stage cluster sampling method, selecting 3 out of 6 educational districts (Districts 3, 4, and 6) in Isfahan city. From each district, three secondary girls' schools and three classes per school were selected. The researcher then visited the selected schools, where the questionnaires were distributed to the students, and necessary instructions on how to answer the questions were provided. Once completed, the questionnaires were collected for analysis. The findings from this implementation are described below.

Table 5
Descriptive Indices of Sub-dimensions in the Questionnaire of Factors Affecting Cybervictimization in Adolescent Girls

Dimension	Scales	Mean	Standard Deviation	Minimum	Maximum	Skewness	Kurtosis	Frequency
Intrapersonal	Self-esteem	9.37	5.48	4	20	0.883	-0.756	384
	Personality	9.54	6.61	4	20	0.845	-0.883	384
	Lack of Skills	7.18	4.23	3	15	0.841	-0.878	384
	Internet Addiction	9.53	5.49	4	20	0.849	-0.866	384
Familial	Unhealthy Family Relations	16.8	9.58	7	35	0.833	-0.949	384
	Economic Pressure	7.33	4.02	3	15	0.721	-0.979	384
Environmental	Academic Issues	7.33	4.11	3	15	0.705	-0.979	384
	Media Literacy	9.74	5.53	4	20	0.704	1.34	384
Overall Score		76.85	42.85	32	160	0.875	-0.937	208

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The analysis of the means shows that the overall mean score of the sub-dimensions of the *Factors Affecting Cybervictimization in Adolescent Girls* questionnaire is 76.85. Given the score range of 1 to 5, it can be concluded that the overall score for factors influencing cybervictimization in adolescent girls in the sample is relatively high and above average. Comparing the means of the sub-dimensions of the factors affecting cybervictimization in adolescent girls reveals that the highest mean is for the *Unhealthy Family Relations* dimension (16.8), and the lowest mean is for the *Lack of Skills* dimension (7.17). The comparison of the mean scores across dimensions shows that the means do not differ significantly, with all dimensions having relatively high average values.

To assess the normality of the data distribution, skewness and kurtosis indices were examined. The significance of checking for the normality of data distribution lies in the fact that certain statistical methods, such as Pearson's correlation, rely on the assumption of normal data distribution (in the population). Furthermore, population parameter estimation is based on the assumption of normality of variable distribution (Karimi, 2015). For skewness and kurtosis, if the values of these statistics are between -2 and +2, it indicates that the univariate distribution is normal (George & Mallery, 2010).

In this section, we examined the validity and reliability of the developed questionnaire. To assess *face validity*, the questionnaire was first presented to 30 specialists in psychology and counseling to evaluate the conceptual relationship of the questions with the topic of the questionnaire and the ability of each item to measure the subject, as well as the conceptual clarity of the appearance of the items. As a result, after making some modifications suggested by the experts, the face validity of the questionnaire was confirmed. For *content validity*, the method of Lawshe was used. Initially, the 32-item questionnaire was presented to 8 specialists, who were asked to evaluate it for its ability to assess the factors influencing cybervictimization in adolescent girls. Since the minimum acceptable Content Validity Ratio (CVR) for a group of 8 specialists is 0.75, items with a CVR of 0.75 or higher were retained. Consequently, the questionnaire was considered to have adequate content validity, and its use as a data collection tool can be trusted. The suggested revisions from the specialists were then applied to the questionnaire.

Table 6
Decision-Making Indices for CVR

Number of Panel Members (Experts)	Minimum Validity Value
5	0.99
6	0.99
7	0.99
8	0.75
9	0.78
10	0.62
11	0.59
12	0.56
13	0.54
14	0.51
15	0.49
20	0.42
25	0.37
30	0.33
35	0.31
40	0.29

To assess the convergent validity of the developed questionnaire, 100 participants completed both the Internet Addiction Test (IAT) by Young and the questionnaire on factors influencing cybervictimization in adolescent girls. The results of the Pearson correlation between the categories of the *Factors Affecting Cybervictimization in Adolescent Girls* questionnaire and the Young's Internet Addiction Test are shown below.

Table 7
Correlation Matrix Between the Internet Addiction Questionnaire and the Factors Affecting Cybervictimization in Adolescent Girls Questionnaire

Factor	(1) Internet Addiction	(2) Intrapersonal Factor	(3) Familial Factor	(4) Environmental Factor
Internet Addiction (1)	1	**0.64	**0.47	**0.49
Intrapersonal Factor (2)	-	1	**0.95	**0.93
Familial Factor (3)	-	-	1	**0.96
Environmental Factor (4)	-	-	-	1

$p < 0.01$

As shown in Table 7, a positive and significant correlation exists between the responses of 100 participants to the Young's Internet Addiction Test and the *Factors Affecting Cybervictimization in Adolescent Girls* questionnaire across all dimensions. This indicates that as the level of internet addiction increases, the likelihood of cybervictimization also increases, which demonstrates the convergent validity of the questionnaire with the Young's Internet Addiction Test.

To assess the discriminant validity of the developed questionnaire, 100 participants responded to both the *Satisfaction*

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with Life Scale for Students (MSLSS) and the *Factors Affecting Cybervictimization in Adolescent Girls* questionnaire. The results of the Pearson correlation between the categories of the *Factors Affecting Cybervictimization in Adolescent Girls* questionnaire and the Satisfaction with Life questionnaire are shown below.

Table 8
Correlation Matrix Between the Satisfaction with Life Questionnaire and the Factors Affecting Cybervictimization in Adolescent Girls Questionnaire

Factor	(1) Life Satisfaction	(2) Intrapersonal Factor	(3) Familial Factor	(4) Environmental Factor
Life Satisfaction (1)	1	**-0.62	**-0.44	**-0.41
Intrapersonal Factor (2)	-	1	**0.95	**0.93
Familial Factor (3)	-	-	1	**0.96
Environmental Factor (4)	-	-	-	1

**p<0.01

As shown in Table 8, a negative and significant correlation exists between the responses of 100 participants to the *Satisfaction with Life* questionnaire and the *Factors Affecting Cybervictimization in Adolescent Girls* questionnaire across all dimensions. This suggests that as life satisfaction increases, the likelihood of cybervictimization decreases, indicating a distinct separation between the *Factors Affecting Cybervictimization in Adolescent Girls* scores and the life satisfaction scale.

To assess the reliability of the *Factors Affecting Cybervictimization in Adolescent Girls* questionnaire, three methods were employed: internal consistency using Cronbach's alpha, test-retest, and split-half reliability. The internal consistency coefficient, using Cronbach's alpha, was 0.93 for the entire questionnaire, and for the intrapersonal, familial, and environmental factors, the respective values were 0.991, 0.983, and 0.981. The range for Cronbach's alpha coefficient is between 0 and 1; therefore, the obtained coefficients were considered acceptable. According to the minimum suggested value of 0.7 as proposed by Nunnally and Bernstein (1994), the internal consistency of the questionnaire was confirmed.

Table 9
Cronbach's Alpha Coefficient for the Factors Affecting Cybervictimization in Adolescent Girls Questionnaire

Internal Consistency Coefficient	Number of Questions	Cronbach's Alpha Coefficient
Cronbach's Alpha for the Entire Questionnaire	32	0.93
Cronbach's Alpha for Intrapersonal Factor	15	0.991
Cronbach's Alpha for Familial Factor	10	0.983
Cronbach's Alpha for Environmental Factor	7	0.981

To assess the validity of the *Factors Affecting Cybervictimization in Adolescent Girls* questionnaire through test-retest reliability, the questionnaire was administered to 30 students with a two-week interval. Using Pearson's correlation coefficient, the test-retest reliability coefficients for the total score, intrapersonal factor, familial factor, and environmental factor were 0.82, 0.71, 0.83, and 0.80, respectively.

Table 10
Correlation Matrix Between the Categories of Factors Affecting Cybervictimization in Adolescent Girls in the 14-Day Test-Retest

Correlation Coefficient	Number of Participants	Correlation Coefficient with Total Score	P-value
Total Score (1)	30	0.82	0.01
Intrapersonal Factor (2)	30	0.71	0.01
Familial Factor (3)	30	0.83	0.01
Environmental Factor (4)	30	0.80	0.01

To determine the reliability of the *Factors Affecting Cybervictimization in Adolescent Girls* questionnaire through split-half reliability, a coefficient of 0.95 was obtained, as shown in Table 11. According to the minimum recommended value of 0.7 by Nunnally and Bernstein (1994), this result indicates sufficient reliability using the internal consistency method for the 32 items in the questionnaire.

Table 11
Reliability through Split-Half Method

Reliability Coefficient	Number of Items	Split-Half Reliability
Split-Half Reliability	32	0.95

According to the research findings, the three-factor structure of the *Factors Affecting Cybervictimization in Adolescent Girls* questionnaire demonstrates good fit. To examine the factorial structure, exploratory factor analysis (EFA) was conducted using LISREL software. The results of the exploratory factor analysis showed that the questionnaire exhibits the best fit with three factors. To verify the construct validity of the questionnaire, factor analysis was performed on a three-factor model, two-factor model, and one-factor model, and the results were compared. The indices

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related to the factor analysis without freeing covariances are shown in Table 12.

Table 12
Fit Indices for the Models

Acceptable Value	Two-Factor Model Index	One-Factor Model Index	Three-Factor Model Index	Index
>0.80 or 0.90	0.63	0.63	0.67	GFI
>0.80	0.60	0.60	0.64	AGFI
>0.80 or 0.90	0.96	0.96	0.97	NFI
>0.90	0.97	0.97	0.98	NNFI
>0.90 or 0.95	0.97	0.97	0.98	CFI
<0.05 or >0.08	0.049	0.049	0.046	Standardized RMR
<0.06 or >0.08	0.95	0.95	0.80	RMSEA
<0.90	0.96	0.96	0.97	RFI
<0.90	0.97	0.97	0.98	IFI

Note: GFI = Goodness of Fit Index, AGFI = Adjusted Goodness of Fit Index, NFI = Bentler-Bonett Index (Normed Fit Index), NNFI = Tucker-Lewis Index (Non-Normed Fit Index), CFI = Comparative Fit Index, Standardized RMR = Standardized Root Mean Square Residual, RMSEA = Root Mean Square Error of Approximation, RFI = Relative Fit Index, Chi-Square/df = Chi-Square/degree of freedom, IFI = Incremental Fit Index.

The results presented in Table 12 indicate that all the fit indices considered for the three models are within acceptable limits, suggesting a good and appropriate fit for all three models, with alignment to the collected data. To compare the fit of the three models, the Goodness of Fit Index (GFI), Root Mean Square Error of Approximation (RMSEA), and Comparative Fit Index (CFI) were used. The results show that in all three models, these indices indicate a significant fit, representing an excellent (adequate) fit between the specified model and the data. The results indicate that, in terms of the GFI and CFI indices, the three-factor model performs better than the two-factor and one-factor models. Therefore, confirmatory factor analysis (CFA) was performed on the three-factor model to determine the placement of the questions within the factors and the factor loadings for each question.

Table 13
Total Variance Distribution in the Factors

Factor	Total Scores	Variance Percentage	Cumulative Percentage
Factor 1	13.352	41.724%	41.724%
Factors 1 & 2	8.013	25.041%	66.755%
Factors 1, 2 & 3	7.051	22.034%	88.799%

As shown in Table 13, the first factor explains approximately 42% of the variance in cybervictimization in the online environment. With the inclusion of the second factor, this explanation increases to around 67%, and with the inclusion of the third factor, it rises to about 89%. The addition of a fourth factor did not significantly improve the explanatory power of the variance; hence, it was not reported by SPSS. Based on the findings, the explanatory power of the three-factor model is significantly higher than the other models, and the factor loadings of the questions on these factors and the distribution of the questions will be further examined.

4. Discussion and Conclusion

The present study aimed to construct and validate a questionnaire assessing the factors influencing victimization in cyberspace among adolescent girls, using exploratory factor analysis (EFA) and confirmatory factor analysis (CFA) in a sample of high school girls in Isfahan. The questionnaire's face, content, and construct validity were examined and confirmed. For face validity, expert opinions were used, and content validity was confirmed using the Lawshe method. Accordingly, eight questionnaires on factors influencing victimization in cyberspace among adolescent girls were distributed among experts, collected after completion, and analyzed. Since the minimum acceptable Content Validity Ratio (CVR) is 0.75, only questions with a CVR greater than or equal to 0.75 were retained. As a result, the questionnaire was confirmed to have adequate content validity as a data collection tool.

To assess the construct validity of the questionnaire, its convergent and discriminant validity were evaluated. The correlation between the Young Internet Addiction Test (IAT) and the questionnaire on factors influencing victimization in cyberspace among adolescent girls was found to be positive and significant across all factors (correlations between the two questionnaires for factors 1, 2, and 3 were 0.64, 0.47, and 0.49, respectively). This means that as internet addiction increased, victimization in cyberspace also increased, demonstrating convergent validity with the Young Internet Addiction Test. Furthermore, the correlation between the Life Satisfaction Scale and the questionnaire on factors influencing victimization in cyberspace was negative and significant across all factors (correlations for factors 1, 2, and 3 were −0.62, −0.44, and −0.41, respectively). This indicates that as life satisfaction increased, cyberspace victimization decreased, demonstrating discriminant validity with the Life Satisfaction Scale.

The results of exploratory factor analysis indicated that the fit indices, including Goodness of Fit Index (GFI), Root Mean Square Error of Approximation (RMSEA), and Comparative Fit Index (CFI), were significantly adequate, reflecting excellent (satisfactory) fit between the proposed model and the data. The results showed that in terms of GFI and CFI, the three-factor model performed better than the two-factor and one-factor models. The confirmatory factor analysis results revealed that the questionnaire

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consisted of three factors: intrapersonal (15 questions), familial (10 questions), and environmental (7 questions).

Furthermore, the reliability of the questionnaire was confirmed by test-retest with a reliability coefficient of 0.82 and internal consistency, measured using Cronbach's alpha, for the total questionnaire was 0.93, and for the intrapersonal, familial, and environmental factors, it was 0.991, 0.983, and 0.981, respectively, which is satisfactory. Therefore, it can be concluded that the questions in the questionnaire are consistent with one another, and this scale has adequate validity and reliability. Thus, the factors derived from the factor analysis can appropriately identify adolescents at risk of victimization in cyberspace.

This study has some limitations that need to be addressed in future research. The first limitation is that this research was conducted in Isfahan and in a population of high school girls, making it difficult to generalize the findings to other cities or to male student populations. The results may also have been influenced by cultural differences. Although this may initially seem unrelated to the study's focus, it is suggested that further studies be conducted on the factors influencing adolescent victimization in cyberspace on a broader scale, including other cities, male students, and all educational levels. Additionally, despite efforts to increase the sample's diversity and select different educational districts within Isfahan, the precision of the sampling method, which was multistage cluster sampling, cannot be fully accounted for. This issue should be considered when generalizing the findings. Furthermore, the questionnaire on factors influencing victimization in cyberspace, which was validated in this study, could be used by future researchers to identify students at risk of cyberspace victimization. However, there is a need for further research on adolescent victimization in cyberspace.

Authors' Contributions

Authors equally contributed to this article.

Declaration

In order to correct and improve the academic writing of our paper, we have used the language model ChatGPT.

Transparency Statement

Data are available for research purposes upon reasonable request to the corresponding author.

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Declaration of Interest

The authors report no conflict of interest.

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Ethical Considerations

All procedures performed in studies involving human participants were under the ethical standards of the institutional and, or national research committee and with the 1964 Helsinki Declaration and its later amendments or comparable ethical standards. This research is based on the doctoral dissertation of Ms. Maryam Mo'tamedi Ghalati, Department of Counseling, Faculty of Psychology, Counseling, and Social Work, Islamic Azad University, Khomeini Shahr Branch, entitled "Study of the Factors Influencing Victimization in Cyberspace among Adolescent Girls and Design and Validation of a Questionnaire Based on These Factors," which was registered on 22 August 2023 by the National Committee for Ethics in Biomedical Research at Islamic Azad University, Khomeini Shahr Branch, under the identification code IR.IAU.KHSH.REC.1402.077.

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