RESEARCH ARTICLE

Severity of dissociative experiences and emotion dysregulation mediate the relationship between childhood trauma and Internet addiction symptom severity among young adults

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ABSTRACT

Objective: The first aim of the present study was to evaluate the relationship between childhood trauma and Internet addiction (IA) symptom severity. The second aim was to evaluate the mediator effects of dissociative experiences and emotion dysregulation on this relationship.

Method: We conducted the study using an online survey with 920 university student participants. Participants were evaluated with the Internet Addiction Test (IAT), Dissociative Experiences Scale (DES), Childhood Trauma Questionnaire (CTQ-28), and Difficulties in Emotion Regulation Scale (DERS).

Results: Compared with participants evidencing low IA risk (n=806, 87.6%), those with high IA risk (n=114, 12.4%) had a longer duration of daily Internet use and a higher rate of problems related to Internet use. The high IA risk group was connected to the Internet less through a smartphone and more through computer use. In addition, scale scores (DES, DERS and CTQ-28) were higher among the group with high IA risk. Scale scores were mildly to moderately correlated with each other. In linear regression analysis, childhood trauma (particularly emotional abuse and physical neglect) was related to severity of IA symptoms. Severity of dissociative experiences and emotion dysregulation mediated the childhood trauma-IA symptom relationship.

Conclusion: These findings suggest relations between the severity of childhood trauma, particularly emotional abuse and physical neglect dimensions, and severity of IA symptoms among Turkish young adults. Severity of dissociative experiences and emotion dysregulation may also partially mediate this relationship.

Keywords: Childhood trauma, dissociative experiences, emotion dysregulation, emotional abuse, internet addiction

INTRODUCTION

Although the usefulness of the Internet is evident in many areas of life, especially in the academic field and for recreational purposes, a loss of control over Internet use may have a negative impact on daily life functioning (e.g., academic impairment, decreased productivity), family relationships, and emotional stability (1). This phenomenon has been termed "problematic Internet use," "pathological Internet use," and "Internet addiction (IA)." Although there is no consensus over the use of the term "IA" and a standardized definition has not been uniformly agreed on, IA can be defined as excessive, uncontrolled and harmful use of the Internet (1). The rates of IA among adolescents and young people range from 2.4% to 37.9% in Asia, and between 3.1% and 18.3% in Europe (2). Previous studies in Turkey demonstrated that the rates of IA can vary even according to the university where the sample is enrolled, with results of 12.3% (3), 9.7% (4), 7.2% (1), or lastly 10% (5).

Childhood traumas were found related to substance addiction (6-9) as well as behavioral addictions such as gambling (10,11), Internet gaming disorder (IGD) (12), and IA (5,13-15). However, only four studies investigated the association between childhood traumas and IA. Zhang et al. (14,15) reported that physical abuse is a possible risk factor for IA among high-school students, whereas Yates et al. (13) suggested that maltreated youth are at disproportionate risk for IA. More recent work conducted by Dalbudak et al. (5) reported that although childhood traumas, in particular physical neglect, emotional neglect, and emotional abuse, were found related to the severity of IA risk, the most important predictor being emotional abuse. Finally, in their recent study Kircaburun et al. (12) found an indirect relationship between childhood emotional trauma and IGD; online gamers with a history of emotional abuse and/or neglect had higher levels of depressive symptoms, and depressive symptomatology was an important risk factor for IGD.

Childhood trauma, particularly emotional neglect was suggested to have significant effect on dissociative disorders among Turkish college students (16). Dissociative symptoms may accompany not only substance addiction (17,18) but also behavioral addictions such as pathological gambling (11) and IA (4,5,19,20). The association between IA and dissociative symptoms was noted in both the clinical (19) and nonclinical populations (4,5,20). Both Canan et al. (4) and Dalbudak et al. (5) suggested that IA was associated with higher levels of dissociative experiences among Turkish university students.

Exposure to traumatic events and interpersonal trauma in childhood is associated with wide-ranging psychosocial, developmental, and medical impairments in children, adolescents, and adults, with emotional dysregulation being a core feature that may help account for this heightened risk (21). Emotion regulation refers to the modulation of emotional arousal, the awareness, understanding, and acceptance of emotions, as well as the ability to act in desired ways regardless of emotional state (22). In recent years, increasing attention has been given to emotion dysregulation as a potentially common feature of many forms of addiction (23), including substance addictions such as smoking, alcohol, or drugs (24-26), and behavioral addictions such as risky sexual behaviors (27,28), gambling addiction (29-31), video game addiction (32), IGD (33), disordered online social networking use (34) and IA (35).

Some researchers have suggested that individuals who possess deficits in emotion regulation are more prone to regulate negative emotions by indulging in activities that offer immediate pleasure (36,37). Consistent with this suggestion, individuals who have emotion dysregulation are more likely to engage in addictive behaviors in an attempt to escape from, or minimize, negative moods and/or try alleviate distressing feelings (38), whereas emotional intelligence has been demonstrated as a protective factor for online gaming addiction (39).

Early speculation by Young and Rogers (40) suggested that Internet use has a propensity to alleviate dysphoric moods and may therefore be used to cope with real-life problems. Later studies demonstrated significant associations between using the Internet to manage emotions, difficulty regulating Internet use, and negative outcomes of Internet use (41-45). Furthermore, studies have shown difficulties in emotion regulation to be associated with problematic Internet use (32,35,38,46-49).

The aim of the present study was to evaluate the relationship between severity of childhood trauma and IA symptom severity. Previous studies revealed that emotion dysregulation and dissociation are mediators in the association between childhood trauma and other variables such as eating psychopathology (50), internalized and externalized behavior problems (51) and gambling severity (11). This suggests that while evaluating the association between childhood trauma and other variables, such as IA symptom severity, it is

important to evaluate mediating effects of emotion dysregulation and dissociation. Thus, in relation to our second aim, the novelty of the present study is that, although there are some studies that evaluated the relationship between childhood trauma and IA symptom severity, this is the first study to evaluate the mediator effects of dissociative experiences and emotion dysregulation on this relationship. We hypothesized that severity of dissociative experiences and emotion dysregulation may mediate this relationship.

METHOD

Participants and procedure

An online survey using a cross-sectional design was conducted with Turkish university students in Ankara, Turkey. The study procedures were carried out in accordance with the Declaration of Helsinki. The study protocol was approved by the Ethics Committee of Cankaya University (Turkey) and the study was anonymous and confidential. After reading the Plain Language Information Statement, informed consent was obtained from all participants. Participants sampled from Cankaya University who agreed to participate in the study were rewarded with bonus credit, which added to their overall grade for particular courses in which they were enrolled. Furthermore, participants were informed that they would not be penalized for declining participation and/or abandoning the study once they started. Overall, the data collection stage spanned from December 11, 2018 to January 14, 2019.

A total of 1,112 potential participants initiated the online survey and they all provided informed consent. Among these, 192 participants did not fill in any of the scales, and thus a total of 920 participants were included in the present study.

Measures

Internet Addiction Test (IAT): The IAT consists of 20 items rated on a six-point Likert scale, ranging from 0 (does not apply) to 5 (always applies) (52). The IAT includes questions such as "How often do you find that you stay online longer than you intended?" A cut-off value of 50 or higher has been suggested as indicative of problematic Internet use and a score of 80 or higher is indicative of pathological use (52,53). The Turkish version of the IAT, which was used in the present study, with high internal consistency (α=0.93) and temporal reliability (α=0.87), revealed promising and sound

psychometric properties (54). Cronbach's α coefficient was 0.93 in the present study.

Dissociative Experiences Scale (DES): Dissociative symptoms were assessed using the 28-item self-report DES (55). The DES is not a diagnostic tool but serves as a screening device for chronic dissociative disorders. Respondents are asked to rate various dissociative experiences occurring in their daily life when they are not under the influence of alcohol or drugs. For each item, possible scores range from 0 to 100. The DES has three subscales. The amnestic dissociation subscale includes items 3, 4, 5, 6, 8, 10, 25, and 26. The absorption and imaginative involvement subscale includes items 2, 14, 15, 16, 17, 18, 20, 22, and 23. The depersonalization and derealization subscale includes items 7, 11, 12, 13, 27, and 28. The DES is a highly reliable and internally consistent questionnaire. The Turkish version of the scale has reliability and validity similar to its original form (56,57). Cronbach's α coefficient was 0.95 in the present study.

Childhood Trauma Questionnaire (CTQ-28): The CTQ (58,59) is a 28-item retrospective self-report instrument that inquires about traumatic experiences during childhood and adolescence. It assesses five types of childhood trauma: emotional abuse, emotional neglect, physical abuse, physical neglect, and sexual abuse. The CTQ has excellent test-retest reliability and convergent validity (58,59). Each item is rated from 1 (never) to 5 (very often). Scores range from 5 to 25 for each type of trauma and 25 to 125 for the total trauma exposure score. The Turkish version of the CTQ was validated in a previous study (60) and Cronbach's α coefficient was 0.81 in the present study.

Difficulties in Emotion Regulation Scale (DERS): The DERS is a 36-item measure that provides a comprehensive assessment of overall emotion dysregulation, as well as six specific dimensions: nonacceptance of negative emotions, difficulties engaging in goal-directed behaviors when distressed, difficulties controlling impulsive behaviors when distressed, limited access to effective emotion regulation strategies, lack of emotional awareness, and lack of emotional clarity. The DERS has demonstrated good test-retest reliability and adequate construct and predictive validity (22,61), and is strongly correlated with an experimental measure of emotion regulation among BPD patients (r=-0.63) (62). The Turkish version of the DERS has been validated (63). In the present study, the DERS total score was used as an index of the overall level of emotion dysregulation; its Cronbach's α coefficient was 0.93.

Data analysis

SPSS 17.0 for Windows (IBM, Chicago IL) was used for all analyses. We formed the groups according to a cut-off value of 80 or higher on the IAT, which is indicative of pathological use (52,53). We used Student's t-tests to compare the groups on continuous variables. Categorical sociodemographic variables were compared by means of χ^2 statistics. Using the severity of IA symptoms as the dependent variable and severity of childhood trauma, dissociative experiences and emotion dysregulation as independent variables, hierarchical multiple linear (stepwise) regression models were performed. For all statistical analyses, p values were two-tailed, and differences were considered significant at p<0.05.

RESULTS

Participants scoring 80 or higher on the IAT constituted the group with high IA risk (n=114, 12.4%) and those with a score of 79 or less constituted the group with low IA risk (n=806, 87.6%).

Sociodemographic variables

Age, gender and marital status did not differ between the group with high IA risk and the group with low IA risk (Table 1). Mean age (±SD) was 21.69 years (±2.21) for the group with high IA risk and 22.19 (±4.26) for the group with low IA risk. The rate of males was 31.6% among the group with high IA, whereas this rate was 33.0% among the group with low IA risk (χ^2=0.092, p=0.762). Among both the group with high IA (95.6%) and the group with low IA risk (94.5%), the rates of singles were high (χ^2=1.405, p=0.704).

Clinical variables

Age at first Internet use (χ^2=6.771, p=0.148) and mobile Internet use (χ^2=1.070, p=0.301) did not differ between the group with high IA risk and the group with low IA risk (Table 1). Duration of daily Internet use was longer in the high IA risk group (χ^2=51.243, p<0.001). Among this group, 38.6% reported that they use the Internet more than 6 hours per day, whereas this rate was 14.0% among those with low IA risk. Similarly, problems related to Internet use were higher in the high IA risk group (72.8%) than the group with low IA risk (33.6%) (χ^2=64.778, p<0.001). In addition, among participants who reported having problems related to Internet use, the rate of those who reported that these problems began before age 18 was higher in the high IA risk group (55.4%) than among those with low IA risk

(χ^2=8.622, p=0.003). This high risk group was connected to the Internet less through a smartphone and more through computer use (χ^2=13.770, p=0.008) (Table 1).

Scale scores

Scale scores (DES [t=-7.499, p<0.001], DERS [t=-9.612, p<0.001] and CTQ-28 [t=-5.240, p<0.001]) were higher among the group with high IA risk. In addition, subscales scores of these scales were higher among the group with high IA risk (Table 2). Scale and subscale scores were mildly to moderately correlated with each other (Table 3).

Linear regression analyses

Taken the severity of IAT score as a dependent variable, series of linear (stepwise) regression analyses were conducted. In the first model, first step, severity of childhood trauma was entered in the analysis as an independent variable, where it was related to the severity of IA symptoms. In the second step of this model, five types of childhood trauma were entered in the analysis as independent variables instead of CTQ-28 total score. In this analysis, emotional abuse and physical neglect were related with the severity of IA symptoms (Table 4).

In the first step of the second model, total DES score was entered in the analysis in addition to emotional abuse and physical neglect, and it was related with the severity of IA symptoms, together with emotional abuse, whereas physical neglect was no more related with the severity of IA symptoms. In the second step of this model, instead of total DES score, subscales of DES were entered in the analysis in addition to emotional abuse and physical neglect. In this analysis, amnestic dissociation (DES-I) and absorption and imaginative involvement (DES-II) subscales of DES together with emotional abuse were related with the severity of IA symptoms (Table 4).

In the first step of the third Model, total DERS score was entered in the analysis in addition to emotional abuse and physical neglect, and it was related with the severity of IA symptoms, together with both emotional abuse and physical neglect. In the second step of this model, instead of total DERS score, subscales of DERS were entered in the analysis in addition to emotional abuse and physical neglect. In this analysis, strategies, impulse, clarity and aware subscales of DERS were related with the severity of IA symptoms, together with physical neglect, whereas emotional abuse was no more related with the severity of IA symptoms (Table 4).

Table 1: Comparing sociodemographic and clinical variables according to the Internet addiction risk severity

	Internet addiction risk severity					
	Low		**High**			
	n=806	**87.6%**	**n=114**	**12.4%**	χ^2	**p**
Age (Mean±SD)	22.19	4.26	21.69	2.21	t=1.231	0.219
Gender (n, %)					0.092	0.762
Female	540	67.0	78	68.4		
Male	266	33.0	36	31.6		
Marital status (n, %)	85.95	21.47	102.18	21.92	1.405	0.704
Married	27	3.3	2	1.8		
Single	762	94.5	109	95.6		
Divorced	3	0.4	1	0.9		
Other	14	1.7	2	1.8		
Duration of Internet use per day*					51.243	<0.001
<1 hour	40	5.0	4	3.5		
1-3 hour	339	42.1	20	17.5		
4-6 hour	314	39	46	40.4		
7-9 hour	78	9.7	30	26.3		
9<hour	35	4.3	14	12.3		
Age at first internet use					6.771	0.148
<6	45	5.6	12	10.5		
7-12	445	55.2	65	57.0		
13-17	272	33.7	34	29.8		
18-25	30	3.7	3	2.6		
25<	14	1.7	0	0		
Mobile internet	795	98.6	111	97.4	1.070	0.301
Connection type**					13.770	0.008
Computer at home	121	15.0	18	15.8		
Computer at internet cafe	9	1.1	5	4.4		
Smartphone or tablet	653	81.0	85	74.6		
Computer at work or school	15	1.9	6	5.3		
Other	8	1.0	0	0		
Problems related with internet use	271	33.6	83	72.8	64.778	<0.001
Problems before age 18	101	37.3	46	55.4	8.622	0.003

*How many hours did you use the Internet (non-business/non-academic) on an average day over the last year?
**How did you connect to the Internet in the last 12 months?

In the first step of the fourth model, total DES and DERS scores were entered in the analysis in addition to emotional abuse and physical neglect, and they were related with the severity of IA symptoms, whereas emotional abuse and physical neglect were no more related with the severity of IA symptoms. In the second step of this model, instead of total DES and DERS scores, subscales of these scales were entered in the analysis in addition to emotional abuse and physical neglect. In this analysis, amnestic dissociation (DES-I) subscale of DES and strategies, impulse, clarity and aware subscales of DERS were related with the severity of IA symptoms, whereas emotional abuse and physical neglect were not (Table 4).

Severity of dissociative experiences (particularly amnestic dissociation [DES-I]), and emotion dysregulation (particularly strategies, impulse, clarity and aware subscales) mediated the relationship of childhood traumas of emotional abuse and physical neglect with the severity of IA symptoms (Table 4).

Table 2: Comparing scale scores according to Internet addiction risk severity

| | Internet addiction risk severity | | | | | |
| | Low (n=806) | | High (n=114) | | | |
	Mean	SD	Mean	SD	t	p
DES	18.38	13.83	32.78	19.84	-7.499	<0.001
DES-I	12.19	13.46	27.68	21.89	-7.359	<0.001
DES-II	24.94	16.76	38.57	21.31	-6.545	<0.001
DES-III	14.67	16.73	31.77	24.23	-7.293	<0.001
DERS	88.53	20.48	108.25	20.66	-9.612	<0.001
Nonaccept	12.52	5.15	16.90	5.67	-8.382	<0.001
Goals	15.11	4.27	17.28	4.60	-5.024	<0.001
Impulse	13.57	5.01	18.27	5.12	-9.344	<0.001
Aware	15.91	4.11	16.31	4.05	-0.972	0.331
Strategies	19.35	6.45	25.15	6.94	-8.893	<0.001
Clarity	12.07	3.88	14.35	3.66	-5.934	<0.001
CTQ-28	37.30	13.78	47.16	19.41	-5.240	<0.001
Emotional abuse	7.43	3.33	9.71	4.76	-4.948	<0.001
Physical abuse	6.13	2.91	8.15	4.48	-4.663	<0.001
Physical neglect	7.32	2.99	9.18	3.95	-4.864	<0.001
Emotional neglect	10.13	4.44	11.68	4.67	-3.445	0.001
Sexual abuse	6.29	3.27	8.44	5.01	-4.461	<0.001

DES: Dissociative Experiences Scale, DES-I: Amnestic dissociation, DES-II: Absorption and imaginative involvement, DES-III: Depersonalization and derealization, DERS: Difficulties in Emotion Regulation Scale, CTQ-28: Childhood Trauma Questionnaire

Table 3: Correlation coefficients between the scale scores

	IAT	DES	CTQ-28	DERS
DES	0.431	1	0.457	0.449
DES-I	0.431	0.878	0.539	0.390
DES-II	0.377	0.917	0.307	0.415
DES-III	0.383	0.902	0.443	0.431
CTQ-28	0.294	0.457	1	0.370
Emotional abuse	0.290	0.434	0.886	0.381
Physical abuse	0.248	0.389	0.851	0.281
Physical neglect	0.274	0.419	0.850	0.306
Emotional neglect	0.189	0.288	0.742	0.299
Sexual abuse	0.230	0.385	0.824	0.258
DERS	0.408	0.449	0.370	1
Nonaccept	0.338	0.383	0.340	0.775
Goals	0.239	0.229	0.039*	0.627
Impulse	0.381	0.436	0.368	0.832
Aware	0.050*	0.060*	0.214	0.380
Strategies	0.370	0.390	0.293	0.873
Clarity	0.303	0.358	0.291	0.691

IAT: Internet Addiction Test, DES: Dissociative Experiences Scale, DES-I: Amnestic dissociation, DES-II: Absorption and imaginative involvement, DES-III: Depersonalization and derealization, CTQ-28: Childhood Trauma Questionnaire, DERS: Difficulties in Emotion Regulation Scale. *p>0.05, all the rest is p<0.001

Table 4: Predictors of severity of Internet addiction in linear regression (stepwise) analysis

Model		Unstandardized coefficients		Standardized coefficients		
		B	Std. Error	Beta	t	p
1a	CTQ-28	0.326	0.035	0.294	9.317	<0.001
1b	Emotional abuse	0.895	0.189	0.195	4.748	<0.001
	Physical neglect	0.769	0.214	0.147	3.588	<0.001
2a	Emotional abuse	0.428	0.183	0.093	2.342	0.019
	Physical neglect	0.315	0.206	0.060	1.528	0.127
	DES	0.392	0.036	0.365	10.903	<0.001
2b	Emotional abuse	0.440	0.182	0.096	2.423	0.016
	Physical neglect	0.165	0.220	0.032	0.752	0.452
	DES-I	0.280	0.049	0.263	5.728	<0.001
	DES-II	0.148	0.038	0.160	3.934	<0.001
3a	Emotional abuse	0.406	0.184	0.088	2.205	0.028
	Physical neglect	0.585	0.203	0.112	2.878	0.004
	DERS	0.263	0.025	0.340	10.583	<0.001
3b	Emotional abuse	0.321	0.184	0.070	1.742	0.082
	Physical neglect	0.684	0.204	0.131	3.348	0.001
	Strategies	0.348	0.106	0.142	3.285	0.001
	Impulse	0.518	0.138	0.164	3.757	<0.001
	Clarity	0.618	0.158	0.146	3.917	<0.001
	Aware	-0.378	0.132	-0.093	-2.857	0.004
4a	Emotional abuse	0.177	0.180	0.039	0.981	0.327
	Physical neglect	0.287	0.200	0.055	1.435	0.151
	DES	0.298	0.037	0.278	8.068	<0.001
	DERS	0.195	0.025	0.252	7.653	<0.001
4b	Emotional abuse	0.168	0.178	0.037	0.942	0.346
	Physical neglect	0.097	0.210	0.019	0.462	0.644
	DES-I	0.312	0.038	0.293	8.286	<0.001
	Strategies	0.326	0.102	0.134	3.192	0.001
	Impulse	0.507	0.153	0.120	3.321	0.001
	Clarity	0.350	0.134	0.111	2.600	0.009
	Aware	-0.327	0.128	-0.081	-2.558	0.011

CTQ-28: Childhood Trauma Questionnaire, DES: Dissociative Experiences Scale, DES-I: Amnestic dissociation, DES-II: Absorption and imaginative involvement, DES-III: Depersonalization and derealization, DERS: Difficulties in Emotion Regulation Scale, Model (1a) F=19.711, df=5, 914, p<0.001, Adjusted R2=0.092, Model (1b) F=49.268, df=2, 917, p<0.001, Adjusted R^2=0.095, Model (2a) F=76.693, df=3, 916, p<0.001, Adjusted R^2=0.198, Model (2b) F=60.935, df=4, 915, p<0.001, Adjusted R^2=0.207, Model (3a) F=74.152, df=3, 916, p<0.001, Adjusted R^2=0.193, Model (3b) F=40.675, df=6, 913, p<0.001, Adjusted R^2=0.206, Model (4a) F=75.777, df=4, 915, p<0.001, Adjusted R^2=0.246, Model (4b) F=47.257, df=7, 912, p<0.001, Adjusted R^2=0.261

DISCUSSION

The rate of high IA risk was 12.4% in the present study, which was consistent with previous studies that considered IA dichotomously (IA present or absent) in analyses and found rates ranging from 7.2 to 12.3 among university students in Turkey (1,3-5). The main finding of the present study, which is also consistent with our hypothesis, was that severity of childhood

trauma and IA symptoms were related, and severity of dissociative experiences (particularly amnestic dissociation [DES-I]) and emotion dysregulation (particularly strategies, impulse, clarity and aware subscales) mediated this relationship. This finding is consistent with previous studies that found both emotion dysregulation and dissociation to be significant mediators between childhood trauma and eating psychopathology (50), internalized and externalized

behavior problems (51), and gambling severity (11). This may suggest that young adults with high dissociative experiences and emotional dysregulation, may enjoy using the Internet, which may offer them immediate pleasure to regulate negative emotions.

Severity of childhood trauma and severity of different trauma types were all higher among those with high IA risk. Although severity of childhood trauma was related with the severity of IA symptoms in regression analysis, subsequent analysis revealed that among different forms of childhood trauma, particularly emotional abuse and physical neglect dimensions are related to the severity of IA symptoms. This may suggest that instead of particularly focusing on physical and sexual abuse, it is important to evaluate all forms of childhood trauma when considering IA (5). This is important because, directly or indirectly, childhood traumas can contribute to the formation of other psychopathologies such as dissociative experiences or disorders (16,18,64-66) and behavioral addictions such as gambling (10,11), IGD (12) and IA (5,13-15), with emotional dysregulation being a core feature that may help account for this heightened risk (21).

In a previous study, physical abuse was reported to be a possible risk factor for IA among Chinese students (14). Nevertheless, causal relationships between physical abuse and IA may be in a reverse sequence in this study. In the present study, one of the two main forms of childhood trauma that was related to severity of IA was emotional abuse. Consistent with this finding, a previous study conducted in Europe revealed that adolescents lacking emotional and psychological support had the highest risk for IA (2). In addition, emotional abuse was found to be a possible risk factor for IA among Turkish university students (5). Supporting these findings, Gladstone et al. (67) pointed out that the significance of emotional abuse as an important development factor was linked with adulthood problems in self-definition and self-worth. The results of previous studies showed that lower family functioning was related with IA (68), whereas a warm family atmosphere was found to be a protective factor against IA among college students (69). Furthermore, early emotional abuse may be related to personality dimensions associated with poor impulse control and interpersonal relationships and may increase the risk of emotional and cognitive problems (70) and vulnerability to severe addiction (71).

Consistent with previous studies (4,5,19,20), severity of dissociative experiences, which is suggested to be a maladaptive strategy to alleviate painful emotions in students (72), were related to severity of IA in the present study. Students with negative emotions may use both dissociation (72) and/or the Internet (73-75) to relieve these emotions both internally and externally. That is, dissociation may (at least theoretically) be associated with unique characteristics of Internet use (e.g., anonymity) (4). Thus the Internet may provide an appropriate place for students with severe childhood trauma to dissociate from, and in other words manage, their negative emotions. Findings from the present study may suggest that dissociative experiences among persons with high IA risk may represent pathological dissociation directly related with childhood trauma or a possible psychological defense mechanism that university students with severe childhood trauma frequently use against internal or external stress. Nevertheless, the cross-sectional design of the present study makes it difficult to interpret the findings.

Our findings that individuals with Internet or online social network addiction were more likely to report problems with emotion regulation are consistent with the literature (34,35,38,46-49). The reason for these findings may be that use of the Internet might serve as an emotion-regulating function for young adults with emotion dysregulation (73-75), by helping them distract from negative emotions or regulate feelings of loneliness, further increasing their likelihood of having IA (49). It was further suggested that emotion dysregulation might be more powerful in driving symptoms of IA compared to negative emotionality (46). The finding that emotion dysregulation is a significant determinant of IA provides important implications that IA could be prevented by providing training to improve young adults' emotion regulation skills. Training in emotion regulation has been included as an important component in various therapeutic approaches, such as emotion-focused therapy (76), acceptance- and mindfulness-based therapy (77), and emotion regulation therapy (23).

There are several limitations of the present study that should be noted. First of all, participants were non-clinical volunteers and all scales were self-rated. Secondly, we did not screen for common comorbidities such as impulse control disorders and gambling disorder, which may be considered as a limitation. Third, because of the shortcoming of the sociodemographic form, which included only information of marital status, gender, and age, detailed information about significant variables, such as previous diagnoses, consumption of any medicines, and substance abuse could not be provided. Finally, since this study is cross-sectional, the findings cannot address the causal relationships among the

primary constructs of interest.

To conclude, the present study supported previous findings demonstrating that the severity of childhood trauma, particularly emotional abuse and physical neglect dimensions, and severity of IA symptoms are associated in Turkish young adults (5). As suggested by previous studies that evaluated childhood trauma in different populations (11,50,51) and a population similar to ours (5), the present study indicates that multiple forms of childhood trauma should be assessed for individuals with pathological Internet use. We also found that severity of dissociative experiences and emotion dysregulation may have partial mediating effects on this relationship. This finding suggests that these considerations are important in understanding the pathophysiology of the relationship between childhood trauma and IA, but at the same time they might offer potential treatment targets. The present study may suggest that in order to tackle IA among young adults, clinicians need to address childhood trauma, dissociative experiences, and emotion regulation competencies, which are potentially important components to be considered in IA intervention programs for reducing IA.

Contribution Categories		Author Initials
Category 1	Concept/Design	C.E., B.E., E.D., J.D.E.
	Data acquisition	M.T., N.K.
	Data analysis/Interpretation	C.E.
Category 2	Drafting manuscript	C.E., B.E., E.D.
	Critical revision of manuscript	C.E.
Category 3	Final approval and accountability	C.E., B.E., E.D., M.T., N.K. J.D.E.
Other	Technical or material support	C.E.
	Supervision	C.E., J.D.E.

Ethics Committee Approval: The study protocol was approved by the Ethics Committee of Cankaya University (Turkey).

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