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## The relationship of internet addiction symptom severity with posttraumatic stress disorder symptoms and impulsivity among Turkish university students

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### ABSTRACT

**OBJECTIVES:** The first aim of this study was to investigate the relationship of impulsivity with Internet addiction symptom severity (IASS), and the second aim was to evaluate the mediator effect of posttraumatic stress disorder (PTSD) symptoms on this relationship among Turkish university students.

**METHODS:** A total of 314 Turkish university students participated in this study. However, 268 students who answered “YES” to the any question concerning various traumatic experiences were included in the study. The students were assessed through sociodemographic questionnaire, the Internet Addiction Scale (IAS), the Posttraumatic Stress Disorder Checklist – Civilian Version (PCL-C) and the Barratt Impulsiveness Scale 11 – Short Form (BIS-11-SF).

**RESULTS:** According to Internet addiction risk severity (IARS), the participants were classified into the three groups as high (25.0%,  $n = 67$ ), mild (33.6%,  $n = 90$ ), and no risk (41.4%,  $n = 111$ ) of IA. Total score of BIS-11-SF and subscale scores (non-planning impulsivity [NPI], motor impulsivity [MI], and attention impulsivity [AI]) were higher in the group with high IARS. Scale scores were mildly correlated with each other. Finally, hierarchical regression analysis indicated that severity of MI, AI, and PTSD symptoms, especially hyperarousal symptoms, were the main predictors for IASS.

**CONCLUSIONS:** There was strong relationship between impulsivity and IASS and this relationship persist even after severity of PTSD symptoms was entered in the analysis among Turkish university students. Severity of PTSD symptoms especially hyperarousal symptoms, may partially mediate the relationship between severity of impulsivity (especially MI and AI) and IASS.

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### KEYWORDS

Hyperarousal; impulsivity; internet addiction; posttraumatic stress disorder; university students

### Objective

Classes of behaviours having hedonic qualities (at least initially) including gambling, shopping, sexual behaviours, Internet use and gaming in the Internet may lead to compulsive engagement among a minority of individuals [1]. The Internet has in recent years become ubiquitous in the lives of young persons and children due to rapid information technology development, high-speed wire connection, easy accessibility, and increasing affordability [2]. Internet use, especially among young adults, is very common all around the world, especially for academic and recreational purposes [3]. On the other hand, excessive internet use or in other word Internet addiction (IA) that is being discussed as a behavioural addiction [4]. Today, the phenomenon has been called under different names such as problematic or pathological Internet use, and last but not least IA [5], which is a term that was preferred in previous studies

conducted with university students in Turkey [3,6–8]. Young [9] described eight common signs of IA which are based largely on the Diagnostic and Statistical Manual of Mental Disorders, Fourth Edition (DSM-IV) [10] criteria for pathological gambling. The common features include preoccupation with the target activity, development of tolerance and withdrawal symptoms, compulsive need to engage in activity or a sense of loss of control, unsuccessful attempts to stop or cut down, and neglect of social, academic and occupational obligations with functional impairment.

Previous studies revealed the rates of IA ranging from 2.4 to 37.9% in Asia and from 3.1 to 18.3% in Europe [11]. The rate of IA was ranging from 7.2 to 12.3 among Turkish university students [6,12]. It was suggested that when Internet use becomes excessive and pathological for university students, there could be ill-health effects on them such as impaired psychological well-being, impairments in daily functioning,

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emotional stability, less peer and family interaction, poor academic performance, and psychological symptoms [3,5–8].

The impulsivity has been defined as a predisposition towards unplanned reactions towards internal or external stimuli without regarding the negative consequences of the action [13]. Research in behavioural addictions has mostly focused on impulsive action, finding this to be elevated versus controls, similar to that seen in chronic substance use disorders (SUD) [14]. Previous studies suggested that impulsivity [7] and hyperactivity/impulsivity symptoms of attention-deficit hyperactivity disorder [3] were main predictors of IA risk severity (IARS) among Turkish university students. Moreover, Dalbudak et al. [7] suggested that although severity of IA is associated with wide range of psychopathology, particularly severity of obsessive-compulsive symptoms, interpersonal sensitivity seems to be the main dimension that predict severity of IARS additional to impulsiveness (attentional and motor) and impulsivity seems to be an important construct when considering IA and its treatment among Turkish university students. It was also suggested that the impulsivity is more common in particular psychiatric disorders [15] such as posttraumatic stress disorder (PTSD) [16]. Not only chemical addictions [15,17,18], but also behavioural addictions such as gambling [19] and IA [7,20,21] was found to be related with impulsivity. Moreover, Lee et al. [22] suggested that the trait impulsivity could be a marker for vulnerability to IA. Nevertheless, impulsivity may be coping efforts with negative feelings such as PTSD symptoms [16], which may in return results with the excessive use of the Internet.

Traumatic experiences may cause psychiatric disorder such as depression, anxiety disorders, PTSD, and last but not least SUD [23,24]. PTSD is a serious and often chronic response to overwhelmingly stressful events [25] and according to Epidemiology of DSM-5 Drug Use Disorder study [26], PTSD symptoms is also related with 12-month and lifetime SUD. Furthermore, PTSD symptoms are not only related with SUD, but they are also related with behavioural addictions such as gambling [27] and problematic smartphone [28]. People with PTSD may be at risk for behavioural addictions as a means of coping with their symptoms [28]. Moreover, Bailin et al. [29] suggested that the increase in the usage of the Internet and social media sites now makes it easier for a student to bully a peer, and adolescents represent the majority of cyber bullying victims. Also, previous studies have shown that individuals may be more vulnerable to PTSD symptoms if they suffer from addictive problems [30,31], and individuals with addictive characteristics, are at higher risk for PTSD [32]. Consistent with this,

study conducted in South Korea, 1–2.5 months after a disaster, among students who were exposed to the disaster or witnessing the rescue work directly, suggested that IA was significantly and independently associated with a high level of PTSD symptoms [33]. Therefore, excessive Internet use or in other words IA may cause traumatic experience or young adults with traumatic experience may be using the Internet excessively to get rid of stress.

As far as we know, there is no study that evaluates the association between impulsivity and IA symptom severity (IASS), while also evaluating the mediator role of PTSD symptoms. Therefore, the first aim of this study was to investigate the relationship of impulsivity with IASS, and the second aim is to evaluate the mediator effect of PTSD symptoms on this relationship among Turkish university students. We hypothesized that impulsivity and IASS may be related and the severity of PTSD symptoms may have a mediating role on this relationship.

## Method

### Design

The study was conducted with volunteered university students from all departments of Turgut Ozal University by cross-sectional, online, self-report survey. A website was prepared for online participation. The online survey was created using Qualtrics. Approval from the Ethical Committee of the Turgut Ozal University was taken. The institutional review board (IRB) approval date was October 17 2014 and the number was 99950669-325.

After reading the Plain Language Information Statement, informed consent was obtained from all participants. Participants who agreed to participate in the study did not receive any incentives for participation or were not rewarded with bonus credit. Furthermore, participants were informed that they would not be penalized for not wanting to participate and/or abandoning the study once they have started. Overall, the data collection stage spanned from November to December in 2014.

### Participants

A total of 375 potential participants initiated the online survey and they all gave informed consent. Among these, 61 participants did not complete the rest of the survey, thus they were removed from the present study and total of 314 participants were evaluated. However, among these participants only 268 students who answered “YES” to the any questions about various traumatic experiences were included in the present study.

## Measures

### Sociodemographic form

The students were assessed through sociodemographic questionnaire.

### Internet addiction scale (IAS)

IAS was developed by Nichols and Nicki [34] to measure the severity of IA and tested on a group of 233 college students. The Cronbach's  $\alpha$  of the IAS was 0.95, and the explained variance was 46.50%. The IAS is scored by summing the Likert responses across the 31 items. In a reliability and validity study of the Turkish version of the IAS [12], Durkee et al. [11] suggested that to better reflect the taxonomy of Internet users, IA should be assessed as a non-dichotomous categorical variable. Thus, in the present study, the participants were separated into three groups according to IARS score, namely, high risk of IA (IA or high-risk group with cut-off score of 81), mild risk of IA (score ranging between 61 and 80), and group without IA risk (score ranging between 30 and 60). This grouping was also similarly computed in our previous studies [6,7]. Cronbach's  $\alpha$  coefficient was found to be 0.96 in the present study.

### Barratt impulsiveness scale 11 – short form (BIS-11-SF)

The BIS-11-SF is a 15-item, self-report questionnaire which was designed to measure impulsiveness. It was suggested that three factors were determined: attentional impulsiveness (AI), motor impulsiveness (MI), and non-planning impulsiveness (NPI) [35]. In the present study, the Turkish version of BIS-11-SF was used to examine impulsivity [36]. Cronbach's  $\alpha$  coefficient was found to be 0.84 for the BIS-11-SF, whereas for AI it was 0.77, for MI it was 0.69, and for NPI it was 0.78 in the present study.

### The PTSD Checklist Civilian (PCL-C) version

The PCL-C version [37] is one of the most commonly used self-report measures of PTSD [37,38]. The 17 Likert items correspond to diagnostic criteria B, C, and D for PTSD, as delineated in the DSM-IV [10]. Respondents are asked to rate the degree to which they were bothered by symptoms in the past month (1 [not at all] to 5 [extremely]). The PCL-C version anchors items to "stressful experiences" [39]. Turkish version of this scale is validated [40]. Cronbach's  $\alpha$  coefficient was found to be 0.90 for the PCL-C, whereas for re-experiencing it was 0.85, for avoidance it was 0.80, and for hyperarousal it was 0.78 in the present study.

### Statistical analysis

The statistical package SPSS 20.0 for Windows (SPSS, 278 Chicago, IL, U.S.A.) was used for all analyses.

Measurement variables were evaluated with the Histogram and the one-sample Kolmogorov–Smirnov test and found to be normally distributed. According to IARS, the participants were classified into the three groups according to IA risk severity (IARS) as high, mild, and without IA risk and one-way ANOVA (Analysis of Variance) was conducted. Pearson correlation was used to evaluate correlations between scale and subscale scores. Lastly, hierarchical linear regression analysis was used to determine the predictors of IASS. Evaluating both zero-order and partial correlations and variance inflation factor in linear regression model suggested no multicollinearity. Three dimensions of BIS-11-SF were taken as independent variables in the first step, whereas total score of PCL-C was taken as independent variables in step 2a and subscales of PCL-C instead of total score of PCL-C was taken as independent variables in step 2b.

## Results

According to IARS, the participants were classified into the three groups as risk of high, mild, and without IA. IA groups were 25.0% ( $n = 67$ ), 33.6% ( $n = 90$ ), and 41.4% ( $n = 111$ ), respectively (Table 1). Total score of BIS-11-SF and subscale scores of NPI, MI, and AI were higher in the group with high IARS (Table 1). Similarly, total mean score of PCL-C and subscales of avoidance, re-experiencing, and hyperarousal were higher in the group with high IARS (Table 1). Scale scores were mildly correlated with each other (Table 2). Lastly, the hierarchical regression analysis indicated that severity of MI, AI, and PTSD symptoms, particularly hyperarousal dimension of PTSD, were the predictors for IASS (Table 3).

## Discussion

Consistent with our first hypothesis and previous study [7], the main finding of the present study was that impulsivity, particularly MI and AI, has strong relationship with IASS among Turkish university students. Also partially consistent with our second hypothesis, PTSD symptom severity, particularly severity of hyperarousal dimension, had a partial mediator effect on this relationship between impulsivity and IASS. There may be different possible explanations for this relationship. As students with negative emotions, such as anxiety and/or depression may be using the Internet to relieve these emotions [3,41,42], individuals with severe PTSD symptoms may be engaged in Internet use to calm themselves. Thus, excessive use of the Internet may be coping efforts with negative feelings such as PTSD symptoms in the name of self-medication. On the other hand, excessive use of the Internet may be the cause of PTSD [28] and also PTSD symptoms may be triggered by the images and sounds, that vulnerable individual

**Table 1.** Comparing age, gender, scale, and subscale scores according to the risk severity of internet addiction evaluated with Internet Addiction Scale.

	Without IA		Mild risk of IA		High risk of IA		<i>F</i>	<i>p</i>
	<i>n</i> = 111 (41.4%)		<i>n</i> = 90 (33.6%)		<i>n</i> = 67 (25.0%)			
	Mean	SD	Mean	SD	Mean	SD		
Age	23.96	5.14	23.42	2.68	24.09	3.46	0.654	.521
Gender							$\chi^2 = 0.847$	.655
Female	61	55.0	54	60.0	41	61.2		
Male	50	45.0	36	40.0	26	38.8		
Non-planning impulsivity <sup>a</sup>	9.51	3.14	10.56	2.82	11.21	2.94	7.36	.001
Motor impulsivity <sup>a</sup>	8.61	2.23	9.81	2.62	10.49	2.50	13.72	<.001
Attention impulsivity <sup>a</sup>	8.10	2.20	9.33	2.75	10.03	2.51	14.00	<.001
BIS-11-SF <sup>a</sup>	26.22	5.94	29.70	6.63	31.73	6.35	17.61	<.001
Re-experiencing <sup>b</sup>	9.38	3.82	10.09	3.65	11.60	4.06	7.05	.001
Avoidance <sup>a</sup>	14.44	5.17	16.54	4.71	18.15	5.24	11.91	<.001
Hyperarousal <sup>c</sup>	10.62	3.85	12.62	3.81	14.12	3.82	18.39	<.001
PCL-C <sup>c</sup>	34.44	11.36	39.26	9.96	43.87	11.34	16.01	<.001

Notes: IA: Internet addiction; PCL-C: Posttraumatic Stress Disorder Checklist – Civilian Version.

<sup>a</sup>High risk of IA, mild risk of IA > without IA,

<sup>b</sup>High risk of IA > mild risk of IA, without IA,

<sup>c</sup>High risk of IA > mild risk of IA > without IA.

sees or hears in the Internet, which may be related with their trauma. As a result, the relationship between PTSD symptoms and IASS can be bi-directional. Unfortunately, because of the cross-sectional design, it was not possible to make conclusive statements about the temporal order between the measures of PTSD symptoms and IASS.

Previous study that evaluated the relationship between PTSD symptoms and suggested that problematic smartphone use is most associated with negative affect and arousal among trauma-exposed individuals rather than avoidance [27]. Consistent with this, among dimensions of PTSD only hyperarousal symptoms, which was also suggested to be related with impulsivity in a previous study [43], predicted the severity of IASS in the present study. Thus, young adults who have severe PTSD symptoms, especially hyperarousal symptoms, may be using the Internet as a form of self-treatment. Some symptoms such as excessive alertness, aggressive behaviour, recklessness, sleep disturbances, safety behaviour, and jumpiness may be more important than other symptoms for IASS among university students.

Consistent with previous studies, there is a relationship between IASS and impulsivity [7,19,21], which can be considered as an endophenotype of addictive behaviours [44]. Finding high levels of trait impulsivity among those suffering from IA even higher than those

with pathological gambling, Lee et al. [21] suggested that the trait impulsivity could be a marker for vulnerability to IA. Previous study suggested that dysfunction of brain areas that are involved in the behaviour inhibition, attention, and emotion regulation might contribute to impulse control problems in adolescents with Internet gaming disorder [45]. Related with this, by recording event-related brain potentials during a Go/NoGo task, university students with IA showed disturbed response inhibition when compared with normal university students. In addition, these students showed less efficiency in information processing and lower impulse control than their normal peers [46]. It is known that the impulsivity is a risk factor not only for high IASS [7] but also for severity of PTSD symptoms [15,43]. Although all three dimensions of impulsivity were higher among those with high IARS, particularly motor and attentional impulsivities, which are considered as over eagerness, inattention and cognitive dysregulation, predicted the IASS. We speculated that university students with over eagerness may be using the Internet excessively since the Internet may allow easier and faster access and they also may be able to open multiple different windows and applications at the same time. Moreover, previous study suggested that impulsivity aims at coping with distressing anger, possibly explaining the presence of substance usage, and other impulsive behaviours in

**Table 2.** Pearson correlation coefficients between scale and subscale scores.

	MI	AI	NPI	BIS-11-SF	RE	Av.	HA	PCL-C
Attention impulsivity (AI)	0.601							
Non-planning impulsivity (NPI)	0.312	0.571						
BIS-11-SF	0.759	0.881	0.800					
Re-experiencing (RE)	0.209*	0.149**	0.032***	0.152**				
Avoidance (Av.)	0.319	0.286	0.180*	0.316	0.617			
Hyperarousal (HA)	0.358	0.276	0.128**	0.303	0.545	0.709		
PCL-C	0.343	0.278	0.138	0.303	0.814	0.917	0.863	
Internet Addiction Scale	0.344	0.322	0.211	0.353	0.243	0.335	0.365	0.364

Note: MI: motor impulsivity.

\* $p < .01$ , \*\* $p < .05$ , \*\*\* $p > .05$  and the rest is  $p < .001$ .



**Table 3.** Predictors of Internet Addiction Scale (IAS) score according to hierarchical linear regression model.

		Unstandardized coefficients		Standardized coefficients		<i>t</i>	<i>P</i>	95.0% confidence interval for <i>B</i>	
		<i>B</i>	Std. error	Beta				Lower bound	Upper bound
Step 1	Motor impulsivity	1.902	0.578	0.235		3.293	0.001	0.765	3.039
	Attention impulsivity	1.438	0.567	0.181		2.535	0.012	0.321	2.554
Step 2a	Motor impulsivity	1.306	0.573	0.161		2.281	0.023	0.179	2.434
	Attention impulsivity	1.199	0.550	0.151		2.180	0.030	0.116	2.281
Step 2b	PCL-C	0.478	0.105	0.267		4.537	<0.001	0.271	0.685
	Motor impulsivity	1.251	0.576	0.154		2.172	0.031	0.117	2.385
	Attention impulsivity	1.237	0.549	0.156		2.252	0.025	0.156	2.319
	Hyperarousal	1.350	0.299	0.267		4.512	<0.001	0.761	1.939

Notes: PCL-C: Posttraumatic Stress Disorder Checklist – Civilian Version. Variables entered in the first step: Subscales of BIS-11-SF. Step 1:  $F = 21.386$ ,  $df = 2, 265$ ,  $p < .001$  and Adjusted  $R^2 = 0.132$ . Variables entered in second step 2a: Subscales of BIS-11-SF and total score of PCL. Step 2a:  $F = 22.171$ ,  $df = 3, 264$ ,  $p < .001$  and Adjusted  $R^2 = 0.192$ . Variables entered in second step 2b: Subscales of BIS-11-SF and PCL. Step 2b:  $F = 22.084$ ,  $df = 3, 264$ ,  $p < 0.001$ , and Adjusted  $R^2 = 0.192$ .

people with PTSD [15]. Higher impulsivity can be a risk factor for trauma, whereas impulsive behaviour may also be coping mechanism with symptoms of PTSD [15]. Contractor et al. [15] suggested that sensation-seeking tendencies are primarily driving the comorbidity between PTSD and certain impulsive behaviours. Consistent with this, sensation-seeking [8] and impulsivity [7] were predictors of IASS among university students. Thus, one of the limitations of the present study may be that we did not evaluate sensation-seeking, which may be related with subjects of interest. Similarly the personality traits of positive and negative urgency, which refer to the tendencies to act rashly when experiencing unusually positive or negative emotions, respectively, were not evaluated. Empirical findings indicate that the urgency traits are particularly important predictors of the onset of, and increases in, substance use in young adults [47], thus they may also be related with behavioural addictions, such as high IASS.

The present study has some limitations. First of all, because all participants were self-selected, generalization of the present findings to the general population cannot be directly made. Also, participants included in the present study do not represent the whole university students in Turkey and all the scales used were self-rated. Thus, PCL-C used in the present study may only indicate the individuals with high risk of PTSD rather than the diagnosis of PTSD. Second, PCL-C corresponds directly to DSM-IV, which may also be considered as a limitation. Moreover, since this study was cross-sectional the findings of this study cannot address the causal relationships among the primary constructs of interest.

Nevertheless, this is the first study to directly evaluate the relationship of impulsivity with IASS, while also considering the mediator effect of PTSD symptom severity on this relationship. At a minimum, these findings suggest that in order to better understand the characteristics of IASS, clinicians must carefully evaluate the severity of PTSD symptoms and impulsivity. Implications also include the need to clinically assess IA among trauma-exposed individuals

presenting with hyperarousal; and targeting impulsivity and hyperarousal symptoms to mitigate the effects of IA. Furthermore, replication studies need to be conducted particularly among clinic populations.

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The study was conducted according to the WMA Declaration of Helsinki – Ethical Principles for Medical Research Involving Human Subjects. The study was approved by the Ethical Committee of the institution. All participants gave their verbal and written informed consent.

## Disclosure statement

No potential conflict of interest was reported by the authors.

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## References

- [1] Leeman RF, Potenza MN. A targeted review of the neurobiology and genetics of behavioural addictions: an emerging area of research. *Can J Psychiatry*. 2013;58(5):260–273.
- [2] Ong SH, Tan YR. Internet addiction in young people. *Ann Acad Med Singapore*. 2014;43(7):378–382.
- [3] Dalbudak E, Evren C. The relationship of internet addiction severity with attention deficit hyperactivity disorder symptoms in Turkish university students; impact of personality traits, depression and anxiety. *Compr Psychiatry*. 2014;55(3):497–503.
- [4] Holden C. 'Behavioral' addictions: do they exist? *Science*. 2001;294(5544):980–982.
- [5] Ko CH, Yen JY, Yen CF, et al. The association between internet addiction and psychiatric disorder: a review of the literature. *Eur Psychiatry*. 2012;27(1):1–8.
- [6] Dalbudak E, Evren C, Aldemir S, et al. Relationship of internet addiction severity with depression, anxiety, and alexithymia, temperament and character in university students. *Cyberpsychol Behav Soc Netw*. 2013;16(4):272–278.

- [7] Dalbudak E, Evren C, Topcu M, et al. Relationship of internet addiction with impulsivity and severity of psychopathology among Turkish university students. *Psychiatry Res.* 2013;210(3):1086–1091.
- [8] Dalbudak E, Evren C, Aldemir S, et al. The impact of sensation seeking on the relationship between attention deficit/hyperactivity symptoms and severity of internet addiction risk. *Psychiatry Res.* 2015;228(1):156–161.
- [9] Young KS. Psychology of computer use: XL. Addictive use of the internet: a case that breaks the stereotype. *Psychol Rep.* 1996;79:899–902.
- [10] American Psychiatric Association. Diagnostic and Statistical Manual of Mental Disorders (DSM-IV-TR). 4th ed. Washington, DC: American Psychiatric Press; 2000.
- [11] Durkee T, Kaess M, Carli V, et al. Prevalence of pathological internet use among adolescents in Europe: demographic and social factors. *Addiction.* 2012;107(12):2210–2222.
- [12] Kayri M, Gunuc S. The adaptation of internet addiction scale into Turkish: The study of validity and reliability. Ankara university. *J Fac Educ Sci.* 2009;42:157–175.
- [13] Moeller FG, Barratt ES, Dougherty DM, et al. Psychiatric aspects of impulsivity. *Am J Psychiatry.* 2009;158(11):1783–1793.
- [14] Grant JE, Chamberlain SR. Impulsive action and impulsive choice across substance and behavioral addictions: cause or consequence? *Addict Behav.* 2014;39(11):1632–1639.
- [15] Hollander E, Evers M. New developments in impulsivity. *Lancet.* 2001;358(9286):949–950.
- [16] Contractor AA, Armour C, Forbes D, et al. Posttraumatic stress disorder's underlying dimensions and their relation with impulsivity facets. *J Nerv Ment Dis.* 2016;204(1):20–25.
- [17] Evren C, Durkaya M, Evren B, et al. Relationship of relapse with impulsivity, novelty seeking and craving in male alcohol dependent inpatients. *Drug Alcohol Rev.* 2012;31(1):81–90.
- [18] Evren C, Alniak I, Karabulut V, et al. Relationship of probable attention deficit hyperactivity disorder with severity of psychopathology and impulsivity in a sample of male patients with opioid Use disorder. *Psychiatry Investig.* 2017;15(2):164–171.
- [19] Lai FD, Ip AK, Lee TM. Impulsivity and pathological gambling: Is it a state or a trait problem? *BMC Res Notes.* 2011;4(1):492.
- [20] Cao F, Su L, Liu T, et al. The relationship between impulsivity and internet addiction in a sample of Chinese adolescents. *Eur Psychiatry.* 2007;22(7):466–471.
- [21] Mazhari S. Association between problematic internet use and impulse control disorders among Iranian university students. *Cyberpsychol Behav Soc Netw.* 2012;15(5):270–273.
- [22] Lee HW, Choi JS, Shin YC, et al. Impulsivity in internet addiction: a comparison with pathological gambling. *Cyberpsychol Behav Soc Netw.* 2012;15(7):373–377.
- [23] Dalbudak E, Evren C, Çetin T, et al. History of trauma and relationship with alexithymia, temperament and character dimensions in male alcohol dependent inpatients. *Dusunen Adam: J Psychiatry Neurol Sci.* 2010;23(1):1–12.
- [24] Schäfer I, Barnow S, Pawils S. Substance use disorders as a cause and consequence of childhood abuse. basic research, therapy and prevention in the BMBF-funded CANSAS-network. *Bundesgesundheitsblatt Gesundheitsforschung Gesundheitsschutz.* 2016;59(1):35–43.
- [25] Kimerling R, Ouimette P, Prins A, et al. BRIEF REPORT: utility of a short screening scale for DSM-IV PTSD in primary care. *J Gen Intern Med.* 2006;21(1):65–67.
- [26] Grant BF, Saha TD, Ruan WJ, et al. Epidemiology of DSM-5 drug use disorder: results from the national epidemiologic survey on alcohol and related conditions–III. *JAMA Psychiatry.* 2016;73(1):39–47.
- [27] Boldrini MP, Caselli G, Spada MM. Post-Traumatic stress disorder, problem gambling and metacognition. *Int J Multidiscipl Trauma Stud.* 2016;10(1):90–99.
- [28] Contractor AA, Frankfurt SB, Weiss NH, et al. Latent-level relations between DSM-5 PTSD symptom clusters and problematic smartphone use. *Comput Human Behav.* 2017;72:170–177.
- [29] Bailin A, Milanaik R, Adesman A. Health implications of new age technologies for adolescents: a review of the research. *Curr Opin Pediatr.* 2014;26(5):605–619.
- [30] Koenen KC. Developmental epidemiology of PTSD: self-regulation as a central mechanism. *Ann N Y Acad Sci.* 2006;1071:255–266.
- [31] Orr SP, Lasko NB, Macklin ML, et al. Predicting post-trauma stress symptoms from pre-trauma psychophysiology reactivity, personality traits and measures of psychopathology. *Biol Mood Anxiety Disord.* 2012;18:8.
- [32] Jacobsen LK, Southwick SM, Kosten TR. Substance use disorders in patients with posttraumatic stress disorder: a review of the literature. *Am J Psychiatry.* 2001;158:1184–1190.
- [33] Lee JY, Kim SW, Kang HJ, et al. Relationship between problematic internet use and post-traumatic stress disorder symptoms among students following the seoul ferry disaster in South Korea. *Psychiatry Investig.* 2017;14(6):871–875.
- [34] Nichols LA, Nicki R. Development of a psychometrically sound internet addiction scale: A preliminary step. *Psychol Addict Behav.* 2004;18(4):381–384.
- [35] Patton JH, Stanford MS, Barratt ES. Factor structure of the Barratt impulsiveness scale. *J Clin Psychol.* 1995;51(6):768–774.
- [36] Tamam L, Gulec H, Karatas G. Short form of barratt impulsiveness scale (BIS-11-SF) Turkish adaptation study. *Noro Psikiyatr Ars.* 2013;50(2):130–134.
- [37] Weathers FW, Litz BT, Herman DS, et al. The PTSD Checklist (PCL): reliability, validity, and diagnostic utility. In Annual convention of the international society for traumatic stress studies, San Antonio, TX (Vol. 462), 1993.
- [38] Elhai JD, Gray MJ, Kashdan TB, et al. Which instruments are most commonly used to assess traumatic event exposure and posttraumatic effects?: A survey of traumatic stress professionals. *J Trauma Stress.* 2005;18(5):541–545.
- [39] Weathers FW, Litz BT, Herman D, et al. The PTSD checklist-civilian version (PCL-C). Boston, MA: National Center for PTSD; 1994.
- [40] Kocabasoglu N, Ozdemir AC, Yargic I, et al. The validity and safety of Turkish “PTSD Checklist - Civilian Version” (PCL-C) Scale. *New Symposium.* 2005;43(3):126–134. (Turkish).
- [41] Gross EF, Juvonen J, Gable SL. Internet use and well-being in adolescence. *J Soc Issues.* 2002;58(1):75–90.
- [42] Selfhout MH, Branje SJ, Delsing M, et al. Different types of internet use, depression, and social anxiety:

- the role of perceived friendship quality. *J Adolesc.* [2009](#);32(4):819–833.
- [43] Armour C, Contractor A, Shea T, et al. Factor structure of the PTSD checklist for DSM-5: relationships among symptom clusters, anger, and impulsivity. *J Nerv Ment Dis.* [2016](#);204(2):108–115.
- [44] Verdejo-García A, Lawrence AJ, Clark L. Impulsivity as a vulnerability marker for substance-use disorders: review of findings from high-risk research, problem gamblers and genetic association studies. *Neurosci Biobehav Rev.* [2008](#);32(4):777–810.
- [45] Du X, Qi X, Yang Y, et al. Altered structural correlates of impulsivity in adolescents with internet gaming disorder. *Front Hum Neurosci.* [2016](#);10:4.
- [46] Dong G, Zhou H, Zhao X. Impulse inhibition in people with internet addiction disorder: electrophysiological evidence from a Go/NoGo study. *Neurosci Lett.* [2010](#);485(2):138–142.
- [47] Smith GT, Syders MA. Integrating affect and impulsivity: the role of positive and negative urgency in substance use risk. *Drug Alcohol Depend.* [2016](#);163 (Suppl. 1):3–12.