

# DÜŞÜNEN ADAM

The Journal of Psychiatry and Neurological Sciences



## Author's Accepted Manuscript

Relationship of Internet gaming disorder symptom severity with non-suicidal self-injury among young adults

Cuneyt Evren, Bilge Evren, Ercan Dalbudak, Merve Topc, Nilay Kutlu

To appear in: *Dusunen Adam The Journal of Psychiatry and Neurological Sciences*

DOI: 10.14744/DAJPNS.2019.00063

Cite this article as: Cuneyt Evren, Bilge Evren, Ercan Dalbudak, Merve Topc, Nilay Kutlu.

Relationship of Internet gaming disorder symptom severity with non-suicidal self-injury among young adults, *Dusunen Adam The Journal of Psychiatry and Neurological Sciences*, DOI:

10.14744/DAJPNS.2019.00063

This is a PDF file of an unedited manuscript that has been accepted by the *Dusunen Adam The Journal of Psychiatry and Neurological Sciences* editor for publication. As a service to our researchers we are providing this early version of the manuscript. The manuscript will undergo copyediting, typesetting, and review of the resulting galley proof before it is published in its final citable version. Please note that during the production process, typos or errors may be discovered which could affect the content, and all legal disclaimers pertaining to the manuscript.

Cuneyt Evren<sup>1\*</sup>, Bilge Evren<sup>2</sup>, Ercan Dalbudak<sup>3</sup>, Merve Topcu<sup>4</sup>, Nilay Kutlu<sup>2</sup>,

<sup>1</sup>Research, Treatment and Training Center for Alcohol and Substance Dependence (AMATEM), Bakirkoy Training and Research Hospital for Psychiatry Neurology and Neurosurgery, Istanbul, Turkey

<sup>2</sup>Department of Psychiatry, Baltalimani State Hospital for Muskuloskeletal Disorders, Istanbul, Turkey

<sup>3</sup>Private Practice, Ankara, Turkey

<sup>4</sup>Çankaya University Department of Psychology, Ankara, Turkey

**Sorumlu Yazar:**

Ercan Dalbudak, Private Practice, Ankara, Turkey

E-mail: edalbudak@hotmail.com

Tel: +90 (505) 647 86 16

## Relationship of Internet gaming disorder symptom severity with non-suicidal self-injury among young adults

### Abstract

**Aim:** The aim of the present study was to evaluate relationship of Internet gaming disorder (IGD) symptom severity with non-suicidal self-injury (NSSI), while controlling the effects of depression, anxiety and neuroticism among young adults.

**Method:** The present study was conducted as a cross-sectional online self-report survey. The data were collected from 1010 volunteered Turkish university students in Ankara, people who were in the e-mail database of a company located in Istanbul that organizes e-sports tournaments (ESL Turkey Amateur e-sport players), and Turkish gamers from gaming forums. Participants were evaluated by applying the Internet Gaming Disorder Scale – Short Form (IGDS-SF), neuroticism dimension of the Eysenck Personality Questionnaire Revised-Abbreviated Form (EPQR-A), the Beck Anxiety Inventory (BAI) and the Beck Depression Inventory (BDI).

**Results:** Age and gender did not differ between those with NSSI (n=207, 20.5%) and those without NSSI (n=803, 79.5%). IGDS9-SF, depression, anxiety and neuroticism scores were higher among those with NSSI. In logistic regression analysis, severity of IGD predicted the presence of NSSI, together with depression, anxiety and neuroticism.

**Conclusion:** These findings suggest that the severity of IGD is related with the presence of NSSI, together with depression, anxiety and neuroticism among young adults. Thus early detection and treatment of these risk factors is important for reduction of self-injurious behavior among young adults.

**Keywords:** Anxiety, depression, Internet gaming disorder, neuroticism, non-suicidal self-injury

## INTRODUCTION

Non-suicidal self-injury behavior (NSSI) is an act that is performed by oneself towards oneself, which is physically violent, intentional and purposeful, but not suicidal (1-3). NSSI typically starts in adolescence and involves numerous episodes and a variety of methods, including cutting, burning, slapping, banging, picking and bone breaking (4). Individuals with NSSI report a range of motivations, including self-punishment, tension reduction, improvement in mood and distraction from intolerable affects, all which might be at least a partial explanation for NSSI (2,5). The rate of NSSI was found as 21.4% among Turkish high-school students (6). Regardless of methods and motivations of self-injury, NSSI is a pervasive public health problem and it is clear that this behavior poses a severe threat to the safety and well-being of these individuals (7). Following decades of progressive increase in the incidence of NSSI among adolescents and young adults, as well as growing scientific interest, the disorder was listed as a condition for further study (Section III) in the Diagnostic and Statistical Manual of Mental Disorders, fifth edition (DSM-5) (8,9).

Social learning and imitation play an important role in the initiation of self-injurious behaviors, as seeing these behaviors in school, on television or on the Internet, is a risk factor for committing NSSI (9,10). Lam et al. (11) suggested that Internet addiction is detrimental to mental health and increases the risk of NSSI among adolescents. Consistent with this, internet addiction and internet exposure to suicidal thoughts were both significantly related to an increased risk of NSSI, after controlling for gender, family factors, exposure to suicidal thoughts in the real life, depression, alcohol/tobacco use, concurrent suicidality, and perceived social support (12). A systematic review suggested a relationship between internet use and NSSI, and NSSI was particularly associated with internet addiction, high levels of internet use, and websites with self-injury or suicide content (13).

The Internet is commonly used for constructive reasons such as seeking support and coping strategies (14) and online interactions provide essential social support for otherwise isolated adolescents (15). Thus the information available on the Internet could be useful for helping or treating individuals at risk, reducing isolation, encouraging recovery, and reducing the urge to commit self-injury (9,10). In

contrast, it could also contribute to normalizing NSSI, increasing its acceptance and social reinforcement, or reducing its stigmatization (9,14,15,17), potentially discouraging disclosure or professional help-seeking (14) and add potentially lethal behaviors to the repertoire of established adolescent self-injurers and those exploring identity options (15). Finally, a recent review suggested that online social networking also leads to increased exposure to and engagement in self-injurious behavior due to users receiving negative messages promoting self-injury, emulating self-injurious behavior of others, and adopting self-injury practices from shared videos (18). Thus, Internet use may exert both positive and negative effects on young people at risk of self-harm or suicide (14).

There is a term as “digital self-injury”, which is defined as the online communication and activity that leads to, supports, or exacerbates, non-suicidal yet intentional harm or impairment of an individual’s physical wellbeing (19). Several statistically significant correlates of involvement in digital self-harm were identified, including sexual orientation, experience with school bullying and cyberbullying, drug use, participation in various forms of adolescent deviance, and depressive symptoms (20). Online game use, exposure to violence in media, Internet risk behaviors, and cyber/school bullying experiences can be used to predict the emergence and cessation of youth cyberbullying perpetration and victimization (21). Exposure to violent online games was associated with being a perpetrator as well as a perpetrator-and-victim of cyberbullying (22). The Internet has created channels of communication that can be misused to 'cyber-bully' peers; both cyber-bullying and general internet use have been found to correlate with increased risk of NSSI, suicidal ideation, and depression (14). Correlations have also been found between internet exposure and violent methods of NSSI (14). A recent meta-analysis, showed that, compared with non-victims, those who have experienced cybervictimization were 2.4 times as likely to self-injury (23). The extreme form of cyber-bullying is the Blue Whale Challenge, which is a series of self-injury causing tasks that are propagated via online social media under the guise of a game, but is neither an application nor internet based game but the users get a link through social media chat groups to enter this "deadly" challenge game (19). Thus, digital self-injury is a new problem that demands additional scholarly attention (20).

Several mental health disorders, including NSSI and internet gaming, are thought to involve those same pleasure responses, neurotransmitters, and brain regions as in substance use disorders (24). As NSSI, the APA also included IGD in the Section III of the DSM-5 as a condition that needs further research before being fully recognized and accepted as an independent disorder in subsequent revisions of the DSM (25). According to the DSM-5, IGD is clinically characterized by a “persistent and recurrent use of the Internet to engage in games, often with other players, leading to clinically significant impairment or distress” (8). More specifically, the nine IGD criteria refer to preoccupation with Internet games, withdrawal symptoms, tolerance, unsuccessful attempts to control participation in Internet games, loss of interest in previous hobbies, continued excessive use of Internet games, deceiving family members, use Internet games to escape, and losing a significant relationship, job or education, or career opportunity (8). We only found one study that compared the gamers and non-gamers among students with pathological Internet use, which found similarly increased risks for NSSI for gamers and non-gamers (26). Thus it is important to evaluate the relationship of NSSI and severity of IGD symptoms among young adults.

The aim of the present study was to evaluate relationship of IGD symptoms with NSSI. Both NSSI and IGD are included in the Section III of DSM-5, and they both include items which imply that both conditions are, at least partially, serving as coping with negative feelings (i.e. IGD-“use Internet games to escape”, NSSI- “to obtain relief from a negative feeling or cognitive state”). Indeed, severity of anxiety, depression (27) and neuroticism (28) are all related with NSSI. Similarly IGD is related with anxiety, depression and neuroticism (29). Thus we also wanted to control the effects of depression, anxiety and neuroticism on the relationship of NSSI and severity of IGD symptoms among young adults.

## **METHOD**

### **Subjects and procedure**

The present study was conducted as a cross-sectional online self-report survey. The data were collected from volunteered Turkish university students in Ankara, people who were in the e-mail

database of a company located in Istanbul that organizes e-sports tournaments (ESL Turkey Amateur e-sport players), and Turkish gamers from gaming forums. A website was prepared for online participation. Approval from the Ethical Committee of the Cankaya University was taken. The institutional review board approval date was 12 April 2018 and the number was 80281877-050.99. The students were asked to fill out the form on the website anonymously. Informed consent was approved by students online before continuing with further questions. Exclusion criteria were unfilled forms. For controlling the duplicate data entry, we checked the e-mail addresses, the nicknames and we also checked for Internet Protocol (IP) Address of the participants. Total of 1010 participants were included in the study. Among these 606 were female (60%) and 404 were male (40%). Participants were divide into two groups as those with lifetime NSSI (n=207, 20.5%) and those without NSSI (n=803, 79.5%). Among 207 participants with lifetime NSSI, 92 (44.4%) reported that the most commonly used methods of self-injury was “cutting or scratching arms or other parts of the body”, 11 (5.3%) reported it was “burning self with cigarette or other means” and 126 (60.9%) reported that it was “hitting head, fist or other body parts in hard places.

### **Measures**

The questionnaire included a question inquiring a lifetime history of NSSI. Self-injury was defined as “deliberate self-injury to body tissue without the intent to die.” The SHB question was “Do you injure yourself intentionally? (never/at least once)”. The question also included the most commonly used methods of self-injury in parentheses (cutting, burning, hitting oneself, inserting sharp objects into body orifices and pulling out body hair) (30). This questionnaire was used in our previous study conducted among high school students (7).

### ***Internet Gaming Disorder Scale–Short-Form (IGDS9-SF)***

The IGDS9-SF assesses the symptoms and severity of IGD and its detrimental effects by examining both online and/or offline gaming activities occurring over a 12-month period (31). The scale comprises nine items corresponding to the nine core criteria defined by the DSM-5. They are answered on a five point Likert scale ranging from (1) never to (5) very often and high scores on the scale

translate onto higher level of gaming disorder. In the present study, Turkish version of the IGDS9-SF was used (32).

#### ***Beck Depression Inventory (BDI)–Beck Anxiety Inventory (BAI)***

Symptoms and severity of depression were evaluated by using the Beck Depression Inventory (BDI) (33), Turkish version (34), and symptoms and severity of anxiety were evaluated by the Beck Anxiety Inventory (BAI) (35), Turkish version (36). Both scales have been validated on Turkish populations. Cronbach's alphas were 0.90 for BDI and 0.93 for BAI in the present study.

#### ***Eysenck Personality Questionnaire Revised Abbreviated Form (EPQR-A)***

Although the EPQR-A includes 24 items in four personality traits (neuroticism, extraversion, psychoticism, and lie), for the purpose of the present study we only used “neuroticism/stability” trait to assess the stability of emotion (37). The reliability and validity of the questionnaire were supported in a Turkish university student sample (38). Kuder–Richardson alpha coefficient for the neuroticism trait was 0.65, and the test–retest reliability of the trait was 0.82.

#### **Statistical analysis**

The statistical package SPSS 17.0 for Windows (SPSS, 278 Chicago, IL, U.S.A.) was used for all the analyses. Gender was compared by means of the  $\chi^2$  statistics. We used Student's t-test to compare the groups on continuous variables. Taking the presence of lifetime NSSI as dependent variable, severity of IGD symptoms, depression, anxiety and neuroticism as independent variables logistic regression analysis was conducted. For all statistical analysis, p values were two-tailed, and differences were considered significant at  $p < 0.05$ .

#### **RESULTS**

Age ( $t=1.618$ ,  $p=0.106$ ) and gender ( $\chi^2=0.366$ ,  $p=0.545$ ) did not differ between those with lifetime NSSI ( $n=207$ , 20.5%) and those without NSSI ( $n=803$ , 79.5%) (Table 1). IGDS9-SF ( $t=-3.893$ ,  $p < 0.001$ ), depression ( $t=-8.392$ ,  $p < 0.001$ ), anxiety ( $t=-7.798$ ,  $p < 0.001$ ) and neuroticism ( $t=-8.955$ ,  $p < 0.001$ ) scores were higher among those with NSSI than those those without NSSI (Table 1).

Taken the presence of NSSI as a dependent variable, a logistic regression analysis was conducted. In the first step depression, anxiety and neuroticism were entered in the analysis as independent



variables. These three variables predicted the presence of the NSSI in the first step. In the second step severity of IGD symptoms was entered in the analysis as independent variable, additional to depression, anxiety and neuroticism. In this analysis, severity of IGD symptoms predicted the presence of NSSI, together with depression, anxiety and neuroticism (Table 2).

## DISCUSSION

The main finding of the present study is that the presence of lifetime NSSI is still related with the severity of IGD symptoms, even after controlling severities of neuroticism and negative affect such as depression and anxiety. This may suggest that depression, anxiety, neuroticism and severity of IGD symptoms may increase the risk of self-injurious behaviors. Alternative explanation might be that severity of IGD symptoms and NSSI may have same risk factors such as depression, anxiety and neuroticism. Severity of anxiety, depression (27) and neuroticism (28) are all related with NSSI and IGD (29). Consistent with this, according to DSM-5 both IGD and NSSI may be maladaptive coping mechanisms with negative affect, such as depression, anxiety and neuroticism (8). Some individuals with symptoms of depression or anxiety and personality trait of neuroticism may cope with negative feelings through gaming in the Internet rather than self-injurious behavior. Thus, severity of IGD symptoms may also be partial mediator between NSSI and negative affect (depression, anxiety and neuroticism). Unfortunately, because of the cross-sectional design, it was not possible to make conclusive statements about the temporal order between the measures of severity of IGD symptoms and NSSI.

Previous studies, including reviews, suggested relationship of NSSI with high levels of Internet use and Internet addiction (11-13,18), whereas the only study that compared the gamers and non-gamers among students with pathological Internet use found no difference for NSSI risk (26).

IGD showed strong associations with anxiety, depression (39), which are common comorbidities of IGD and this comorbidities are related to more serious psychiatric phenomenology and a greater psychiatric burden (40). Avoidance coping responses mediated the relationship between psychological distress and IA (41). Among gaming motivations, the dimension of escaping reality and problems

(escapism) significantly predicted excessive gaming and appeared as stronger predictors than time investment in game (42). The coping factor, which emphasizes that gaming helps coping with real problems (stress, aggression, anxiety) and managing unpleasant moods and unwanted impulses, is important motivation factor for gaming (43). A previous study suggested that psychiatric distress is both directly and indirectly (via escape and competition motives) negatively associated with IGD (44). Individuals playing video games in the Internet to socialize and to gain a sense of achievement tend to be high on neuroticism (45). Greater time spent on social networking websites led to higher psychological distress, an unmet need for mental health support, poor self-rated mental health, and increased suicidal ideation, thus, greater time spent on online social networking promotes self-injurious behavior and suicidal ideation in vulnerable individuals (18).

The most commonly cited reasons for NSSI are associated with relief from negative emotions (46). Acute negative affect precedes self-injury, decreased negative affect and relief are present after self-injury, self-injury is most often performed with intent to alleviate negative affect, and negative affect and arousal are reduced by the performance of self-injury proxies in laboratory settings (46).

Depression, anxiety, and stress each exerted a direct effect on NSSI (47). Individuals who engaged in NSSI indicated greater use of coping behaviors for regulation of dysphoric affect, communication of distress, interpersonal influence, expression of emotions and coping with dissociative states and self-punishment than the non-NSSI group (48,49). Individuals who had engaged in NSSI had significantly elevated levels of neuroticism (i.e. anxiousness, angry hostility, depressiveness, self-consciousness, impulsiveness and vulnerability) (50,51). Neuroticism is associated with NSSI engagement via high stress levels and a typical depressive reaction pattern to handle stressful life events (52). In previous studies conducted among adolescents and young adults, NSSI was related with more frequent use of coping styles that might be considered more immature (or maladaptive) (53) and immature (maladaptive) defense mechanisms (54,55). Thus for those with high neuroticism, whom capacity of coping strategies may probably be immature, NSSI may be maladaptive way for coping with negative emotions. Anxiety, depression and neuroticism may also be indirectly related with NSSI, through

online gaming, which may be either maladaptive or adaptive, in other words protecting from self-injurious behaviour.

Methodology is the strongest point of the present study, as it employs adequate sample size and proper sampling method, whereas the main limitation was the cross-sectional nature of the study; hence, we were only able to report associations rather than definitive temporal or causal relationships. Also, we did not gain more information for sociodemographic characters of the participants. Similarly, we did not gain detailed information for NSSI other than methods of the NSSI. Another important limitation is that the analyses were based on self-reported data, which may yield conservative estimates as a result of underreporting. Nevertheless, this is the first study to evaluate the relationship of severity of IGD with NSSI, while controlling other variables such as personality trait of neuroticism, depression and anxiety.

To conclude, the present study showed that the severity of IGD symptoms has predicted the presence of NSSI even after controlling the effects of neuroticism personality trait, depression and anxiety symptoms among Turkish young adults. Thus, these variables must be taken as potential risk factors for NSSI in this group. The present study may suggest that to better understand the problem of NSSI among university students, additional to online gaming, which is an important factor, clinicians must also carefully evaluate symptoms anxiety, depression and neuroticism personality trait. Thus early detection and treatment of these risk factors is important for reduction of self-injurious behavior. Also implementation of therapies to strengthen coping mechanisms can be an important intervention method for NSSI. Finally, the generalizability of the findings of the present study to the homogeneous populations of patients with IGD requires further study.

## REFERENCES

1. Briere J, Gil E. Self-mutilation in clinical and general population samples: Prevalence, correlates, and functions. *Am J Orthopsychiatry* 1998; 68:609–620.
2. Favazza AR. The coming of age of self-mutilation. *J Nerv Ment Dis* 1998; 186:259–268.
3. Zlotnick C, Mattia JI, Zimmerman M. Clinical correlates of self-mutilation in a sample of general psychiatric patients. *J Nerv Ment Dis* 1999; 187:296–301.

4. Favazza AR. Why patients mutilate themselves. *Hosp Community Psychiatry* 1989; 40:137–145.
5. Herpertz S. Self-injurious behaviour. Psychopathological and nosological characteristics in subtypes of self-injurers. *Acta Psychiatr Scand* 1995; 91:57–68.
6. Zoroglu SS, Tuzun U, Sar V, Tutkun H, Savas HA, Ozturk M, Alyanak B, Kora ME. Suicide attempt and self-mutilation among Turkish high school students in relation with abuse, neglect and dissociation. *Psychiatry Clin Neurosci* 2003; 57: 119–126.
7. Evren C, Evren B, Bozkurt M, Can Y. Non-suicidal self-harm behavior within the previous year among 10th-grade adolescents in Istanbul and related variables. *Nord J Psychiatry* 2014;68:481-487.
8. American Psychiatric Association, 2013. *Diagnostic and Statistical Manual of Mental Disorders*, Fifth ed. VA, Arlington.
9. Vega D, Sintes A, Fernández M, Puntí J, Soler J, Santamarina P, Soto À, Lara A, Méndez I, Martínez-Giménez R, Romero S, Pascual JC. Review and update on non-suicidal self-injury: who, how and why? *Actas Esp Psiquiatr* 2018;46:146-155.
10. Jarvi S, Jackson B, Swenson L, Crawford H. The impact of social contagion on non-suicidal self-injury: a review of the literature. *Arch Suicide Res* 2013;17:1–19.
11. Lam LT, Peng Z, Mai J, Jing J. The association between internet addiction and self-injurious behaviour among adolescents. *Inj Prev* 2009;15:403-408.
12. Liu HC, Liu SI, Tjung JJ, Sun FJ, Huang HC, Fang CK. Self-harm and its association with internet addiction and internet exposure to suicidal thought in adolescents. *J Formos Med Assoc* 2017;116:153-160.
13. Marchant A, Hawton K, Stewart A, Montgomery P, Singaravelu V, Lloyd K, Purdy N, Daine K, John A. Correction: A systematic review of the relationship between internet use, self-harm and suicidal behaviour in young people: The good, the bad and the unknown. *PLoS One*. 2018 Mar 1;13(3):e0193937.
14. Daine K, Hawton K, Singaravelu V, Stewart A, Simkin S, Montgomery P. The power of the web: a systematic review of studies of the influence of the internet on self-harm and suicide in young people. *PLoS One* 2013;8:e77555.
15. Whitlock JL, Powers JL, Eckenrode J. The virtual cutting edge: the internet and adolescent self-injury. *Dev Psychol* 2006;42:407-417.
16. Frost M, Casey L. Who Seeks Help Online for Self-Injury? *Arch Suicide Res* 2016;20:69–79.
17. Dyson MP, Hartling L, Shulhan J, Chisholm A, Milne A, Sundar P, Scott SD, Newton AS. A systematic review of social media use to discuss and view deliberate self-harm acts. *PLoS One* 2016;11:e0155813.
18. Memon AM, Sharma SG, Mohite SS, Jain S. The role of online social networking on deliberate self-harm and suicidality in adolescents: A systematized review of literature. *Indian J Psychiatry* 2018;60:384-392.
19. Mukhra R, Baryah N, Krishan K, Kanchan T. 'Blue Whale Challenge': a game or crime? *Sci Eng Ethics* 2019;25:285-291.
20. Patchin JW, Hinduja S. Digital self-harm among adolescents. *J Adolesc Health* 2017;61:761-766.
21. Chang FC, Chiu CH, Miao NF, Chen PH, Lee CM, Huang TF, Pan YC. Online gaming and risks predict cyberbullying perpetration and victimization in adolescents. *Int J Public Health* 2015;60:257-266.
22. Lam LT, Cheng Z, Liu X. Violent online games exposure and cyberbullying/victimization among adolescents. *Cyberpsychol Behav Soc Netw* 2013;16:159-165.

23. John A, Glendenning AC, Marchant A, Montgomery P, Stewart A, Wood S, Lloyd K, Hawton K. Self-harm, suicidal behaviours, and cyberbullying in children and young people: systematic review. *J Med Internet Res* 2018;20:e129.
24. Worley J. The role of pleasure neurobiology and dopamine in mental health disorders. *J Psychosoc Nurs Ment Health Serv* 2017;55:17-21.
25. Petry NM, O'Brien CP. Internet gaming disorder and the DSM-5. *Addiction* 2013;108:1186–1187.
26. Strittmatter E, Kaess M, Parzer P, Fischer G, Carli V, Hoven CW, Wasserman C, Sarchiapone M, Durkee T, Apter A, Bobes J, Brunner R, Cosman D, Sisask M, Várník P, Wasserman D. Pathological Internet use among adolescents: Comparing gamers and non-gamers. *Psychiatry Res* 2015;228:128-135.
27. Valencia-Agudo F, Burcher GC, Ezpeleta L, Kramer T. Nonsuicidal self-injury in community adolescents: A systematic review of prospective predictors, mediators and moderators. *J Adolesc* 2018;65:25-38.
28. Lin MP, You J, Ren Y, Wu JY, Hu WH, Yen CF, Zhang X. Prevalence of nonsuicidal self-injury and its risk and protective factors among adolescents in Taiwan. *Psychiatry Res* 2017;255:119-127.
29. Evren B, Evren C, Dalbudak E, Topcu M, Kutlu N. Neuroticism and introversion mediates the relationship between probable ADHD and symptoms of Internet gaming disorder: results of an online survey. *Psychiatry and Clinical Psychopharmacology* 2019; 29: 90–91.
30. Nock MK. Self-injury. *Annu Rev Clinl Psychology* 2010; 6:339–363.
31. Pontes HM, Griffiths MD. Measuring DSM-5 Internet gaming disorder: Development and validation of a short psychometric scale. *Comput Human Behav* 2015;45:137–143.
32. Evren C, Dalbudak E, Topcu M, Kutlu N, Evren B, Pontes HM. Psychometric validation of the Turkish nine-item Internet Gaming Disorder Scale-Short Form (IGDS9-SF). *Psychiatry Res* 2018;265:349-354.
33. Beck AT, Ward CH, Mendelson M, Mock J, Erbaugh J. An inventory for measuring depression. *Arch Gen Psychiatry* 1961;4: 561–571.
34. Hisli N, Reability and validity of beck depression inventory among university students. *Turk J Psychol* 1989;7: 3–13.
35. Beck AT, Epstein N, Brown G, Steer RA. An inventory for measuring clinical anxiety: psychometric properties. *J Consult Clin Psychol* 1988;56: 893–897.
36. Ulusoy M, Erkmen H, Sahin N. Turkish version of the Beck anxiety inventory: psychometric properties. *J Cogn Psychother* 1998;12: 163–172.
37. Francis LJ, Brown LB, Philipchalk R. The development of an abbreviated form of the Revised Eysenck Personality Questionnaire (EPQR-A): its use among students in England, Canada, the USA and Australia. *Personal Individ Differ* 1992;13:443-449.
38. Karancı AN, Dirik G, Yorulmaz O. Reliability and validity studies of Turkish translation of Eysenck Personality Questionnaire revised abbreviated. *Turk Psikiyatri Derg* 2007;18:254-261.
39. González-Bueso V, Santamaría JJ, Fernández D, Merino L, Montero E, Ribas J. Association between Internet gaming disorder or pathological video-game use and comorbid psychopathology: a comprehensive review. *Int J Environ Res Public Health* 2018;15(4).
40. Wang HR, Cho H, Kim DJ. Prevalence and correlates of comorbid depression in a nonclinical online sample with DSM-5 internet gaming disorder. *J Affect Disord* 2018;226:1-5.
41. McNicol ML, Thorsteinsson EB. Internet addiction, psychological distress, and coping responses among adolescents and adults. *Cyberpsychol Behav Soc Netw* 2017;20:296-304.

42. Kuss DJ, Louws J, Wiers RW. Online gaming addiction? Motives predict addictive play behavior in massively multiplayer onlinerole-playing games. *Cyberpsychol Behav Soc Netw* 2012;15:480-485.
43. Demetrovics Z, Urbán R, Nagygyörgy K, Farkas J, Zilahy D, Mervó B, Reindl A, Ágoston C, Kertész A, Harmath E. Why do you play? The development of the motives for online gaming questionnaire (MOGQ). *Behav Res Methods* 2011;43:814-25.
44. Király O, Urbán R, Griffiths MD, Ágoston C, Nagygyörgy K, Kökönyei G, Demetrovics Z. The mediating effect of gaming motivation between psychiatric symptoms and problematic online gaming: an online survey. *J Med Internet Res* 2015;17:e88.
45. Graham LT, Gosling SD. Personality profiles associated with different motivations for playing World of Warcraft. *Cyberpsychol Behav Soc Netw* 2013;16:189-193.
46. Klonsky ED. The functions of deliberate self-injury: a review of the evidence. *Clin Psychol Rev* 2007;27:226-239.
47. Richmond S, Hasking P, Meaney R. Psychological distress and non-suicidal self-injury: the mediating roles of rumination, cognitive reappraisal, and expressive suppression. *Arch Suicide Res* 2017;21:62-72.
48. Hamza CA, Willoughby T, Good M. A preliminary examination of the specificity of the functions of nonsuicidal self-injury among a sample of university students. *Psychiatry Res* 2013;205:172-175.
49. Paris J. Understanding self-mutilation in borderline personality disorder. *Harv Rev Psychiatry* 2005;13:179-185.
50. Brown SA. Personality and non-suicidal deliberate self-harm: Trait differences among a non-clinical population. *Psychiatry Res* 2009;169:28-32.
51. Mullins-Sweatt SN, Lengel GJ, Grant DM. Non-suicidal self-injury: the contribution of general personality functioning. *Personal Ment Health* 2013;7:56-68.
52. Kiekens G, Bruffaerts R, Nock MK, Van de Ven M, Witteman C, Mortier P, Demyttenaere K, Claes L. Non-suicidal self-injury among Dutch and Belgian adolescents: Personality, stress and coping. *Eur Psychiatry* 2015;30:743-749.
53. Evans E, Hawton K, Rodham K. In what ways are adolescents who engage in self-harm or experience thoughts of self-harm different in terms of help-seeking, communication and coping strategies? *J Adolesc* 2005; 28:573-587.
54. Brody S, Carson CM. Brief report: self-harm is associated with immature defense mechanisms but not substance use in a nonclinical Scottish adolescent sample. *J Adolesc* 2011; 35:765-767.
- 55-Sarno I, Madeddu F, Gratz KL. Self-injury, psychiatric symptoms, and defense mechanisms: findings in an Italian nonclinical sample. *Eur Psychiatry* 2010; 25:136-145.

Table 1

Comparing scale scores according to the presence of non-suicidal self-injury (NSSI).

	<b>Non-Suicidal Self-Injury</b>				<i>t</i>	<i>df</i>	<i>p</i>
	<b>Absent</b>		<b>Present</b>				
	<i>n=803, 79.5%</i>		<i>n=207, 20.5%</i>				
	<b>Mean</b>	<b>S.D.</b>	<b>Mean</b>	<b>S.D.</b>			
<b>Age</b>	21.93	3.44	21.51	3.14	1.618	1008	0.106
<b>Gender (<i>n, %</i>)</b>					$\chi^2=0.366$	1	0.545
Females	478	59.5	128	61.8			
Males	325	40.5	79	38.2			
<b>IGDS9-SF</b>	14.79	6.50	17.07	7.79	-3.893	284,262	<0.001
<b>Anxiety</b>	12.07	10.94	19.50	12.55	-7.798	291,835	<0.001
<b>Depression</b>	34.18	9.86	41.47	11.46	-8.392	289,399	<0.001
<b>Neuroticism</b>	3.08	1.77	4.21	1.57	-8.955	352,802	<0.001

Table 2

Logistic regression analyses with non-suicidal self-injury (NSSI) as dependent variable and severity of anxiety, depression, personality dimension of neuroticism and severity of Internet gaming disorder as independent variables

		<b>B</b>	<b>S.E.</b>	<b>Wald</b>	<b>df</b>	<b>p</b>	<b>Exp(B)</b>	<b>95% C.I.</b>	
								Lower	Upper
Step 1	<b>Anxiety</b>	0.022	0.008	6.744	1	0.009	1.022	1.005	1.039
	<b>Depression</b>	0.028	0.010	8.162	1	0.004	1.028	1.009	1.048
	<b>Neuroticism</b>	0.245	0.058	17.572	1	<0.001	1.277	1.139	1.432
	<b>m</b>								
Step 2	<b>Anxiety</b>	0.023	0.008	7.597	1	0.006	1.023	1.007	1.040
	<b>Depression</b>	0.023	0.010	5.125	1	0.024	1.023	1.003	1.043
	<b>Neuroticism</b>	0.251	0.059	18.308	1	<0.001	1.286	1.146	1.443
	<b>m</b>								
	<b>IGDS9-SF</b>	0.033	0.012	8.024	1	0.005	1.033	1.010	1.057

Nagelkerke R<sup>2</sup>: Step1=0.150, Step 2=0.161, IGDS9-SF: Internet Gaming Disorder Scale – Short Form