Is internet gaming disorder associated with trauma and stress? Testing the trauma model of addiction in an international sample of young adults

Author's Accepted Version

Hong Wang Fung, PhD, RSW
School of Nursing, The Hong Kong Polytechnic University, Hong Kong
Email: andy.hw.fung@polyu.edu.hk
ORCID: http://orcid.org/0000-0002-4606-2173

Guangzhe Frank Yuan, PhD*
School of Education Science, Leshan Normal University, Leshan, China
Email: yb97316@umac.mo

Caimeng Liu
School of Education Science, Leshan Normal University, Leshan, China

Henry Wai-Hang Ling, MPhil, RSW
The Department of Social Work and Social Administration, The University of Hong Kong, Hong Kong
Email: henrylinglwh@gmail.com
ORCID: https://orcid.org/0000-0002-4734-5802

Colin A. Ross, MD
The Colin A. Ross Institute for Psychological Trauma, Richardson, TX, United States
Email: rossinst@rossinst.com
ORCID: https://orcid.org/0000-0001-9583-7046

Vincent Wan Ping Lee, PhD, RSW
Department of Social Work, Hong Kong Baptist University, Hong Kong
Email: vwplee@hkbu.edu.hk
ORCID: https://orcid.org/0000-0003-4574-636X

Stanley Kam Ki Lam, PhD, RN*
Nethersole School of Nursing, Faculty of Medicine, The Chinese University of Hong Kong, Hong Kong
Email: stanleylam@cuhk.edu.hk
ORCID: https://orcid.org/0000-0002-6544-795X

Janet Yuen-Ha Wong, PhD, RN*
School of Nursing and Health Studies, Hong Kong Metropolitan University, Hong Kong
Email: jyhwong@hkmu.edu.hk
ORCID: https://orcid.org/0000-0002-3000-4577

* Correspondence concerning this article should be addressed to Stanley Kam Ki Lam (stanleylam@cuhk.edu.hk), Guangzhe Frank Yuan (yb97316@umac.mo), and Janet Yuen-Ha Wong (jyhwong@hkmu.edu.hk).

Fung, H. W., Yuan, G. F.*, Liu, C., Ling, H. W. H., Ross, C. A., Lee, V. W. P., Lam, S. K. K.*, & Wong, J. Y.-H.* (2025). Is internet gaming disorder associated with trauma and stress? Testing the trauma model of addiction among young adults. Journal of Interpersonal Violence. https://doi.org/10.1177/088626052513259

Is internet gaming disorder associated with trauma and stress? Testing the trauma model of addiction in an international sample of young adults

Abstract

Internet gaming disorder (IGD) is a growing public health concern, with longitudinal studies linking it to a range of negative outcomes, including psychological distress and poor academic achievements. While the trauma model has been applied to other addictive behaviors, little is known about the relationship between childhood trauma, trauma-related symptoms, and IGD symptoms. This preliminary study investigated whether childhood betrayal trauma would have a stronger relationship with IGD symptoms than non-betrayal trauma and whether IGD symptoms would be associated with interpersonal stress and trauma-related symptoms. A regionally diverse, predominantly female sample of English-speaking young adults aged 18 to 24 ($N = 283$) completed validated standardized measures. We found that IGD symptoms were associated with childhood non-betrayal trauma ($\beta = .225$, $p < .001$) and interpersonal stress ($\beta = .214$, $p < .001$), but not with childhood betrayal trauma and post-traumatic and dissociative symptoms. While the results should be interpreted with caution because of the limitations of this study, it extends the application of the trauma model of addiction to the context of IGD. Our study underscores the universal importance of child protection and early interventions for childhood trauma survivors in the prevention of addictive behaviors.

Keywords: Internet Gaming Disorder (IGD); Addiction; Childhood trauma; Post-traumatic stress disorder (PTSD); Dissociation

Is internet gaming disorder associated with trauma and stress? Testing the trauma model of addiction in an international sample of young adults

Internet gaming disorder (IGD) as an increasingly recognized public health concern

Internet gaming disorder (IGD), which involves persistent and recurrent use of internet to engage in video games and could lead to significant distress or functional impairment, has been identified as a mental health condition warranting more empirical research and clinical attention in DSM-5 (American Psychiatric Association, 2013). In a recent scoping review, Darvesh et al. (2020) reported that the prevalence of IGD ranged from 0.21% to 57.50% in six general population studies. Another systematic review further suggested that there is an increase in internet-based addictive behaviors in recent years and that IGD may also be particularly associated with stress, loneliness and social restrictions during the COVID-19 pandemic (Masaeli & Farhadi, 2021). Longitudinal studies revealed that IGD could result in poor mental health, increased physical aggression, higher levels of psychological symptoms, and poor academic achievements (for a systematic review, see Mihara & Higuchi, 2017). Given the increasing prevalence of IGD and its societal consequences, it is important to enhance our understanding of the factors associated with IGD to improve prevention and intervention strategies. Additionally, while

previous studies showed that IGD is a male-predominant condition and that there may be gender differences in IGD (Dong & Potenza, 2022), further studies are required to understand IGD in both male and female samples.

Trauma as a possible etiological risk factor for IGD

In the psychology literature, addiction is usually seen as a maladaptive behavior or a behavioral disorder, which can be understood from a learning theory perspective (Thombs, 2006). Both the self-medication theory (Khantzian, 2017) and the trauma model (Ross & Halpern, 2009; Schimmenti et al., 2022) suggest that addictive behaviors can serve as a coping mechanism for underlying psychosocial issues, and both theories have been used to understand and explain the development and maintenance of addictive behaviors. Similar to the self-medication theory, which is a more general theory and is particularly used to understand substance abuse (Khantzian, 2017), the trauma model of addiction conceptualizes addictive behaviors as maladaptive coping strategies, specifically avoidance. In the trauma model, addiction is like a "vehicle for getting from here to over there… it's all about getting away from here" (Ross, 2007, p. 259); "the purpose of every addiction is to take you from over here to over there" (Ross, 2008, p. 325). Namely, addiction may be understood as an unhealthy way to cope with and get away from pain, intolerable memories/emotions and/or stressful situations. Similarly, the self-medication theory

hypothesizes that individuals with underlying psychosocial difficulties may turn to substance as a means of self-treatment (Khantzian, 2017). However, in the trauma model, this conceptualization also applies to other types of addictive behaviors.

In fact, trauma and adversities are increasingly recognized as a significant contributing factor to the development of addiction in general (Zarse et al., 2019), with childhood trauma being identified as the most preventable cause of substance abuse (The Childhood Adversity Narratives, 2015). Evidence from longitudinal studies or systematic reviews has shown that trauma is a significant risk factor associated with various addictive behaviors, such as substance abuse (Halpern et al., 2018; Herron & Venner, 2022; Petruccelli et al., 2019), alcohol misuse (Devries et al., 2014; Hughes et al., 2017; Ogden et al., 2022), gambling (Lane et al., 2016), problematic smartphone use (Geng et al., 2022) and smoking (Taha et al., 2014).

Current research gaps

Although IGD is also a form of addictive behavior (Király et al., 2023), little is known about the relationship between trauma and IGD symptoms. In a recent scoping review, we found that there were only 12 empirical studies reporting the association between trauma/adversities and gaming disorders, and the correlations were generally significant but weak ($r = .18$ to $.46$, $p < .01$)(Fung et al., 2024). Additionally, no studies have examined whether some specific forms of traumatic events (e.g.,

interpersonal/betrayal trauma) would be particularly associated with IGD symptoms. The relationship between trauma-related symptoms (i.e., post-traumatic stress disorder [PTSD] and dissociative symptoms) and IGD symptoms also requires further investigation. In fact, betrayal and non-betrayal trauma could have distinct psychological effects and mental health outcomes; betrayal trauma perpetrated by a close person (e.g., a caregiver) could be more damaging due to victim's need to maintain attachment to the perpetrator (Fung et al., 2023; Yalch & Levendosky, 2019). Additionally, while interpersonal stress may not necessarily be traumatic, such chronic or toxic stress could also be psychologically damaging (Bancila et al., 2006). Sometimes referred to as "small t", interpersonal stress may also be related to a variety of mental health outcomes, such as IGD symptoms, but such relationship has not been investigated in previous studies. Therefore, it is important to examine the differential association of IGD symptoms with both betrayal and non-betrayal trauma as well as interpersonal stress.

The present study

Although the trauma model has been commonly investigated in the field of addiction and although it could provide insights into the prevention and management of addictive behaviors (Lee et al., 2023; Ross et al., 2019; Schimmenti et al., 2022), little is known about the relationship between trauma, trauma-related symptoms, and

IGD symptoms. As described above, a recent scoping review have shown there are very few studies that examined the relationship between trauma and IGD symptoms (Fung et al., 2024). Therefore, in order to address the existing knowledge gaps and to test the trauma model of IGD, this study aimed to further our understanding of the relationship between trauma, interpersonal stress, trauma-related symptoms and IGD symptoms. In particular, the following hypotheses were tested:

First, given that betrayal trauma (i.e., trauma perpetrated by a caregiver or a trusted person) is generally more harmful than non-betrayal trauma (Freyd, 2008; Fung et al., 2023; Goldsmith et al., 2012; Wu et al., 2022), as mentioned above, we hypothesized that, compared with non-betrayal trauma, betrayal trauma would have a stronger relationship with IGD symptoms.

Second, as mentioned above, even non-Criterion A stressors (so-called small "t", such as toxic interpersonal stress) can still be harmful (Kira et al., 2021; Long et al., 2008) and is associated with various mental health problems (Bancila et al., 2006; Mittelmark et al., 2004). Interpersonal stress also have a stronger relationship with mental health symptoms than trauma (Fung et al., 2022). However, the relationship of IGD symptoms with interpersonal stress remains unclear. Thus, we hypothesized that interpersonal stress would be associated with IGD symptoms after controlling for trauma exposure.

Third, since trauma-related symptoms (i.e., PTSD and dissociative symptoms) are found to be associated with other types of addictions (Brady et al., 2021; Rogier et al., 2021; Schimmenti et al., 2022), we also hypothesized that PTSD and dissociative symptoms would be associated with IGD symptoms after controlling for trauma exposure.

Methods

Participants

Data in the current study were drawn from a survey project that examined psychosocial experiences and health problems in young adults. Approved by the institutional review board at the XXX University (blind for review), this project used online methods to recruit a convenience sample of English-speaking young adults aged 18 to 24 to complete an online survey. Potential participants were recruited through online social media platforms, including Facebook and Instagram, during the period from February to March, 2023. Participants had to be aged 18 to 24, able to read and write English, and agree to provide informed consent and voluntarily participate. The online advertising campaigns were targeted towards countries where English is the primary language. Since no incentives were provided and no efforts were made to recruit a representative sample, there is a possibility of self-selection

bias. This means that individuals who were more interested or motivated to participate in the study purpose may have been more likely to take part in the survey. Only participants who self-reported with a diagnosis of a reading disorder, dementia or intellectual disabilities were excluded.

Measures

Participants completed an online survey which included questions about demographic and health backgrounds as well as the following standardized assessment tools:

IGD symptoms were assessed using the Internet Gaming Disorder Scale–Short-Form (IGDS9-SF), which is a 9-item self-report measure based on the nine DSM-5 criteria for IGD (Pontes & Griffiths, 2015). The IGDS9-SF was found to have adequate internal consistency and excellent validity in a recent systematic review of 21 studies (Poon et al., 2021). Higher scores indicate higher levels of IGD symptoms. Participants would be regarded as having IGD if they endorsed at least five criteria with the response "very often". This measure had good internal consistency ($\alpha = .881$) in our sample.

Childhood trauma was assessed using the Brief Betrayal Trauma Survey (BBTS), which is a 24-item self-report measure that assesses 12 different types of traumatic events during childhood and adulthood (Goldberg & Freyd, 2006). The

traumatic events can be divided into betrayal trauma and non-betrayal trauma. The BBTS had good test-retest reliability over three years with an agreement rate of 83% for childhood trauma (Goldberg & Freyd, 2006). Only the 12 childhood trauma items were used in this study. This measure had acceptable internal consistency (α = .765) in our sample.

Interpersonal stress was assessed using the Bergen Social Relationships Scale (BSRS), which is a 6-item self-report measure of chronic interpersonal stress. The BSRS had satisfactory internal consistency (α = .73), with a factor structure being invariant across all cultures tested (Bancila & Mittelmark, 2009). Higher scores indicate higher levels of interpersonal stress. This measure had acceptable internal consistency (α = .754) in our sample.

Post-traumatic symptoms were assessed using the 4-item version of the PTSD Checklist for DSM-5 (4-item PCL-5). The original 20-item PCL-5 is a commonly-used, validated self-report measure of DSM-5 PTSD symptoms (Geier et al., 2019). Recently, the abbreviated 4-item version of the PCL-5 was also found to be reliable and valid (Geier et al., 2020). Higher scores indicate more PTSD symptoms. This measure had good internal consistency (α = .823) in our sample.

Dissociative symptoms were assessed using the Dissociative Experiences Scale-Taxon (DES-T), which is an 8-item subscale of the original 28-item DES (Bernstein

& Putnam, 1986; Ross, 1997). The DES-T can be particularly used to assess pathological dissociation (Waller et al., 1996; Waller & Ross, 1997). Higher scores indicate more psychoform dissociative symptoms. This measure had good internal consistency ($\alpha = .890$) in our sample.

To ensure the validity of the data, two attention check items were included in the online survey.

Data analysis

SPSS 22.0 was used to perform statistical analyses. We first reported the descriptive data of the major study variables. We then conducted Pearson and point-biserial correlation analyses to examine the correlates of IGD symptoms. We also conducted hierarchical multiple regression analyses to examine whether childhood trauma, interpersonal stress, PTSD symptoms, and dissociative symptoms would be associated with IGD symptoms.

Results

Sample characteristics

This international sample included 283 participants from 10 different countries, including 72 from Canada (25.44%), 64 from the United Kingdom (22.61%), 42 from New Zealand (14.84%), 40 from the United States (14.13%), 20 from Singapore

(7.07%), 18 from Australia (6.36%), 18 from Ireland (6.36%), 5 from Iceland (1.77%), 3 from Scotland (1.06%), and one from Malaysia (0.35%). The age of the participants ranged from 18 to 24 years, and most of them were female (91.2%). About one-third of participants (35.69%) reported having seen a psychiatrist in the past year. In this sample, 23.3% of participants screened positive for IGD on the IGDS9-SF. The sample characteristics are reported in Table 1.

Correlates of IGD symptoms

As shown in Table 1, IGD symptoms were correlated with childhood non-betrayal trauma ($r = .233$, $p < .001$) but not with betrayal trauma ($p = .130$).

Both PTSD symptoms and dissociative symptoms were positively correlated with the IGD symptoms ($r = .177$ to $.211$, $p < .01$) (see Table 1).

Further analyses were conducted using hierarchical multiple regression, and the findings are reported in Table 2.

We found that only childhood non-betrayal trauma ($\beta = .225$, $p < .001$) and interpersonal stress ($\beta = .214$, $p < .001$) – but not childhood betrayal trauma ($p = .234$) – had a significant association with IGD symptoms after controlling for gender (Step 3). Nevertheless, when PTSD and dissociative symptoms were entered to the model, both ($p = .246$ to $.692$) were not significantly associated with IGD symptoms (Step 5).

Discussion

This is one of the very few studies that specifically tested the trauma model of IGD. We found that IGD symptoms were associated with childhood non-betrayal trauma and interpersonal stress in this predominantly female sample. However, IGD symptoms were not associated with PTSD or dissociative symptoms.

Although the trauma model of addiction generally applies to IGD symptoms, this preliminary study suggested that further understanding of the impacts of different types of trauma and stress is needed. For example, the betrayal trauma theory does not seem to apply to IGD symptoms, although previous studies (e.g., Fung et al., 2023; Gómez et al., 2014; Mildrum Chana et al., 2021) showed that betrayal trauma is particularly associated with substance abuse and other mental health problems. According to the betrayal trauma theory, trauma perpetrated by a caregiver or a trusted person may increase the risk of developing dissociative symptoms because the victim needs to remain attached to the caretaker-perpetrator for survival (Freyd, 2008; Freyd et al., 2007). Substances such as drugs and alcohol may serve as an external regulator to help the victim to dissociate (Schimmenti et al., 2022), but playing video games may not serve the same purpose. This may explain why IGD symptoms were not associated with childhood betrayal trauma and trauma-related symptoms in our study.

Although both previous studies (e.g., De Pasquale et al., 2018) and our study found a positive correlation between IGD symptoms and dissociative symptoms, we found that dissociative symptoms were no longer associated with IGD symptoms when other variables were controlled for. This implies that dissociative symptoms may be associated with other types of addictive behaviors but not with IGD symptoms.

In addition, our data suggested that IGD symptoms were significantly associated with interpersonal stress. This finding is consistent with the interpersonal impairment hypothesis (Teng et al., 2020), which conceptualizes gaming disorder as a maladaptive response associated with poorer social well-being. However, it is unclear why IGD symptoms were particularly associated with childhood non-betrayal trauma in our sample, and this finding points to the need for further research.

Our findings highlight the importance of child protection in the prevention of addictive behaviors, particularly IGD symptoms, although different types of childhood traumatic events may have different correlates and outcomes. Given the individual and social consequences of IGD symptoms, early prevention is of high public health priority. As childhood trauma and adversities may be one of the most preventable etiological risk factors for mental health problems, including addictions (The Childhood Adversity Narratives, 2015), child protection and early interventions

for childhood trauma survivors should be a central focus of addiction prevention programs and integrated into public health policies. In addition, interpersonal difficulties are not only a common challenge for childhood trauma survivors (Cloitre et al., 2020), but are also independently associated with IGD symptoms, as demonstrated in the present study; therefore, timely social interventions and interpersonal skills training such as nonviolent communication training may be helpful for the prevention and management of mental health problems including IGD symptoms. (Cheung et al., 2022). While research on treatment for IGD is still limited, recent studies (e.g., Torres-Rodríguez et al., 2018) have emphasized the importance of interpersonal and family interventions, and our findings support the inclusion of these elements in the treatment of IGD.

Despite the potential implications of the findings, this study had a number of major limitations. First, this study replied on self-report measures, and we did not conduct structured interviews to confirm the IGD diagnosis, although all screening tools have been well validated in previous studies. Second, we analyzed data from an online convenience sample, and there may be self-selection bias. Most of our participants were female, which may be due to the use of online methods for recruitment as indicated in previous studies (Whitaker et al., 2017), and our sample

was not representative. Individuals with mental health struggles may be more likely to participate in mental health-related social media platforms (i.e., Facebook and Instagram pages) mental health-related survey studies, and therefore a considerable number of participants reported using psychiatric services in our sample. Therefore, while the findings are interesting, the results should be interpreted with caution given that the sample was not representative and diverse enough. Considering the IGD may be more prevalent in males (Mihara & Higuchi, 2017), the generalizability of our findings may be limited. Although we used a reasonably sized, multinational sample, we only focused on English speakers who had access to the Internet. In other words, our results may not be generalized to more diverse populations. Third, as the number of participants from each country was relatively small, we also lack statistical power to conduct subgroup analyses to reveal potential differences between participants from different cultures and countries. However, it is important to note that health-related studies (e.g., testing a theory, looking for relationships among specific variables) are commonly conducted using opportunistic and convenience samples, and random, representative samples are not often necessary (Tyrer & Heyman, 2016). The findings of our study are still meaningful and can contribute to the limited body of knowledge regarding the relationship between trauma and IGD. Fourth, the cross-sectional nature of the present study did not allow us to examine the causal

relationships among the variables. For example, while it is theoretically assumed that trauma-related dissociative symptoms may contribute to substance addiction and that interpersonal stress may drive individuals to engage in gaming as a coping strategy to avoid ongoing stress, the casual role of trauma, dissociative symptoms and interpersonal stress require future longitudinal studies. Finally, although our study did not specifically inquire about COVID-19-related stressors, it is important to note that the data collection took place during the pandemic. The COVID-19 pandemic has significantly altered the daily lives and social interactions of young people, and there is a possibility that IGD has increased during this period (Claesdotter-Knutsson et al., 2022). Future studies should also examine whether IGD symptoms would have different correlates in the post-pandemic era.

Concluding remarks

Despite the limitations of this study, our results contribute to the limited understanding of IGD from a trauma-informed perspective, given that it is one of the very few studies which examined the relationships of IGD symptoms with trauma and trauma-related symptoms in female populations. Childhood non-betrayal trauma and interpersonal stress are significant factors associated with IGD symptoms. While different types of childhood trauma might lead to different coping strategies and addictive behaviors, our study highlights the universal importance of child protection

and early interventions for childhood trauma survivors in the prevention of addictive behaviors. The preliminary results also point to the importance of further research on the social etiological factors related to IGD symptoms, as it is important to inform preventive intervention approaches.

References

American Psychiatric Association. (2013). *Diagnostic and statistical manual of mental disorders (5th ed.)*. Author.

Bancila, D., & Mittelmark, M. B. (2009). Measuring interpersonal stress with the Bergen Social Relationships Scale: Psychometric properties in studies in Norway, Romania, and Russia. *European Journal of Psychological Assessment*, *25*(4), 260-265.

Bancila, D., Mittelmark, M. B., & Hetland, J. (2006). The association of interpersonal stress with psychological distress in Romania. *European Psychologist*, *11*(1), 39-49.

Bernstein, E. M., & Putnam, F. W. (1986). Development, reliability, and validity of a dissociation scale. *The Journal of Nervous and Mental Disease*, *174*(12), 727-735. https://doi.org/10.1097/00005053-198612000-00004

Brady, K. T., McCauley, J. L., & Back, S. E. (2021). The comorbidity of post-traumatic stress disorder (PTSD) and substance use disorders. In N. el-Guebaly, G. Carrà, M. Galanter, & A. M. Baldacchino (Eds.), *Textbook of Addiction Treatment: International Perspectives* (pp. 1327-1339). Springer International Publishing. https://doi.org/10.1007/978-3-030-36391-8_93

Cheung, C. T. Y., Cheng, C. M.-H., Lam, S. K. K., Ling, H. W. H., Lau, K. L., Hung, S. L., & Fung, H. W. (2022). Reliability and validity of a novel measure of nonviolent communication behaviors. *Research on Social Work Practice*. https://doi.org/10.1177/10497315221128595

Claesdotter-Knutsson, E., André, F., & Håkansson, A. (2022). Gaming activity and possible changes in gaming behavior among young people during the COVID-19 pandemic: Cross-sectional online survey study [Original Paper]. *JMIR Serious Games*, *10*(1), e33059. https://doi.org/10.2196/33059

Cloitre, M., Cohen, L. R., Ortigo, K. M., Jackson, C., & Koenen, K. C. (2020). *Treating*

survivors of childhood abuse and interpersonal trauma: STAIR Narrative Therapy (2nd ed.). The Guilford Press.

Darvesh, N., Radhakrishnan, A., Lachance, C. C., Nincic, V., Sharpe, J. P., Ghassemi, M., Straus, S. E., & Tricco, A. C. (2020). Exploring the prevalence of gaming disorder and Internet gaming disorder: A rapid scoping review. *Systematic Reviews*, *9*, 1-10. https://doi.org/10.1186/s13643-020-01329-2#Sec19

De Pasquale, C., Dinaro, C., & Sciacca, F. (2018). Relationship of Internet gaming disorder with dissociative experience in Italian university students. *Annals of General Psychiatry*, *17*(1), 28. https://doi.org/10.1186/s12991-018-0198-y

Devries, K. M., Child, J. C., Bacchus, L. J., Mak, J., Falder, G., Graham, K., Watts, C., & Heise, L. (2014). Intimate partner violence victimization and alcohol consumption in women: A systematic review and meta-analysis. *Addiction*, *109*(3), 379-391. https://doi.org/10.1111/add.12393

Dong, G.-H., & Potenza, M. N. (2022). Considering gender differences in the study and treatment of internet gaming disorder. *Journal of Psychiatric Research*, *153*, 25-29. https://doi.org/10.1016/j.jpsychires.2022.06.057

Freyd, J. J. (2008). Betrayal Trauma. In G. Reyes, J. D. Elhai, & J. D. Ford (Eds.), *Encyclopedia of Psychological Trauma*. John Wiley & Sons.

Freyd, J. J., DePrince, A. P., & Gleaves, D. H. (2007). The state of betrayal trauma theory: Reply to McNally—Conceptual issues, and future directions. *Memory*, *15*(3), 295-311. https://doi.org/10.1080/09658210701256514

Fung, H. W., Cheung, C. T. Y., Lam, P., Yuan, G. F., Wong, M. Y. C., Ling, H. W. H., Lam, S. K. K., Chau, A. K. C., & Lee, V. W. P. (2024). Is gaming disorder related to psychological trauma? A scoping review. 32nd European Congress of Psychiatry, Budapest.

Fung, H. W., Chien, W. T., Chan, C., & Ross, C. A. (2023). A cross-cultural investigation of the association between betrayal trauma and dissociative features. *Journal of Interpersonal Violence*, *38*(1-2). https://doi.org/10.1177/08862605221090568

Fung, H. W., Lam, S. K. K., Chien, W. T., Hung, S. L., Ling, H. W. H., Lee, V. W. P., & Wang, E. K. S. (2022). Interpersonal stress mediates the relationship between childhood trauma and depressive symptoms: Findings from two culturally different samples. *Australian and New Zealand Journal of Psychiatry*. https://doi.org/10.1177/00048674221138501

Gómez, J. M., Kaehler, L. A., & Freyd, J. J. (2014). Are hallucinations related to betrayal trauma exposure? A three-study exploration. *Psychological Trauma: Theory, Research, Practice, and Policy*, *6*(6), 675.

Geier, T. J., Hunt, J. C., Hanson, J. L., Heyrman, K., Larsen, S. E., Brasel, K. J., & deRoon-

Cassini, T. A. (2020). Validation of abbreviated four-and eight-item versions of the PTSD Checklist for DSM-5 in a traumatically injured sample. *Journal of traumatic stress*, *33*(3), 218-226. https://doi.org/10.1002/jts.22478

Geier, T. J., Hunt, J. C., Nelson, L. D., Brasel, K. J., & deRoon-Cassini, T. A. (2019). Detecting PTSD in a traumatically injured population: The diagnostic utility of the PTSD Checklist for DSM-5. *Depression and Anxiety*, *36*(2), 170-178. https://doi.org/10.1002/da.22873

Geng, J., Bao, L., Wang, H., Wang, J., Gao, T., & Lei, L. (2022). Does childhood maltreatment increase the subsequent risk of problematic smartphone use among adolescents? A two-wave longitudinal study. *Addictive Behaviors*, *129*, 107250. https://doi.org/problematic smartphone use

Goldberg, L. R., & Freyd, J. J. (2006). Self-reports of potentially traumatic experiences in an adult community sample: Gender differences and test-retest stabilities of the items in a brief betrayal-trauma survey. *Journal of Trauma & Dissociation*, *7*(3), 39-63. https://doi.org/10.1300/J229v07n03_04

Goldsmith, R. E., Freyd, J. J., & DePrince, A. P. (2012). Betrayal trauma: Associations with psychological and physical symptoms in young adults. *Journal of Interpersonal Violence*, *27*(3), 547-567. https://doi.org/10.1177/0886260511421672

Halpern, S. C., Schuch, F. B., Scherer, J. N., Sordi, A. O., Pachado, M., Dalbosco, C., Fara, L., Pechansky, F., Kessler, F., & Von Diemen, L. (2018). Child maltreatment and illicit substance abuse: A systematic review and meta-analysis of longitudinal studies. *Child Abuse Review*, *27*(5), 344-360. https://doi.org/10.1002/car.2534

Herron, J. L., & Venner, K. L. (2022). A systematic review of trauma and substance use in American Indian and Alaska Native individuals: Incorporating cultural considerations. *Journal of Racial and Ethnic Health Disparities*. https://doi.org/10.1007/s40615-022-01250-5

Hughes, K., Bellis, M. A., Hardcastle, K. A., Sethi, D., Butchart, A., Mikton, C., Jones, L., & Dunne, M. P. (2017). The effect of multiple adverse childhood experiences on health: A systematic review and meta-analysis. *The Lancet Public Health*, *2*(8), e356-e366. https://doi.org/10.1016/S2468-2667(17)30118-4

Khantzian, E. J. (2017). The theory of self-medication and addiction. *Psychiatric Times*, *34*(2). https://www.psychiatrictimes.com/view/new-drug-indication-patients-with-depression-could-be-life-changing

Kira, I. A., Fawzi, M., Shuwiekh, H., Lewandowski, L., Ashby, J. S., & Al Ibraheem, B. (2021). Do adding attachment, oppression, cumulative and proliferation trauma dynamics to PTSD Criterion “a” improve its predictive validity: Toward

a paradigm shift? *Current Psychology*, *40*(6), 2665-2679. https://doi.org/10.1007/s12144-019-00206-z

Király, O., Koncz, P., Griffiths, M. D., & Demetrovics, Z. (2023). Gaming disorder: A summary of its characteristics and aetiology. *Comprehensive Psychiatry*, *122*, 152376. https://doi.org/10.1016/j.comppsych.2023.152376

Lane, W., Sacco, P., Downton, K., Ludeman, E., Levy, L., & Tracy, J. K. (2016). Child maltreatment and problem gambling: A systematic review. *Child Abuse & Neglect*, *58*, 24-38. https://doi.org/10.1016/j.chiabu.2016.06.003

Lee, K., Lam, S. K. K., Hung, S. L., & Fung, H. W. (2023). Substance abuse among mothers in Taiwan: Investigating its prevalence and testing the trauma model. *Asian Journal of Psychiatry*, 103805. https://doi.org/10.1016/j.ajp.2023.103805

Long, M. E., Elhai, J. D., Schweinle, A., Gray, M. J., Grubaugh, A. L., & Frueh, B. C. (2008). Differences in posttraumatic stress disorder diagnostic rates and symptom severity between Criterion A1 and non-Criterion A1 stressors. *Journal of Anxiety Disorders*, *22*(7), 1255-1263. https://doi.org/10.1016/j.janxdis.2008.01.006

Masaeli, N., & Farhadi, H. (2021). Prevalence of Internet-based addictive behaviors during COVID-19 pandemic: A systematic review. *Journal of Addictive Diseases*, *39*(4), 468-488. https://doi.org/10.1080/10550887.2021.1895962

Mihara, S., & Higuchi, S. (2017). Cross-sectional and longitudinal epidemiological studies of Internet gaming disorder: A systematic review of the literature. *Psychiatry and clinical neurosciences*, *71*(7), 425-444. https://doi.org/10.1111/pcn.12532

Mildrum Chana, S., Wolford-Clevenger, C., Faust, A., Hemberg, J., Ramaswamy, M., & Cropsey, K. (2021). Associations among betrayal trauma, dissociative posttraumatic stress symptoms, and substance use among women involved in the criminal legal system in three US cities. *Drug and Alcohol Dependence*, *227*, 108924. https://doi.org/10.1016/j.drugalcdep.2021.108924

Mittelmark, M. B., Aarø, L. E., Henriksen, S. G., Siqveland, J., & Torsheim, T. (2004). Chronic social stress in the community and associations with psychological distress: A social psychological perspective. *International Journal of Mental Health Promotion*, *6*(1), 5-17. https://doi.org/10.1080/14623730.2004.9721919

Ogden, S. N., Dichter, M. E., & Bazzi, A. R. (2022). Intimate partner violence as a predictor of substance use outcomes among women: A systematic review. *Addictive Behaviors*, *127*, 107214. https://doi.org/10.1016/j.addbeh.2021.107214

Petruccelli, K., Davis, J., & Berman, T. (2019). Adverse childhood experiences and associated health outcomes: A systematic review and meta-analysis. *Child Abuse & Neglect*, *97*, 104127. https://doi.org/10.1016/j.chiabu.2019.104127

Pontes, H. M., & Griffiths, M. D. (2015). Measuring DSM-5 internet gaming disorder: Development and validation of a short psychometric scale. *Computers in human behavior*, *45*, 137-143. https://doi.org/10.1016/j.chb.2014.12.006

Poon, L. Y. J., Tsang, H. W. H., Chan, T. Y. J., Man, S. W. T., Ng, L. Y., Wong, Y. L. E., Lin, C.-Y., Chien, C.-W., Griffiths, M. D., Pontes, H. M., & Pakpour, A. H. (2021). Psychometric Properties of the Internet Gaming Disorder Scale–Short-Form (IGDS9-SF): Systematic Review [Review]. *Journal of Medical Internet Research*, *23*(10), e26821. https://doi.org/10.2196/26821

Rogier, G., Beomonte Zobel, S., Marini, A., Camponeschi, J., & Velotti, P. (2021). Gambling disorder and dissociative features: A systematic review and meta-analysis. *Psychology of Addictive Behaviors*, *35*(3), 247. https://doi.org/10.1037/adb0000693

Ross, C. A. (1997). *Dissociative identity disorder: Diagnosis, clinical features, and treatment of multiple personality disorder*. John Wiley & Sons.

Ross, C. A. (2007). *The trauma model: A solution to the problem of comorbidity in psychiatry*. Manitou Communications.

Ross, C. A. (2008). Group therapy for dissociative disorders and addiction. *Journal of Groups in Addiction & Recovery*, *3*(3-4), 323-346. https://doi.org/10.1080/15560350802424795

Ross, C. A., Engle, M. C., & Baker, B. (2019). Reductions in symptomatology at a residential treatment center for substance use disorders. *Journal of aggression, maltreatment & trauma*, *28*(10), 1173-1180. https://doi.org/10.1080/10926771.2018.1543746

Ross, C. A., & Halpern, N. (2009). *Trauma model therapy: A treatment approach for trauma, dissociation and complex comorbidity*. Manitou Communications.

Schimmenti, A., Billieux, J., Santoro, G., Casale, S., & Starcevic, V. (2022). A trauma model of substance use: Elaboration and preliminary validation. *Addictive Behaviors*, *134*, 107431. https://doi.org/https://doi.org/10.1016/j.addbeh.2022.107431

Taha, F., Galea, S., Hien, D., & Goodwin, R. D. (2014). Childhood maltreatment and the persistence of smoking: A longitudinal study among adults in the US. *Child Abuse & Neglect*, *38*(12), 1995-2006. https://doi.org/10.1016/j.chiabu.2014.10.022

Teng, Z., Pontes, H. M., Nie, Q., Xiang, G., Griffiths, M. D., & Guo, C. (2020). Internet gaming disorder and psychosocial well-being: A longitudinal study of older-

aged adolescents and emerging adults. *Addictive Behaviors*, *110*, 106530. https://doi.org/10.1016/j.addbeh.2020.106530

The Childhood Adversity Narratives. (2015). *Opportunities to change the outcomes of traumatized children* [BOOK]. http://static1.squarespace.com/static/552ec6c7e4b0b098cbafba75/t/56915f539cadb61a0a0d94a2/1452367700722/CAN_Narrative_1-5-16-v4L.pdf

Thombs, D. L. (2006). The multiple conceptions of addictive behavior and professional practice today. In *Introduction to Addictive Behaviors* (3 ed., pp. 1-17).

Torres-Rodríguez, A., Griffiths, M. D., & Carbonell, X. (2018). The treatment of Internet Gaming Disorder: A brief overview of the PIPATIC program. *International Journal of Mental Health and Addiction*, *16*(4), 1000-1015. https://doi.org/10.1007/s11469-017-9825-0

Tyrer, S., & Heyman, B. (2016). Sampling in epidemiological research: issues, hazards and pitfalls. *BJPsych Bulletin*, *40*(2), 57-60. https://doi.org/10.1192/pb.bp.114.050203

Waller, N. G., Putnam, F. W., & Carlson, E. B. (1996). Types of dissociation and dissociative types: A taxometric analysis of dissociative experiences. *Psychological Methods*, *1*(3), 300-321. https://doi.org/10.1037/1082-989X.1.3.300

Waller, N. G., & Ross, C. A. (1997). The prevalence and biometric structure of pathological dissociation in the general population: Taxometric and behavior genetic findings. *Journal of Abnormal Psychology*, *106*(4), 499-510. https://doi.org/10.1037/0021-843X.106.4.499

Whitaker, C., Stevelink, S., & Fear, N. (2017). The use of Facebook in recruiting participants for health research purposes: A systematic review. *Journal of Medical Internet Research*, *19*(8), e290. https://doi.org/10.2196/jmir.7071

Wu, Z. Y., Fung, H. W., Chien, W. T., Ross, C. A., & Lam, S. K. K. (2022). Trauma and dissociation among inpatients diagnosed with schizophrenia spectrum disorders in Taiwan. *European Journal of Psychotraumatology*, *13*(2), 2105576. https://doi.org/10.1080/20008066.2022.2105576

Yalch, M. M., & Levendosky, A. A. (2019). Influence of betrayal trauma on borderline personality disorder traits. *Journal of Trauma & Dissociation*, *20*(4), 392-401. https://doi.org/10.1080/15299732.2019.1572042

Zarse, E. M., Neff, M. R., Yoder, R., Hulvershorn, L., Chambers, J. E., & Chambers, R. A. (2019). The adverse childhood experiences questionnaire: Two decades of research on childhood trauma as a primary cause of adult mental illness, addiction, and medical diseases. *Cogent Medicine*, *6*(1), 1581447.

https://doi.org/10.1080/2331205X.2019.1581447

Table 1. Sample characteristics and correlates of internet gaming disorder symptoms (N = 283)

Variables	Mean (SD) / Percentage	IGD symptoms
IGD symptoms	14.02 (6.22) / 23.3% screened positive	1
Age	20.04 (1.88)	.065
Gender (female)	91.2%	-.129*
Childhood betrayal trauma	2.08 (1.58)	.090
Childhood non-betrayal trauma	1.30 (1.20)	.233***
Interpersonal stress	15.35 (4.33)	.240***
PTSD symptoms	9.24 (4.39)	.177**
Dissociative symptoms	27.24 (22.47)	.211***

Notes:

** $p < .05$ ** $p < .01$ *** $p < .001$*

IGD = Internet gaming disorder; PTSD = Post-traumatic stress disorder

Table 2. Hierarchical multiple regression predicting internet gaming disorder symptoms (N = 283)

	Internet gaming disorder symptoms				
Variables	β	p	F	ΔR2	ΔF
Step 1			4.758*	.017	4.758*
Gender (Female)	-.129	.030			
Step 2			7.771***	.060	9.139***
Gender (Female)	-.149	.011			
Betrayal trauma	-.024	.723			
Non-betrayal trauma	.258	.000			
Step 3			9.160***	.039	12.378**
Gender (Female)	-.154	.007			
Betrayal trauma	-.082	.234			
Non-betrayal trauma	.225	.001			
Interpersonal stress	.214	.001			
Step 4			7.455***	.002	.676
Gender (Female)	-.153	.008			
Betrayal trauma	-.098	.171			
Non-betrayal trauma	.218	.001			
Interpersonal stress	.195	.003			
PTSD symptoms	.057	.412			
Step 5			6.446***	.004	1.353
Gender (Female)	-.147	.011			
Betrayal trauma	-.111	.126			
Non-betrayal trauma	.201	.004			
Interpersonal stress	.184	.005			
PTSD symptoms	.029	.692			
Dissociative symptoms	.084	.246			

*$p < .05$ **$p < .01$ ***$p < .001$