Three key lessons learned from over a decade of gaming disorder assessment research

HALLEY M. PONTES[1*] ⓘ and MARK D. GRIFFITHS[2] ⓘ

[1] Birkbeck, University of London School of Psychological Sciences, London, United Kingdom

[2] Psychology Department, Nottingham Trent University, Nottingham, United Kingdom

ABSTRACT

Since the recognition of internet gaming disorder (IGD) in the fifth edition of the *Diagnostic and Statistical Manual of Mental Disorders* and gaming disorder (GD) in the eleventh revision of the *International Classification of Diseases*, significant progress has been made toward standardizing assessment practices. However, the present paper argues that three key lessons can be derived when considering the advancements in the field over the past decade. Firstly, rather than developing additional instruments, the field would greatly benefit from unifying existing assessment frameworks and establishing a clinical 'gold standard' based on current diagnostic criteria. Secondly, continued development of psychometric assessment alone is insufficient because the field urgently needs a robust theoretical framework that is able to distinguish between excessive and disordered gaming effectively. Without sound a theory, assessment and treatment practices risk ongoing conceptual drift and fragmentation. Finally, despite recent criticisms regarding the use of psychometric instruments and self-report measures, these methodologies remain necessary. While more objective gaming data can be valuable, they also present with important limitations that need to be fully considered. A potential way forward for an effective assessment approach may involve combining both psychometrically robust self-report data with objective data. However, future research must still ensure that assessment instruments undergo rigorous psychometric validation beyond reliability and validity alone. The paper concludes that instead of prioritizing the development of new assessment tools, the field would benefit more from strengthening its theoretical foundation and rigorously evaluating existing diagnostic frameworks and psychometric instruments.

BACKGROUND

The American Psychiatric Association (APA) facilitated an important turning in the field of addiction by legitimizing the recognition of behavioral addictions in the fifth edition of the *Diagnostic and Statistical Manual of Mental Disorders* (DSM-5) back in 2013 (APA, 2013). More specifically, the APA reconceptualized gambling disorder (formerly 'pathological gambling') as an addictive disorder, rather than as an impulse-control disorder, effectively making gambling disorder the first officially recognized non-substance behavioral addiction (Rash, Weinstock, & Van Patten, 2016; Reilly & Smith, 2013). At the same time, the APA introduced internet gaming disorder (IGD) as a tentative disorder alongside its defining clinical features and diagnostic criteria.

The APA proposed nine diagnostic criteria for IGD, of which at least five need to be endorsed over a period of 12 months and result in clinically significant impairment for individuals to be diagnosed as experiencing IGD. These criteria included: (1) preoccupation with gaming; (2) withdrawal symptoms when gaming is not possible; (3) the need to spend increasing amounts of time engaged in gaming, (4) unsuccessful attempts to control participation in gaming; (5) loss of interest in hobbies and entertainment as a result of, and with the exception of, gaming; (6) continued excessive gaming despite knowledge of

*Corresponding author.
E-mail: contactme@halleypontes.com

psychosocial problems; (7) deception of family members, therapists, or others regarding the amount of time spent gaming; (8) use of gaming to escape or relieve a negative mood; and (9) loss of a significant relationship, job, or educational or career opportunity because of gaming participation (APA, 2013).

The inclusion of IGD in the DSM-5 as a tentative disorder arguably provided a much-needed unification assessment framework for IGD because prior to the publication of the DSM-5, the field struggled with the lack of a consistent framework for psychometric testing and clinical assessment of IGD (Griffiths, King, & Demetrovics, 2014). This effectively hindered the quality and consistency of research on IGD and its potential for being recognized as an official disorder in the future, similar to gambling disorder.

Another key development in the field took place when the World Health Organization (WHO) decided to include gaming disorder (GD) in the eleventh revision of the *International Classification of Diseases* (ICD-11, World Health Organization, 2019) after deciding that the extant evidence warranted recognizing GD as an official disorder at the 72nd World Health Assembly (Pontes & Griffiths, 2020). Although both IGD and GD conceptually relate to the same phenomenon, the WHO defined GD as comprising: (1) diminished control in relation to gaming (e.g., onset, frequency, intensity, duration, termination, and context); (2) an increase in the priority given to gaming to a point that it takes precedence over other important life interests and activities; (3) continuation or escalation of gaming regardless of the experience of detrimental consequences; and that (4) the gaming behavior pattern should be of sufficient severity to result in significant impairments in personal, family, social, educational, occupational, or other important areas of life (WHO, 2019).

Although the APA's position remains the same, that is, IGD is still a condition warranting further research, the WHO's current understanding is that the existing evidence-base is sufficient to warrant the recognition of GD as an official mental health disorder alongside gambling disorder as the only two currently recognized non-substance-based addictive disorders. It is worth noting that since the publication of the DSM-5 and ICD-11, the field has developed rapidly with important advancements taking place along the way, which we contend has resulted in three key lessons learned in respect to the assessment of GD at present.

Lesson number one: Unifying the assessment framework is more important than unifying the assessment itself

It is important not confuse previous calls for unification of an assessment framework with current calls for unification of assessment instruments which in our view is counterproductive. Recently, King, Billieux, and Delfabbro (2025) argued that there is an existing challenge in the field of GD due to the history of inconsistent screening and assessment because previous approaches relied on adapting criteria from other fields. It is worth noting that because GD presents unique clinical and experiential features due to the specific nature of the gaming activity itself, directly importing diagnostic criteria from other disorders to assess GD is not the way forward as it once was for earlier concepts such as 'internet addiction' that borrowed criteria from other addictions (Young, 1998) at a time where no diagnostic frameworks existed as is the case now.

It has also been suggested by King et al. (2025) that the WHO is developing a screening and diagnostic instrument for GD to provide a 'gold standard' which may unify assessment practices across the board. However, this initiative involves addressing a problem that in our view is not that critical or widespread, and in fact, it provides a solution for an issue in which its practical importance remains questionable given the significant efforts and latest developments regarding the assessment of GD under the current WHO framework.

Within the extant literature, multiple psychometrically robust instruments suitable for assessing GD within the WHO framework can be found. We therefore argue that a more beneficial approach would instead be to establish a clear clinical 'gold standard' for GD, which would involve systematically evaluating and comparing the diagnostic accuracy and clinical usefulness of the currently available psychometric instruments against actual clinical diagnoses performed by clinicians through the application of the official GD criteria from the ICD-11. This approach aligns with the concerns raised by King et al. (2025), who cautioned against the creation of additional assessment instruments for GD, noting that the continuous proliferation of instruments targeting the same construct contributes to problematic outcomes, such as the 'silo effect' in psychometric validation studies where research teams work in isolation by developing and validating their own instrument rather than coordinating around a small set of shared instruments and pooling data to build a cumulative and comparable evidence base. We therefore invite those in the field to reflect on the notion that the cause of the stated problem (i.e., proliferation of instruments) is being proposed simultaneously as its resolution (i.e., the creation of a new instrument).

Because official diagnostic criteria for GD already exist, another "all-encompassing" solution based on the creation of yet another assessment instrument for GD is not needed and may in fact be argued to be harmful in the current context of research. In our view, there is sufficient compelling evidence at present suggesting that the most widely used assessment instruments for GD based on official diagnostic criteria (i.e., APA and WHO frameworks) are suitable because they have been shown to be valid and reliable across multiple studies conducted in many nations, cultures, and languages (Poon et al., 2021) with clinical research supporting their use (Qin et al., 2020). Interestingly, evidence from King et al.'s own previous recent research suggested that popular and widely used psychometric instruments based on the APA framework such as the Internet Gaming Disorder Scale-Short-Form (IGDS9-SF, Pontes & Griffiths, 2015) provides full coverage of the APA diagnostic criteria for IGD while showing robust psychometric properties (King et al., 2020).

Additionally, in regards to the assessment of GD based on the WHO framework, the Gaming Disorder Test (GDT, Pontes et al., 2021) was the first standardized assessment instrument developed based on the diagnostic criteria proposed by the WHO. Similar to the IGDS9-SF, the GDT has also been widely used internationally and substantial evidence supports its use given its robust psychometric properties and strong content and criteria coverage of the construct (Jahrami et al., 2024; Siřínková, Blinka, & Montag, 2024; Wang & Cheng, 2020). Moreover, Karhulahti, Martončik, and Adamkovič (2021) found in their study that of all available instruments, the GDT was the only one to show the highest level of validity in the operationalization of the assessment criteria for GD. Moreover, the recent meta-analysis by Jahrami et al. (2024) reviewing a total of 17 studies in 14 languages that employed the GDT concluded that there was robust evidence supporting its internal consistency across diverse populations and that the instrument showed strong psychometric properties without risk of bias across all reviewed studies.

While it may be true that before the publication of the DSM-5 and ICD-11 the field was in a chaotic state regarding the foundations and consistency of psychometric and clinical assessment instruments, arguably, this was mainly due to the fact that no solid and officially recognized diagnostic framework existed at the time as is the case now. To this end, we conclude that although the field is at present well-served by robust assessment instruments providing excellent coverage of the official GD diagnostic criteria, it is essential to recognize that there is still a need for diversity and adaptability in assessing GD particularly because different cultural contexts and populations may warrant bespoke approaches to both assessment and treatment of GD.

Based on the aforementioned observations, our view is that the field should now focus on refining existing diagnostic frameworks by examining more deeply the suitability and relevance of each criterion while moving away from simplistic approaches that propose the development of a 'magic' solution to all problems within the field through the creation of yet another assessment instrument.

Lesson number two: Sound theories are more needed than additional assessment instruments

With the exception of a few general existing theories, models, and theoretical assumptions that have been developed, such as the components model of addiction within a biopsychosocial framework (Griffiths, 2005), the Interaction of Person-Affect-Cognition-Execution (I-PACE) model (Brand, Young, Laier, Wölfling, & Potenza, 2016), and the syndrome model of addiction (Shaffer et al., 2004), meaningful recent theoretical breakthroughs in the field of GD have been virtually non-existent, despite attempts to revise existing perspectives (Brand et al., 2019). As such, we argue that instead of focusing the nature of the problem on the assessment itself, a shift is needed toward developing a sound theory for GD explaining its etiology, maintenance,

and consequences more deeply in light of the extensive literature available and the evolving nature of the criteria proposed in the DSM-5 and ICD-11. To properly address this gap, a sound theory specific for GD should be developed to clarify the following important points.

First, such a theory should convincingly explain with precision what exactly disordered gaming is and what is merely excessive play or hazardous gaming behavior. That is, a sound theory will provide clear and compelling evidence-based explanations regarding the actual role of time spent gaming in the etiology and maintenance of GD. This is an important point to address that recent large-scale research began exploring using large-scale data (Katz et al., 2024; Pontes, Schivinski, Kannen, & Montag, 2022). However, it is unlikely that a few isolated cross-sectional studies will be able to entirely address this issue. It is clear that a much larger body of evidence will be needed to capture the full extent of the interplay between time spent gaming and GD across different developmental stages and cultural contexts, particularly from a longitudinal perspective capable of informing its trajectories and clinical course (i.e., onset triggers, escalation, plateaus, recovery, and relapse). Drawing a fine evidence-based line between excessive gaming and disordered gaming will contribute to informing national and international preventative policies and likely help individuals distinguish what healthy and unhealthy gaming behaviors look like from an engagement perspective, hopefully before the issue escalates.

Second, a robust theory must delineate the exact constellation of risk factors that propel excessive gaming toward disordered gaming and outline the functional impairments that ensue. It should map how intra-personal vulnerabilities (e.g., personality traits, comorbidities, etc.) interact with structural factors related to the gaming activity itself (e.g., persuasive game mechanics, monetization features, etc.), alongside social factors (e.g., social reinforcement, family conflict, etc.). Importantly, such theory should trace these interactions across the lifespan to identify key developmental pressure points (e.g., early adolescence, the transition to college or work, periods of social isolation) when specific combinations of risk profiles are most likely to emerge and crystallize into disordered gaming patterns. We argue that linking each risk pathway to clear downstream outcomes (e.g., academic failure, occupational disengagement, sleep disturbance, relationship strain, comorbidity) would enable such theory to provide researchers with precise hypotheses to test and equip clinicians with concrete markers for screening, delivering early intervention, and tailored treatment planning.

Third, a comprehensive theory must be cross-culturally valid and generalizable. That is, the core mechanisms it proposes should be articulated so they can be observed irrespective of the cultural environment where gaming occurs. At the same time, such theory should consider clearly defined cultural moderators including (but not limited to) parental norms, collectivist versus individualist value orientations, local opportunities for alternative leisure activities, and the culturally ascribed meanings of gaming behavior.

Incorporating such parameters at the theoretical level, rather than introducing them post-hoc as statistical co-variates, should allow rigorous tests of cross-group invariance, facilitating the development of culturally-calibrated impairment thresholds while guiding the design of interventions that remain faithful to GD's core processes while also respecting local contexts.

With this in mind, we argue that the field cannot advance solely based on incremental empirical findings alone or the development of additional assessment instruments aimed at tackling all the existing issues that currently exist in the field. To complement and expand upon the progress brought about by existing diagnostic frameworks, it is evident that the field now needs a robust theoretical framework capable of providing an integrated and falsifiable theory of GD that is conceptually precise, developmentally informed, and culturally inclusive. To achieve this, such developments will need to determine the totality of measurable *in vivo* experiences and external, observable phenomena relevant to disordered gaming. Until such theoretical framework is developed, the lack of a robust GD-specific theoretical foundation risks ongoing conceptual drift that will likely further exacerbate the chaos and confusion in the assessment and treatment realms.

Lesson number three: Psychometric assessment is still important and will continue to be so

Recently, several authors have brought attention to the pitfalls associated with the use of so-called "subjective data" collected via psychometric instruments and self-report measures in relation to their accuracy in estimating digital technology use due to inconsistencies observed when assessing key behaviors such as time spent gaming (Parry et al., 2021) and social media use (Verbeij, Pouwels, Beyens, & Valkenburg, 2021), leading some authors to suggest that their use is not tenable (Johannes, Vuorre, & Przybylski, 2021). Although self-report measures, including the use of standardized psychometric assessment instruments, may present with caveats similar to any other measurement method, it is important to not to dismiss them entirely on that basis. Instead, it is necessary to recognize their strengths and weaknesses to leverage their benefits more effectively without forgetting the potential issues also associated with more objective data.

Importantly, psychometric assessment through self-report measures plays an important role in GD research by offering important insights related gaming behaviors that may help further our understanding of the psychological dynamics underlying GD and even overcome some of the issues related to the use of objective data alone. Consequently, it has been argued that researchers should not blindly dismiss the results of studies that rely on self-report measures nor abandon altogether the use of subjective data in favor of more objective data (Johannes, Nguyen, Weinstein, & Przybylski, 2021).

Based on this, we argue that objective data (e.g., in-game telemetry, logged data from gaming sessions, account-based tracking data, etc.) present with potential limitations that highlight the importance of complementing them with data collected from self-reported methodologies. First, objective data may suffer from contextual blindness. For instance, while server logs can precisely identify the moment a player exits the game following a defeat, they provide no information regarding the reasons behind this departure (e.g., anger, fatigue, or something else not related to gaming). Conversely, self-reported measures can provide useful insights into the motives underpinning player actions, enabling researchers to better differentiate emotional responses from simple interruptions, restoring the personal narrative that objective data fails to capture.

Second, objective data often suffer from a proxy-gap between the actual data collected and subjective player experiences. Although time spent gaming, achievements, and/or experience gains within games may be used to conveniently represent enjoyment for example, these metrics fail to differentiate between disordered play and authentic enjoyment. In this context, self-report methods are able to offer relevant data on players' subjective experiences (e.g., flow states, stress, satisfaction, etc.) helping bridge the gap between recorded behavior and subjective experiences. When used alongside objective data, self-reports may enable researchers to better distinguish between disordered, hazardous, and non-disordered gaming patterns.

Third, objective gaming data are often limited by poor quality and uncertainty about who is actually playing. This is because technical issues (e.g., client crashes, poor internet connection leading to packet loss, etc.) and behavioral issues (e.g., account sharing, using multiple accounts, etc.) can introduce significant distortions or gaps in objective data. For example, a household with several gamers sharing the same account might mistakenly appear as a highly engaged gamer, while a single highly engaged gamer playing from multiple locations or devices might be incorrectly flagged as many disengaged gamers. Here, self-report measures can be a valuable verification methodology to help researchers validate user identity, interpret unusual patterns in the data, and maintain clarity around individual gaming patterns that more objective data might misrepresent.

Indeed, traditional psychometric instruments and self-report measures are predominantly used in GD research because they allow researchers and clinicians to assess personal experiences involving, for example, psychiatric distress (Pontes, Taylor, & Stavropoulos, 2018), functional impairments (Montag & Pontes, 2023), loss of control (Ha & Kim, 2024), and motivational factors (Montag, Schivinski, Kannen, & Pontes, 2022) driving disordered gaming behaviors. Such factors are important to consider when assessing GD beyond the immediate observations derived from objective data. In our view, a significant advantage of self-reported methodologies lies on their practicality and ease of use. Conversely, objective data almost always require specialized technology, complex research design, and/or direct collaboration with gaming companies that may not be possible to all researchers.

Additionally, collecting data using self-reported methodologies can be significantly cost-effective, straightforward,

and easily scalable for studies that need to collect population-wide data to support public health research and policy initiatives aimed at developing preventive strategies. In the context of GD, early monitoring of gaming behaviors and attitudes in large-scale research can contribute to effective diagnosis and intervention efforts that may mitigate the burden of GD (Männikkö et al., 2022; Rumpf et al., 2018).

Nevertheless, for such benefits to occur, psychometric instruments must be evaluated on more than basic reliability and validity. Researchers and clinicians should take into consideration testing conducted in relation to other aspects, including (but not limited to) measurement invariance because it helps in (i) ensuring that test scores carry equivalent meaning across different relevant groups that may be potentially affected by GD in a differential way (e.g., gender, age, cultures), and (ii) preventing spurious group comparisons based on non-existent group differences. Additionally, it is also important to make considerations beyond classical test theory to item response theory analyses because they are capable of (a) evaluating the performance of test-items by identifying poor performance, and (b) ensuring that the instrument is equally sensitive to mild, moderate, moderate, and severe symptoms of GD, which is paramount for early diagnosis and treatment-focused research initiatives. Based on this, our view is that research on GD should focus on only employing robust psychometric instruments with extensive evidence supporting their suitability beyond traditional reliability and validity considerations in order to help the field improve its quality in terms of assessment.

Because collecting objective data is not always possible and that there are benefits in using psychometric assessment instruments and self-report measures to assess gaming behaviors, psychometric assessment instruments and self-report measures will remain integral to both present and future GD research because they are capable of offering deeper insights into gaming behaviors that may not be fully captured by objective data alone. Moreover, as definitions of GD continue to evolve alongside clinical and technological advancements, psychometric instruments and self-report measures will likely remain indispensable for identifying emerging patterns and new risk factors associated with GD, helping delineate the boundaries between healthy and unhealthy gaming behaviors. Therefore, ensuring methodological rigor through the use of robust psychometric instruments remains extremely important to effectively understand, diagnose, and address the phenomenon of GD in psychological research.

CONCLUSION

The field appears to be at an important juncture. While previous studies have greatly contributed to the current evidence-base on GD and its formal recognition, incremental studies aiming to develop additional assessment instruments for GD are likely to be insufficient for sustained progress in the long run. We argue that the pursuit of a 'one-size fits all' solution through the development of yet another assessment instrument will likely be unproductive because the field would benefit more from targeted, concerted, and focused efforts toward refining existing diagnostic approaches and building a robust theoretical foundation for GD, noting that such refinement should involve a rigorous examination of the suitability and relevance of current criteria.

More specifically, we also argue that sustained, long-term progress in the field will require a robust, falsifiable, developmentally-informed, and culturally-inclusive theoretical framework for understanding the complexities of GD as a behavioral addiction. Without such a foundation, the field risks a lack of consistent direction that may contribute to exacerbating confusion in both research and clinical practice involving both the assessment and treatment of GD. While the use of psychometric instruments and self-report measures remains important and will likely continue to be so in the future, it must be grounded in robust theory and the potential combination of objective data where possible. However, just because a significant proportion of GD studies lack objective data, this does not mean they cannot be well-designed and produce valuable findings.

Finally, while potential initiatives to propose and develop a new screening instrument are well-intentioned, their practical importance is questionable given the significant recent developments related to the assessment of GD within the existing APA and WHO frameworks. Therefore, a shift in focus toward the consolidation of theory-driven efforts and critical evaluation of existing diagnostic frameworks and assessment instruments based on new theoretical developments arguably represents a more pragmatic and impactful future direction for the field.

REFERENCES

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

Brand, M., Wegmann, E., Stark, R., Müller, A., Wölfling, K., Robbins, T. W., & Potenza, M. N. (2019). The Interaction of Person-Affect-Cognition-Execution (I-PACE) model for addictive behaviors: Update, generalization to addictive behaviors beyond internet-use disorders, and specification of the process character of addictive behaviors. *Neuroscience & Biobehavioral Reviews*, *104*, 1–10. https://doi.org/10.1016/j.neubiorev.2019.06.032

Brand, M., Young, K., Laier, C., Wölfling, K., & Potenza, M. N. (2016). Integrating psychological and neurobiological considerations regarding the development and maintenance of specific internet-use disorders: An Interaction of Person-Affect-Cognition-Execution (I-PACE) model. *Neuroscience & Biobehavioral Reviews*, *71*, 252–266. https://doi.org/10.1016/j.neubiorev.2016.08.033

Griffiths, M. D. (2005). A 'components' model of addiction within a biopsychosocial framework. *Journal of Substance Use*, *10*(4), 191–197. https://doi.org/10.1080/14659890500114359

Griffiths, M. D., King, D. L., & Demetrovics, Z. (2014). DSM-5 internet gaming disorder needs a unified approach to assessment. *Neuropsychiatry*, *4*(1), 1–4. https://doi.org/10.2217/npy.13.82

Ha, S., & Kim, S. (2024). Barriers to playing digital games: Why do some people choose not to play digital games? *Telematics and Informatics*, *93*, 102161. https://doi.org/10.1016/j.tele.2024.102161

Jahrami, H., Husain, W., Lin, C.-Y., Björling, G., Potenza, M. N., & Pakpour, A. (2024). Reliability generalization meta-analysis and psychometric review of the Gaming Disorder Test (GDT): Evaluating internal consistency. *Addictive Behaviors Reports*, *20*, 100563. https://doi.org/10.1016/j.abrep.2024.100563

Johannes, N., Nguyen, T., Weinstein, N., & Przybylski, A. K. (2021). Objective, subjective, and accurate reporting of social media use: No evidence that daily social media use correlates with personality traits, motivational states, or well-being. *Technology, Mind, and Behavior*, *2*(2). https://doi.org/10.1037/tmb0000035

Johannes, N., Vuorre, M., & Przybylski, A. K. (2021). Video game play is positively correlated with well-being. *Royal Society Open Science*, *8*(2), 202049. https://doi.org/10.1098/rsos.202049

Karhulahti, V. M., Martončik, M., & Adamkovič, M. (2021). Measuring internet gaming disorder and gaming disorder: A qualitative content validity analysis of validated scales. *Assessment*, *30*, 402–413. https://doi.org/10.1177/10731911211055435

Katz, D., Horváth, Z., Pontes, H. M., Koncz, P., Demetrovics, Z., & Király, O. (2024). How much gaming is too much? An analysis based on psychological distress. *Journal of Behavioral Addictions*, *13*(1), 716–728. https://doi.org/10.1556/2006.2024.00036

King, D. L., Billieux, J., & Delfabbro, P. H. (2025). Screening, assessment and management of gaming disorder: Recent evidence and future directions. *World Psychiatry*, *24*(2), 268–269. https://doi.org/10.1002/wps.21319

King, D. L., Chamberlain, S. R., Carragher, N., Billieux, J., Stein, D., Mueller, K., … Delfabbro, P. D. (2020). Screening and assessment tools for gaming disorder: A comprehensive systematic review. *Clinical Psychology Review*, *77*, 101831. https://doi.org/10.1016/j.cpr.2020.101831

Männikkö, N., Ojala, P., Hylkilä, K., Kääriäinen, M., Vähänikkilä, H., & Mustonen, T. (2022). The effects of an early intervention on adults' gaming-related problems – A pilot study. *Journal of Addictive Diseases*, *40*(4), 501–513. https://doi.org/10.1080/10550887.2022.2030640

Montag, C., & Pontes, H. M. (2023). Letter to the editor: A closer look at functional impairments in gaming disorder. *Journal of Psychiatric Research*, *164*, 402–403. https://doi.org/10.1016/j.jpsychires.2023.06.003

Montag, C., Schivinski, B., Kannen, C., & Pontes, H. M. (2022). Investigating gaming disorder and individual differences in gaming motives among professional and non-professional gamers: An empirical study. *Addictive Behaviors*, *134*, 107416. https://doi.org/10.1016/j.addbeh.2022.107416

Parry, D. A., Davidson, B. I., Sewall, C. J. R., Fisher, J. T., Mieczkowski, H., & Quintana, D. S. (2021). A systematic review and meta-analysis of discrepancies between logged and self-reported digital media use. *Nature Human Behaviour*, *5*, 1535–1547. https://doi.org/10.1038/s41562-021-01117-5

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

Pontes, H. M., & Griffiths, M. D. (2020). A new era for gaming disorder research: Time to shift from consensus to consistency. *Addictive Behaviors*, *103*, 106059. https://doi.org/10.1016/j.addbeh.2019.106059

Pontes, H. M., Schivinski, B., Kannen, C., & Montag, C. (2022). The interplay between time spent gaming and disordered gaming: A large-scale world-wide study. *Social Science & Medicine*, *296*, 114721. https://doi.org/10.1016/j.socscimed.2022.114721

Pontes, H. M., Schivinski, B., Sindermann, C., Li, M., Becker, B., Zhou, M., & Montag, C. (2021). Measurement and conceptualization of gaming disorder according to the World Health Organization framework: The development of the Gaming Disorder Test. *International Journal of Mental Health and Addiction*, *19*, 508–521. https://doi.org/10.1007/s11469-019-00088-z

Pontes, H. M., Taylor, M., & Stavropoulos, V. (2018). Beyond "Facebook addiction": The role of cognitive-related factors and psychiatric distress in social networking site addiction. *Cyberpsychology, Behavior, and Social Networking*, *21*(4), 240–247. https://doi.org/10.1089/cyber.2017.0609

Poon, L. Y. J., Tsang, H. W. H., Chan, T. Y. J., Man, S. W. T., Ng, L. Y., Wong, Y. L. E., … Pakpour, A. H. (2021). Psychometric properties of the Internet Gaming Disorder Scale–Short-Form (IGDS9-SF): Systematic review. *Journal of Medical Internet Research*, *23*(10), e26821. https://doi.org/10.2196/26821

Qin, L., Cheng, L., Hu, M., Liu, Q., Tong, J., Hao, W., … Liao, Y. (2020). Clarification of the cut-off score for nine-Item Internet Gaming Disorder Scale–Short Form (IGDS9-SF) in a Chinese context. *Frontiers in Psychiatry*, *11*, 470. https://doi.org/10.3389/fpsyt.2020.00470

Rash, C., Weinstock, J., & Van Patten, R. (2016). A review of gambling disorder and substance use disorders. *Substance Abuse and Rehabilitation*, *7*, 3–13. https://doi.org/10.2147/sar.s83460

Reilly, C., & Smith, N. (2013). The evolving definition of pathological gambling in the DSM-5. *International Center for Responsible Gaming*. Retrieved July 23, 2025, from https://www.icrg.org/blog/the-evolving-definition-of-pathological-gambling-in-the-dsm-5/.

Rumpf, H. J., Bischof, A., Bischof, G., Besser, B., Brand, D., & Rehbein, F. (2018). Early intervention in gaming disorder: What can we learn from findings in the substance abuse field? *Current Addiction Reports*, 5, 511–518. https://doi.org/10.1007/s40429-018-0229-4

Shaffer, H. J., LaPlante, D. A., LaBrie, R. A., Kidman, R. C., Donato, A. N., & Stanton, M. V. (2004). Toward a syndrome model of addiction: Multiple expressions, common etiology. *Harvard Review of Psychiatry*, 12(6), 367–374. https://doi.org/10.1080/10673220490905705

Siřínková, D., Blinka, L., & Montag, C. (2024). Gaming Disorder Test: Assessing psychometric properties, prevalence, temporal stability, and invariance using a Czech two-time-point longitudinal sample. *Journal of Psychiatric Research*, 175, 192–199. https://doi.org/10.1016/j.jpsychires.2024.05.023

Verbeij, T., Pouwels, J. L., Beyens, I., & Valkenburg, P. M. (2021). The accuracy and validity of self-reported social media use measures among adolescents. *Computers in Human Behavior Reports*, 3, 100090. https://doi.org/10.1016/j.chbr.2021.100090

Wang, H. Y., & Cheng, C. (2020). Psychometric evaluation and comparison of two gaming disorder measures derived from the DSM-5 and ICD-11 frameworks. *Frontiers in Psychiatry*, 11, 1490. https://doi.org/10.3389/fpsyt.2020.577366

World Health Organization. (2019). *International statistical classification of diseases for mortality and morbidity statistics* (11th ed.). Retrieved July 23, 2025, from https://icd.who.int/browse/2025-01/mms/en#1448597234.

Young, K. S. (1998). Internet addiction: The emergence of a new clinical disorder. *CyberPsychology & Behavior*, 1(3), 237–244. https://doi.org/10.1089/cpb.1998.1.237