

The relationship between gaming disorder and addiction requires a behavioral analysis

*Commentary on: Scholars' open debate paper on the World Health Organization
ICD-11 Gaming Disorder proposal (Aarseth et al.)*

RICHARD J. E. JAMES* and RICHARD J. TUNNEY

School of Psychology, University of Nottingham, University Park, Nottingham, UK

(Received: February 15, 2017; revised manuscript received: April 28, 2017; accepted: June 17, 2017)

In their position paper, Aarseth et al. (2016) bring to light several timely issues concerning the categorization of gaming disorder as a form of addiction and as a discrete mental disorder. In our commentary, we welcome their caution toward this move and their discussion of the equivocal scientific data in its support and the potential negative consequences for gamers. We suggest that a more heterogeneous approach is required for understanding any behavioral addiction, as concepts from gambling appear to be more relevant for aspects of mobile gaming than for video games more generally. In addition to a greater need for clinical research, we argue that studying gaming at a different level of analysis than the epidemiological study is required to gain a meaningful understanding of the harm video games may or may not entail.

Keywords: addiction, behavior, gaming, gambling

INTRODUCTION

The open debate paper by Aarseth et al. (2016) raises a number of important difficulties concerning the proposal for a gaming disorder category in the 11th Revision of the International Classification of Diseases (ICD-11), but are also relevant to the existing debate concerning the proposed Internet gaming disorder (IGD) in the fifth edition of the *Diagnostic and Statistical Manual of Mental Disorders* (DSM-5). There is a substantial range of conceptual, epidemiological, and nosological concerns highlighted that lead to the compelling conclusion that the introduction of a category of gaming disorder in diagnostic manuals is premature and is liable to be detrimental in understanding the nature of any harm that might be caused by gaming. These concerns are relevant regardless of whether gaming is considered as a whole or for a subset of games, such as with the online/offline distinction in the ICD-11 drafts and ostensibly so in the DSM-5 (although the DSM includes the possibility that offline games could be included in IGD). The debate paper also highlights some of the wider effects that might result from codifying such a disorder, such as moral panics and stigmatization of video gamers, leading to the possibility of changes in public policy. Public concerns about the effects of video games, whether it be aggression, addiction, or other forms of harm are common, but the research is at best equivocal.

The purpose of this commentary is to focus on two issues that arise from the debate letter. Primarily, we argue that the study and diagnosis of behavioral addictions should be determined by a deeper unit of analysis than is currently used, such

as the behavioral mechanics of games. We then challenge the assertion that it is problematic to translate concepts from gambling and addictions to the study of video games, discussing this further in relation to the introduction of gambling elements into mobile games. This is likely to be informative in broadening our collective understanding of the impact of video games on people and society, rather than a naïve conception of a behavioral addiction as being merely a compulsive behavior in the absence of a known mechanism for dependence.

A GREATER HETEROGENEITY IN STUDYING PROBLEMATIC GAMING

The open letter highlights the predominance of gaming research that is (a) typically not substantiated against clinical samples, (b) liable to mischievous responding, and (c) based on potentially erroneous interpretation of large-scale survey data. Building on this, we feel that there is also an absence of research looking in depth at gaming at the product level, with a particular need for research that focuses on the structural and associative aspects of games. For these reasons, we question whether it makes sense to classify video games generally as addictive, and instead

* Corresponding author: Richard J. E. James; School of Psychology, University of Nottingham, University Park, Nottingham NG7 2RD, UK; Phone: +44 115 951 5281; Fax: +44 115 95 15324; E-mail: lpzrj@nottingham.ac.uk

recommend that research should look at the problem at a more appropriate level of analysis.

The empirical literature is limited in trying to capture heterogeneity in the design and content of video games, often focusing on sociodemographic predictors of gaming addiction rather than the types of games played or how these are engaged with. Models of IGD (Lee, Lee, & Choo, 2017) have considered differences between genres alongside other outcomes, but these can belie differences in a game's mechanics. Games within a genre may have substantially different mechanisms of play, either to suit the device the game is played upon or the business model underlying the game. The focus on mechanics and design elements rather than genres to an extent mirrors a similar distinction in the gambling literature between a type of product and its structural features (Griffiths & Auer, 2013), although a larger number of intra-genre differences might be expected. In some cases, there is room for translation from one to the other, as research has experimentally examined the role of near-misses, a feature typically associated with slot machines, in casual puzzle games (Larche, Musielak, & Dixon, 2017). In this case, the translation from gambling to gaming was appropriate, but there is also utility in studying the cognitive and behavioral features included within some gaming mechanics independently of their association with gambling.

An associative-behavioral analysis of potential behavioral addictions is likely to be one of the most fruitful lines of enquiry (James & Tunney, 2017; Robbins & Clark, 2015). In gambling, there has been an effort to understand how the mechanics of gambling play affect behavior simultaneous to the survey-based work that tends to be dominant in the gaming disorder field. Even if the psychometric research is ultimately able to identify a valid construct of gaming disorder, it is intrinsically limited in the conclusions that can be drawn regarding the nature of the addiction or harm that video games may entail. Behavioral research is likely also to complement studies of clinical cases of gaming disorder. Much of the work, when applied to gambling (and in forms to other addictions) has identified differential responding, both in brain and behavior, between disordered and non-disordered individuals. However, a significant proportion of this work has been undertaken not only to understand the relationship between these events and addiction, but the nature of these events themselves.

Such work is also not a prerequisite for identifying video gaming as a potentially addictive behavior, and can be exploratory in studying the effects of mechanics or structural features on behavior. A similar line of thought has been applied to the "gamification" of activities to increase enjoyment of a tedious activity, or to encourage positive behaviors. Many of these include components derived from associative learning alongside an array of psychological techniques (Baranowski, Buday, Thompson, & Baranowski, 2008). Such work can be informative as much as the darker side of video gaming that has been more typically the object of study. From the perspective of the gambling researcher, understanding the behavioral features of games in more depth is useful as the convergence of gaming and gambling goes in both directions. Slot machines in casinos in America are starting to utilize skill-based elements as a means of attracting younger audiences (Parry, 2016). We recommend that research should

focus more on different features or mechanics included in games instead of measuring the prevalence and predictors of disorder in the general population.

MOBILE GAMING AND PATHOLOGICAL GAMBLING CRITERIA

The recommendations of Aarseth et al.'s (2016) paper are important for determining the appropriate diagnostic criteria for a gaming disorder. Concerns about some addiction criteria, particularly tolerance and withdrawal, are relevant across analyses of behavioral addictions (Billieux, Schimmenti, Khazaal, Maurage, & Heeren, 2015) as well as gaming (Kaptis, King, Delfabbro, & Gradisar, 2016). However, the call to move away from addiction and specifically gambling may be less beneficial for understanding some forms of play more than others. The increasing use of gambling mechanics and themes in mobile play leads itself toward a sustained, gambling-informed analysis that is less advisable in other domains of gaming or behavioral addiction.

It is important to emphasize that in referring to "mobile" gaming, we do not attempt to distinguish between modalities of play in the manner that has been common, for example, between "online" and "offline" games. This approach underlies both the DSM-5 and ICD-11 proposals for a gaming disorder, and is in our view, unhelpful. In the time between initial formulations of gaming in Internet addiction (Young, 1998) and its codification in the DSM (American Psychiatric Association, 2013), changes in the video gaming market have meant that a much wider spread of games are now online-focused, meaning whatever discriminant validity this term had is vestigial. We instead refer to a subset of games that have a common clustering of mechanisms and business models that have become prevalent on mobile devices. What appears to be common among these is a reliance on principles derived from behavioral psychology, including the use of random ratio schedules of reinforcement alongside gambling themes, different types of reinforcement (e.g., achievements/badges) and the use of stamina-style systems to affect how frequently reinforcement is delivered (James, O'Malley, & Tunney, 2017; Larche et al., 2017). These make heavy use of micro-transactions, often based on the premise that a small proportion of users, colloquially referred to as "whales" (Alha, Koskinen, Paavilainen, Hamari, & Kinnunen, 2014; Kimppa, Heimo, & Harviainen, 2016), engage in substantial spending (Garfield, 2016). These are not limited to mobile games, with similar mechanics being used in some console or PC games. Much of the criticism of these models comes from video gamers and developers themselves, with a focus on their exploitative nature, referring to these games as "Skinnerware" for their overt basis in conditioning and associative learning (Garfield, 2016).

These types of activity have been partially explored in the existing literature, which has looked at social gambling or social casino games (Gainsbury et al., 2015; Parke, Wardle, Rigbye, & Parke, 2012). However, this research has tended to focus on games that are primarily gambling-based (i.e., stand-alone casino apps or on social media) or contain an explicit gambling element that is ring-fenced from the primary content of the game (Gainsbury, Russell,

& Hing, 2014) or a side game (Griffiths, King, & Delfabbro, 2012). What differentiates this emerging form of mobile gaming is that gambling mechanics are a core focus of the game itself. The term “games with gambling elements” has been used to describe this phenomenon alongside a number of commentaries identifying a convergence between gaming and gambling or the “gamblification” of games (Gainsbury, Russell, King, Delfabbro, & Hing, 2016; King, Delfabbro, & Griffiths, 2010; King, Gainsbury, Delfabbro, Hing, & Abarbanel, 2015; McBride & Derevensky, 2016), but again an examination of the literature shows that this has tended to focus more on console video games with a simulated gambling element using in-game currency (Gainsbury et al., 2015; Gainsbury, Hing, Delfabbro, & King, 2014). Griffiths and King (2015) have argued that gambling elements within games can constitute a gambling activity, using the example of simulated gambling games within RuneScape, the browser-based massively multiplayer online role-playing game. Plays on the games in question can be purchased using a secondary currency that can be obtained both in-game and using real money. This model is reasonably similar to the one that has proliferated among mobile gaming, although this example differs insofar as a maximum monthly spending limit is placed on this activity.

Although it has been argued these kinds of games could be classed as gambling (Griffiths & King, 2015), regulatory perspectives on this issue have tended to be more cautious (The Gambling Commission, 2015). Moreover, the existing questions appear to focus on whether these activities engender a risk of problem gambling/gambling-like problems (Parke et al., 2012), or whether their risk is in encouraging players to transition to real money gambling, where there is a growing research literature (Gainsbury et al., 2016; Kim, Wohl, Salmon, Gupta, & Derevensky, 2015; McBride & Derevensky, 2016). In addition, this behavior may not fall under the criteria for existing constructs of gaming disorder, which focus on excessive behavior and (in the case of the DSM-5) the lack of monetary risk involved. Mobile games are an example in which gambling style mechanics are becoming more common in video games. Although we agree comparisons from gambling are often inappropriate, we argue that a more nuanced approach is required.

CONCLUDING REMARKS

The primary theme underlying this commentary is the need for a greater heterogeneity in understanding the nature of the relationship between video gaming and disorder. Given the range of mechanics and business models within video gaming, it seems inadvisable to treat this as an unitary phenomenon, both in attempting to codify and measure a gaming disorder (both of which consider games as either “online” and “offline”) or in the psychometric scales employed to measure gaming disorders of various kinds. This commentary highlights an example of one increasingly common type of gaming that has the potential to substantially differ from other games in that regard. In discussing this, we identify a number of issues in the area that highlight different elements of an association with problematic gambling behavior that makes a gambling perspective on these

products more informative than for other types of gaming. At one extreme it might be viable to consider some cases as instances of gambling disorder. Further research is required to understand the behavioral characteristics of video games, whether common or distinct from those observed in gambling.

We have previously argued for a greater heterogeneity in understanding potentially addictive behavior in behavioral addictions, including video games. Translating markers from drugs and gambling has proven of limited utility, overinflating estimates in epidemiologically inspired studies. Gambling may not be the most appropriate starting point to consider behavioral addictions. However, it is important to recognize the market for video games is being driven in multiple directions. One of the more prominent of these is in the growth of free to play or freemium models, particularly on mobile phones. Many of the mechanisms these games are designed around or involve mechanics or themes from gambling. While the debate paper cites mounting research that markers derived from substance use or gambling addictions are of limited utility in the study of video gaming generally, there are certain kinds of game where translations appear to be appropriate and proportional.

Funding sources: None.

Authors' contribution: RJEJ and RJT were directly involved in the writing of the manuscript; RJEJ wrote the initial draft.

Conflict of interest: No conflicts of interest have arisen from the production of this manuscript.

REFERENCES

- Aarseth, E., Bean, A. M., Boonen, H., Carras, M. C., Coulson, M., Das, D., Deleuze, J., Dunkels, E., Edman, J., Ferguson, C. J., Haagsma, M. C., Bergmark, K. H., Hussain, Z., Jansz, J., Kardefelt-Winther, D., Kutner, L., Markey, P., Nielsen, R. K. L., Prause, N., Przybylski, A., Quandt, T., Schimmenti, A., Starcevic, V., Stutman, G., Van Looy, J., & Van Rooij, A. J. (2016). Scholars' open debate paper on the World Health Organization ICD-11 Gaming Disorder proposal. *Journal of Behavioral Addictions*, Advance online publication. doi:10.1556/2006.5.2016.088
- Alha, K., Koskinen, E., Paavilainen, J., Hamari, J., & Kinnunen, J. (2014). Free-to-play games: Professionals' perspectives. *Proceedings of Nordic DiGRA*, Gotland, Sweden, May 29–30 (pp. 1–14).
- American Psychiatric Association. (2013). *Diagnostic and statistical manual of mental disorders (DSM-5®)*. Washington, DC: American Psychiatric Association.
- Baranowski, T., Buday, R., Thompson, D. I., & Baranowski, J. (2008). Playing for real: Video games and stories for health-related behavior change. *American Journal of Preventive Medicine*, 34(1), 74–82.e10. doi:10.1016/j.amepre.2007.09.027
- Billieux, J., Schimmenti, A., Khazaal, Y., Maurage, P., & Heeren, A. (2015). Are we overpathologizing everyday life? A tenable blueprint for behavioral addiction research. *Journal of*

- Behavioral Addictions*, 4(3), 119–123. doi:[10.1556/2006.4.2015.009](https://doi.org/10.1556/2006.4.2015.009)
- Gainsbury, S., King, D., Delfabbro, P., Hing, N., Russell, A., Blaszczynski, A., & Derevensky, J. (2015). *The use of social media in gambling*. Melbourne, VIC: Gambling Research Australia.
- Gainsbury, S. M., Hing, N., Delfabbro, P. H., & King, D. L. (2014). A taxonomy of gambling and casino games via social media and online technologies. *International Gambling Studies*, 14(2), 196–213. doi:[10.1080/14459795.2014.890634](https://doi.org/10.1080/14459795.2014.890634)
- Gainsbury, S. M., Russell, A., & Hing, N. (2014). An investigation of social casino gaming among land-based and Internet gamblers: A comparison of socio-demographic characteristics, gambling and co-morbidities. *Computers in Human Behavior*, 33, 126–135. doi:[10.1016/j.chb.2014.01.031](https://doi.org/10.1016/j.chb.2014.01.031)
- Gainsbury, S. M., Russell, A. M. T., King, D. L., Delfabbro, P., & Hing, N. (2016). Migration from social casino games to gambling: Motivations and characteristics of gamers who gamble. *Computers in Human Behavior*, 63, 59–67. doi:[10.1016/j.chb.2016.05.021](https://doi.org/10.1016/j.chb.2016.05.021)
- Garfield, R. (2016). A game player's manifesto. Retrieved from <https://www.facebook.com/notes/richard-garfield/a-game-players-manifesto/1049168888532667>
- Griffiths, M., King, D., & Delfabbro, P. (2012). Simulated gambling in video gaming: What are the implications for adolescents? *Education and Health*, 30, 68–70.
- Griffiths, M., & King, R. (2015). Are mini-games within RuneScape gambling or gaming? *Gaming Law Review and Economics*, 19(9), 640–643. doi:[10.1089/glre.2015.1995](https://doi.org/10.1089/glre.2015.1995)
- Griffiths, M. D., & Auer, M. (2013). The irrelevancy of game-type in the acquisition, development and maintenance of problem and pathological gambling [Opinion]. *Frontiers in Psychology*, 3, 621. doi:[10.3389/fpsyg.2012.00621](https://doi.org/10.3389/fpsyg.2012.00621)
- James, R. J. E., O'Malley, C., & Tunney, R. J. (2017). Understanding the psychology of mobile gambling: A behavioural synthesis. *British Journal of Psychology*, 108, 608–625. doi:[10.1111/bjop.12226](https://doi.org/10.1111/bjop.12226)
- James, R. J. E., & Tunney, R. J. (2017). The need for a behavioural analysis of behavioural addictions. *Clinical Psychology Review*, 52, 69–76. doi:[10.1016/j.cpr.2016.11.010](https://doi.org/10.1016/j.cpr.2016.11.010)
- Kaptsis, D., King, D. L., Delfabbro, P. H., & Gradisar, M. (2016). Withdrawal symptoms in Internet gaming disorder: A systematic review. *Clinical Psychology Review*, 43, 58–66. doi:[10.1016/j.cpr.2015.11.006](https://doi.org/10.1016/j.cpr.2015.11.006)
- Kim, H. S., Wohl, M. J. A., Salmon, M. M., Gupta, R., & Derevensky, J. (2015). Do social casino gamers migrate to online gambling? An assessment of migration rate and potential predictors. *Journal of Gambling Studies*, 31(4), 1819–1831. doi:[10.1007/s10899-014-9511-0](https://doi.org/10.1007/s10899-014-9511-0)
- Kimppa, K. K., Heimo, O. I., & Harviainen, J. T. (2016). First dose is always freemium. *ACM SIGCAS Computers and Society*, 45(3), 132–137. doi:[10.1145/2874239.2874258](https://doi.org/10.1145/2874239.2874258)
- King, D., Delfabbro, P., & Griffiths, M. (2010). The convergence of gambling and digital media: Implications for gambling in young people. *Journal of Gambling Studies*, 26(2), 175–187. doi:[10.1007/s10899-009-9153-9](https://doi.org/10.1007/s10899-009-9153-9)
- King, D. L., Gainsbury, S. M., Delfabbro, P. H., Hing, N., & Abarbanel, B. (2015). Distinguishing between gaming and gambling activities in addiction research. *Journal of Behavioral Addictions*, 4(4), 215–220. doi:[10.1556/2006.4.2015.045](https://doi.org/10.1556/2006.4.2015.045)
- Larche, C. J., Musielak, N., & Dixon, M. J. (2017). The candy crush sweet tooth: How 'Near-misses' in candy crush increase frustration, and the urge to continue gameplay. *Journal of Gambling Studies*, 33, 599–615. doi:[10.1007/s10899-016-9633-7](https://doi.org/10.1007/s10899-016-9633-7)
- Lee, S.-Y., Lee, H. K., & Choo, H. (2017). Typology of Internet gaming disorder and its clinical implications. *Psychiatry and Clinical Neurosciences*, 71, 479–491. doi:[10.1111/pcn.12457](https://doi.org/10.1111/pcn.12457)
- McBride, J., & Derevensky, J. (2016). Gambling and video game playing among youth. *Journal of Gambling Issues*, 34, 156–178. doi:[10.4309/jgi.2016.34.9](https://doi.org/10.4309/jgi.2016.34.9)
- Parke, J., Wardle, H., Rigbye, J., & Parke, A. (2012). *Exploring social gambling: Scoping, classification and evidence review*. London, UK: Gambling Commission.
- Parry, W. (2016). Firm hopes to be 1st with skill-based slot machines. *Las Vegas Review Journal*. Retrieved from <http://www.reviewjournal.com/business/casinos-gaming/firm-hopes-be-1st-skill-based-slot-machines>
- Robbins, T. W., & Clark, L. (2015). Behavioral addictions. *Current Opinion in Neurobiology*, 30, 66–72. doi:[10.1016/j.conb.2014.09.005](https://doi.org/10.1016/j.conb.2014.09.005)
- The Gambling Commission. (2015). Social gaming. Retrieved from <http://www.gamblingcommission.gov.uk/pdf/Social-gaming—January-2015.pdf> (May 11, 2015).
- Young, K. S. (1998). Internet addiction: The emergence of a new clinical disorder. *CyberPsychology & Behavior*, 1(3), 237–244. doi:[10.1089/cpb.1998.1.237](https://doi.org/10.1089/cpb.1998.1.237)