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Gaming addiction in adolescence revisited

Gaming addiction has become a topic of increasing research interest. Over the last 25 years, I have written many articles on adolescent video gaming for [Education and Health](#) as it is one of the research fields that is constantly evolving. In fact, over the last decade, there has been a significant increase in the number of scientific studies examining various aspects of online addiction particularly among adolescents and young adults (Kuss & Griffiths, 2012; Kuss, Griffiths, Karila & Billieux, 2014). Although the amount and the quality of research in the field has progressed much over this period, it is still in its infancy compared to other more established behavioural addictions (such as pathological gambling). This article briefly examines (i) how adolescent gaming addiction research has changed over the last three decades, (ii) how online gaming addiction has gained genuine psychiatric status, (iii) excessive gaming as an addiction, and (iv) where the gaming addiction field is going.

How has adolescent gaming addiction research changed?

In the 1980s, research mainly concerned adolescents playing 'pay-to-play' arcade video games. In the 1990s, research mainly concerned standalone (offline) video games played by adolescents at home on consoles, PCs or handheld devices. In the 2000s, research mainly concerned the playing of Massively Multiplayer Online Role Playing Games (MMORPGs) by both adolescents and adults. Over time, there has been less of an emphasis on research involving pure adolescent samples with increasing research on older samples (particularly young adults and university students). Estimates of the prevalence of problematic and/or addictive gaming use among those aged 10 to 17 years are typically between 2% and 5% although some studies have

reported much higher prevalence rates particularly among those that actually play video games as opposed to general adolescent populations (Kuss & Griffiths, 2012).

There has also been a noticeable shift in how gaming addiction data are collected and this has had an impact on the number of research studies carried out on adolescent gaming. Up until the early 2000s, data about problematic gaming were typically collected face-to-face in schools, whereas contemporary studies tend to collect data online, strategically targeting online gaming forums where gamers are known to (virtually) congregate. The decrease of data collection in schools has clearly contributed to the decrease in adolescent-only gaming studies. These online samples are typically self-selecting and (by default) unrepresentative of the adolescent and/or general population. Therefore, generalization is almost always one of the methodological shortcomings of this data collection approach. As a direct consequence of changing the way data are collected, survey study sample sizes have generally increased. In the 1980s and 1990s, sample sizes were typically in the low hundreds and came from one school. In the 2000s, sample sizes in their thousands – even if unrepresentative – are not uncommon.

Finally, there has been a diversification in the way data are collected including experiments, physiological investigations, secondary analysis of existing data (such as that collected from online forums), and behavioural tracking studies. These newer research methods are also less likely to include adolescent samples because ethical approval for participant recruitment in experiments and physiological investigations is typically easier. Behavioural tracking studies tend to involve data from gaming operators where the minimum age is typically 18 years. Finally, there has also been increased research on adult (i.e., non-child and non-adolescent)

samples more generally reflecting the fact that the demographics of gaming have changed and that the typical gamer is no longer a male teenager but a male in his late twenties or early thirties.

The medicalisation of online gaming addiction

Prior to the publication of the fifth edition of the *Diagnostic and Statistical Manual of Mental Disorders* (DSM-5; American Psychiatric Association, 2013), there had been some debate as to whether 'Internet addiction' should be introduced into the DSM text as a separate disorder (Petry & O'Brien, 2013). Alongside this, there were also debates as to whether those researching in the online addiction field should be researching generalised Internet use and/or the potentially addictive activities that can be engaged on the Internet (e.g., gambling, video gaming, sex, shopping, etc.) (Griffiths, 2000) and whether adolescent gaming addiction is conceptually or functionally any different from adult gaming addiction.

Following these debates, the Substance Use Disorder Work Group (SUDWG) recommended that the DSM-5 include a sub-type of problematic Internet use (i.e., 'Internet Gaming Disorder' [IGD]) in Section 3 ('Emerging Measures and Models') as an area that needed future research before being included in future editions of the DSM (Petry & O'Brien, 2013). There were no exclusion criteria relating to age (i.e., adolescents fulfilling the criteria are no different from adults clinically). According to Petry and O'Brien (2013), IGD will not be included as a separate mental disorder until the (i) defining features of IGD have been identified, (ii) reliability and validity of specific IGD criteria have been obtained cross-culturally, (iii) prevalence rates have been determined in representative epidemiological samples across the world, and (iv) aetiology and associated biological features have been evaluated. I would also add that adolescents are a particular group at risk for developing such problems and that research should routinely include adolescent subsamples.

One of the key reasons that IGD was not included in the main text of the DSM-5 was that the SUDWG concluded that no standard

diagnostic criteria were used to assess gaming addiction across these many studies. A recent review of instruments assessing problematic, pathological and/or addictive gaming by King and colleagues (2013) reported that 18 different screening instruments had been developed, and that these had been used in 63 quantitative studies comprising 58,415 participants (and even more instruments have been developed since). This comprehensive review identified both strengths and weaknesses of these instruments.

The main strengths of the instrumentation included the: (i) the brevity and ease of scoring, (ii) excellent psychometric properties such as convergent validity and internal consistency, and (iii) robust data that will aid the development of standardised norms for adolescent populations. However, the main weaknesses identified in the instrumentation included: (i) core addiction indicators being inconsistent across studies, (ii) a general lack of any temporal dimension, (iii) inconsistent cut-off scores relating to clinical status, (iv) poor and/or inadequate inter-rater reliability and predictive validity, and (v) inconsistent and/or dimensionality.

Excessive gaming as an addiction

Video gaming that is problematic, pathological and/or addictive lacks a widely accepted definition. A recent review by Pápay and colleagues (2014) argued that some researchers consider video games as the starting point for examining the characteristics of this specific disorder, while others consider the Internet as the main platform that unites different addictive Internet activities, including online games. Again, no differentiation is made between adolescents and adults that play video games problematically. Recent studies (Demetrovics et al., 2012; Kim & Kim, 2010) have made an effort to integrate both approaches. Consequently, IGD can either be viewed as a specific type of video game addiction, or as a variant of Internet addiction, or as an independent diagnosis.

I have argued that although all addictions have particular and idiosyncratic characteristics, they share more commonalities than differences (i.e., salience, mood modification, tolerance,

withdrawal symptoms, conflict, and relapse), and likely reflects a common aetiology of addictive behaviour that often begins in adolescence (Griffiths, 2005). Consequently, online game addiction is viewed as a specific type of video game addiction. Similarly, Porter and colleagues (2010) do not differentiate between problematic video game use and problematic online game use. They conceptualised problematic video game use as excessive use of one or more video games resulting in a preoccupation with and a loss of control over playing video games, and various negative psychosocial and/or physical consequences. Researchers such as Young (1998) view online gaming addiction as a sub-type of Internet addiction and that the Internet itself provides situation-specific characteristics that facilitate gaming becoming problematic and/or addictive. This is potentially important in relation to online gaming addiction in that research tends to show that minors are more at risk from developing problems online than adults (Kuss et al., 2014).

Irrespective of approach or model, the components and dimensions that comprise online gaming addiction are very similar to the IGD criteria in Section 3 of the DSM-5. For instance, my six addiction components (Griffiths, 2005) directly map onto the nine proposed criteria for IGD (of which five or more need to be endorsed and resulting in clinically significant impairment). More specifically:

1. Preoccupation with Internet games [salience]
2. Withdrawal symptoms when Internet gaming is taken away [withdrawal]
3. The need to spend increasing amounts of time engaged in Internet gaming [tolerance]
4. Unsuccessful attempts to control participation in Internet gaming [relapse/loss of control]
5. Loss of interest in hobbies and entertainment as a result of, and with the exception of, Internet gaming [conflict]
6. Continued excessive use of Internet games despite knowledge of psychosocial problems [conflict]
7. Deception of family members, therapists, or others regarding the amount of Internet gaming [conflict]

8. Use of the Internet gaming to escape or relieve a negative mood [mood modification]
9. Loss of a significant relationship, job, or educational or career opportunity because of participation in Internet games [conflict]

The fact that IGD was included in Section 3 of the DSM-5 appears to have been well received by researchers and clinicians in the gaming addiction field (and by those adolescents and adults that have sought treatment for such disorders and had their experiences psychiatrically validated and feel less stigmatized). However, for IGD to be included in the section on 'Substance-Related and Addictive Disorders' along with 'Gambling Disorder', the gaming addiction field must unite and start using the same assessment measures so that comparisons can be made across different demographic groups (including adolescents) and different cultures.

For epidemiological purposes, Koronczi and colleagues (2011), asserted that the most appropriate measures in assessing problematic online use (including Internet gaming) should meet six requirements. Such an instrument should have:

1. Brevity (to make surveys as short as possible and help overcome question fatigue)
2. Comprehensiveness (to examine all core aspects of PAP gaming as possible)
3. Reliability and validity across age groups (e.g., adolescents vs. adults)
4. Reliability and validity across data collection methods (e.g., online, face-to-face interview, paper-and-pencil)
5. Cross-cultural reliability and validity
6. Clinical validation

It was also noted that an ideal assessment instrument should serve as the basis for defining adequate cut-off scores in terms of both specificity and sensitivity.

The good news is that research in the gaming addiction field does appear to be reaching an emerging consensus. King and colleagues (2013), noted that across many different studies, IGD is commonly defined by (a) withdrawal, (b) loss of control, and (c) conflict irrespective of the age of gamers. However, it is critical that a unified approach to assessment of IGD is

urgently needed as this is the only way that there will be a strong empirical basis for IGD to be included in the next DSM.

Where is the gaming addiction field going?

Finally, this section provides a considered (and somewhat speculative) examination of what might happen in the gaming addiction field from a number of different standpoints (e.g., methodological, conceptual, technological).

Better instrumentation

Given the many different screening instruments that have been developed over the last decade, there is likely to be a refinement of video game addiction measures and greater consensus on its conceptualisation, either as a single disorder and/or incorporated into other known disorders (e.g., impulse control disorder). This is also likely to lead to improved assessment tools based on such conceptualisation(s). For instance, my colleagues and I have just developed a new instrument specifically based on the new IGD criteria in the DSM-5 (see: Pontes, Király, Demetrovics & Griffiths, 2014). In the last few years, instruments have been developed that have more robust psychometric properties in terms of reliability and validity. However, there are still some concerns as many of the most widely used screening instruments were adapted from adult screens and much of the video game literature has examined children and adolescents.

Increased gaming diversification

Measures of gaming use and subsequent behaviour are likely to diversify in terms of media use, including social networking sites (SNS) and associated Internet resources (Griffiths, Kuss & King, 2012). Already, games such as *Call of Duty* and *Battlefield 3* are being released with their own SNS (e.g., *COD Elite*) that track player behaviour and provide feedback to players as to how to improve their game (thus functionally reinforcing video game play and thus have implications for excessive and/or potentially addictive play). Many of these newer online media – particularly social networking sites – are heavily used by adolescents (Griffiths, Kuss & Demetrovics, 2014) and is why adolescent samples need to be continually monitored in this area.

Increased monetisation of games

Given the pressure on media enterprises to 'monetize' their business and look for different revenue streams, there is likely to be even greater media convergence between gaming and other more profit-making activities such as gambling (Griffiths, King & Delfabbro, 2014). Given the well established addictive potential of gambling, this may also have implications for the incidence of gaming addiction among both adolescents and adults (Griffiths et al., 2012).

Increased feminisation of gaming

Given the fact that the Internet is gender-neutral, there is likely to be increasing feminization of gaming where increasing numbers of females not only engage in the playing of online games, but also develop problems as a result. Casual gaming online is already popular among females (Lewis & Griffiths, 2011; McLean & Griffiths, 2013). However, the biggest difference between male and female gaming is likely to be content-based (e.g., research has shown that teenage males prefer competitive type gaming experiences whereas teenage females appear to prefer co-operative type gaming experiences) (Griffiths, Davies & Chappell, 2004).

Increased collaboration between researchers and the gaming industry

Given the increasing number of research teams in the gambling field being given direct access to gambling companies' behavioural tracking data, there is likely to be an increasing number of such collaborations in the gaming studies field in which actual online micro-data can be analysed. This may mean adolescent samples are neglected in such research, as many such sites require credit card subscriptions and/or require clients to be adult.

Improved and more innovative treatment

As the diagnosis of video game addiction becomes more legitimate in psychiatric and medical circles, it will lead to improved randomized control trials on interventions for problematic video game play than the ones already carried out. There is also likely to be an increase in the online medium itself being used as a treatment channel. The reasons that people like to engage in some online leisure activities (i.e., the fact that the online environment is non-face-to-face, convenient, accessible, affordable,

anonymous, non-threatening, non-alienating, non-stigmatising, etc.) may also be the very same reasons why people would want to seek advice, help and treatment online rather than in face-to-face situations. There is also some evidence that teenagers (particularly adolescent boys) would be more likely to access online services when they have problems rather than seek out face-to-face help, guidance and/or counselling (Wood & Griffiths, 2007).

Conclusions

Clearly, there are knowledge gaps in current understanding of problematic video game play and video game addiction in both adolescent and adult populations. The number of studies into adolescent gaming addiction may further decrease over time given the way in which data is now typically collected and the fact that playing video games is no longer the sole domain of male teenagers. However, there is still a need for epidemiological research to determine the incidence and prevalence of clinically significant problems associated with video game play both adolescents and in the broader population. This needs to include both children and adolescents so that video game playing and potentially problematic play can be studied in a longitudinal and developmental context.

There are too few clinical studies that describe the unique features and symptoms of problematic video game play and/or video game addiction. There may well be differences between adolescents and adults as to whether gaming is seen as problematic – especially as context is an important determinant of whether something is viewed as problematic, and adolescents are likely to have much more flexibility and time available to play video games than adults (Griffiths, 2010). While the current empirical base is relatively small, gaming addiction has become a more mainstream area for psychological and psychiatric research. Adolescent gaming addiction is likely to become an area of significant importance given the widespread popularity of gaming among the current adolescent population (Kuss & Griffiths, 2012).

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