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## Daria J. Kuss and Mark D. Griffiths

### Adolescent online gaming addiction

For most adolescents, gaming is a pleasurable pastime activity. However, research suggests that excessive online gaming may in extreme cases lead to symptoms commonly experienced by substance addicts, namely salience, mood modification, craving, and tolerance (Kuss & Griffiths, 2012a). Particularly excessive engagement with both online and offline games appears to lead to addiction in a small minority of players. Since video gaming is particularly appealing to children and adolescents, it appears reasonable to suggest that these groups may be particularly at risk (i.e., more vulnerable and susceptible) of developing gaming addiction. Furthermore, it has been argued that because of the 24/7 nature and almost mandatory excessive play required in playing online games (such as *World of Warcraft* and *Everquest*), online gaming may be more problematic for 'at risk' individuals than offline gaming (Griffiths, 2009).

#### Online gaming addiction

Assessing online gaming addiction in children and adolescents is relevant for several reasons. With regards to developmental psychopathological findings, it appears that addictions tend to have precursors during adolescence (Griffiths, 2011). Also, it is relatively common that most dependencies develop in early adulthood (Griffiths, 2011). Therefore, prevention efforts must be established that target adolescents who have their first experiences with addictive substances and behaviours during puberty. Parental influence is diminished whereas the peer group gains more importance. Peer pressure may lead to a variety of problems that may result in the development of pathological behaviours, such as chemical and behavioural addictions (Wölfling & Müller, 2009).

Adolescents may use online games as a way

of coping with stressors and gaming can become a dysfunctional media-focused coping strategy (Thalemann, 2009). Similarly, relationships between problematic gaming and the ways in which adolescents cope with stressors and frustrations have been reported (Wölfling, Thalemann, & Grüsser, 2008). For instance, problematic gamers play games significantly more frequently than non-problematic gamers as a reaction to anger and frustration. Thus, they appear to use gaming as a strategy for emotion regulation in order to decrease negative feelings. This seems particularly problematic because those adolescents who play online games excessively are likely to get little chance to actually develop healthy ways of coping with stressors because they are constantly occupied with playing online games instead. Therefore, their psychosocial development may be significantly impaired.

The consistent blocking out and passive coping with stressful experiences is a strategy that may be successful in the short-term. However, viewed from a long-term perspective, this dysfunctional coping style may limit the adolescents' potential to have fundamental experiences that are necessary for developing a protective way to cope. In this case, it appears more likely that once new stressors appear, some adolescents continue to use escapist and media-focused coping mechanisms. This results in a vicious circle (Wölfling & Müller, 2009). Moreover, adolescents aged 17-19 years treated for their pathological gambling and online gaming addiction at the Outpatient Clinic for Gaming Addictions in Mainz, Germany, have been found to suffer from depressive symptoms, anxiety, and somatization (Wölfling & Müller, 2009). Such clinical observations hint at the importance of assessing excessive and potentially pathological online gaming

behaviour.

### Literature review

Because of these concerns, we recently carried out a comprehensive and systematic review of the adolescent online gaming literature (Kuss & Griffiths, 2012b). To be included in the review, studies had to (i) include empirically collected data, (ii) assess online gaming addiction in some form, (iii) include children and adolescents (aged 8-18 years) in the sample, (iv) have been published in peer-reviewed journals, and (v) be published after the year 2000. This timeframe was applied because studies that were published earlier than 2000 were assumed to have a focus different from online games (i.e., they specifically assessed console or arcade video games without an equivalent on the Internet). A total of 30 empirical studies were identified as meeting the inclusion criteria.

Online gaming addiction in these 30 studies was assessed using different screening instruments. These included those based on the criteria for pathological gambling ( $n = 18$ ), those based on the criteria for substance dependence ( $n = 3$ ), those based on a combination of both pathological gambling and substance dependence ( $n = 3$ ), those based on parental referral ( $n = 2$ ), and those based on other miscellaneous classification criteria ( $n = 4$ ). A detailed evaluation of each of these 30 studies can be found in our full review (see Kuss & Griffiths, 2012b). In summary, the data collected were of variable quality and the vast majority of studies had major methodological shortcomings (detailed later in this article). Only one of the 30 studies used a large nationally representative sample of adolescents (i.e., Rehbein, Kleimann & Mößle, 2010). Prevalence rates for problematic gaming or online gaming addiction were reported to be as high as 12% (although they were typically in the 2% to 5% range). However, the most robust study carried out on over 15,000 adolescents in Germany reported that 3% of male adolescents and 0.3% of female adolescents were dependent on gaming (i.e., Rehbein, Kleimann & Mößle, 2010).

### Insights

Our review provided important insights into the state of current knowledge of adolescent online gaming addiction despite the many types of screening criteria used to assess online gaming addiction. A large majority of studies

adapted pathological gambling criteria in order to assess the extent to which online gaming addiction was present. This appears acceptable since online gaming and online gambling share a variety of similar characteristics that have been extensively discussed in the psychological literature for over 20 years (Griffiths, 2005; Johansson & Götestam, 2004). Furthermore, there are now a number of overviews highlighting the convergence between Internet use, gaming and gambling (e.g., Griffiths, 2002; King, Delfabbro, & Griffiths, 2010). This suggests that gaming and gambling activities are progressively merging. Nevertheless, although gaming and gambling share a variety of similarities, they cannot be necessarily equated with one another. Furthermore, some researchers claim that the classification of behavioural addictions within the framework of pathological gambling appears relatively insufficient and it can have negative consequences for actual treatment when no use is made of therapeutic elements for patients suffering from substance dependence (Poppelreuter & Gross, 2000).

### Limitations

As noted briefly above, the empirical studies that have examined adolescent online gaming addiction suffer from a variety of limitations. A major limitation was the frequent lack of sensitivity and specificity of measures used. On the one hand, it appears difficult to judge the extent to which the assessment tools utilized are sensitive enough to actually determine online gaming addiction status within adolescents. Thus, the question of sensitivity remains. On the other hand, it is unclear in how far the measurement instruments used are able to specifically identify adolescents who are not addicted to online gaming. Therefore, problems in the instruments' specificity may arise because the latter appears to be rather limited. In addition, the almost exclusive utilization of self-report measures calls into question the accuracy of diagnosis. Psychological and psychiatric assessments as well as parental reports appear to be indispensable complements for judging whether and to what extent an adolescent is actually addicted to online gaming particularly in light of a variety of symptoms that are commonly experienced comorbidly.

Another problem that materialized with the

large majority of identified studies was the utilization of small, specified, self-selected, and/or mixed samples. Small samples are not representative of whole populations and therefore establishing representative prevalence estimates is impeded. Furthermore, if samples are particularly specified (i.e., using a limited age group in a particular country, etc.), the participants' responses cannot be generalized to larger populations and to other countries either. The opposite problem occurs if samples are mixed. It is unclear to what extent the findings can be generalized to specified populations. Self-selected samples comprise only those people who were enthused enough to participate and therefore these samples are somewhat unrepresentative of most target populations. Each of these problems calls for improvements in future research in order to increase the external validity of the studies' results. In addition, research in the field calls for studies that assess online gaming addiction cross-culturally because by comparing and contrasting the disorder within diverse sociocultural contexts, the differences and similarities can be discerned and treatment approaches can be tailored to the respective needs of particular cultural groups.

With regards to adolescents who are potentially vulnerable to becoming addicted to playing online games, classification is essential because it will help to develop and initiate prevention efforts. Only when online gaming addiction is more clearly and comprehensively understood, can risk variables be targeted and protective factors fostered from a mental health point of view and on a large scale. Among groups of young people, prevention efforts may include both psycho-education as well as provision of information and tools that focus on developing healthy ways of coping with daily stressors. The earlier preventive efforts are initiated, the greater the chance that children and adolescents are protected from the dangers and ramifications of online gaming addiction.

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