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Problematic internet use and problematic online gaming are not the same:

Findings from a large nationally representative adolescent sample

Running title: **Problematic internet use and problematic online gaming**

Abstract

There is an ongoing debate in the literature whether problematic internet use (PIU) and problematic online gaming (POG) are two distinct conceptual and nosological entities or whether they are the same. The present study contributes to this question by examining the interrelationship and the overlap between PIU and POG in terms of gender, school achievement, time spent using the internet and/or online gaming, psychological wellbeing, and preferred online activities. Questionnaires assessing these variables were administered to a nationally representative sample of adolescent gamers (N=2,073; mean age 16.4 years, SD=0.87, 68.4% male). Data showed that internet use was a common activity among adolescents while online gaming was engaged in by a considerably smaller group. Similarly, more adolescents met the criteria for PIU than for POG and a small group of adolescents showed symptoms of both problem behaviors. The most notable difference between the two problem behaviors was in terms of gender. POG was much more strongly associated with being male. Self-esteem had low effect sizes on both behaviors, while depressive symptoms were associated with both PIU and POG, affecting PIU slightly more. In terms of preferred online activities, PIU was positively associated with online gaming, online chatting, and social networking while POG was only associated with online gaming. Based on our findings POG appears to be a conceptually different behavior than PIU and therefore data support the notion that Internet Addiction Disorder and Internet Gaming Disorder are separate nosological entities.

INTRODUCTION

The phenomenon of internet addiction (IA) was first described in a number of papers by both Young^{1,2} and Griffiths.^{3,4} The topic immediately gained more general attention and has since become a highly researched area numbering approximately 70 large-scale studies with sample sizes of over 1,000 participants.⁵ Despite the continuing use of the term ‘internet addiction’, researchers have pointed out the diverse nature of the activities that can now be engaged in on the internet and have often assumed that different online activities contribute to IA in different scales.⁶⁻⁸

Online applications differ considerably depending on the role the internet plays in them. For instance, it was argued that in the case of activities like online gambling and shopping, the internet was simply another channel in which traditional offline activities could now take place.^{9,10} However, the internet is an essential component in other online activities such as information browsing (e.g., ‘*Googling*’), interacting in online chat rooms and more recently, social networking.^{9,11} In short, these latter activities can only take place online.

However, there are also some activities where the internet has brought a new dimension to an offline activity. One such activity is the playing of video games. While video games (and arguably multiplayer video games) existed long before the internet became widely used, large-scale online connectedness subsequently opened new frontiers and experiences in gaming – particularly in the case of Massively Multiplayer Online Games (MMOGs). Current MMOGs can host thousands of players simultaneously in the same virtual space and has completely changed the quality, experience, and dynamics of gaming.^{12,13} This could perhaps be one reason why problematic online gaming or online gaming addiction has become such a distinct research area. The fact that the proposed DSM-5 category of Internet Use Disorder was eventually

replaced by Internet Gaming Disorder¹⁴⁻¹⁶ also demonstrates the importance of this particular phenomenon.

Despite the increasing number of studies conducted in these areas, relatively little is known about the relation between problematic internet use (PIU) and problematic online gaming (POG). Beyond the theoretical considerations, it is also important on both a practical and pragmatic level to examine whether there is need for differentiation between these two phenomena. In short, are PIU and POG two distinct conceptual and nosological entities involving different populations and having different features or are they one and the same? More concretely, are the characteristics of the individuals affected by PIU and POG similar or different? Are the contributing factors similar or different?

Earlier research suggest some differences between the populations affected by the two phenomena. For instance while perhaps a larger demographical group is affected by PIU¹ POG seems to affect mostly the younger male population.^{17,18} However, a critical methodological shortcoming of most of these studies is that they examined PIU and POG separately. Consequently, the aim of the present study was to examine the interrelation and the overlap between PIU and POG in terms of gender, school achievement, time spent using the internet and/or online gaming, psychological wellbeing, and preferred online activities in a nationally representative adolescent sample.

METHODS

Sample and procedure

Data were collected as part of an international project called the *European School Survey Project on Alcohol and Other Drugs (ESPAD)*.¹⁹ This project nationally assesses smoking habits and alcohol and drug use of adolescents aged 16 years in 36 participating countries. In addition to the mandatory questions, in 2011 Hungary added two brief sections to assess problematic internet use and problematic online gaming.

To obtain a representative sample of 16-year old adolescents in the Hungarian population, an internationally homogenous stratified random sampling method was applied based on region (Central/Western/Eastern Hungary), grade (8–10), and class type (primary general, secondary general, secondary vocational, and vocational classes). The sampling unit was the class, and the questionnaire was administered to every student present at school at the time of data collection. Data needed to be weighted due to skewed nonresponse resulting from a refusal rate of 15%. To match the composition of the participants with the sampling frame, data were weighted by strata with the matrix weighting method recommended by the National Education Information System (KIR-STAT).²⁰

Questions relating to problematic internet use and problematic online gaming were only administered to the nationally representative sample of 9th–10th graders in secondary general and secondary vocational schools (N = 5,045). After removing cases where answers to problematic internet use and problematic online gaming questions were completely missing, the final sample comprised 4,875 adolescents.

Measures

Basic sociodemographics (i.e., gender and age) along with school performance (grade average), and information regarding internet use and online gaming were collected. Time spent using the

internet and time spent playing online games on an average day were asked with single choice questions (less than 1 hour, 1-2 h, 3-4 h, 5-6 h, 7-8 h, more than 8 h). In order to make the results clearer, the number of categories was reduced during the analyses by merging the two categories from the edges, respectively. The three most frequently used internet activities were also recorded. Students could choose from six options (i.e., searching for information online, playing online games, online chatting, using social networking sites, sending emails, and downloading) and could specify up to two additional online activities.

Problematic internet use was assessed using the 6-item version of the Problematic Internet Use Questionnaire (PIUQ-6).²¹ The original scale had 18 items and three subscales: obsession, neglect, and control disorder.²² The shorter version kept the original three-factor structure measured by two items, respectively. A 5-point Likert scale (from “never” to “always/almost always”) was used to estimate how much the given statements characterized the respondents. Scores range from 6 to 30, with higher scores indicating more problematic internet use. A cut-off score of 15 was recommended to distinguish between problematic and non-problematic internet users. Both instruments showed good psychometric properties.²¹⁻²³ Internal consistency of the 6-item PIUQ was .77 on the present sample.

Problematic online gaming was measured using the 12-item POGQ-SF (Problematic Online Gaming Questionnaire Short-Form).²⁴ This instrument derives from the 18-item POGQ, a scale with good psychometric properties based on both theoretical and empirical content.²⁵ Both versions measure six underlying dimensions of problematic gaming (i.e., preoccupation, overuse, immersion, social isolation, interpersonal conflicts, and withdrawal) using a 5-point Likert scale. Scores range from 12 to 60, with higher scores indicating more problematic online gaming. A

cut-off score of 32 was recommended to distinguish between problematic and non-problematic online gamers. Internal consistency of the 12-item POGQ was .93 on the present sample.

Psychological characteristics such as depressive mood (short-form [6-item] Center of Epidemiological Studies Depression-Scale [CES-D]²⁶) and self-esteem (Rosenberg's Self-Esteem Scale [RSES]²⁷) were also assessed. Short-form CES-D is a scale designed to assess depressive symptom levels using a 4-point Likert scale (from "rarely or never" to "most of the time"). Scores range from 4 to 24, with higher scores indicating higher depressive mood levels. Internal consistency was .82 on the present sample. RSES assesses feelings of self-worth and self-acceptance measuring in such a way global self-esteem. It has 10-items (5 reversed items) and a 4-point Likert scale (from "strongly agree" to "strongly disagree"). Scores range from 10 to 40, with higher scores indicating higher self-esteem. Internal consistency was .86 on the present sample.

Statistical analyses

Descriptive analyses were performed with SPSS20.0. To test the interrelation between average daily internet use and average daily online gaming (measured as categorical variables), as well as the interrelation between PIU and POG, two contingency tables were created. In order to examine the two nosological entities proposed by recent psychological literature (i.e., PIU and POG), the association of PIU and POG was compared with relevant predictive variables using a multivariate multiple regression analysis within structural equation modeling (SEM) in MPLUS 6.0. Multivariate multiple regression is a technique that estimates a single regression model with more than one outcome variable and more than one predictor variable. This way the association between one predictor variable and one outcome variable was estimated by controlling all other predictor variables in the model. Due to deviation from normal distribution the maximum

likelihood estimation with robust standard errors (MLR) estimation was used. All analyses were conducted on the weighted sample. Missing data in Mplus were treated with Full Information Maximum Likelihood (FIML) method.

RESULTS

Descriptive statistics

Mean age of the sample (N=4,875) was 16.4 years (SD=0.87), and 50% were boys. Only six students (0.1%) reported not using the internet at all in the month preceding data collection. The majority of those students that had used the internet could be grouped into one of three groups: (i) those who had never played online games (n=709, 14.5%), (ii) those who had played during the month preceding data collection (n=2073, 42.5%), and (iii) those who had played online games but not during the month preceding data collection (n=1799, 36.9%). All the analyses were carried out on the second subsample that comprised current gamers in order to be able to make a comparison between problematic internet use and problematic online gaming. Mean age of the current gamer subsample was the same as of the total sample. However, gender distribution was different: two-thirds (68.4%) of current gamers were boys compared to half (50%) of the total sample.

Time spent using the internet and playing online games

In order to find out the interrelation between average daily internet use and average daily online gaming, a contingency table was created (see Table 1). The data show that while average daily internet use was distributed fairly equally between the three time categories, online gaming substantially decreased as the time categories increased. The table also shows that while online

gaming is accompanied by high amounts of internet use, the opposite is less true. Namely those who spend a lot of time using the internet do not necessarily spend a lot of time playing online games.

~ Table 1. ~

Problematic internet users and problematic online gamers

To find out the scale of PIU and POG and the overlap between the two, another contingency table was created comprising four different groups: (i) neither problematic internet users, nor problematic online gamers (80.2%), (ii) problematic internet users but not problematic online gamers (8.8%), (iii) problematic online gamers but not problematic internet users (4.3%), (iv) both problematic internet users and problematic online gamers (6.7%).

~ Table 2. ~

Multivariate multiple regression

To compare the association of PIU and POG with relevant predictor variables, a multivariate multiple regression was carried out (see Figure 1). Results demonstrated distinctive associations of some predictor variables with the two outcome variables. Gender played a much stronger role in POG ($\beta = -.29$ $p < .001$) than in PIU ($\beta = -.07$ $p < .01$). More than five hours of internet use on an average day had a stronger association with PIU ($\beta = .20$ $p < .001$) than POG ($\beta = .07$ $p < .01$), while online gaming for more than five hours on an average day had a closer association with POG ($\beta = .20$ $p < .001$) than PIU ($\beta = .07$ $p < .01$). Self-esteem had a very low standardized effect

on both entities ($\beta = -.08$ $p < .01$ for PIU and $\beta = -.09$ $p < .01$ for POG) while depressive symptoms showed slightly stronger association with PIU ($\beta = .29$ $p < .001$ vs. $\beta = .22$ $p < .001$). In addition, school performance measured by grade point average had a very low positive effect on both problem online behaviors ($\beta = .05$ $p < .05$ for PIU and $\beta = .07$ $p < .01$ for POG). In relation to the six internet activities that were offered to be rated as one of the three favorite online activities (i.e., searching for information, playing online games, chatting, using social network sites, sending emails, and downloading) only playing online games was considerably associated with POG ($\beta = .20$ $p < .001$) while playing online games, online chatting, and social networking were all associated with PIU though their effect sizes were negligible ($\beta = .09$ $p < .01$, $\beta = .06$ $p < .01$, and $\beta = .05$ $p < .05$, respectively).

~ Figure 1. ~

DISCUSSION

The present study aimed to examine the interrelationship between PIU and POG on a nationally representative adolescent sample. The results suggested that while internet use was a common activity among adolescents, online gaming was engaged in by a much smaller group. Moreover, ‘hard-core’ gaming (i.e., those playing online games for more than 7 hours per day) was much rarer than the prolonged use of the internet (i.e., using the internet for 7 hours per day). Based on these results, it is not surprising that more adolescents met the criteria for PIU than for POG while a small group of adolescents showed symptoms of both problem behaviors. These results are in line with the literature suggesting higher internet use than online gaming^{28,29} and higher PIU than POG in adolescent samples.²⁸

The multivariate multiple regression model also demonstrated a distinction between the two online behaviors. The most notable difference was in terms of gender and time spent on the two activities. While both PIU and POG were associated with being male, the effect size was much larger for POG. The association of PIU with time spent using the internet was stronger than its association with playing online games, while the association of POG with time spent on online gaming was stronger than its association with time spent using the internet. The distinction is also demonstrated by different preference for online applications. While online gaming was the only online activity mentioned as one of the frequently practiced online activities for POG, PIU was positively associated with online gaming, online chatting, and social networking. However, the very low effect size of social networking on PIU was surprising. One explanation might be that the popularity of social networking sites in Hungary began to grow exponentially following the period of this data collection. The recent increase of smart phone ownership³⁰ might also change the findings of the upcoming *ESPAD* research in relation to activities such as social networking.

Interestingly, low self-esteem had low standardized effect sizes on both problem online behaviors. These findings are in line with some previous research²⁸ but contradicts some other studies.^{24,31,32} However, depressive symptoms were associated with both PIU and POG but affecting PIU slightly more. This again supports much of the previous literature.³³⁻³⁶

Despite the many strengths of the study including the large sample size, the national representativeness of the sample, and the strong psychometric properties of the instruments used to assess both POG and PIU, there are some limitations to the data collected. The data were all self-report and as such are prone to various biases (e.g., social desirability, memory recall biases, etc.). In addition, all the participants were from Hungarian adolescents and the results may

therefore not be generalizable to adolescents in other countries or adult samples. As mentioned above, the data were collected before the recent social networking boom and if repeated now, the study may have produced different results. The study should therefore be replicated among adult samples and in different countries.

Based on the findings of the present study, POG appears to be a conceptually different behavior than PIU. The results clearly show that the two types of problematic online behavior appear to be different populations and are associated with different contributing factors. The data support the notion that Internet Addiction Disorder and Internet Gaming Disorder are separate nosological entities. Consequently, classifying only POG as a disorder in the current diagnostic systems might lead to ignorance towards other potentially addictive online activities such as social networking³⁷ or more general problematic use of the internet.⁵

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List of figure legends

Figure 1. Multivariate multiple regression model for problematic online gaming (POG) and pathological internet use (PIU). *Note:* Error covariances among the predictor variables are not shown for the sake of clarity. * $p < .05$ ** $p < .01$ *** $p < .001$