

## Rapid Communication

# Excessive Computer Game Playing: Evidence for Addiction and Aggression?

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### ABSTRACT

Computer games have become an ever-increasing part of many adolescents' day-to-day lives. Coupled with this phenomenon, reports of excessive gaming (computer game playing) denominated as "computer/video game addiction" have been discussed in the popular press as well as in recent scientific research. The aim of the present study was the investigation of the addictive potential of gaming as well as the relationship between excessive gaming and aggressive attitudes and behavior. A sample comprising of 7069 gamers answered two questionnaires online. Data revealed that 11.9% of participants (840 gamers) fulfilled diagnostic criteria of addiction concerning their gaming behavior, while there is only weak evidence for the assumption that aggressive behavior is interrelated with excessive gaming in general. Results of this study contribute to the assumption that also playing games without monetary reward meets criteria of addiction. Hence, an addictive potential of gaming should be taken into consideration regarding prevention and intervention.

### INTRODUCTION

**R**ECENTLY, RESEARCH on excessive gaming (computer game playing) in adolescents and young adults has received increasing public attention. While there are positive effects of computer games with regard to clinical and educational issues, excessive gaming ("videogame addiction") has been discussed in relation to the core components of addiction, e.g., salience or craving, mood modification or increasing game playing activities.<sup>1</sup> Nevertheless, the prevalence of individuals who display addictive gaming among computer users remains unclear.

Furthermore, it is supposed that gaming increases the aggressive potential in computer users.<sup>2</sup> It has

been reported that rewarding violent action increases aggressive behaviour, hostile emotion as well as aggressive thinking.<sup>3</sup> However, no data concerning the relation between excessive gaming and aggression are available. Therefore, the aim of the present study was the investigation of the addictive potential of gaming as well as the relationship between excessive gaming and aggressive attitudes and behaviour.

### METHODS

The study sample comprised 7069 gamers (94% male; mean age: 21.11 years, SD = 6.35) who were recruited in cooperation with an online gaming

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magazine. Subjects answered two online-questionnaires concerning gaming behaviour and associated variables as well as aggressive behaviour and violent attitudes.<sup>4,5</sup>

To test group differences in demographic variables categorical data were analyzed using  $\chi^2$  tests while the continuous data were analyzed using one-way analyses of variance (ANOVA). All simple effects were investigated with Tanhame T2 or Bonferroni post hoc tests depending on the homogeneity of variances. Due to the high number of participants and therefore, higher probability of statistically significant results, data were controlled for effect sizes. *F* values from the ANOVA (or  $\chi^2$  values when using a  $\chi^2$  test) were used to develop effect size estimates *f* (or *w*, respectively) for each comparison. A simple linear regression analysis, with respect to the factor "aggression," was completed to determine the variance explained by "excessive gaming."

Modelled after key symptoms of a dependence syndrome as outlined in WHO's ICD-10,<sup>6</sup> participants who fulfilled at least three of six criteria of addiction with regard to their gaming behavior were assigned to the group of pathological gamers.

## RESULTS

Data analyses revealed that 840 subjects (11.9%) of the total sample fulfilled at least three criteria of addiction concerning their gaming behavior. Pathological gamers (mean = 4.70, SD = 4.03) differed significantly from non-pathological computer gamers (mean = 2.49, SD = 2.22) regarding daily hours of playing ( $F(1, 5609) = 475.28, p < 0.01$ ) with a moderate effect size ( $f = 0.29$ ). Compared to non-pathological gamers (mean = 1.64, SD = 2.00) pathological gamers (mean = 4.60, SD = 3.33) showed significantly higher "expected relief of withdrawal symptoms when gaming" ( $F(1, 6258) = 1242.02, p < 0.01$ ) with a strong effect size ( $f = 0.45$ ). In addition, pathological gamers (mean = 5.84, SD = 2.91) showed also significantly higher "craving due to the expectation of a positive outcome of gaming" ( $F(1, 6479) = 934.61, p < 0.01, f = 0.38$ ) than non-pathological gamers (mean = 3.10, SD = 2.31). Furthermore, aggressive behavior reported in pathological gamers (25.7%) and non-pathological gamers (10.7%) differed significantly ( $\chi^2(1, n = 5218) = 109.23, p < 0.01$ ) as well but just with a small effect size ( $w = 0.14$ ). Regression analysis revealed that the factor "excessive gaming" explained only 1.8% variance of aggression.

## DISCUSSION

In this study, nearly 12% of participants complied with three or more modified criteria for addiction and were therefore considered to be pathological gamers. This rate seems rather high, even if one takes into account the specific sample (all participants were active gamers and registered members of an online gaming magazine). Nevertheless, findings of other studies report even higher rates—at least in adolescence.<sup>7,8</sup>

A significant group difference but moderate effect size regarding the time spent daily with gaming has been found. More important, findings point to the fact that gaming has an addictive potential that is also mirrored by addiction-related cognitive components like significantly stronger positive outcome expectancies.<sup>9</sup> Given that such cognitions are dysfunctional in the long term and maintain addictive behaviors, our findings suggest that these cognitive components may be considered in therapy of excessive behaviors that meet core symptoms of addiction.

Furthermore, there is only weak evidence for the assumption that aggressive behavior is interrelated with excessive gaming. To identify subgroups, further studies should include the kind of games preferred by excessive gamers.<sup>3</sup>

In conclusion, the addictive potential of gaming should be taken into consideration especially in adolescents whose leisure activities comprise gaming to a large extent. Cognitive-behavioral interventions which focus on developing self-observation skills with regard to the function of gaming as an inadequate stress coping strategy (e.g., "playing the hurt away") and outcome expectancies seem to be appropriate in treating excessive gamers.

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