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Causes and consequences of pathological gaming

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Publication date
2010

Citation for published version (APA):
Lemmens, J. S. (2010). *Causes and consequences of pathological gaming*. [Thesis, fully internal, Universiteit van Amsterdam]. Amsterdam School of Communication Research.

Chapter 6

Summary and Main Conclusion

Computer and video games have become an indispensable part of adolescent daily life. For the vast majority of adolescents, this form of interactive entertainment provides nothing but positive and enjoyable experiences. Some players however, enjoy games so much that they will spend excessive amounts of time playing, feel stressed and anxious when they cannot play, and are persistently unable to control their excessive gaming habits despite detrimental social and emotional consequences. In short, they display the core symptoms of pathological behavior (e.g., APA, 2000). Because adolescence is a pivotal time for the development of a coherent sense of self that forms the basis for success and satisfaction in adulthood, it is crucial that we understand which adolescents are more likely to become pathologically involved with games, and how pathological gaming affects adolescent development. Therefore, empirical examination of the causes and consequences of pathological gaming among adolescents became the focal point of this research project. The following section provides a summary for each of the four studies in this dissertation.

Chapter 2: Development and Validation of a Game Addiction Scale for Adolescents

Before any sort of relation between pathological gaming and other constructs could be examined, we had to find a valid and reliable method to quantify the concept of pathological involvement with computer and video games among adolescents. We opted for the most commonly used method

in previous studies: adaptation of the diagnostic criteria for pathological gambling from the DSM-IV (APA, 2000) as described by Griffiths (2005). Using three items for each of the seven criteria (i.e., salience, tolerance, mood modification, withdrawal, relapse, conflict, and problems), we created a 21-item *game addiction scale*. The hypothesized dimensional structure, reliability and validity of this scale were examined by conducting surveys among two independent samples of Dutch adolescents aged 12 through 18. In total, 721 game-playing adolescents (352 from the first sample and 369 from the second sample) were included in our analyses.

Using structural equation modeling, confirmatory factor analyses indicated that the 21-item scale and the shortened 7-item scale showed good reliability and internal consistency in both samples of adolescent gamers. The seven underlying criteria were strongly interrelated and together measured the higher order construct of pathological gaming. The game addiction scales also showed good convergent validity, as indicated by the strong correlations with weekly time spent on games in both samples. Both scales also showed good criterion validity, as higher scores on the game addiction scales were correlated with lower life satisfaction, lower social competence, higher loneliness, and higher aggression. Because of these solid psychometric properties in two independent samples of adolescent gamers, the 21-item scale and the shortened 7-item scale were used in all of the following studies in this research project.

Chapter 3: The Relation between Pathological Gaming, Attentional Bias, and Response Inhibition among Male Adolescents

In our second study we collaborated with researchers from the Amsterdam Institute for Addiction Research in order to further examine the validity of the game addiction scale. Previous studies have shown that all sorts of addictive behaviors are characterized by biases in the attentional processing of addiction-related stimuli (e.g., Field & Cox, 2008)

and an impaired ability to inhibit urges to perform desired behavior (e.g., Garavan & Hester, 2007). In order to determine if these behavioral patterns common to addictive behaviors are also found related to pathological gaming, we adapted two tasks that measured attentional bias (dot-probe, addiction-Stroop) and one task that measured behavioral inhibition (go/no-go). Because of the conceptual similarities between self-control and behavioral inhibition, we also added a self-report measure of self-control. Responses on these measures were examined among 92 male adolescent gamers, and compared to their individual mean scores on the 21-item game addiction scale.

Our results indicted that gamers with higher levels of pathological gaming displayed attentional bias for game-related cues, and diminished response inhibition when game-related cues were presented. Contrary to neutral cues, game cues were perceived as wanted, thereby eliciting approach behavior to these stimuli, resulting in impaired inhibitory responses when these cues were present. Furthermore, we found that pathological gaming was related to lower levels of self-control. Thus, this study provided evidence that the underlying cognitive-emotional processes of pathological gaming are similar to clinically recognized addictive behaviors. These findings imply that, due to their fixation on game-related cues, male adolescent gamers with higher levels of pathological gaming have more difficulty restraining themselves from starting a game when they should be doing other things on their PC. They may also have more difficulty disengaging from a game session, and are more likely to fail when trying to quit or control their excessive gaming habits.

Chapter 4: Psychosocial Causes and Consequences of Pathological Gaming

Previous cross-sectional studies, including our own (see chapter 2), have shown that pathological gaming is related to low psychosocial well-

being, as indicated by lower satisfaction with daily life (Wang, Chen, Lin & Wang, 2008), lower self-esteem (Ko et al., 2005), lower social competence (Lo, Wang & Fang, 2005), and higher loneliness (Kim, LaRose, & Peng, 2009). However, very few studies have decisively demonstrated whether these indicators of psychosocial well-being are causes or consequences of pathological gaming. To examine the causal relations, we conducted a two-wave panel study among 851 Dutch adolescents (543 gamers) analyzing the relation between each indicator of well-being and pathological gaming using autoregressive cross-lagged panel models in structural equation modeling. We also examined whether gender moderated the relations.

Regarding causality, our autoregressive models indicated that lower social competence, higher loneliness, and lower self-esteem predicted an increase in pathological gaming six months later. Furthermore, we found a reciprocal relation between loneliness and pathological gaming, indicating that loneliness was both a cause and a consequence of pathological involvement with games. These psychosocial causes and consequences were similar for adolescent boys and girls. This study showed that lower psychosocial well-being can generally be considered an antecedent of pathological gaming among adolescents. However, displacement of real-world social interaction resulting from pathological involvement with games is likely to deteriorate existing relationships. This, in turn, could explain why pathological gaming increased adolescent gamers' feelings of loneliness.

Chapter 5: The Effects of Pathological Gaming on Aggressive Behavior

Although it has been implicitly assumed that adolescents who show signs of pathological gaming will gradually increase the frequency and duration of gaming binges, this assumption has never been tested in a longitudinal design. Therefore, our first aim was to examine if higher levels of pathological gaming predicted an increase in time spent on games six

months later. Furthermore, previous cross-sectional studies among adolescent gamers have suggested that pathological gaming causes an increase in aggressive behavior (Caplan, Williams, & Yee, 2009; Grüsser, Thalemann, & Griffiths, 2007; Kim, Namkoong, Ku, & Kim, 2008). However, the cross-sectional nature of these studies does not allow for rigorous testing of such causal assumptions. Moreover, because these studies have not taken into account whether pathological involvement concerned violent or non-violent games, we do not know whether aggressive behavior is caused, or aggravated by, violent content of games. Thus, our second aim was to examine the causal relation between pathological gaming and aggressive behavior, and how this relation may depend on the use of violent games.

Using the same longitudinal dataset and autoregressive cross-lagged panel models as reported in the previous chapter, our analyses indicated that higher levels of pathological gaming predicted an increase in the frequency and duration of gaming sessions six months later. Furthermore, pathological gaming predicted an increase in aggressive behavior six months later, regardless of whether players were involved with violent or non-violent games. However, this effect on aggressive behavior applied only to adolescent boys. For both genders, we found that the time spent playing violent games specifically, and not computer or video games per se, caused an increase in aggressive behavior, which is in agreement with previous longitudinal studies. Because girls generally did not play violent games, pathological involvement among girls generally concerned non-violent games, which may explain why pathological gaming reduced aggressive behavior among girls.

Main Conclusion

During the three years of this research project, public and academic interest in pathological gaming has increased exponentially. Although the terminology is still under debate, the general concept of pathological gaming has gained widespread acceptance among researchers as a legitimate behavioral disorder (e.g., Gentile, 2009; Young, 2009). The societal pervasiveness of pathological gaming was illustrated by the emergence of various 'game addiction clinics' all over the world, that offer treatment for gamers who require professional help. Unfortunately, the impact of pathological gaming on society was further emphasized by several disturbing news reports: 'Game addiction inspired teen to matricide' (BBC, 2009), and 'Game addicts arrested for starving baby to death' (ABC, 2010). Despite evident acknowledgement from the public and academic sphere, the American Psychiatric Association may decide not to include 'video game addiction' in the fifth edition of the Diagnostic and Statistical Manual of Mental Disorders (DSM-V, now planned for 2013). In a recently released draft version, a new category of behavioral addictions is proposed, in which gambling addiction will be the sole disorder (APA, 2010). It has been recommended that video game addiction and internet addiction are included in the manual's appendix instead, encouraging additional research that could lead to their inclusion in future editions.

These preliminary decisions by the APA notwithstanding, we believe that our research has consistently provided compelling evidence of the existence and validity of pathological involvement with computer and video games among adolescent gamers. We defined the concept of pathological gaming as persistent, recurrent and progressively excessive involvement with computer or video games that cannot be controlled despite associated social and/or emotional problems. The extent to which adolescent gamers show signs of this behavioral tendency can be measured with a short survey scale consisting of seven criteria that are commonly

used to identify clinically recognized addictive behaviors and dependencies. Because the game addiction scale proved to be a valid instrument to assess pathological gaming among adolescents, this scale was subsequently used to investigate its causes and consequences.

In our studies, pathological gaming was conceptualized as a continuum, instead of using an arbitrary cut-off point to determine if someone is addicted or not. Therefore, high scores on the game addiction scale may provide an indication of serious pathological involvement, but should not be used to classify gamers as addicted. A clinical interview, in addition to information from family members, would probably be the most effective method to determine with the highest degree of accuracy if a person is addicted to the games. However, whether a person can be clinically diagnosed as a 'game addict' is perhaps not the most relevant issue. Extended periods of obsessive, excessive and uncontrollable gaming are likely to impair the social and/or educational development of adolescents in some way. Regardless of whether, or when, these players can be classified as 'game addicts', pathological gaming is inherently detrimental behavior and should therefore be prevented or stopped.

Vulnerable Gamers and Negative Consequences

Our research has shown that adolescent gamers with pre-existing psychosocial vulnerabilities, such as loneliness, low social competence, and low self-esteem, are more likely to become pathologically involved with games. It has been suggested that these vulnerable gamers are particularly susceptible to pathological involvement with *online* games (Ng & Wiemer-Hastings, 2006; Smyth, 2007). Over the last decade, online multiplayer games such as *World of Warcraft* (Blizzard, 2004) and *Runescape* (Jagex, 2001) have evolved into massive virtual worlds with thriving communities and near limitless possibilities. These immersive environments provide a space where lonely adolescents with low self-esteem and diminished social

skills can avoid their real-life deficiencies through virtual contacts and achievements. For some players, these virtual experiences become more important than real experiences, causing them to forgo real-life interaction and participation in social activities (e.g., Ng & Wiemer-Hastings, 2006). Although playing online games may temporarily reduce negative feelings associated with social deficiencies, pathological involvement does little to facilitate the development or maintenance of real-life contacts. In fact, pathological gaming binges will likely lead to displacement of real-world social interaction, which may deteriorate existing relationships, thereby isolating this already vulnerable group even more. This may explain why our analyses indicated that pathological involvement further increased feelings of loneliness.

In general, our research confirmed the common finding that playing computer and video games is much more popular among adolescent boys than among adolescent girls. The vast majority of adolescent boys regularly played games, whereas only half of the adolescent girls played games regularly, and almost none of them played excessively. Not only are adolescent boys more likely to play excessively, they also show more signs of pathological involvement than girls (see Appendix, page 169). In fact, excessive daily gaming binges coupled with relatively severe signs of pathological gaming were found almost exclusively among adolescent boys. Adolescent males with higher levels of pathological gaming also showed lower self-control and diminished response inhibition when confronted with game-related cues, which indicated that they have more difficulty restraining themselves from starting a game or disengaging from a game session once started. Although the causal relation between self-control and addictions is still unclear (low self-control may facilitate addiction or addiction may reduce self-control), over time, these patterns of impaired behavioral inhibition can explain why pathological involvement caused an increase in the frequency and duration of gaming habits.

Progressively excessive gaming habits among adolescents will likely lead to problems at school and conflicts with their parents. When attempts are made to stop this excessive behavior, withdrawal symptoms following from abstinence after prolonged use can lead to irritability and aggression (Young, 2009). This could cause male adolescents to behave aggressive in situations where they cannot play, for instance at school, or at home when their parents restrict them from playing. Increased aggressive behavior resulting from pathological involvement with games will also likely have a negative impact on their social life, providing an alternate explanation for their increase in loneliness. Furthermore, aggressive behavior may be aggravated if adolescent gamers are involved with violent games. These findings may be particularly disconcerting for male gamers and their families because adolescent males are generally very likely to play violent games and most susceptible to pathological involvement.

How to Control or Prevent Pathological Gaming

Despite the fact that pathological use of games can seriously disrupt the lives of players and their families, it is important that we do not overstate the dangers of computer and video games. For the vast majority of adolescents, games are nothing but a source of enjoyment and pleasure. In general, playing computer or video games does not have adverse effects, nor does playing them induce pathological involvement. Only a small group of predominantly male gamers with pre-existing psychosocial vulnerabilities show high levels of pathological involvement, which will subsequently have negative consequences for their social and emotional well-being. In order to help these gamers, parents and mental health specialists should first be aware that it is not the games that cause pathological involvement. It is important that parents understand *why* their child chooses to spend so much time in a virtual world instead of the real world. Individual psychosocial vulnerabilities coupled with a general

dissatisfaction with life can lead some adolescent to use games as a means to escape, which could lead to a downward spiral of pathological gaming habits and diminished well-being. Because low psychosocial well-being increases the chances of adolescents developing pathological involvement with games, addressing these psychosocial problems may reduce pathological behavior. Simply reducing the amount of time spent on games, or forbidding them to play at all, may not be an effective solution because the psychosocial problems remain. Furthermore, when parents attempt to break their children's pathological gaming patterns by prohibiting games, withdrawal symptoms can cause conflicts and aggressive outburst (e.g., Young, 2009). As a result, parents may think that it is better to avoid these conflicts by not interfering with pathological gaming habits. However, not interfering in order to avoid conflicts will likely exacerbate excessive gaming habits and increase associated problems. Instead, parents might focus their treatment or prevention on activities that stimulate the development of social skills in a non-gaming environment, thereby improving their social interaction and building their self-esteem. If pathological gaming habits are not adequately dealt with during adolescence, this condition may cause more serious problems as these gamers progress into young adulthood and become independent from their parents.

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