

## IMPULSIVENESS AND VIDEO GAME ADDICTION

## IMPULSIVIDAD Y ADICCIÓN A LOS VIDEOJUEGOS

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### Abstract

Impulsiveness has been associated with substance abuse disorders and behavioural addictions. Impulsiveness could play a role in the development of video game addictions. The aim of this study was to analyse the relationship between impulsiveness, amount of video gaming and addiction to video gaming. A total of 411 adolescents aged from 12 to 16 fulfilled GASA (Gaming Addiction Scale for Adolescents), the Plutchik Impulsiveness Scale and a videogame behaviour questionnaire. Descriptive analysis of videogame behaviour found gender differences, therefore analysis differentiate between genders. Results indicate that impulsiveness is associated with addiction to video games in both genders, and it appears to be related to time spent on video games only in weekdays. According to the results, impulsiveness is a factor to consider for understanding the development of addiction to video games. Thus, impulsiveness should be taken into account to explain problematic gaming behaviour as well as to design preventive and treatment interventions.

*Keywords: Impulsiveness, video game, addiction, adolescents.*

### Resumen

La impulsividad ha sido asociada con el abuso de drogas y las adicciones comportamentales. La impulsividad puede modular el desarrollo de la adicción a los videojuegos. El objetivo del presente estudio es analizar la relación entre impulsividad, la frecuencia e intensidad de uso de videojuegos y la adicción a los videojuegos. Un total de 411 adolescentes de 12 a 16 años de edad, cumplieron la escala GASA (Gaming Addiction Scale for Adolescents), la Escala de Impulsividad de Plutchik y un cuestionario sobre la conducta de juego. Los análisis descriptivos de la conducta de juego revelaron diferencias de género, por lo tanto se adoptó un enfoque de género. Los resultados indican que la impulsividad está asociada a la adicción a los videojuegos en ambos géneros y mantiene relación únicamente con el tiempo dedicado a los videojuegos en días laborales. Atendiendo a los resultados, la impulsividad es un factor a considerar en el desarrollo de adicción a video juegos. Por lo tanto, la impulsividad debe ser tenida en cuenta para explicar la conducta problemática de videojuegos, así como en el diseño de intervenciones preventivas y terapéuticas.

*Palabras clave: Impulsividad, videojuego, adicción, adolescentes.*

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Impulsiveness is the incapacity to exercise effective self-control when faced with signs that suggest reward or punishment (Stewart, Ebmeier & Deary, 2004; Woicik, Stewart, Phil & Conrod, 2009). From a cognitive perspective, it implies difficulty in assessing future consequences of one's own conduct (Evenden, 1999). As a result, impulsive behaviour is characterised by a failure to consider alternative solutions to problems, accepting the first idea that comes to mind without taking the time to consider and assess, or assess properly, the consequences of these solutions (D'Zurilla, Chang & Sanna, 2003).

Impulsiveness has been linked, even identified, with different psychological dimensions such as lack of inhibition, urgency, the search for something new, the search for excitement (Michalczuk, Bowden-Jones, Verdejo-García & Clark, 2011; Stewart et al., 2004; Zuckerman, Kuhlman, Joireman, Teta & Kraft, 1993) attention deficiency (Patton, Standord & Barrat, 1995) and the lack of planning and perseverance (Michalczuk et al., 2011; Whiteside & Lynam, 2001). Therefore, the scales for measuring impulsiveness include various factors that indicate its conceptual range. For instance, the Scale for measure Control of Impulses Ramón y Cajal (Ramos, Gutiérrez-Zotes & Sáiz, 2002) was based on four factors: Impulsiveness, Immediacy, Imposition and Risk. The Barrat Impulsiveness Scale (Patton et al., 1995), includes 3 factors: Attentional Impulsiveness, Motor Impulsiveness and Unplanned Impulsiveness. The structure of the Plutchik Impulsiveness Scale (Plutchik & van Praag, 1989) consists of 4 factors. Self-control is the ability to wait or delay action. Planning involves the ability to consider the consequences of one's actions. The physiological factor refers to nutritional and sexual behaviours. Spontaneity refers to impulsive and uncontrolled behaviour. Therefore, it can be confirmed that impulsiveness is a complex concept, the measurement of which presents specific difficulties.

The lack of impulse control is a characteristic that is strongly related to behaviours of substance abuse and addiction, including both the initial stages as well as the advanced stages of experimentation. Young people who show high levels of impulsiveness are more likely to experiment (Adan, 2012, Calvete & Estévez, 2009; Case, 2007; Chassin, Flora & King, 2004; Cloninger, Sigvardsson, Von Knorring & Bohman, 1998; Moeller & Dougherty, 2002). Likewise, experienced consumers and patients

being treated for addiction are characterised by their high marks on the impulsiveness scale (Bravo de Medina, Echeburúa & Aizpiri, 2007; Fernández-Serrano et al., 2012). Impulsiveness has also been identified as a predictor of non-substance addictive behaviours (Barnes, Welte, Hoffman & Dintcheff, 2005; de Sola, Rubio & Rodríguez, 2013, Walther, Morgenstern & Hanewinkel, 2012), problematic behaviours (Cooper, Wood, Orcutt & Albino, 2003), as failure at school (Lozano, Gordillo & Pérez, 2014; Vigil-Colet & Morales-Vives, 2005), and unsafe sexual conduct (Birthron & Latzman, 2014; Derefinko et al., 2014). Therefore, dysfunctional impulsiveness is considered an indicator of susceptibility towards addictive behaviours in general, with or without substances.

.Although there is no formal consensus that recognises addiction to video games as a mental disorder, there are numerous authors that have found an addictive use pattern, especially in massive multiplayer online role playing games (MMORPGs) (Yee, 2006). During the preparation of the fifth version of the Diagnostic and Statistical Manual of Mental Disorders (DSM-V) (APA, 2013) there were serious attempts to include it as an impulse control disorder (Hiller, 2014). The American Medical Association actively defended the inclusion of video game addiction as a sub-type of addictive disorder. However, later on, APA re-considered its position suggesting that there was not enough evidence to justify its inclusion in the DSM-V. A decision celebrated by the video game lobby and an industry with a turnover of 93,000 million dollars in 2013 (Gartner, 2014).

Despite the later decision of the American Psychiatric Association not to recognise the problem as a diagnostic entity, the prevalence of abusive or problematic use is growing. In Europe, one of every four young people had played during the previous week (ISFE, 2012). Between 1 and 3 per cent of them showed symptoms of lack of impulse control and developed abusive gaming behaviours associated with psycho-social problems (Lemmens, Valkenburg & Peter, 2009; Peukert, Sieslack, Barth & Batra, 2010; Rehbein, Kleimann & Mössle, 2010; Van Rooij, Schoenmakers, Vermulst, Van Den Eijnden & Van De Mheen, 2011; Wenzel, Bakken, Johansson, Götestam & Øren, 2009).

Impulsiveness has shown a strong association with experimentation with drugs and regular substance abuse, as well as other addictive habits such as

compulsive gambling. Nevertheless, although there is increasing evidence of the relationship between impulsiveness and the use of information and communication technologies, specifically video games (Lee et al. 2012; Liao et al. 2011; Wu, Cheung, Ku, & Hung, 2012), more is still required. The aim of this study is to describe the relationship between impulsiveness, time spent in videogames, and addiction to video games.

**METHOD**

**Participants**

The initial sample was composed of 507 high school students from three educational centres selected through non-randomised (incidental) stratified sampling. The centres were chosen based on their geographic and social representation (Public centres: 43%, Privates: 57%; variable socioeconomic level). 96 participants were excluded because they did not play video games. Final sample (Table 1) consisted of 411 participants (157 females: 38.2% and 254 males: 61.8%). Participants ranged in age from 12 to 16 years (M=13.7; SD=1.297). 40.6% of them do not play in weekdays, 31.6 % played one or two weekdays, and 27.7% player 3 or more weekdays. Most of them played both days (61.6%) at weekends. Intensity, hours per week, shows that the majority of participants (87.9%) played less than 3 hours per day and that 5.9% played more than 5 hours per day in weekdays. At the weekend, 54.7 % player less than 3 hours and 15.8% player more than 5 hours per day.

Once the approval of the Parent’s Associations had been obtained, an agreement was made on the dates for administration. The collection of data lasted three months. The objective of the study and the answering procedure were explained to the participants before they answered the questionnaire. The questionnaire was anonymous and self-administered. Participants spent approximately 30 to 40 minutes to complete it.

Table 1. Sociodemographic and Gaming Behaviour description

| <b>Gender</b>                             | n   | %    |
|---|-----|------|
| Females                                   | 157 | 38.2 |
| Males                                     | 254 | 61.8 |
| <b>Age</b>                                |     |      |
| 12  | 92  | 22.4 |
| 13  | 112 | 27.3 |
| 14  | 69  | 16.8 |
| 15  | 102 | 24.8 |
| 16  | 36  | 8.8  |
| <b>Frequency of the use of videogames</b> |     |      |
| <b>Weekdays</b>                           |     |      |
| Do not play                               | 167 | 40.6 |
| 1-2 days                                  | 130 | 31.6 |
| 3-4 days                                  | 60  | 14.6 |
| 5 days                                    | 54  | 13.1 |
| <b>Weekend</b>                            |     |      |
| Do not play                               | 9   | 2.2  |
| Saturday                                  | 96  | 23.4 |
| Sunday                                    | 53  | 12.9 |
| Saturday & Sunday                         | 253 | 61.6 |
| <b>Intensity of the use of videogames</b> |     |      |
| <b>Weekdays</b>                           |     |      |
| Do not play                               | 168 | 40.9 |
| <1 hour                                   | 60  | 14.6 |
| 1 Hour                                    | 78  | 19   |
| 2 Hours                                   | 55  | 13.4 |
| 3 hours                                   | 26  | 6.3  |
| 3-5 Hours                                 | 16  | 3.9  |
| 5-10 Hours                                | 4   | 1    |
| >10 hours                                 | 4   | 1    |
| <b>Weekends</b>                           |     |      |
| Do not play                               | 8   | 1.9  |
| <1 hour                                   | 42  | 10.2 |
| 1 Hour                                    | 58  | 14.1 |
| 2 Hours                                   | 117 | 28.5 |
| 3 hours                                   | 62  | 15.1 |
| 3-5 Hours                                 | 59  | 14.4 |
| 5-10 Hours                                | 39  | 9.5  |
| >10 hours                                 | 26  | 6.3  |

## Variables and instruments

**Gaming behaviour.** Gaming was assessed by a 20 items questionnaire of closed questions with dichotomous answers, multiple choice and Likert-type 5-option scales. Gaming behaviour was defined according to two dimensions: frequency and intensity. Frequency indicated the number of days per week that a person played. Working-days and weekends were separated, thereby producing 4 working-days categories: 1) do not play, 2) 1-2 days, 3) 3-4 days, and 4) 5 days; and 4 weekend categories: 1) do not play, 2) Saturdays, 3) Sundays, and 4) Saturdays and Sundays. On the other hand, intensity referred to the number of gaming hours and the difference between hours played during working-days and weekends.

**Addiction to video games,** was assessed with GASA «Addiction to video Games Scale for Adolescents – Short version» (Lemmens et al., 2009; Spanish version by Lloret & Tirado, 2014). It is made up of 7 items that correspond to a 7-dimension structure (salience, tolerance, mood modification, relapse, withdrawal, conflict and problems) under a higher factor: addiction. The scores of the scale vary from 1 to 5. The author establishes two criteria for diagnosis depending on the cut-off point. We used the polythetic method, which requires a minimum mark of 3 in at least 4 items. The monothetic method is more demanding; it establishes the cut-off point at 3 in all items. The reliability was Cronbach's alpha of 0.86 in the first sample and 0.81 in the second one (Lemmens et al., 2009).

**Impulsiveness.** We assessed impulsiveness through «The Plutchik Impulsiveness Scale» (Plutchik & Van Praag, 1989; Spanish version by Rubio et al., 1999), consists of 15 short phrases that must be valued on a frequency scale of four alternatives (never - almost always). With a score that varies from 0 to 45 points, (Never=0, Almost always=3), 20 points above is considered high impulsiveness. The scale had a Cronbach's alpha of 0.73 (Plutchik & Van Praag, 1989).

## Statistical analysis

Data analysis was conducted with SPSS for Windows, version 21.0. Descriptive analyses of central tendencies that reflected percentages, averages and standard deviations were carried out. T-Student test was used to analyse the differences in independent samples. Level of significance was set 0.05. The Cohen test was used to determine the effect size ( $\delta$ ).

## RESULTS

Data analyses show significant differences in the parameters of gaming behaviour in terms of the gender (Table 2). Male participants who play video games did it more frequently and intensely than girls did, both on weekdays and at weekends and presented significantly higher levels of addiction than females.

Table 2. Frequency (days), Intensity (hours) of video games and GASA, in both genders

|                 | ♀ (n=157) |       | ♂ (n=254) |       | T      | P       | $\delta$           |
|-----------------|-----------|-------|-----------|-------|--------|---------|--------------------|
|                 | Mean      | S.D.  | Mean      | S.D.  |        |         |                    |
| Frequency M-F   | 1.252     | 1.571 | 1.884     | 1.828 | -3,711 | 0.0**   | 0.328              |
| Frequency Sa-Su | 1.395     | 0.563 | 1.717     | 0.477 | -5.954 | 0.0**   | 0.527 <sup>M</sup> |
| Intensity M-F   | 0.783     | 1.268 | 1.209     | 1.675 | -2.733 | 0.007** | 0.242              |
| Intensity Sa-Su | 1.997     | 1.807 | 3.835     | 2.785 | -8.112 | 0.0**   | 0.718 <sup>M</sup> |
| GASA            | 1.547     | 0.557 | 2.048     | 0.673 | -8.081 | 0.0**   | 0.715 <sup>M</sup> |

\* \* p-value < 0.01; Effect size Moderate  $\delta > 0.50$ ; M-F= From Monday to Friday; S-S= Saturday and Sunday

Taking these gender differences into account, we analysed data in terms of boys and girls. In the first place, we analysed the relationship between impulsiveness and addiction. Subsequently, we compared the scores in addiction and the use of video games between two

groups with the highest and lowest scores in impulsiveness.

## Impulsiveness and Addiction

The results reveal an association between impulsiveness and addiction to video games. Those who

meet the diagnosis criteria in the GASA scale obtained significantly higher values on the impulsiveness scale than those who do not matched the diagnosis criteria. Girls diagnosed with the GASA scale scored 6 points above those who did not matched the diagnosis criteria. These differences were significant and the effect size high, more than 80% of those who met the diagnosis

criteria score upper than non-diagnosis group in impulsiveness. The differences in impulsiveness between boys were also significant, however not so high ( $\delta = 0.663$ ) (Table 3).

Table 3. Impulsiveness means according to GASA diagnosis

|   | GASA negative |        |       | GASA positive |        |       | T      | P       | $\delta$           |
|---|---------------|--------|-------|---------------|--------|-------|--------|---------|--------------------|
|   | N             | Mean   | S.D.  | n             | Mean   | S.D.  |        |         |                    |
| ♀ | 144           | 15.865 | 6.636 | 13            | 21.615 | 4.925 | -3.046 | 0.003** | 0.882 <sup>H</sup> |
| ♂ | 193           | 14.598 | 6.14  | 60            | 18.433 | 5.794 | -4.281 | 0.000** | 0.633 <sup>M</sup> |

\* \* p-value < 0.01; Effect size Moderate  $\delta > 0.50$ ; High  $\delta > 0.80$

**Impulsiveness, Use of video games and Addiction**

We compared the two groups with the highest and lowest scores in impulsiveness (Table 4): Group A, made up of those subjects with the highest scores (4th quartile), and Group B, first quartile and the lowest scores on the impulsiveness scale. In girls, differences in frequency point out that the more impulsive played more days on working-days, but not in weekends. In both genders, the

number of hours (Intensity) spent gaming from Monday to Friday, was significantly higher in Group\_A than in Group\_B. Finally, scoring in GASA is significantly different in the two groups and in the two genders: Group\_A (high impulsiveness) obtains significantly higher scores on the addiction scale, and the effect size indicates that more than 80% get a higher score in GASA than Group B.

Table 4. Frequency, Intensity and Addiction according to Impulsiveness and Gender

|           | Impulsiveness |       |         |       |        |         |                    |
|-----------|---------------|-------|---------|-------|--------|---------|--------------------|
|           | Group B       |       | Group A |       | T      | p       | $\delta$           |
|           | Mean          | S.D.  | Mean    | S.D.  |        |         |                    |
| Girls     | (n=43)        |       | (n=41)  |       |        |         |                    |
| Freq. M-F | 0.733         | 1.151 | 1.439   | 1.67  | -2.22  | 0.030*  | 0.485              |
| Freq. S-S | 1.372         | 0.536 | 1.39    | 0.628 | -0.143 | 0.887   | 0.031              |
| Int. M-F  | 0.442         | 0.709 | 0.9512  | 1.213 | -2.335 | 0.023*  | 0.51 <sup>M</sup>  |
| Int. S-S  | 1.523         | 1.017 | 1.988   | 1.801 | -1.446 | 0.153   | 0.316              |
| GASA      | 1.279         | 0.321 | 1.777   | 0.737 | -3.970 | 0.0**   | 0.867 <sup>H</sup> |
| Boys      | (n=70)        |       | (n=77)  |       |        |         |                    |
| Freq. M-F | 1.621         | 1.789 | 2.085   | 1.823 | -1.552 | 0.123   | 0.256              |
| Freq. S-S | 1.771         | 0.423 | 1.688   | 0.494 | 1.099  | 0.274   | 0.181              |
| Int. M-F  | 0.779         | 0.927 | 1.565   | 2.113 | -2.967 | 0.004** | 0.49               |
| Int. S-S  | 3.593         | 2.462 | 4.318   | 3.012 | -1.604 | 0.111   | 0.265              |
| GASA      | 1.775         | 0.531 | 2.381   | 0.68  | -5.895 | 0.000** | 0.974 <sup>H</sup> |

\* \* p-value < 0.01; \*p-value < 0.05; Group A = High Impulsiveness, Group B=Low Impulsiveness;

Effect size Moderate  $\delta > 0.50$ ; High  $\delta > 0.80$ ; M-F= From Monday to Friday; S-S= Saturday and Sunday

## DISCUSSION

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The present study explored time spent in video games and gaming addiction and its relation with impulsiveness among adolescents. Findings confirmed that impulsiveness is associated with addictive gaming behaviour.

Gender appeared as an influent variable. From this perspective, results indicated differences in gaming behaviour parameters. Boys played approximately twice as many days and hours than girls, and showed greater prevalence of addiction, according to the GASA test. These results are consistent with the findings of similar studies which indicate that boys play significantly more and present more characteristics of addiction to video games (Desai, Krishnem-Sharin, Cavallo & Potenza, 2010; Gentile, 2009; Haagsma, Pieterse, & Peters, 2012; Tejeiro & Bersabé, 2002; Wang et al., 2014). Attempts have been made to explain these differences in terms of the time available for leisure activities. Indeed, girls report having less free-time, and that this free time is divided into shorter periods, which makes it more difficult to spend more time on video games (Winn & Heeter, 2009). Further research about differences between genders is needed to shed more light on this question.

Impulsiveness is related to the development of addictive gaming behaviour. Findings confirm that the more impulsive young people are more likely to develop addictive gaming behaviour. Our results are consistent with recent studies suggesting that the addiction to video games is an impulse control disorder (Ding et al., 2014; Gentile et al., 2011). Results of the meta-analysis carried out by MacKillop et al. (2011) of the relationship between impulsiveness and addiction provide strong evidence that impulsiveness is related to the development of addictive behaviour in general. Consequently we can conclude that the impulsiveness is related to a greater likelihood of the development of addiction. The case of addiction to video games is not an exception, and impulsiveness should be considered a target in interventions.

Comparing the group of high and low impulsiveness, we found significant differences in intensity (hours of play) in working-days, and frequency (days per week) in working-days only among girls. It has been found that exposure to first-person-shooter games is positively related to impulsiveness (Metcalf & Pammer, 2013), whereas exposure to games of strategy is negatively

related to impulsiveness (Bailey, West & Kuffel, 2013). In this study has been found that differencing between working-days and weekend is a variable to be taken into account. Therefore, in future research it would be interesting to include other variables such as the type of game or the contents.

As seen before, participants with higher scoring in impulsivity play more in working-days, that led us to reflect on the development of impulsiveness. In spite of the difficulty of finding a single definition of impulsiveness, we face a construct of which the main characteristics are the lack of reflection on behaviour patterns and their consequences, the lack of planning, a reduced ability to delay behaviour patterns, and urgency and difficulty in controlling emotions (Stewart et al., 2004; Woicik et al., 2009; Evenden, 1999; D'Zurilla et al., 2003). These characteristics can and may be modified. Indeed, it has been observed that early experiences may influence the development of impulsiveness (Anda et al., 2006; Perry, 2009). In addition, it has been suggested that impulsiveness may have a bidirectional relationship to the use of video games (Gentile et al., 2012), as shown by the results of a longitudinal study in which impulsiveness predicts video game abuse (Gentile et al., 2011). In the development of adolescents, in which impulsiveness acquires a priority dimension, limiting the use of video games to weekends may provide an exercise for the control of the impulsiveness of minors.

### Author Disclosure Statement

The authors have no conflicts of interest to disclose.

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