



**HAL**  
open science

# Tilt in video gaming: Development and Validation of the Video Gaming Tilt Scale (VGTS)

Emeline Chauchard, Marie Dupau, Yasser Khazaal, Axelle Moreau

## ► To cite this version:

Emeline Chauchard, Marie Dupau, Yasser Khazaal, Axelle Moreau. Tilt in video gaming: Development and Validation of the Video Gaming Tilt Scale (VGTS). 2023. hal-04405866v1

**HAL Id: hal-04405866**

**<https://hal.science/hal-04405866v1>**

Preprint submitted on 19 Jan 2024 (v1), last revised 5 Mar 2024 (v2)

**HAL** is a multi-disciplinary open access archive for the deposit and dissemination of scientific research documents, whether they are published or not. The documents may come from teaching and research institutions in France or abroad, or from public or private research centers.

L'archive ouverte pluridisciplinaire **HAL**, est destinée au dépôt et à la diffusion de documents scientifiques de niveau recherche, publiés ou non, émanant des établissements d'enseignement et de recherche français ou étrangers, des laboratoires publics ou privés.

# Rage in video gaming: Development and Validation of the Video Gaming Rage Scale (VGRS)

Emeline Chauchard<sup>1</sup>, Marie Dupau<sup>1</sup>, Yasser Khazaal<sup>2</sup>, Axelle Moreau

<sup>1</sup> Nantes Université, Univ Angers<sup>(4)</sup>, Laboratoire de psychologie des Pays de la Loire, LPPL, UR 4638, F-44000 Nantes, France

<sup>2</sup> Addiction Medicine, Lausanne University Hospital and Lausanne University, Lausanne, Switzerland

## **Role of Funding Sources :**

No funding sources

## **Conflict of interest :**

Emeline Chauchard, Marie Dupau, Yasser Khazaal, Axelle Moreau, declare no conflict of interest.

## **Ethical Statement:**

This study followed the ethical guidelines set out in the Declaration of Helsinki and was approved by the local ethics committee (approval number: 07122022)

**Acknowledgements:** Thank you to Hubert Baillot who worked on building the questionnaire and testing the first version of the VGRS.

**Words count :** 3282 words

## **Abstract**

Rage refers to a decrease in playing abilities, due to sudden manifestations of negative emotions (anger or frustration) and engagement in more aggressive behaviour. Rage is commonly experienced by gamers. The purpose of this article is to assess the psychometric properties of the Video Gaming Rage Scale (VGRS).

A sample of 454 players (81.7% men) completed a set of questionnaires comprising the VGRS and questionnaires assessing internet gaming disorder, anger, impulsivity, anxiety, and depression. The total sample was randomly divided into two distinct samples of a similar size, Group A and Group B, to conduct exploratory and confirmatory factor analyses.

The exploratory factor analysis identified two factors of equal weight and fitted the data from Group A well. The confirmatory factor analysis reported an excellent fit with the data for Group B. Internal reliability was good and the correlation between the two factors was moderate.

The first factor, "Emotion dysregulation", describes the emotional dysregulation of rage, particularly anger. The second factor, "cognitive dysregulation", measures cognitive dysregulation and its impact on decision-making and strategy judgement. This scale can contribute to a new area of research focusing on the trajectories of gamers and problem gamers.

**Key Words.** Online video game, Anger, Rage, Scale validation, Emotion

## 1. Introduction

Tilt is a term commonly used by players in the field of online poker. It is defined as a “sudden and uncontrolled change in gambling behaviour (loss of control over the game) induced by frustration, a shift which, in turn, affects behavioural, emotional, and cognitive processes” (Moreau et al., 2020, p. 4). The player experiences negative emotions (anger, sadness, guilt), irrational beliefs and dissociative experiences, impacting their ability to make rational decisions and resulting in loss of money (Barrault et al., 2014; Browne, 1989; Moreau et al., 2015, 2017; Palomäki et al., 2013, 2014)

In the field of video gaming, the terms “tilt” and “rage” have been adopted by gamers. Both describe a state of frustration and anger, unmanaged by the gamer, which leads to a loss of control and a decrease in the abilities needed to perform in the game (Moreau et al., 2023; Przybylski et al., 2014; Wu et al., 2021). To differentiate the phenomenon when it occurs while playing poker or while playing video games, we will use the term “tilt” for poker and “rage” for video games. Rage affects players on emotional, cognitive, and behavioural levels (Moreau et al., 2023). Rage-related phenomena are discussed online by many gamers, on various websites (e.g. Reddit, forums). It is an integral part of the gaming experience. For instance, one outcome could be “*rage-quitting*”, where a gamer suddenly quits the game to manage a high-intensity, negative emotional state (Przybylski et al., 2014).

Three qualitative studies on rage while gaming – focusing on different samples: children (Kahila, Juho et al., 2021), adolescents engaged in e-sport (Wu et al., 2021) and young adult online gamers (Moreau et al., 2023) – have been published recently. All three studies gave similar descriptions of rage. The triggers of rage included interactions with other players,

whether team members, friends, or strangers; disappointment with one's own game performance; comparisons with other players; repeated failure and loss; and technical problems (hardware, game or Internet). Study participants also reported that the more competitive the game, the more likely they were to rage (Kahila, Juho et al., 2021; Moreau et al., 2023; Wu et al., 2021), and described rage as a transitory emotional reaction (Moreau et al., 2023). The main emotional states associated with rage were anger and frustration, followed by feelings of annoyance, irritation, and guilt (Moreau et al., 2023; Wu et al., 2021). On a cognitive level, study participants described confusion, a decline in ability to concentrate, impulsive decision-making, and dissociative experiences (Moreau et al., 2023; Wu et al., 2021). When asked about behavioural responses, they reported a loss of control, physical (on hardware) and verbal aggression, and a difference in their usual game play (Kahila, Juho et al., 2021; Moreau et al., 2023; Wu et al., 2021).

Study participants reported using various regulation strategies to control their rage episodes. Some said they would quit the game, namely "*raged quitting*", to cut off the source of rage. Then, they would express their emotions by crying or screaming. They might also attempt to change their emotional state by trying to calm down or changing activity; and by rationalizing their anger (Kahila, Juho et al., 2021; Moreau et al., 2023; Wu et al., 2021). The possible consequences of rage included losing the game, broken equipment, loss of pleasure and interest in the game, and a spillover effect on other gamers. Few participants reported a feeling of emotional release (Moreau et al., 2023).

While most gamers experience some degree of rage when gaming, some may experience problematic or repeated episodes. Rage and its consequences should therefore be studied to better understand their possible role in gaming disorder and the negative effects of gaming (anger, sleep disturbance, emotional distress, -etc.). Moreover, the regulation of rage could

be a specific focus of prevention programmes that reinforce emotional and cognitive regulation. First however, to better understand rage and its implications, we developed the Video Gaming Rage Scale (VGRS) based on the results of the qualitative study (Kahila, Juho et al., 2021; Moreau et al., 2023). This article assesses the psychometric properties of the Video Gaming Rage Scale (VGRS).

## 2. Methodology

### 2.1. Participants

To be included in the study, participants had to be 18 years old, fluent in French, and have played video games at least once in the last month. In total, 1054 people accessed the online questionnaire. Six hundred biased or incomplete questionnaires were excluded from our sample, which accounted for 57% of the recorded answers. The final sample consisted of 454 players, of whom 18.3% (n = 83) were women. The total sample was randomly divided into two distinct samples of similar size, named Group A and Group B. Sociodemographic and gaming characteristics are reported in Table 1. The two groups were statistically similar in these characteristics.

### 2.2. Materials

The online survey included several questions on sociodemographic data, namely, age, gender and level of education, as well as gaming-related information such as gaming frequency, length of gaming sessions and types of gaming activity. Additionally, participants were invited to answer the following questionnaires:

#### 2.2.1. *The Video Gaming Rage Scale (VGRS)*

VGRS was developed based on a qualitative study describing rage among gamers (Moreau et al., 2023), previous studies, and a questionnaire on online poker tilt (Moreau et al., 2015, 2017, 2020). In the qualitative study (Moreau et al., 2023), we identified nine main topics to characterise rage: anger, impaired reasoning skills, verbal aggression, tension/restlessness, impulsivity, loss of game/decrease in level of play, loss of pleasure/interest, relationship with gaming partners/contagious aspects of rage, and rage quit. First, we created three items for each topic – 27 items in total. This first version was trialled with a sample of 25 gamers. In view of comments from participants in this sample, we modified some wording and identified the “rage quit” aspect as an outcome of rage rather than a component of the phenomenon. We decided to exclude it from the VGRS but recommend adding a subsidiary question about rage-quit frequency. The 24 items in the VGRS questionnaire are presented in Table 2. The instructions for the questionnaire were: “Please indicate how often you have encountered the following situation in the past three months – ‘When I play online video games, there are times when...’ ”. Participants answered the questionnaire on a Likert scale with five different responses: “Never” (0), “Rarely” (1), “Sometimes” (2), “Often” (3), “Almost Always” (4).

### *2.2.2. Severity of Tilting Scale*

Two items from the Palomäki, Laakasuo, & Salmela study on tilt in poker (Palomäki et al., 2014) were adapted to video gaming to measure the perceived frequency of tilting episodes. The question “According to you, how many times have you raged in the past 3 months?” was rated on a 7-point Likert scale ranging from 0 to more than 10 times and “Rage has been a problem for me in the last 3 months” was rated on a seven-point Likert scale ranging from “Completely Disagree” (1) to “Completely Agree” (7).

### *2.2.3. Online Poker Tilt Scale (OPTS-9)*

The nine-item questionnaire initially used to measure the frequency of tilt episodes in online poker (Moreau et al., 2020) was adapted to the context of gaming. The instruction was “When I play video games online, there are times when...”. Responses were reported on a 5-point Likert scale from 1 to 5 (“Never”, “Rarely”, “Sometimes”, “Often”, “Almost Always”). Scores range from 0 to 36 and the higher the score, the more frequent the episodes of rage. OPTS-9 had good reliability in our sample ( $\omega = 0.832$ )

#### *2.2.4. Internet Gaming Disorder Test (IGDT-10)*

IGDT-10 (Király et al., 2015) was used to evaluate Internet Gaming Disorder (IGD) using the 9 criteria in DSM-5 (American Psychiatric Association, 2013). Participants answered 10 questions on a three-point Likert scale (“Never”, “Sometimes”, and “Often”). “Often” was scored as “Yes” (1) and “Never” and “Sometimes” were scored as “No” (0). Items 9 and 10 refer to the same criterion and are combined in the scoring. The composite score of IGDT-10 ranges from 0 to 9. A score of more than 5 indicates a potential internet gaming disorder. IGDT-10 had low reliability in our sample ( $\omega = 0.658$ ).

#### *2.2.5. Clinical Anger Scale (CAS)*

The CAS is a measure of anger (Snell et al., 1995). This scale is made up of 21 items that assess anger levels in a variety of situations to determine how the individual manages anger. Each item is composed of four statements and participants must choose the one that best corresponds to their feelings or situation. Each statement is associated with a score from 0 to 3. Total scores range from 0 to 63. The CAS had good reliability in our sample ( $\omega = 0.891$ ).

#### *2.2.6. UPPS Impulsive Behaviour Scale*

The 20 items in the UPPS Impulsive Behaviour Scale-short form (Billieux et al., 2012) assessed five aspects of impulsivity: urgency, positive urgency, lack of premeditation, lack of perseverance, and sensation seeking. Participants answered on a Likert scale ranging from 1



“I strongly agree” to 4 “I strongly disagree”. Overall scores range from 20 to 80. A high score on a sub-scale and on the overall score corresponds to a high level of impulsivity. In our sample, the UPPS had good reliability ( $\omega = 0.821$ ).

#### 2.2.7. Hospital Anxiety and Depression Scale (HADS)

The Hospital Anxiety and Depression Scale (HADS) is used to evaluate depressive and anxiety symptoms (Roberge et al., 2013; Zigmond & Snaith, 1983). The HADS comprises 14 items divided into two aspects – anxiety and depression. For each item, there are four response options coded from 0 to 3. The score for the two subscales varies between 0 and 21. The higher the scores, the more severe the symptomatology. HADS presented good reliability in our sample ( $\omega_{\text{depression}} = 0.688$ ;  $\omega_{\text{anxiety}} = 0.768$ ).

### 2.3. Procedure

The questionnaire was created using LimeSurvey software and was available online from March 2019 to September 2019. Participants accessed the questionnaire via an announcement posted on social media gaming groups (primarily Facebook and Twitter). At the beginning of the questionnaire, all participants agreed to give their informed consent and participation was anonymous. This study followed the ethical guidelines set out in the Declaration of Helsinki and was approved by the ethics committee (approval number: 07122022)

### 2.4. Statistical Analysis

To begin, an exploratory factor analysis was performed on the 24 items in the VGRS questionnaire using a varimax rotation and taking half of the study population (Group A). As a first step, the scale, which was based on eight topics from a qualitative study, was reduced to two items per topic by deleting the item with the lowest saturation. Then, a second

exploratory factor analysis was performed on these 16 items in the VGRS to identify the structure of the questionnaire. Kaiser criterion (factors with Eigen values greater than 1) and a scree-plot examination (keep all factors before the breaking point or elbow) were used to select factors. Items were assigned to a factor if they weighted greater than 0.45 on that factor (Tabachnick & Fidell, 2012). Finally, a confirmatory factor analysis was performed on the other half of the population (Group B). Several adjustment indices were used to evaluate the model fully (Tabachnick & Fidell, 2012; Thompson, 2000):

(1) the model chi square divided by degree of freedom ( $\chi^2 / df$ . With a large sample size, this value should be lower than 2.00. The lower this value, the better the fit),

(2) the Tucker–Lewis index (TLI. This value should be 0.90 or higher for a good fit; the higher this value, the better the fit) (Bentler & Bonett, 1980; Tucker & Lewis, 1973),

(3) the Comparative Fit Index (CFI. This value should be 0.90 or higher for a good fit; the higher this value, the better the fit) (Bentler, 1990),

(4) the Root Mean Square Residual (RMR. This value should be 0.05 or lower; the lower this value, the better the fit), and

(5) the Root Mean Square Error of Approximation (RMSEA. This value should be 0.08 or lower; the lower this value, the better the fit) (Steiger, 1980).

The internal consistency of the subdimensions was determined by the  $\omega$  McDonald.

To test for convergent validity, Pearson's correlations were conducted to examine relationships between scores on the VGRS and other variables (Sample A and B).

The statistics were generated using Jamovi software.

### 3. Results

#### 3.1. Descriptive statistics

The overall population consisted of 454 participants, of whom 369 were men (81.3%) and the mean age was 25.7 years (SD = 8.5 years). Table 1 presents the sociodemographic and gaming characteristics of the overall population and for Groups A and B. When it came to gaming behaviour, 5% (n = 23) were potential problem gamers.

### 3.2. Item Suppression

To reduce the scale, we conducted an exploratory factor analysis (EFA) using the Group A sample and including the 24 items used to create the VGRS. The EFA proposed a two-factor solution (KMO = .897; Bartlett test,  $p > .001$ ). This model explained 38.8% of the variance. The factor matrix and the items associated with each theme are presented in Table 2. At this first step, and for each of the eight topics, we deleted the item that had the lowest saturation. All items from the topic “loss of pleasure” were excluded because they weighted below 0.45. Finally, we selected 14 items for exploratory analyses.

### 3.3. Exploratory analyses for VGRS

Still considering the sample for Group A, a second EFA was performed using the 14 items selected in the item suppression step. Four more items had to be deleted. Item 1 was deleted because its meaning and saturation were similar to those for item 9 and its removal improved the fit of the scale (RMSEA = 0.0802). Items 2 and 20 were rejected due to their low saturation ( $< .45$ ). As a result, the “relationship with partners/contagious aspects” topic is no longer represented in this scale and like rage quit, this aspect should be considered a consequence rather than a feature of rage episodes. Finally, item 15 was deleted, because it loaded similarly on both factors.

A third EFA was performed with the 10 remaining items (Table 3). This explained 53.7% of the variance, which is more than the 50% recommended for a meaningful factor solution. The Bartlett test was significant ( $p < .001$ ) (Floyd & Widaman, 1995), and KMO= .833. The factor matrix for the 10 items in the VGRS is shown in Table 3. The analysis produced a two-factor solution: the first factor, combining items oriented toward cognitive regulation, named “cognitive dysregulation”; and the second, considering items oriented toward emotional regulation, named “emotion dysregulation”. These factors presented an equivalent percentage of explained variance, respectively, 28.5 and 25.2%.

#### 3.4. Confirmatory factor analysis for VGRS on Group B

The two-factor model derived from the EFA was tested on the second half of the sample, Group B, with a confirmatory factor analysis. The correlated model fitted the data well ( $\chi^2 / df = 2$ , TLI = 0.946, CFI = 0.959, RMR = 0.043, RMSEA = 0.067). All loadings were significant and the correlation between the two factors was moderate (from 0.35).

#### 3.5. Reliability

The  $\omega$  McDonald coefficient for reliability was 0.834 for emotional dysregulation and 0.838 for cognitive dysregulation, indicating good internal reliability.

#### 3.6. Correlation

The two factors moderately correlated ( $r = 0.351$ ). The factors cognitive dysregulation (CD) and emotional dysregulation (ED) correlated with the number of episodes ( $r_{CD} = 0.227$ ;  $r_{ED} = 0.603$ ); estimation of rage as a problem ( $r_{CD} = 0.310$ ;  $r_{ED} = 0.534$ ); the scores for Internet Gaming Disorder ( $r_{CD} = 0.171$ ;  $r_{ED} = 0.287$ ); the Clinical Anger Scale ( $r_{CD} = 0.152$ ;  $r_{ED} = 0.349$ );

Positive urgency ( $r_{CD} = 0.163$  ;  $r_{ED} = 0.201$ ); Negative urgency ( $r_{CD} = 0.280$ ;  $r_{ED} = 0.283$ ); Lack of perseverance ( $r_{CD} = 0.200$ ;  $r_{ED} = 0.128$ ); Lack of premeditation ( $r_{CD} = 0.172$ ;  $r_{ED} = 0.128$ ); Anxiety ( $r_{CD} = 0.129$ ;  $r_{ED} = 0.205$ ); and Depression( $r_{CD} = 0.107$ ;  $r_{ED} = 0.211$ ).

#### 4. Discussion

The aim of this study was to create and explore the psychometric properties of the VGRS. First, the exploratory factor analysis identified two factors of equal weight and fitted the data from the Group A sample well. Then, the confirmatory factor analysis reported an excellent fit to the data for the Group B sample. The final version of the scale included 10 items divided into two distinct factors. The first factor refers to the emotional dysregulation of rage, particularly anger. The second factor measures cognitive dysregulation and its incidence on decision-making and strategy judgement. These two factors are concordant with the two aspects assessed by the Online Poker Tilt Scale (OPTS) (Moreau et al., 2020) and are in line with the results of qualitative studies published about rage (Kahila, Juho et al., 2021; Moreau et al., 2023; Wu et al., 2021). The VGRS measures the occurrence of typical characteristics of rage, without directly naming the rage. The higher the score on the scale, the more frequent the episodes of rage. No cut-off score was defined.

Components from three topics identified by the qualitative study (Moreau et al., 2023) were excluded, namely, “rage quit”, “relationship with partners” / “contagious aspects”, and “loss of pleasure” (Table 2). These three aspects are outcomes or consequences of rage episodes, and do not characterise it. However, we suggest the use of additional questions to the VGRS to assess the outcomes of rage on the behaviour of gamers (rage quit), their relations with gaming partners and on their own pleasure and interests in gaming (Supplementary material).

Low to medium correlations indicate that rage is an independent construct of video game addiction, anger, and impulsivity. Nevertheless, these variables are related, therefore, they deserve to be investigated in future research.

Rage is a distinct and emerging construct. The VGRS is a new scale in the field of video gaming, which can be used to measure transitory loss of control and experiences of unpleasant emotions while gaming. This scale can contribute to new areas of research that focus on the trajectories of gamers and problem gamers and which aim to understand emotional regulation and the emotional skills deployed while playing video games and e-sport. It could have clinical and preventative implications. The correlations found with Internet Gaming Disorder may indicate a possible contribution of such aspects to gaming disorder. Further longitudinal studies are called for. The frequency of rage episodes could help to detect problem players and could be central to prevention by encouraging gamers to develop emotional skills and regulation. Emotional skills are identified as crucial for preventing addictive behaviours and could be used and well received by video game players (Marchica et al., 2019).

This study has several limits. As we used online data collection, our sample could not be considered representative of the video gaming population. Indeed, the sample is mainly composed of men, while women constitute 48% of the online video gaming population (Entertainment Software Association., n.d.). Finally, the psychometric properties of the scale were evaluated using a sample of French or French speaking gamers. Validation of the scale needs to be replicated among various samples of gamers, in different languages.

## 5. Conclusions

Rage is well known and identified by gamers but has been understudied in the research field. Rage refers to a decrease in playing abilities, due to sudden manifestations of negative emotions (anger or frustration) and engagement in more aggressive behaviour. It is triggered by interactions with other players, disappointment with one's own game performance, repeated failure and loss, or technical issues (Kahila, Juho et al., 2021; Moreau et al., 2023; Wu et al., 2021). The VGRS is designed to assess rage episodes. After performing exploratory and confirmatory analysis, the scale comprises ten items, divided into two factors: emotion dysregulation and cognitive dysregulation. The scale has good psychometric properties. The VGRS will be useful for developing studies in the field of problematic gaming and e-sport.

## REFERENCES

- American Psychiatric Association. (2013). *Diagnostic and Statistical Manual of Mental Disorders: Dsm-5*. American Psychiatric Publishing.
- Barrault, S., Untas, A., & Varescon, I. (2014). Special features of poker. *International Gambling Studies, 14*(3), 492–504. <https://doi.org/10.1080/14459795.2014.968184>
- Bentler, P. M. (1990). Comparative fit indexes in structural models. *Psychological Bulletin, 107*(2), 238–246.
- Bentler, P. M., & Bonett, D. G. (1980). Significance tests and goodness of fit in the analysis of covariance structures. *Psychological Bulletin, 88*(3), 588–606. <https://doi.org/10.1037/0033-2909.88.3.588>
- Billieux, J., Rochat, L., Ceschi, G., Carré, A., Offerlin-Meyer, I., Defeldre, A. C., Khazaal, Y., Besche-Richard, C., & Van Der Linden, M. (2012). Validation of a short French version of the UPPS-P Impulsive Behavior Scale. *Comprehensive Psychiatry, 53*(5), 609–615. <https://doi.org/10.1016/j.comppsy.2011.09.001>
- Browne, B. R. (1989). Going on tilt: Frequent poker players and control. *Journal of Gambling Behavior, 5*(1), 3–21. <https://doi.org/10.1007/BF01022134>
- Entertainment Software Association. (n.d.). The video game player community. *2022 Essential Fact about Video Games*. Retrieved January 25, 2023, from <https://www.theesa.com/resource/2022-essential-facts-about-the-video-game-industry/>
- Floyd, F. J., & Widaman, K. F. (1995). Factor analysis in the development and refinement of clinical assessment instruments. *Psychological Assessment, 7*(3), 286–299. <https://doi.org/10.1037/1040-3590.7.3.286>
- Kahila, Juho, Piispa-Hakala, Satu, Kahila, Sanni, Valtonen, Teemu, Vartiainen, Henriikka, & Tedre, Matti. (2021). “If the game does not work, it is lagging, or you die in game, you just get furious” – Children’s experiences on gamer rage. 21–29. <http://ceur-ws.org/Vol-2883/paper3.pdf>



- Király, O., Slecza, P., Pontes, H. M., Urbán, R., Griffiths, M. D., & Demetrovics, Z. (2015). Validation of the Ten-Item Internet Gaming Disorder Test (IGDT-10) and evaluation of the nine DSM-5 Internet Gaming Disorder criteria. *Addictive Behaviors*. <https://doi.org/10.1016/j.addbeh.2015.11.005>
- Marchica, L. A., Mills, D. J., Derevensky, J. L., & Montreuil, T. C. (2019). The Role of Emotion Regulation in Video Gaming and Gambling Disorder: A Systematic Review. *The Canadian Journal of Addiction*, *10*(4), 19–29. <https://doi.org/10.1097/CXA.0000000000000070>
- Moreau, A., Bethencourt, A., Payet, V., Turina, M., Moulinard, J., Chabrol, H., & Chauchard, E. (2023). Rage in video gaming, characteristics of loss of control among gamers: A qualitative study. *Psychology of Popular Media*, No Pagination Specified-No Pagination Specified. <https://doi.org/10.1037/ppm0000481>
- Moreau, A., Chauchard, E., Hamel, A., Penthier, L., Giroux, I., & Sévigny, S. (2020). Tilt in online poker: Development of a short version of the online poker tilt scale. *Journal of Gambling Issues*, *44*, 45–60.
- Moreau, A., Delieuvain, J., Chabrol, H., & Chauchard, E. (2017). Online Poker Tilt Scale (OPTS): Creation and validation of a tilt assessment in a French population. *International Gambling Studies*, *17*(2). <https://doi.org/10.1080/14459795.2017.1321680>
- Moreau, A., Delieuvain, J., Chauchard, E., & Chabrol, H. (2015). Le TILT au Poker en ligne: Un comportement pathologique transitoire? *Alcoologie et Addictiologie*, *37*(3), 245–252.
- Palomäki, J., Laakasuo, M., & Salmela, M. (2013). ‘This is just so unfair!’: A qualitative analysis of loss-induced emotions and tilting in on-line poker. *International Gambling Studies*, *13*(2), 255–270. <https://doi.org/10.1080/14459795.2013.780631>

- Palomäki, J., Laakasuo, M., & Salmela, M. (2014). Losing More by Losing It: Poker Experience, Sensitivity to Losses and Tilting Severity. *Journal of Gambling Studies*, 30(1), 187–200. <https://doi.org/10.1007/s10899-012-9339-4>
- Przybylski, A. K., Rigby, C. S., Deci, E. L., & Ryan, R. M. (2014). Competence-impeding electronic games and players' aggressive feelings, thoughts, and behaviors. *Journal of Personality and Social Psychology*, 106(3), 441–457. <https://doi.org/10.1037/a0034820>
- Roberge, P., Doré, I., Menear, M., Chartrand, É., Ciampi, A., Duhoux, A., & Fournier, L. (2013). A psychometric evaluation of the French Canadian version of the Hospital Anxiety and Depression Scale in a large primary care population. *Journal of Affective Disorders*, 147(1–3), 171–179. <https://doi.org/10.1016/j.jad.2012.10.029>
- Snell, W. E., Gum, S., Shuck, R. L., Mosley, J. A., & Kite, T. L. (1995). The clinical anger scale: Preliminary reliability and validity. *Journal of Clinical Psychology*, 51(2), 215–226. [https://doi.org/10.1002/1097-4679\(199503\)51:2<215::AID-JCLP2270510211>3.0.CO;2-Z](https://doi.org/10.1002/1097-4679(199503)51:2<215::AID-JCLP2270510211>3.0.CO;2-Z)
- Steiger, J. H. (1980). Tests for comparing elements of a correlation matrix. *Psychological Bulletin*, 87(2), 245–251.
- Tabachnick, B. G., & Fidell, L. S. (2012). *Using Multivariate Statistics*. Pearson.
- Thompson, B. (2000). Ten commandments of structural equation modeling. In *Reading and understanding MORE multivariate statistics*. (pp. 261–283). American Psychological Association.
- Tucker, L. R., & Lewis, C. (1973). A reliability coefficient for maximum likelihood factor analysis. *Psychometrika*, 38(1), 1–10. <https://doi.org/10.1007/BF02291170>
- Wu, M., Lee, J. S., & Steinkuehler, C. (2021). Understanding Tilt in Esports: A Study on Young League of Legends Players. *Proceedings of the 2021 CHI Conference on Human Factors in Computing Systems*, 1–9. <https://doi.org/10.1145/3411764.3445143>

Zigmond, A. S., & Snaith, R. P. (1983). The Hospital Anxiety and Depression Scale. *Acta Psychiatrica Scandinavica*, 67(6), 361–370. <https://doi.org/10.1111/j.1600-0447.1983.tb09716.x>

Table 1. Descriptive statistics for the samples

	All Sample N= 454	Group A n= 227	Group B n= 227
<b>Age</b>	25.7	25.3 (ET = 8.2)	26.1 (8.7)
<b>Women</b>	83	40 (17.6%)	43 (18.9%)
<b>Men</b>	369	185	184
<b>Socio-professional category</b>			
Student	199 (44%)	103 (45%)	96 (42.3%)
Employee	190 (42%)	100 (44 %)	90 (39.6%)
Unemployed	59 (13%)	21 (9%)	38 (16.7%)
Other	6 (1.6%)	3 (1.3%)	3 (1.3%)
<b>Gaming frequency</b>			
More than once a day	213 (47%)	105 (46%)	108 (47.6%)
Once a Day	145 (32%)	71 (31%)	74 (32.5%)
Two or three times a week	77 (17%)	41 (18%)	36 (16%)
Once a week	14 (3%)	8 (3.5%)	6 (2.6%)
Twice a month or less	5 (1%)	2 (1%)	3 (1.3%)
<b>Length of playing sessions</b>			
Less than 30 minutes	16 (3.5%)	8 (3.5%)	8 (3.5%)
Between 30 min and 1 h	26 (6%)	14 (6.2%)	12 (5.3%)
Between 1 and 2 h	115 (25%)	57 (25%)	58 (25.6%)
Between 2 and 3 h	146 (32%)	78 (34%)	68 (30%)
Between 3 and 4 h	67 (15%)	31 (13%)	36 (15.9%)
More than 4h	84 (18%)	39 (17%)	45 (19.8%)
<b>Multiplayers practice</b>	325 (71%)	158 (69%)	167 (73.6%)
<b>Type of game played (not exclusive)</b>			
Massively Multiplayer Online (MMO)	252 (55%)		
Multiplayer Online Battle Arena (MOBA)	170 (37%)		
Role Playing Game	250 (55%)		
Strategy/Management	232 (51%)		
Survival	166 (36%)		

Table 2. Themes associated to each item in the VGRS and factor matrix for exploratory analysis after Varimax rotation (Sample A)

Themes	Items from the original version	Factor 1	Factor 2
Anger	<b>1. I am angry [Je suis en colère]</b> 5. Others make me angry [Les autres me mettent en colère] <b>9. I feel anger [Je ressens de la colère]</b>	.757 .546 .733	
Alteration in reasoning abilities	3. My decisions are no longer rational [Mes décisions ne sont plus rationnelles] <b>26. I play poorly [Je joue mal]</b> <b>16. I make bad choices [Je fais de mauvais choix]</b>		.496 .722 .786
Verbal Aggression	<b>19. I insult others [J'insulte les autres]</b> <b>18. I criticise the game out loud [Je critique le jeu à voix haute]</b> 17. I swear [Je dis des gros mots]	.736 .656 .562	
Tension / restlessness	6. I hit my hardware hard (mouse, keyboard, gamepad) [Je tape fort sur mon matériel (souris, clavier, manette)] <b>7. I am physically tense [Je suis tendu physiquement ]</b> <b>14. I feel irritated [Je me sens énervé]</b>	.499 .515 .762	
Impulsivity	15. I play without thinking about the consequences [Je joue sans penser aux conséquences] <b>27. I act without thinking [J'agis sans réfléchir]</b> 10. I take more risks [Je prends plus de risque]	.496 .767 <.45	
Loss of the game/decrease in level of play	<b>12. I no longer apply the strategy necessary to succeed [Je n'applique plus la stratégie nécessaire pour réussir]</b> 8. I am below my usual level [Je suis en dessous de mon niveau habituel] <b>11. I am not efficient [Je ne suis pas efficace]</b>		.700 .608 .720
Loss of pleasure, lack of interest	23. I felt like I was wasting my time [J'ai eu l'impression de perdre mon temps] 21. I thought the game was poorly done [J'ai trouvé que le jeu était mal fait] 13. I don't enjoy the game anymore [Je n'ai plus de plaisir à jouer]	<.45 <.45 <.45	<.45 <.45 <.45
Contagious aspects/relations hip with partners	<b>2. My gaming partners told me to calm down [Mes partenaires de jeu m'ont dit de me calmer]</b> <b>20. I annoy my teammates [J'énervé mes coéquipiers]</b> 4. My teammates reproach me [Mes coéquipiers me font des reproches]	.557 .478 <.45	

Note:

The numeration of the items corresponds to the order in which they appear in the questionnaire the participants completed.

Items in bold correspond to the selected items included in the second round of the exploratory analysis of the VGRS.

Table 3. Factor matrix for the second exploratory analysis performed on the 14 items selected in the first step (Group A sample)

VGRS Items	<b>Factor 1</b> <i>Cognitive dysregulation</i>	<b>Factor 2</b> <i>Emotion dysregulation</i>
1. <b>I make bad choices</b> [Je fais de mauvais choix]	.779	
2. <b>I act without thinking</b> [J'agis sans réfléchir]	.747	
3. <b>I play poorly</b> [Je joue mal]	.730	
4. <b>I am not efficient</b> [Je ne suis pas efficace]	.712	
5. <b>I no longer apply the strategy necessary to succeed</b> [Je n'applique plus la stratégie nécessaire pour réussir]	.701	
6. <b>I feel irritated</b> [Je me sens énervé]		.802
7. <b>I feel anger</b> [Je ressens de la colère]		.798
8. <b>I insult others</b> [J'insulte les autres]		.665
9. <b>I criticize the game out loud</b> [Je critique le jeu à voix haute]		.614
10. <b>I am physically tense</b> [Je suis tendu physiquement]		.544
<b><math>\omega</math> McDonald</b>	0.838	0.834
<b>Explained Variance</b>	28.5%	25.2%

