

# Aggression, Impulsiveness and Gaming Motivation in Young Adult Video Gamers: An Empirical Study

Nataliya Bogacheva<sup>a</sup> and Anna Alekseeva<sup>b</sup>

<sup>a</sup> *Sechenov First Moscow State Medical University (Sechenov University), 8-2 Trubetskaya str., Moscow, 119991, Russia*

<sup>b</sup> *Independent researcher, Moscow, Russia*

## Abstract

The study aims to investigate the connection between video gaming motivation, aggression, and impulsiveness in a sample of young adult video gamers from Russia. Literature analysis suggests specific gaming motivations, e.g., competition, can contribute to higher general and verbal aggression. Gaming motivation and impulsiveness are both believed to partake in gaming addiction development, which in its turn raises aggressive tendencies and further enhances impulsiveness, according to some studies. An empirical study was conducted on a sample of 102 voluntary participants (48 men, 54 women) aged 18-33 years. Participants anonymously answered online versions of the following questionnaires: Buss-Perry Aggression Questionnaire; Barratt Impulsiveness Scale; Boiko's Integral Forms of Communicative Aggression Questionnaire, Yee's Motivations of Play in MMORPGs Questionnaire. Most participants showed normal levels of trait-level aggression and impulsiveness (according to the normative values suggested by questionnaires' authors). Gamers who played more than 10 hours per week showed higher physical, trait-level, and communicative aggression scores compared to those who played less than 4 hours per week. None of the gaming motivations were positively correlated with impulsiveness or aggression, except for a positive correlation between hostility and immersion motivation. No significant differences in gaming motivations were found between gamers with different lengths of regular gaming time. Generally, the study results neither support that video gaming increases aggression or impulsivity in young adults nor that higher gaming motivation contributes to those traits.

## Keywords

Computer games, video games, gamers, aggression, impulsiveness, motivation

## 1. Introduction

Video games are arguably one of the most popular forms of modern technology-based entertainment. Business analytics report there were almost 2.7 billion active video gamers worldwide at the end of 2020, and the estimates suggest there will be more than 3 billion in 2023 [1]. Such popularity and its rapid growth in the past years enhances scientific and social debates surrounding video games since the 1980s-1990s, including the question of whether violent video games (and video games in general) can increase aggression and impulsiveness in those who play them regularly, especially at the young age.

According to Christopher Ferguson, the history of violent video games research in the context of aggressive behavior is more than 30 years long already [2]. Still, the general agreement is yet to be achieved. For instance, in March 2020 American Psychological Association (APA) reaffirmed its position on violent video games as a risk factor for aggressive behavior, aggressive affect, aggressive cognitions, and a decrease in prosocial behavior, empathy, and moral engagement [3]. This

---

IMS 2021 - International Conference "Internet and Modern Society", June 24-26, 2021, St. Petersburg, Russia

EMAIL: bogacheva.nataly@gmail.com (A. 1)

ORCID: 0000-0002-9483-246X (A. 1)



© 2021 Copyright for this paper by its authors.

Use permitted under Creative Commons License Attribution 4.0 International (CC BY 4.0).

CEUR Workshop Proceedings (CEUR-WS.org)

resolution's scientific background and why many academic scientists disagree with its implementation due to methodological faults and weak statistical effects have already been explained in numerous articles (e.g. [4, 5, 6, 7]). APA's resolution is mostly based on General Aggression Model (GAM), proposed by Brad Bushman and Craig Anderson [8]. GAM suggests that violent media, including video games, can lead to the formation of aggressive cognitive scripts. Those scripts automatically provide the information on how to behave in certain situations and can also lead to interpreting ambiguous situations as threatening or hostile, thus leading to a more aggressive response. This model, to some extent, assumes that cognitive scripts cannot distinguish virtual and real-life situations, thus transforming virtual aggression experience into real-life situations. However, studies done under a different paradigm have found teenagers as young as 12-14 to fully recognize violent video game content as something that "you cannot do in real life," suggesting that at least consciously, they are quite capable of correct interpretation of real-life and virtual events [9]. A recent large-scale study also failed to find a link between violent video games and teenagers' aggressive behavior, supporting the idea that the relationship between video game violence and aggression is at least not as direct as supposed by GAM [10]. Yet, another model of violent behavior proposed by Ferguson, which includes more genetic and environmental factors and less relies on learned behaviors, suggesting that media violence has no causal but only a "stylistic" role in aggression, currently remains much less popular to GAM [4].

Along with aggression and violence research, numerous studies explored the connection between video gaming and impulsiveness [11]. Many video games require rapid responses to certain stimuli to succeed. Along with the possibility to replay part of the game in case of a mistake, this led many scientists to believe that video games encourage "trial-and-error" behavior with little critical thinking and reflection [12], provoking impulsiveness. If aggression can be taught through aggressive scripts, as GAM suggests, then impulsive behavior can probably be taught by certain video games in a similar way. Metcalf and Pammer found addicted first-person shooter gamers (first-person shooter or FPS is a game genre characterized by high levels of violence and requiring dynamic navigation through virtual environments and shooting multiple computer or player operated enemies) to have higher impulsiveness scores, compared to non-addicted FPS gamers or those who prefer strategic video games [13]. On the contrary, addicted MMORPG gamers were significantly less impulsive than non-addicted gamers of the same genre [14]. No significant impulsiveness specifics were found in non-addicted adult gamers, preferring online and offline games [11]. Thus, as supported by a recent systematic literature review, video gamers' impulsiveness seems to be associated with video game addiction more than with regular gaming experience [15] but should be considered genre-specific as well. There is also a link between aggression and impulsiveness in video gamers, as suggested by Gentile et al. longitudinal study report [16]. This study claims there is a bidirectional causality, in this case, meaning that not only more impulsive and violent teenagers are more likely to engage in violent video games, but that excessive gaming prevents normal cognitive control development, increases impulsiveness, and can even lead to the development of attention deficit disorder. Another study made during this longitude on the same sample also linked teenager gamers' impulsiveness to their chances to become pathological (addicted) gamers. No direct link between addiction, impulsiveness, and aggression was stated. Still, the authors suggested becoming an addicted gamer led teenagers to higher exposure to violent video games and the development of "normative beliefs about aggression, hostile attribution biases, and aggressive fantasies and to engage in more physically and relationally aggressive behaviors" [17, p. e325].

The third aspect we want to discuss in this study concerning the previous two is video gaming motivation. There are very few studies linking gaming motivation directly with aggression or impulsiveness. In a 2010 study, Xuemin Zhang et al. found both violent video games and competitive situations in non-violent video games to increase aggressive cognition and aggressive behavior [18]. In a more recent French study, the authors found that high achievement motivation, impulsiveness, and longer gaming time per week contributed to higher verbal aggression in online gaming situations. Socializing gaming motivation, on the contrary, performed as a protective factor against changing the gamer's behavior into being more "toxic" or verbally abusive during playing games [19].

Additionally, some studies explore the role of video gaming motivation in the development of gaming addiction (which, as mentioned above, can contribute or be the result of higher impulsiveness and/or aggression). Nick Yee, the author of a popular model of online gaming motivation, considered

high escapism and, to a lesser degree, advancement motivations to be gaming addiction development factors [20]. Escapism motivation means that the game is used to hide from real-life problems and conflicts, and advancement motivation describes the gamer's desire to progress in the game, to get more levels, resources, and status for their character. Other studies named immersion [21] and social [22] gaming motivations as possible predictors for video game addiction, suggesting that various motivations can be associated with video game overuse but do not inevitably do so.

Thus, while there is some empirical evidence that video gamers' aggression, impulsiveness, and gaming motivations are interconnected (possible through their role in video gaming addiction development), there are not enough studies to fully establish or understand those connections. To contribute to this field, we conducted empirical research on our own.

Based on the review above, we assumed the following hypotheses for the empirical testing:

1. A considerable part of the video gamers sample has high levels of trait-level aggression and impulsiveness based on normative values proposed by the authors of corresponding questionnaires.
2. Different aspects of aggression (physical and communicative aggression, anger, hostility) positively correlate with impulsiveness in the video gamers sample.
3. Gamers who regularly spend more time playing video games have stronger gaming motivation, specifically – higher escapism and advancement motivations.
4. Gamers who spend more time a week playing video games have higher scores in aggression and impulsiveness.
5. Gamers with higher competition, advancement, and achievement motivations have higher aggression scores.
6. Male gamers have higher achievement, advancement, and competition gaming motivations and higher physical and communicative aggression levels than female gamers.

## **2. Materials and Methods**

### **2.1. Participants**

The sample included 102 voluntary participants (48 men and 54 women) from Russia, aged 18-33 years (mean age 22.62; median age 22; standard deviation 2.96) who participated in anonymous online research using Google Forms. The link to the online form was shared through social networks. To proceed with the questionnaire, the participants had to agree with the informed consent form and answer positively to the question of whether they currently (during their adulthood) occasionally play computer-based video games.

### **2.2. Methods and Procedure**

The online response form consisted of five parts, presented to the participants in the following order:

1. A socio-demographic survey also included questions about time regularly spent playing video games (less than 4 hours; 4-10 hours or more than 10 hours per week) and preferred video game type (online, offline, or both).
2. Buss-Perry Aggression Questionnaire (BPAQ) [23] in Russian adaptation by Enikolopov and Tsybul'sky [24]. This adapted version consists of 24 5-point Likert scale items. It includes three sub-scales (instead of four scales in the original questionnaire): physical aggression, anger, and hostility. Trait-level aggression is measured as a sum of those three sub-scales.
3. Barratt Impulsiveness Scale (BIS) [25] in Russian adaptation by Enikolopov and Medvedeva [26]. The questionnaire consists of 30 items. For this research, we only used the general impulsiveness score.
4. Integral Forms of Communicative Aggression Questionnaire by Boiko [27]. Due to the Russian BPAQ adaptation lacking the verbal aggression scale, this questionnaire was added to the

battery. The questionnaire consists of 55 yes-no items, and only the general communicative (verbal) aggression score was used in this study.

5. Yee's Motivations of Play in MMORPGs Questionnaire in Russian adaptation by Epishin, Bogacheva, Milyanskaya [28]. This adapted version of the questionnaire retains the original questionnaire structure. It includes three main scales representing the main types of online gamers' motivation (according to Yee): achievement motivation, social motivation, and immersion motivation. Each of the scales includes several subscales as well. Those are mechanics, advancement, and competition sub-scales in the achievement motivation scale; socializing, relationships, and teamwork sub-scales in the social motivation scale and discovery, escapism, role-playing, and customization sub-scales in the immersion scale of the questionnaire. This version consists of 24 5-point Likert scale items.

Due to most data's non-normal distribution, non-parametric statistical methods were used, including Mann-Whitney U-test and Kruskal-Wallis H test for group comparisons, Spearman's rank correlation coefficient for correlation analysis. All statistical procedures were performed in IBM SPSS Statistics ver. 23.

### 3. Results

#### 3.1. Aggression and Impulsiveness in Adult Video Gamers

While the study's design did not include a control non-gamers group, the questionnaires we used allowed us to compare our sample with normative values proposed by the authors of the corresponding questionnaires [24, 26, 27]. For BPAQ scales, those levels were based on mean and standard deviations and allowed to assign participants to "low level," "medium level," or "high level" groups separately for each of the scales and the trait-level aggression. BIS only recognized a "non-clinical" level of impulsiveness (below 70 scores), clinically significant high impulsiveness (70-75 scores), and very high impulsiveness, which might indicate impulsiveness control disorder (above 75 scores) [26]. Boiko's Integral Forms of Communicative Aggression Questionnaire provided normative values for five levels of communicative aggression [27]. According to those values, none of the participants in our sample scored either "very low" or "very high." Most of the current sample participants had low to medium impulsiveness and aggression levels (see Table 1).

**Table 1**

Descriptive statistics and levels of aggression and impulsiveness among video gamers sample

Measurement	Means and standard deviations in the sample	Min-max scores in the sample [min-max scores possible]	Number of participants with different levels of the measurement (%) in the sample
Physical aggression	M = 20.27; SD = 4.92	9-36 [9-45]	Low: 38 (37.3%); Medium: 61 (59.8%); High: 3 (2.9%)
Anger	M = 18.16; SD = 5.06	7-30 [7-35]	Low: 27 (26.5%); Medium: 71 (69.6%); High: 4 (3.9%)
Hostility	M = 20.24; SD = 4.68	8-32 [8-40]	Low: 26 (25.5%); Medium: 70 (68.9%); High: 6 (5.9%)
Trait-level aggression	M = 58.67; SD = 10.19	35-85 [24-120]	Low: 39 (38.2%); Medium: 62 (60.8%); High: 1 (1.0%)
Impulsiveness	M = 63.58; SD = 8.25	49-87 [30-120]	Normal: 76 (74.5%); High: 18 (17.6%); Very high: 8 (7.8%)
Communicative aggression	M = 21.46; SD = 6.30	12-37 [0-55]	Low: 47 (46.1%); Medium: 45 (44.1%); High: 10 (9.8%)

Those results suggested that most of our participants had medium levels of physical and communicative aggression, hostility, anger, and trait-level aggression. However, about ¼ of the sample had increased impulsiveness levels (according to [26]).

According to  $\chi^2$  statistics those highly impulsive gamers were relatively equally distributed between different preferred game types ( $\chi^2 = 7.580$ ;  $p = 0.108$ , insignificant) or regular gaming activity ( $\chi^2 = 2.947$ ;  $p = 0.567$ , insignificant) subgroups.

Table 2 shows correlations between BPAQ scales, impulsiveness, and communicative aggression.

**Table 2**  
Aggression and impulsiveness scales correlations

	BPAQ trait-level aggression	BIS impulsiveness	Communicative aggression
Physical aggression	-	0.185 ( $p = 0.062$ )	0.517 ( $p = 0.000$ )
Anger	-	0.290 ( $p = 0.003$ )	0.398 ( $p = 0.000$ )
Hostility	-	0.070 ( $p = 0.483$ )	0.228 ( $p = 0.021$ )
Trait-level aggression	-	0.258 ( $p = 0.009$ )	0.567 ( $p = 0.000$ )
Impulsiveness	0.258 ( $p = 0.009$ )	-	0.297 ( $p = 0.002$ )
Communicative aggression	0.597 ( $p = 0.000$ )	0.297 ( $p = 0.002$ )	-

As seen in Table 2, physical aggression, anger, and trait-level aggression had significant positive correlations with impulsiveness. Communicative aggression positively correlated with physical aggression, hostility, anger, trait-level aggression, and impulsiveness.

In Table 3, we compared video gamers groups with different levels of regular gaming activity. To specify the obtained differences, a pairwise comparison was performed with Dunn's test with Bonferroni correction.

**Table 3**  
Aggression and impulsiveness scales in groups with different regular gaming activity

Scale	(1) Less than 4 h/week (n = 28)	(2) 4-10 h/week (n = 30)	(3) Over 10 h/week (n = 40)
Physical aggression*	M = 18.79; SD = 4.83 <sup>(3)</sup>	M = 19.73; SD = 5.38	M = 21.59; SD = 4.40 <sup>(1)</sup>
Anger	M = 15.89; SD = 4.86	M = 18.63; SD = 4.23	M = 19.27; SD = 5.33
Hostility	M = 19.71; SD = 5.35	M = 20.20; SD = 4.41	M = 20.59; SD = 4.47
Trait-level aggression*	M = 54.39; SD = 9.23 <sup>(3)</sup>	M = 58.57; SD = 10.19	M = 61.45; SD = 10.19 <sup>(1)</sup>
Impulsiveness	M = 64.18; SD = 10.05	M = 62.63; SD = 7.59	M = 63.84; SD = 7.52
Communicative aggression**	M = 18.89; SD = 5.50 <sup>(3)</sup>	M = 20.63; SD = 6.57	M = 23.66; SD = 5.95 <sup>(1)</sup>

\*\* - significant,  $p < 0.01$ ; \* - significant,  $p < 0.05$ ; <sup>(n)</sup> – significant difference when pairwise compared to group n

As seen in Table 3, there were no significant differences between groups in anger, hostility, or impulsiveness. However, the least active gamers, who regularly played less than 4 hours per week, had significantly lower physical aggression, trait-level aggression, and communicative aggression compared to the most enthusiastic gamers, who played more than 10 hours per week.

No significant differences were found between gamers, who preferred online, offline, or both types of video games in physical aggression, anger, hostility, trait-level aggression, or impulsiveness. However, offline gamers had significantly lower communicative aggression scores than online gamers ( $H = 6.363$ ;  $p = 0.042$ ;  $M_{\text{online}} = 23.78$ ;  $SD_{\text{online}} = 7.75$ ;  $M_{\text{offline}} = 19.35$ ;  $SD_{\text{offline}} = 5.75$ ).

### 3.2. Sex-related Specifics of Aggression, Impulsiveness and Gaming Motivation

Most of the studies suggest there are differences between male and female gamers in their motivation for gaming. According to Yee, male gamers have higher achievement, advancement, mechanics, and competition motivations and lower relationship and customization motivations than female gamers [20]. Men are also usually considered more aggressive than women [24], and video gamers' research also tends to find them more verbally aggressive [19, 29].

In our study, there were no significant differences between men and women gamers distribution across groups with different regular gaming activity ( $\chi^2 = 3.296$ ;  $p = 0.192$ , insignificant). However, women were more likely to prefer offline games only, while men were more likely to choose online games only ( $\chi^2 = 6.291$ ;  $p = 0.043$ ).

In our sample, male and female gamers did not significantly differ in physical aggression, hostility, trait-level aggression, communicative aggression, and impulsiveness. However, women had significantly higher anger scores, and some differences in gaming motivations were also found (see Table 4).

**Table 4**

Parameters showing significant differences between male and female samples

Scale	Male gamers (n = 48)	Female gamers (n = 54)
Anger**	M = 16.58; SD = 4.43	M = 19.56; SD = 5.20
Achievement**	M = 16.79; SD = 3.25	M = 14.76; SD = 3.29
Competition sub-scale**	M = 4.54; SD = 1.77	M = 3.57; SD = 1.68
Relationship sub-scale*	M = 6.48; SD = 2.20	M = 5.48; SD = 2.50
Escapism sub-scale*	M = 6.69; SD = 1.93	M = 5.87; SD = 1.92

\*\* - significant,  $p < 0.01$ ; \* - significant,  $p < 0.05$

According to Table 4, male gamers in our sample have higher achievement and competition motivation, which corresponds to the previous studies. Interestingly enough, men also score higher in relationship and escapism motivation, which contradicts Yee's earlier findings [20].

### 3.3. Gaming Motivation in Relation to Aggression and Impulsiveness

In our sample gaming motivation scales showed mostly small or insignificant correlations with each other, suggesting their relative independence from each other. Among three main scales: achievement, social and immersion only achievement and social motivations were significantly correlated ( $\rho = 0.222$ ;  $p = 0.025$ ). Among sub-scales, mechanics had no significant correlations, discovery ( $\rho = 0.236$ ;  $p = 0.017$ ), escapism ( $\rho = 0.221$ ;  $p = 0.025$ ) and customization ( $\rho = 0.352$ ;  $p = 0.000$ ) all significantly positively correlated with role-playing only. Two sub-scales from the social motivation scale were positively correlated with both social and achievement motivations. Socializing as the motivation to play video games to communicate with others positively correlated with advancement ( $\rho = 0.196$ ;  $p = 0.048$ ), competition ( $\rho = 0.242$ ;  $p = 0.014$ ), relationship motivation ( $\rho = 0.617$ ;  $p = 0.000$ ) and teamwork ( $\rho = 0.430$ ;  $p = 0.000$ ), while relationship motivation also correlated with competition ( $\rho = 0.246$ ;  $p = 0.013$ ) and teamwork ( $\rho = 0.324$ ;  $p = 0.001$ ) scales.

There were no significant differences in gaming motivation between gamers who played regularly for a different amount of time. The only difference between gamers who preferred different game types was in social motivation. Those who only preferred offline games had significantly lower motivation than those who preferred online games only ( $H = 12.820$ ;  $p = 0.002$ ), which was relatively predictable and matched previous works [30].

A few significant correlations were found between gaming motivations and aggression (see Table 5), while impulsiveness had no significant correlations with gaming motivation whatsoever.

**Table 5**  
Aggression and gaming motivation correlations (significant only)

	Competition	Discovery	Achievement	Immersion
Physical aggression	-	-0.269 (p = 0.006)	-	-
Anger	-0.203 (p = 0.041)		-0.215 (p = 0.030)	-
Hostility	-	-	-	0.219 (p = 0.027)
Trait-level aggression	-	-0.234 (p = 0.018)	-	-
Communicative aggression	-	-0.206 (p = 0.038)	-	-

As seen in Table 5, most correlations between gaming motivation and aggression were negative, with discovery motivation having the most connections. Discovery motivation in video games is described as the desire to explore the game's virtual world, find its secrets, and collect in-game items with no significance gameplaywise. Competition and achievement motivations were negatively correlated with hostility, which seems contra-intuitive at first glance, but supports the idea that competition in video games can be used to express negative emotions in a socially appropriate way, thus lowering anger and frustration [4, 9].

#### 4. Discussion

The results of the study did not support most of our hypotheses. Only a few participants from the study showed higher than normative scores in any of the aggression measurements we used in the study. It worth noticing that those normative scores were obtained on samples that were quite similar to our sample agewise [24, 27]. Indeed, some time has passed since those questionnaires were adapted or standardized on Russian samples, suggesting that the norms could have changed. Still, even with this taken into consideration, adult gamers from our sample do not seem to have high aggression (if we assume it can be measured by questionnaires). About ¼ of the sample showed levels of impulsiveness that exceed the normative values provided by the authors of the adaptation [26]. According to the description of the questionnaire, those people might have difficulties controlling their behavior [25]. It partially supports our first hypothesis. Yet, no data supports that higher impulsiveness had any connection with the preferred game type or regular time spent playing video games, which matches some previous findings based on other impulsiveness measurements [11].

More active gamers showed higher levels of physical aggression, trait-level aggression, and communicative aggression than the least active gamers group. It partially supports our fourth hypothesis. There are several possible explanations. First, people with higher trait-level aggression might be more likely to play video games longer (e.g., to release their aggressive tendencies in a socially appropriate way). Second, suppose the general aggression model is correct, playing violent or competitive video games might enhance aggressive tendencies in those who play longer due to longer exposure to video game violence [16]. While we cannot identify how many of our participants preferred violent video games, a significant amount of popular video games contain some forms of virtual violence, and all online games include some form of competition between gamers in direct or indirect form (via ratings, trophies, etc.). Nevertheless, it is still worth noticing that the sample's aggression levels were mainly in the normative range. Thus, further research is needed to support or refute any of those possibilities. Additionally, gaming addiction can also partake in gamers' aggressive tendencies. However, while gaming addiction results in more prolonged regular gaming, more extended gaming cannot be considered a sign of gaming addiction without the presence of addictive behavior symptoms, such as conflicts or salience.

As assumed by the second hypothesis, impulsiveness showed significant positive correlations with all aggression measurements except for hostility. It matches the previous findings and suggests that while impulsive people might be more prone to aggressive or angry behavior, hostility as a cognitive

component of aggression, based on injustice, disadvantage, and dissatisfaction [24], has little to do with impulsiveness and lack of self-control.

No significant differences in gaming motivation were found between gamers who played regularly for a different time; thus, the third hypothesis is also rejected. It means that being more interested in the game is not unequivocally linked with extended periods of gaming.

No gaming motivation scales were positively correlated with impulsiveness or aggression, except for a positive correlation between hostility and immersion. It means that our fifth hypothesis is also rejected. This correlation suggests that people experiencing injustice and dissatisfaction with their needs not being met might be more interested in immersing themselves in virtual environments like video games. Yet, the correlation between hostility and escapism was almost zero, meaning that even if our assumption is correct, this is not done entirely consciously. The escapism scale of Yee's questionnaire includes the direct questions "How often do you play so you can avoid thinking about some of your real-life problems or worries?" and "How important is escaping from the real world to you in the game?" [20, 28], which means that high escapism scores require at least some reflection over own gaming behavior, while immersion as a general scale includes other motives as well.

Interestingly, competition motivation correlated with anger negatively and had no significant correlation with other aggression measurements. We already supposed that it might contribute to the idea of using competitive video games to release negative emotions, such as anger, safely and appropriately, thus lowering its levels. This result can also be explained by correlations between competition and social forms of gaming motivation, including socializing and relationship motivation. It seems that in our sample, advancement and competition motivations were more linked with social motivation than solely proving yourself worthy. It might be so that for adult gamers playing video games even in a competitive way is also a way to communicate more than to oppose each other.

Unlike many other studies, in our young-adult Russian sample (e.g. [19, 20]), men were found to have stronger relationship motivation than women. It might be due to the unbalanced sample with more women being interested in offline games and having lower gaming social motivation. It might also suggest that women from the sample do not use video games as a mean of relationship building. The discovery motivation seems to be associated with lower aggression indefinitely, suggesting that non-aggressive gamers are more interested in non-competitive, non-destructive exploration-oriented gameplay, or those types of gaming activities can lower aggressive tendencies. Male gamers from our sample did not differ from female gamers in any form of aggression except for anger, in which women scored significantly higher. Thus, our sixth hypothesis was only partially supported concerning higher achievement and competition motivations in the male sample.

## 5. Conclusion

The results do not support the idea that video gaming indefinitely increases aggression or impulsivity in young adult video gamers. Questionnaire-wise, aggressive tendencies in our sample were not stronger than normal. Yet, about ¼ of our sample had high levels of impulsiveness. Competition or achievement gaming motivation showed no significant correlation with trait-level aggression or communicative aggression. Instead, competition motivation in video games was associated with lower anger, suggesting that competitive gaming might partake in anger redirection, as suggested by some previous studies. Video gamers who play more than 10 hours per week had higher trait-level aggression and communicative aggression than gamers who play less than 4 hours per week, which is not explained by the sample's gaming motivations or gender specifics. Higher aggression might be an independent motivating factor to play more video games or the result of excessive gaming – anyway, further investigation is needed.

## 6. Limitations

There are several significant limitations in the present study. First, there was no control group of non-gamers. It was an elaborate decision, as in the targeted sample of young adults aged 18-33, it is difficult to find enough male participants with no gaming experience. However, it still limits our possibility to interpret and generalize the result.



Second, the use of Yee's Motivations of Play in MMORPGs Questionnaire for offline games or non-MMORPG online games requires further studies, as it was not initially designed for those types of gamers. However, Lemerrier-Dugarin et al. [19] successfully used this questionnaire for online gamers regardless of their preferred genre. Some gamers' motivation studies also use similar to Yee's models to compare online and offline gamers (e.g. [30]).

Third, we did not ask our participants about the violent content in their preferred games, while most video games and aggression studies specifically deal with violent video games. It significantly limits our ability to draw conclusions and parallels. However, we found several studies linking aggression to non-violent games with competitions (e.g. [17]). We also assume that the depicted violence levels can be quite different even across games of the same genre or the gaming product's age rating. Thus, to identify the preference for violent video games, a whole new part of the survey is needed. It would be done in our future studies.

Other limitations are usual for this type of study: the sample is relatively small and is to a degree "self-selected," and the methods we use do not allow causality-based conclusions. Aggression was only measured with questionnaires; thus, we only obtained information about trait-level aggression and its components but had no information about the real-life behaviors of our participants. However, the latter seems almost impossible in an anonymous online study, as none other sources of information other than self-reports are obtainable with this design.

## 7. Acknowledgments

The authors want to thank Vitalii Epishin for his regular assistance and valuable tips about statistical analysis and data interpretation and for all his work to bring the Russian adaptation of Yee's questionnaire into existence.

## 8. References

- [1] Number of Gamers Worldwide 2021/2022: Demographics, Statistics, and Predictions, Finances Online, 2021. URL: <https://financesonline.com/number-of-gamers-worldwide/>
- [2] M. Elson, C. Ferguson, Twenty-Five Years of Research on Violence in Digital Games and Aggression Empirical Evidence, Perspectives, and a Debate Gone Astray. *Eur. Psychol.* 19 (2014): 33-46. doi:10.1027/1016-9040/A000147
- [3] APA Resolution on Violent Video Games, American Psychological Association, 2020. URL: <https://www.apa.org/about/policy/resolution-violent-video-games.pdf>
- [4] C. J. Ferguson, S. M. Rueda, A. M. Cruz, D. E. Ferguson, S. Fritz, S. M. Smith, Violent Video Games and Aggression. *Crim. Justice Behav.* 35.3 (2008): 311-332. doi:10.1177/0093854807311719
- [5] A. E. Voiskounsky, Do children addicted to computer games become more aggressive? *Voprosy Psikhologii* 6 (2010): 133-143 (In Russ.)
- [6] N. V. Bogacheva, The problem of causality in cyberpsychology in the context of video games players' psychological characteristics, *Gosudarstvo i grazhdane v jelektronnoj srede* 1 (2017): 315-327 (In Russ.)
- [7] C. J. Ferguson, A. Copenhaver, P. Markey, Reexamining the Findings of the American Psychological Association's 2015 Task Force on Violent Media: A Meta-Analysis, *Perspect. Psychol. Sci.* 15.6 (2020): 1423-1443. doi:10.1177/1745691620927666
- [8] B. Bushman, C. Anderson, Violent video games and hostile expectations: A test of the general aggression model. *Pers. Soc. Psychol. Bull.* 28.12 (2002): 1679-1686. doi:10.1177/014616702237649
- [9] C. K. Olson, L. A. Kutner, D. E. Warner, The Role of Violent Video Game Content in Adolescent Development. *J. Adolesc. Res.* 23.1 (2008): 55-75. doi:10.1177/0743558407310713
- [10] A. K. Przybylski, N. Weinstein, Violent video game engagement is not associated with adolescents' aggressive behaviour: evidence from a registered report. *R. Soc. Open Sci.* 6.2: 171474. doi:10.1098/rsos.171474

- [11] N. Bogacheva, A. Voiskounsky, Impulsivity and Risk-Taking in Adult Video Gamers. In: D. Alexandrov, A. Boukhanovsky, A. Chugunov, Y. Kabanov, O. Koltsova (Eds.) *Digital Transformation and Global Society*. DTGS 2018. Communications in Computer and Information Science, vol 859. Springer, Cham, 2018, pp. 250-263. doi:10.1007/978-3-030-02846-6\_20
- [12] P. M. Greenfield, Technology and informal education: what is taught. What Is Learned. *Sci.* 323 (2009): 69–71. doi:10.1126/science.1167190
- [13] O. Metcalf, K. Pammer, Impulsivity and related neuropsychological features in regular and addictive first person shooter gaming. *Cyberpsychol. Behav. Soc. Netw.* 17.3 (2014): 147–152 doi:10.1089/cyber.2013.0024
- [14] E. Collins, J. Freeman, T. Chamarro-Premuzic, Personality traits associated with problematic and non-problematic massively multiplayer online role playing game use. *Pers. Individ. Differ.* 52 (2012): 133–138. doi:10.1016/j.paid.2011.09.015
- [15] S. I. Şalvarlı, M. D. Griffiths, The Association Between Internet Gaming Disorder and Impulsivity: A Systematic Review of Literature. *Int. J. Ment. Health Addiction* (2019). doi:10.1007/s11469-019-00126-w
- [16] D. A. Gentile, E. L. Swing, G. L. Choon, A. Khoo, Video game playing, attention problems, and impulsiveness: evidence of bidirectional causality. *Psychol. Popul. Media Cult.* 1 (2012): 62–70. doi:10.1037/a0026969
- [17] D. A. Gentile, H. Choo, A. Liau, T. Sim, D. Li, D. Fung, A. Khoo, Pathological Video Game Use Among Youths: A Two-Year Longitudinal Study. *PEDIATRICS*, 127.2 (2011): e319–e329. doi:10.1542/peds.2010-1353
- [18] Xuemin Zhang, Chang Liu, Langlang Wang, Qihong Piao, Effects of Violent and Non-violent Computer Video Games on Explicit and Implicit Aggression. *JSW.* 5 (2010): 1014-1021. doi:10.4304/jsw.5.9.1014-1021
- [19] M. Lemercier-Dugarin, L. Romo, C. Tijus, O. Zerhouni, “Who Are the Cyka Blyat?” How Empathy, Impulsivity, and Motivations to Play Predict Aggressive Behaviors in Multiplayer Online Games. *Cyberpsych. Beh. Soc. N.* 24.1 (2021): 63-69. doi:10.1089/cyber.2020.0041
- [20] N. Yee, Motivations of Play in MMORPGs, 2009. URL: <http://nickyee.com/daedalus/archives/pdf/3-2.pdf>
- [21] A. Kirby, C. Jones, A. Copello, The Impact of Massively Multiplayer Online Role Playing Games (MMORPGs) on Psychological Wellbeing and the Role of Play Motivations and Problematic Use. *Int. J. Ment. Health Addiction* 12 (2014): 36–51. doi:10.1007/s11469-013-9467-9
- [22] L. Blinka, J. Mikuška, The role of social motivation and sociability of gamers in online game addiction. *Cyberpsychology: Journal of Psychosocial Research on Cyberspace* 8.2 (2014): 6. doi:10.5817/CP2014-2-6
- [23] A. H. Buss, M. Perry, The Aggression Questionnaire. *J. Pers. Soc. Psychol.* 63.3 (1992): 452-459. doi:10.1037/0022-3514.63.3.452
- [24] S. N. Enikolopov, N. P. Tsybulsky, Psychometric analysis of Russian-language version of questionnaire for aggression diagnostics by A. Buss and M. Perry. *Psikhologicheskii Zhurnal* 28.1 (2007): 115-124. (In Russ.)
- [25] J. H. Patton, M. S. Stanford, E. S. Barratt, Factor structure of the Barratt Impulsiveness Scale. *J. Clin. Psychol.* 51.6 (1995): 768-774. doi: 10.1002/1097-4679(199511)51:6<768::AID-JCLP2270510607>3.0.CO;2-1
- [26] S. N. Enikolopov, T. I. Medvedeva, Approbation of the Russian-language version of the Barratt Impulsiveness Scale (BIS-11). *Psikhologiya i pravo* 5.3 (2015): 75–89. doi:10.17759/psylaw.2015050307. (In Russ.)
- [27] V. B. Shapar, Practical psychology. Psychodiagnostics of the relationship between parents and children, Feniks, Rostov-on-Don, 2006, pp. 221-227 (In Russ.)
- [28] A. V. Milyanskaya, N. Yee’s Motivations of Play in MMORPGs Questionnaire Adaptation, Senior Thesis, Sechenov University, Moscow, Russia, 2019. (In Russ.)
- [29] R. M. Chory, V. Cicchirillo, The Relationship between Video Game Play and Trait Verbal Aggressiveness: An Application of the General Aggression Model. *Commun. Res. Rep.* 24.2 (2007): 113–119. doi:10.1080/08824090701304766

- [30] T. Hainey, T. Connolly, M. Stansfield, E. Boyle, The differences in motivations of online game players and offline game players: a combined analysis of three studies at higher education level. *Computers & Education* 57.4 (2011): 2197-2211. doi:10.1016/j.compedu.2011.06.001