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## Demographic and family-related predictors of online gaming addiction in adolescents

### Abstract

**Introduction.** Dependence on the Internet and online games is a growing problem worldwide.

**Aim.** The aim of this study was to determine the differences between girls and boys as well as between adolescents living in urban vs. rural areas in regard to prevalence of playing online games, the amount of time devoted to playing games, the severity of symptoms of online gaming addiction, and preferences for game genres. Also, significant predictors of online game addiction in the studied group of young people were identified.

**Material and methods.** The study involved 827 adolescents aged 14 to 19 years. When it comes to 488 (60.02%) of them, they lived in the countryside and 325 (39.98%) in a city. The following instruments were used: a sociodemographic questionnaire, the Online Gaming Addiction Questionnaire and the Disturbed Family Relations Questionnaire, all developed by Pawłowska and Potembska.

**Results.** Statistically significant differences were found between girls and boys and between adolescent urban and rural dwellers in prevalence of playing online games, severity of online gaming addiction symptoms, preferences for specific game genres, and the amount of time spent playing online games.

**Conclusions.** 1. Significantly more boys than girls played online games. Boys devoted more time to playing and had more severe symptoms of addiction to online games. 2. Adolescent city dwellers spent significantly more time playing online games, mainly to relieve boredom and experience new sensations, than young people living in the countryside. 3. Major predictors of online gaming addiction included male gender, urban residence, domestic violence, mother's child-raising rules being challenged by the father, and the child's sense of responsibility for his/her parents.

**Keywords:** Internet Gaming Disorder, adolescents, family predictors, demographic predictors.

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### INTRODUCTION

For several years now, physicians and psychologists have shown increasing interest in the problems of Internet addiction and online gaming addiction [1]. In 2013, the American Psychiatric Association (APA) described the criteria for Internet Gaming Disorder (IGD) in DSM-5 [2]. Müller et al. [3], who conducted a study of Internet Addictive Behaviours among European Adolescents (EU NET ADB) on a group of 12,938 individuals aged from 14 to 17 years, found that the criteria for IGD were met by 1.6% of their respondents and that 5.1% of the European respondents met the criteria for the risk of IGD. Lopez-Fernandez et al. [4] estimated that the criteria for IGD were met by 7.7% of adolescents in Spain and by 14.6% in Great Britain. Porter et al. [5] showed that 8% of the young people they surveyed excessively played computer games. Grüsser et al. [6] reported that 12% of online gamers met the criteria for Internet addiction, and Thomas and Martin [7], Kuss and Griffiths [8] and Jeong and Kim [9] established

that from 2.2% to 5% of adolescents in their samples were addicted to online video games.

It is estimated that the problem of excessive playing of video games may concern from 1.7% to 11.9% of young people [6,10-14], depending on the country and the diagnostic criteria used. Worryingly, this number is on the rise [6,15]. Among the problems related to pathological video games use, researchers point to differences in game preferences between boys and girls [16,17] and differences in playing time between boys and girls [13,18,19] and between older and younger game users [7].

Among the psychological effects of excessive video game playing, specialists mention disturbed peer-to-peer relationships [20-22], concentration and attention deficits [23,24], school problems and truancy [9,12,25], suicidal ideation [12,26,27], obsessive behaviour [28] and depressive symptoms [18,26,28]. Given these facts, research aimed at identifying the risk factors of online gaming addiction seems to be topical and consequential.

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## AIM

The aim of this study was to determine the differences between girls and boys as well as adolescents living in urban vs. rural areas in regard to prevalence of playing online games, the amount of time devoted to playing games, the severity of symptoms of online gaming addiction, and preferences for game genres. We also wanted to identify significant predictors of online game addiction in the studied group of young people.

## MATERIAL AND METHODS

The participants were 827 adolescents (525 girls and 288 boys) aged 14-19 years. The mean age of the participants was 17.12 years, SD=1.19 years. All participants were secondary-school students from Lublin Province. As many as 488 (60.02%) respondents lived in the country and 325 (39.98%) in a city.

The following instruments were used in this study:

1. a socio-demographic questionnaire for collecting data on the participants' age, gender, education and place of residence.
2. The Online Gaming Addiction Questionnaire (Kwestionariusz do Badania Uzależnienia od Gier Internetowych, KBUGI) designed by Potembska and Pawłowska for assessing the symptoms of dependence on online games. KBUGI consists of four scales: Loss, Entertainment and Search for New Stimuli, Compensation and Escape, and Violence and Domination [29].
3. The Disturbed Family Relations Questionnaire (Kwestionariusz do Badania Zaburzonych Relacji w Rodzinie, KBZ-RR II) by Pawłowska, which contains 58 items on seven scales: Lack of Acceptance and Understanding, Symbiosis, Alliance with the Mother, Alliance with the Father, Regression, Role Reversal and Violence [30], is used to determine abnormal parent-child relationships.

Two independent groups were compared using the  $\chi^2$  test for nominal variables and student's t-test for interval variables. Based on linear forward stepwise regression, demographic and social (family-related) variables which were important predictors of online gaming addiction (measured by the global KBUGI scale) were identified. A p value of 0.05 was deemed statistically significant. All data analyses were performed using STATISTICA PL, version 10.

## RESULTS

In the first stage of the study, the prevalence of online gaming was assessed in the group of adolescent respondents, taking into account their gender and place of residence. As many as 631 (83.69%) of the respondents played online games. This number included significantly more boys than girls (N=267; 95.02% vs. N=364; 76.96%;  $\chi^2=42.13$ ;  $p=0.001$ ). Significantly more of the online game players lived in urban areas than in rural areas (N=258; 87.16% vs. N=366; 81.51%,  $\chi^2=4.18$ ,  $p=0.04$ ).

The results of student's t-test showed that boys spent significantly more time (hours per week) playing online games than girls (M=2.66; SD=0.94 vs. M=1.87; SD=0.81;  $t=12.41$ ;  $p=0.001$ ). Young city dwellers devoted significantly more time to playing than their peers from the countryside (M=2.25;

SD=0.94 vs. M=2.09; SD=0.94;  $t=2.28$ ;  $p=0.02$ ). Boys living in a city and in the countryside did not differ significantly with regard to the amount of time they spent playing online games (M=2.74; SD=0.96 vs. M=2.63; SD=0.93;  $t=0.92$ ;  $p=ns$ ). By contrast, girls living in a city devoted significantly more time to playing online games than those living in the country (M=2.01; SD=0.83 vs. M=1.77; SD=0.79;  $t=3.36$ ;  $p=0.001$ ).

The results of the  $\chi^2$  test, which was used to compare the number of girls and boys playing specific genres of games, indicated that boys were significantly more likely than girls to play sports games (56.66% vs. 22.50%;  $\chi^2=97.14$ ;  $p=0.001$ ), racing games (54.95% vs. 33.46%;  $\chi^2=35.96$ ;  $p=0.001$ ), shooter games (54.61% vs. 16.82%;  $\chi^2=127.48$ ;  $p=0.001$ ), FPP (29.01% vs. 6.99%;  $\chi^2=72.31$ ;  $p=0.001$ ), economic simulation games (26.62% vs. 8.62%;  $\chi^2=48.46$ ;  $p=0.001$ ), military games (war games) (35.85% vs. 6.99%;  $\chi^2=112.04$ ;  $p=0.001$ ), RPG (32.76% vs. 7.18%;  $\chi^2=90.44$ ;  $p=0.001$ ), fighting games and beat 'em ups (brawlers) (23.55% vs. 7.79%;  $\chi^2=40.17$ ;  $p=0.02$ ), combat games (17.41% vs. 3.59%;  $\chi^2=46.19$ ;  $p=0.001$ ), and MMORPG (27.65% vs. 5.10%;  $\chi^2=83.95$ ;  $p=0.001$ ). Significantly more girls than boys played logic games (46.69% vs. 36.86%;  $\chi^2=7.43$ ;  $p=0.006$ ).

The results of the  $\chi^2$  test showed that young city dwellers were significantly more likely than their peers from the countryside to play action games (48.77% vs. 40.25%;  $\chi^2=5.74$ ;  $p=0.02$ ), adventure games (41.05% vs. 34.29%;  $\chi^2=3.81$ ;  $p=0.05$ ), strategic-economic games (17.90% vs. 12.96%;  $\chi^2=3.73$ ;  $p=0.05$ ) and beat 'em ups (22.22% vs. 14.58%;  $\chi^2=7.83$ ;  $p=0.001$ ).

Significantly more boys living in urban areas than those from rural areas played economic simulation games (33.02% vs. 22.65%;  $\chi^2=3.69$ ;  $p=0.05$ ), and significantly fewer of the former played racing games (42.45% vs. 62.98%;  $\chi^2=11.40$ ;  $p=0.001$ ).

Compared to their peers from the countryside, girls living in a city were significantly more likely to play sports games (26.61% vs. 18.69%;  $\chi^2=4.65$ ;  $p=0.03$ ), action games (44.95% vs. 33.11%  $\chi^2=7.56$ ;  $p=0.01$ ); shooter games (22.94% vs. 11.80%;  $\chi^2=11.47$ ;  $p=0.001$ ), adventure games (41.74% vs. 31.80%;  $\chi^2=5.46$ ;  $p=0.02$ ), strategic military games (9.63% vs. 5.25%;  $\chi^2=3.72$ ;  $p=0.05$ ), RPG (10.55% vs. 4.26%;  $\chi^2=7.82$ ;  $p=0.005$ ), MMORPG (7.80% vs. 3.28%;  $\chi^2=5.30$ ;  $p=0.02$ ), fighting games and beat 'em ups (26.61% vs. 12.13%;  $\chi^2=17.92$ ;  $p=0.001$ ), and combat simulations (5.50% vs. 2.30%;  $\chi^2=3.74$ ;  $p=0.05$ ).

Table 1 shows the results of student's t-test, which was used to compare the severity of video gaming addiction symptoms measured by KBUGI scales in girls and boys.

**TABLE 1. Comparison of girls' and boys' scores on KBUGI scales.**

KBUGI scales	Boys		Girls		t	p
	M	SD	M	SD		
Loss	0.37	0.61	0.13	0.32	5.93	0.001
Entertainment and Search for New Stimuli	1.07	0.80	0.60	0.65	7.84	0.001
Compensation and Escape	0.40	0.60	0.19	0.38	4.98	0.001
Violence and Domination	0.82	0.93	0.36	0.65	6.97	0.001
KBUGI global score	77.09	76.65	35.70	48.77	7.88	0.001

Boys had significantly more severe symptoms of video game addiction measured by KBUGI compared to girls. Boys were significantly more likely than girls to reduce the amount of time they were supposed to spend learning, working, pursuing hobbies, and maintaining family relationships in favour of playing online games. They were also significantly more likely to make unsuccessful attempts at cutting down on gaming time and report a constant need to increase the frequency and amount of gaming. Boys were significantly more likely to have learning difficulties at school due to playing online games and also to lie to their families about the amount of time they had spent playing. Compared to their female counterparts, male participants, were more likely to feel anxious when they did not have access to online games and more often reported that they played games to relieve boredom, boost their mood, compete with others and experience new sensations. Boys were much more likely than girls to treat online games as a way of escaping from conflicts and loneliness. Gaming made them feel more important, more competent, and stronger than they really were. Boys were significantly more likely to choose games in which they could break traffic rules and show aggressive behaviour marked by violence and power seeking.

Table 2 shows the scores obtained on KBUGI scales by urban and rural teens who play online games.

**TABLE 2. Comparison of KBUGI scores obtained by urban and rural residents.**

KBUGI scales	Entire group				t	p
	Rural		Urban			
	M	SD	M	SD		
Loss	0.22	0.47	0.26	0.50	-0.92	0.360
Entertainment and Search for New Stimuli	0.75	0.75	0.89	0.76	-2.14	0.033
Compensation and Escape	0.25	0.46	0.31	0.53	-1.35	0.176
Violence and Domination	0.53	0.78	0.62	0.87	-1.33	0.183
KBUGI global score	50.10	65.11	58.78	65.83	-1.56	0.120

  

KBUGI	Boys				t	p
	Rural		Urban			
	M	SD	M	SD		
Loss	0.34	0.58	0.40	0.65	-0.78	0.437
Entertainment and Search for New Stimuli	1.02	0.79	1.17	0.82	-1.41	0.160
Compensation and Escape	0.38	0.58	0.41	0.61	-0.42	0.677
Violence and Domination	0.80	0.90	0.86	1.00	-0.48	0.634
KBUGI global score	73.07	74.90	83.34	78.64	-1.02	0.310

  

KBUGI	Girls				t	p
	Rural		Urban			
	M	SD	M	SD		
Loss	0.11	0.30	0.16	0.35	-1.55	0.122
Entertainment and Search for New Stimuli	0.51	0.62	0.72	0.66	-2.91	0.004
Compensation and Escape	0.14	0.28	0.25	0.47	-2.53	0.012
Violence and Domination	0.27	0.55	0.47	0.75	-2.72	0.007
KBUGI global score	29.30	46.18	43.64	51.20	-2.64	0.009

In the entire study group, city dwellers, compared to their peers living in the countryside, were more likely to play online games to relieve boredom, boost their mood, and experience joy and new sensations. Girls living in a city had significantly more severe symptoms of addiction to online games than those living in the countryside. Girls from urban areas were significantly more likely to report that games allowed them to experience new sensations, feel more important, better and stronger than they really were, escape from problems, conflicts and loneliness, and express aggression. Male urban and rural residents did not differ significantly in their KBUGI scores.

As a final step of this study, results of linear forward stepwise regression were used to identify demographic and social (family-related) variables which were important predictors of video gaming addiction, as measured by the global KBUGI scale. The independent variables entered into a linear regression equation were age and gender of the respondents, their place of residence and their scores on the Disturbed Family Relations Questionnaire.

Table 3 shows the results of linear forward stepwise regression for the dependent variable ‘Global KBUGI Score’.

**TABLE 3. Regression results for the dependent variable ‘Global KBUGI Score’.**

Independent variables	R	R <sup>2</sup>	F	p	Beta	B	t	p
Violence	0.34	0.11	60.11	0.001	0.20	16.68	4.32	0.001
Gender	0.45	0.20	49.51	0.001	-0.31	-42.98	-7.76	0.001
Alliance with the Father	0.48	0.23	22.12	0.001	0.17	15.77	3.46	0.001
Role Reversal	0.49	0.24	5.10	0.024	0.11	8.92	2.33	0.020
Place of Residence	0.50	0.25	4.35	0.038	0.08	11.57	2.09	0.038

R=0.50; R<sup>2</sup>=0.25; Adjusted R<sup>2</sup>=0.24; F(5,47)=30.99; p<0.001; Std. error of estimate: 58.54

The following factors turned out to be significant predictors of video game addiction: the demographic factors – male gender and urban residence, and the family-related factors – experiences of psychological and physical parental abuse, taking the father’s side in situations of conflict between parents, the father mitigating the mother’s parenting principles in order to present himself to the child as the “better parent”, and the child’s belief that he/she is responsible for his/her parents. Taken together, these variables explained 25% of the variance in video gaming addiction among the young people studied. Experiences of violence explained 11% of variance in the dependent variable, male gender – 9%, alliance with the father – 3%, sense of responsibility for parents – 1% and urban residence – 1%.

## DISCUSSION

The results of the statistical analyses showed that 83.69% of the young people aged from 14 to 19 who took part in the experiments played online games. Statistically significant differences were found between girls and boys and between adolescent urban and rural dwellers in prevalence of playing online games, severity of online gaming addiction symptoms measured by KBUGI, and the amount of time spent playing online games. In a study of a sample of Polish adolescents,

Bobrowski [31] found that 74% of third-grade junior high school (gymnasium) students from Warsaw schools used the Internet daily and 64% played computer games daily. Boron and Zyss [32] established that the problem of computer games concerned 56% of the population sample they studied. Thomas and Martin [7] reported that among young Australians, 73.6% of primary school students, 56.7% of secondary school students and 26.2% of university students played online games. In the United States, as many as 88% of Americans between the ages of 8 and 18 occasionally play computer games [11]. A study conducted in Norway [33] on a group of 3,337 young people aged between 12 and 18 showed that 63.3% of them regularly played computer games. Porter et al. [5], based on an online study of English-speaking participants of Internet fora for over-14-year-old players from around the world, determined that the problem of pathological online gaming concerned online game aficionados, who represented 75.6% of the surveyed group.

The results of the present study show that there are more boys than girls playing online games. Boys spend significantly more time each day playing online games and have significantly more severe symptoms of Internet gaming addiction than girls. Most studies confirm that boys and men spend more time playing computer games and that they are more likely than women to meet gaming addiction criteria [13,19]. Dependence on playing video games is more prevalent among boys (78%) than girls (40%) [32,34]. According to Poprawa [34], in the Polish population, there are more men than women who play online games. German researchers [12] have shown, in a nation-wide study, that 4.7% of German boys are at risk of video gaming addiction and 3% meet addiction criteria. The problem of Internet gaming addiction is ten times less severe in the population of girls compared with the population of boys.

The results obtained in the present study show that significantly more young online game users live in cities than in the countryside. City dwellers spend significantly more time playing online games; they are more likely to play to relieve boredom, boost their mood, and experience new sensations than people living in the countryside. Women living in cities have significantly more severe symptoms of addiction to online games than their peers from rural areas. A higher prevalence of online gaming in city dwellers compared to inhabitants of the countryside was reported by Pawłowska et al. [35] in a previous study conducted on Polish teenagers of a similar age group. In those studies, the authors showed that girls living in cities were more likely to play violent online games than their peers from the countryside.

The analysis of the types of games played by men and women revealed that significantly more men played sports, racing, shooter, FPP, economic simulation, military, fighting, and combat games as well as RPGs and MMORPGs, while women preferred logic games. Significantly more young city dwellers than their peers living in the country played action, adventure, strategic-economic and fighting games. Boys living in the country preferred playing racing games, while their urban counterparts preferred economic simulation games. Significantly more girls living in a city than those from the countryside played sports games, action games, shooter, adventure, strategic military games, RPG, MMORPG, beat 'em ups and combat simulations. Differences in computer game preferences were also noticed by King and Delfabbro [36], who observed that boys were more likely than girls to choose shooter

games, RPGs and online strategy games, while girls preferred jigsaw puzzles and simulation games. Funk et al. [37] and Chiu et al. [38] believe that games with violent content are more attractive to men, and that the development of addiction in male gamers is affected by such game attributes as light and sound effects. In a study by Kuntsche [39], almost half of the boys and only 20% of the girls surveyed cited a violent game as their favourite game.

On the basis of regression, we identified the demographic and family-related factors that were important predictors of online gaming addiction. Male gender, urban residence, psychological and physical parental abuse, mitigation of the mother's child-raising principles by the father in order to present himself to the child as the "better parent", and the child's belief that he/she was responsible for his/her parents altogether explained a quarter of the variance in online gaming addiction. Many researchers who study the determinants of video game addiction draw attention to abnormal relationships in the families of young people who excessively play computer games, disturbed family communication [20,21,38,40] and parental violence [30,41]. Kwon et al. [22] emphasize that family relationships are a more important factor in the development of computer gaming addiction than peer relationships. In their study of a Korean sample, young people were found to increase the amount of time they spent playing online games when they perceived weak ties with their parents, who showed unconscious hostility towards them. Poorer relationships with peers and family were also a feature of excessive video game users in a study by Padilla-Walker et al. [20]. Shen and Williams [21] observed that frequent MMORPG use was associated with abnormal communication in the family and children's sense of loneliness. Litwinowicz [16] found that physically punished girls preferred shooter games, RPGs and MMORPGs to other game genres. Chiu et al. [38] showed that in those families in which parents had better time management skills and placed a greater emphasis on activity planning and entertainment, young people had a less tendency to develop addiction to gaming. Increased social interaction between parents and children also has a protective effect against the development of online gaming addiction, but this does not apply to playing games together [14]. Given the role family relationships play in the development of online gaming addiction, preventive programs aimed at protecting teenagers against this type of addiction should involve parent counseling and psychoeducation.

## CONCLUSIONS

1. Significantly more boys than girls play online games. Boys devote more time to playing and have more severe symptoms of addiction to online games.
2. Adolescent city dwellers spend significantly more time playing online games, mainly to relieve boredom and experience new sensations, than young people living in the countryside.
3. Women living in the city have significantly more severe symptoms of addiction to online games than those living in the countryside.
4. The significant predictors of online gaming addiction include male gender, urban residence, domestic violence, mother's child-raising rules being challenged by the father, and the child's sense of responsibility for his/her parents.

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