DYSFUNCTIONAL IMPULSIVITY AND SOCIABILITY OF GAMERS IN ONLINE GAME ADDICTION

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ABSTRACT

In this paper , higher impulsivity has been found to be a risk factor for becoming a pathological gamer in a longitudinal study on higher levels of impulsivity which was the only predictor of problematic gaming shared with other addictions, such as gambling, and with the use of tobacco, alcohol, and cannabis. Problematic internet gamers had distinct personality types compared to those with other addictions, e.g. they were younger, less extroverted, and showed higher levels of social anxiety.

KEYWORDS: *tobacco, alcohol, and cannabis.*

INTRODUCTION :

Research on impulsivity and online gaming has to reflect upon the inverse proportionality between impulsivity and age: impulsivity decreases towards adulthood (Steinberg et al., 2008) and it changes its structural features with age (Leshem & Glicksohn, 2007). Gaming addiction seems to be more prevalent among younger people and many studies have been conducted with adolescent samples (Kuss & Griffiths, 2012). Thus, it is not certain to what extent higher impulsivity in gamers is specifically explained by their young age and whether impulsivity is still a predictor of addiction in older age.

METHODS
Participants

The data come from an online survey of Czech and Slovak players of Massive Multiplayer Online Games. The study was advertised in online gaming magazines, on gaming discussion forums, and on guild websites, and targeted the core of the Czech and Slovak gaming community. Heavy players were expected to account for the majority of the sample. Incentives in the form of lottery prizes were used to solicit higher participation. The questionnaire was published in Czech on the Lime Survey platform in spring 2014. A total of 1,463 players (aged 12-69; M = 24.40, SD = 6.48; 90.80% male) filled out the questionnaire sufficiently in order to be included in the analysis. Participants spent between zero and 92 hours playing online games per week (M = 27.50, SD = 16.05).

MEASURES

Online gaming addiction was measured using the Addiction-Engagement Questionnaire (AEQ), which is a 24-item tool with response options on a four-point scale (1 - strongly disagree; 4 - strongly agree). The tool distinguishes between online gaming addiction (12 items) and high engagement in online games (12 items). The addiction subscale focuses on core addiction criteria, such as conflict, behavioural salience, and withdrawal, while the engagement subscale measures peripheral

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addiction criteria, such as cognitive salience, euphoria, and tolerance (Charlton & Danforth, 2007, 2010). Both subscales had sufficient internal consistency (Cronbach's alpha 0.80 for addiction and Cronbach's alpha 0.72 for high engagement). We created two new combined variables for addiction and engagement as mean scores of the respective subscales ranging from 1 to 4 (M_{ADD} = 1.73, SD_{ADD} = 0.48; M_{ENG} = 2.82, SD_{ENG} = 0.38).

The frequency of online gaming, expressed in weekly playing hours, was constructed as a combined measure using two open-ended questions: "In the last three months, how much time (in hours) did you usually spend gaming on a normal working day?" and "In the last three months, how much time (in hours) did you usually spend gaming on a day off?" Respondents who did not play in the last three months (i.e., obtained zero in the combined frequency variable) were excluded from the analysis.

Dysfunctional impulsivity was measured using the 12 items of the respective subscale of Dickman's (1990) Impulsivity Inventory. The items were measured as a yes/no dichotomy; the scale had sufficient internal consistency (Cronbach's alpha 0.79). The final dysfunctional impulsivity variable was created as a mean score and ranged from 0 to 1 (M = 0.25, SD = 0.24), and was positively skewed (S= 0.959, SE = 0.06).

Data Analysis

Pearson's correlation coefficients were calculated for all variables. Two separate regression models were constructed using hierarchical linear regression to determine the association between online gaming addiction/engagement and dysfunctional impulsivity, while controlling for age, gender, and the frequency of online gaming. Given the age characteristics of the sample, we did not control for education because it proved to be age-dependent.

The assumptions of regression analysis were met. Multicollinearity was not a problem because all correlation coefficients were relatively low with values of a maximum of 0.35; VIF = 1.046, tolerance = 0.940. Autocorrelation also was not observed – the value of Durbin-Watson was 1.934, which indicates uncorrelated residuals. The residuals were approximately normally distributed and the assumption of independence was not violated in this study.

RESULTS

Dysfunctional impulsivity and age were negatively correlated, confirming that impulsivity is a natural developmental characteristic of adolescence. There was a moderate positive relationship between dysfunctional impulsivity and addiction, while only a weak positive relationship with gaming engagement (AS IN Table 1). The outcomes of the hierarchical linear regression showed that the effect of impulsivity on addiction was partially mediated by age and hours spent gaming weekly (AS IN Table 2). Although dysfunctional impulsivity was a good predictor of gaming addiction (β = .252), it actually explained only about 7% of the variance of addiction. The same analysis with gaming engagement as a dependent variable revealed a similar pattern of associations; however, engagement appears to be more gender-dependent and less the result of dysfunctional impulsivity.

When comparing addicted gamers (who scored 2 or more SDs above the sample mean on the AEQ addiction subscale, n = 46) who are impulsive (above 2 SDs on dysfunctional impulsivity, $n_{IMP \cap ADD}$ = 9) and those who are not (less than 2 SDs, n = 37), problematic gamers high on impulsivity had similar patterns of addiction criteria as non-impulsive gamers, with one exception: they had, despite small sample sizes, a significantly higher tendency to relapse (χ^2(3, n = 41) = 8.27, p < 0.05). Relapse and reinstatement were measured by the following item: *I have made unsuccessful attempts to reduce the time I spend playing*.

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Table 1. *Correlations of the Main Study Variables.*

	(1)	(2)	(3)	(4)	(5)
Addiction (1)	-	.30**	.31**	.35**	-.19**
Engagement (2)		-	.11**	.24**	-.05*
Dysfunctional impulsivity (3)			-	.16**	-.17**
Frequency of play (4)				-	-.20**
Age (5)					-

Note: ** p < .01; * p < .05

Table 2. *Linear Regression Models for Online Gaming Addiction.*

	Model 1			Model 2			Model 3		
	b	β	Sig.	*b*	β	Sig.	*b*	β	Sig.
Constant	1.96		.00	1.63		.00	1.46		.00
Gender (Female=1, Male=2)	0.05	-.03	.26	0.02	.01	.57	0.03	.02	.43
Age	-0.01	-.19	.00	-0.01	-.12	.00	-0.01	-.09	.00
Frequency of gaming				0.01	.32	.00	0.01	.29	.00
Dysfunctional impulsivity							0.51	.25	.00
F	27.23			75.12			88.11		
p	<.00			<.00			<.00		
R Square	.04			.13			.20		

Table 3. *Linear Regression Models for High Engagement in Online Gaming.*

	Model 1				Model 2				Model 3		
	b	β	Sig.		*b*	β	Sig.		*b*	β	Sig.
Constant	3.18		.00		2.98		.00		2.94		.00
Gender (Female=1, Male=2)	-0.15	-.11	.00		-0.17	-.12	.00		-0.16	-.12	.00
Age	0.00	.00	.05		0.00	.00	.10		0.00	.01	.70
Frequency of gaming					0.01	.25	.00		0.01	.24	.00
Dysfunctional impulsivity									0.12	.08	.00
F	11.42				38.91				31.45		
P	<.00				<.00				<.00		
R Square	.01				.07				.08		

DISCUSSION

The aim of this paper is to evaluate the role of dysfunctional impulsivity in excessive online gaming, both in a pathological and non-pathological way. The results are mixed. On one hand, impulsivity was significant and a rather strong predictor of online gaming addiction. The strength of the association was similar to the association between the frequency of gaming and addiction. However, adding dysfunctional impulsivity to the model increased the variance of addiction by only 7%. This likely means that higher levels of dysfunctional impulsivity elevate the risk of developing the symptoms of addiction, but impulsivity itself is not the most important factor behind gaming addiction.

According to Müller et al. (2016) sensation seeking (and, thus, impulsivity to some extent) is lower in addicted gamers, while Billieux et al. (2015) showed that for certain groups of pathological gamers some impulsive traits are typical, e.g. the lack of premeditation and the lack of perseverance. Our

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findings seem be in line with these views — impulsivity is probably involved with gaming addiction, but its contribution is rather small; gaming addiction has to be accompanied by other individual traits or risk factors; and/or gaming addiction is typical only for specific groups of gamers.

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