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Free-to-play: About addicted Whales, at risk Dolphins and healthy Minnows. Monetarization design and Internet Gaming Disorder

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HIGHLIGHTS

- Risky and addicted free-to-play gamers show higher perceived stress and dysfunctional coping strategies than non-problematic free-to-play gamers.
- Risky and addicted free-to-play gamers significantly spend more time and money on free-to-play games than non-problematic free-to-play gamers.
- No age differences could be detected regarding risky and addicted free-to-play gaming in children and adolescents.

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ABSTRACT

Introduction: Video games are not only changing due to technical innovation, but also because of new game design and monetization approaches. Moreover, elite gamer groups with financial in-game-investments co-finance all users of free-to-play-games. Besides questions on youth protection, the growing popularity of free-to-play games has fostered discussions on supposed associations to Internet Gaming Disorder (IGD).
Method: Children and adolescents using free-to-play browser games were examined in a German school-based representative study (N = 3967; age range 12 to 18). Based on a clinical self-report AICA-S (Wölfling et al., 2011), students were categorized into non-problematic, risky, and addicted users. Psycho-social problems (SDQ; Goodman, 1997), perceived stress (PSS; Cohen, Kamarck & Mermelstein, 1983), coping strategies (BriefCOPE; Carver, 1997), and Average Revenue per (Paying) User (ARPU) were investigated as dependent variables. Furthermore, an industry classification (Freeloaders, Minnows, Dolphins, and Whales) for free-to-play gamers was used for additional relations regarding IGD, SDQ, PSS, BriefCOPE, and ARPU.
Results: Among free-to-play gamers the prevalence of IGD amounted to 5.2%. Subjects classified with IGD displayed higher psycho-social symptoms than non-problematic users, reported higher degrees of perceived stress, and applied dysfunctional coping strategies more frequently. Additionally, we found a higher ARPU among subjects with IGD.
Conclusion: ARPU is significantly associated with IGD. Whales share significant characteristics with addicted video gamers; Dolphins might be classified as risky consumers; Minnows and Freeloaders are rather non-pathological gamers. Vulnerability for stress, dysfunctional coping, and free-to-play gaming represent an unhealthy combination.

1. Introduction

The implementation of monetarization strategies has changed traditional game design. Today, free-to-play monetarization mechanisms are considered and implemented as core features of online video games. According to Lovell (2011) gamers with high financial performance (20€ [Average Revenue Per (Paying) User]) per month are commonly addressed as Whales (10% of payers). Gamers spending around 5€ are considered as Dolphins (40% of payers). Gamers spending around 1€ are considered as Minnows (50% of payers). Non-spenders are classified as Freeloaders. Whales significantly co-finance all users of free-to-play games and realize rentable business models for video game publishers (cf. Lovell, 2011). During

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their play some Whales even spend copious five-figure amounts of money on the game (Rose, 2013).

Within the last years a growing body of literature has emerged dealing with Internet Gaming Disorder (IGD). IGD is characterized by loss of control, preoccupation with game-related contents, tolerance, withdrawal, and continued use despite negative repercussions (e.g. APA, 2013). Since there is a growing evidence that IGD has to be perceived as a severe health issue that has adverse effects in many ways (e.g. social withdrawal, deteriorating achievements, decreasing psychological well-being, depression, and impairment of psychosocial functioning; e.g. Müller, Beutel & Wölfling, 2014; Kuss & Griffiths, 2012) the American Psychiatric Association (APA) decided to include it as a preliminary mental disorder within the DSM-5 (APA, 2013). Within adolescence, prevalence of IGD is estimated to amount to 2–4% (e.g. Müller et al., 2015) with higher rates in some Asian countries (e.g. Mak et al., 2014).

Previous research indicated that especially MMORPGs (Massively Multiplayer Online Role Playing Games) are associated with IGD (Kuss, Louws, & Wiers, 2012; Lam, 2014; Stetina, Kothgassner, Lehenbauer, & Kryspin-Exner, 2011). However, supposing that monetarization strategies are creating consumer commitment towards the game, it is reasonable to assume that also free-to-play games might bear an addictive potential.

1.1. Research questions and hypothesis

Since free-to-play games are receiving growing popularity, we firstly were interested in knowing more about who is playing this kind of video games. Thus we want to provide a detailed demographic description of free-to-play game users. Applying monetarization strategies in online games is a popular way to enhance the gamers' commitment to the game. At the same time, creating commitment was shown to be associated with an increased risk for developing excessive and addictive use (e.g. Hsu, Wen, & Wu, 2009; Tone, Zhao, & Yan, 2014). In contrast to previous studies that have focused on relationships between IGD and MMORPGs, we were interested in exploring the prevalence of IGD and risky use among adolescent users of free-to-play games. Furthermore, we were interested in providing a detailed characterization of these children and adolescents meeting criteria for IGD. In order to allow for comparisons to the characteristics found in previous research, we defined psychosocial symptoms, perceived stress, and coping strategies as dependent variables. In accordance with previous findings based on samples not specifically using free-to-play games, we expected to find a higher degree of psychosocial symptoms associated with IGD and higher levels of distress (e.g. Müller et al., 2015; Gentile et al., 2011) as well as a preponderance of dysfunctional coping styles (e.g. Batthyány, Müller, Benker, & Wölfling, 2009; see also Kuss & Griffiths, 2012). As a secondary aim, we investigated differences of financial investments for video games depending on the clinical classification of gaming behavior. We expect to find that subjects meeting the diagnostic criteria for IGD will spend higher amounts of money for the game than healthy regular users.

2. Methods

2.1. Subjects and recruitment

A total of 4.047 students aged 12 to 18 years from secondary and vocational schools in Germany participated. The sample was drawn according to representative standards (stratified regarding region and population density). Participating schools were randomly selected from all secondary schools of Rhineland-Palatinate, Germany. Random selection identified 62 schools, whereof 41 consented participation in the survey. Informed consent and information letters were circulated in selected classes and signed by pupils' parents and the pupils. Eighty-six point five percent of requested students participated. The study was in accordance with the Declaration of Helsinki and approved by the local ethics committee. 80 cases had to be eliminated due to missing values leading to a sample of 3.967 children and adolescents. From these, we extracted a subsample of n = 1.485 (37.4%) subjects reporting to have at least some experience using free-to-play (browser) games (filter item: "Which of the following computer games do you use … browser-games"; 0 = never, 1 = seldom, 2 = sometimes, 3 = often, 4 = very often).

3. Measures

3.1. Assessment for internet and computer game addiction (AICA-S; Wölfling, Müller, & Beutel, 2011)

AICA-S is a clinical self-report measure to classify internet behavior into non-problematic (0.0–6.5 points), risky (7.0–13.0 points), and addictive usage (>13.0 points). Its 14 items are closely related to those recently published within the DSM-5, covering preoccupation, tolerance, loss of control, withdrawal etc. Its cutoffs firstly were derived from a community-based sample and furthermore validated in a clinical sample of treatment seekers (Müller, Beutel, et al., 2014). By applying the rating of psychotherapists on the severity of addictive behavior as an external criterion, AICA-S yielded good diagnostic accuracy (sensitivity: 80.5%; specificity: 82.4%; Müller, Beutel, et al., 2014). Psychometric properties of AICA-S have been successfully evaluated within clinical samples and representative populations (Müller, Glaesmer, Brähler, et al., 2014). In this survey Cronbach's Alpha amounted to .82.

3.2. Strengths and difficulties questionnaire (SDQ; Goodman, 1997)

The SDQ is a clinical questionnaire for adolescents encompassing 25 items. It assesses psychosocial symptoms on five subscales: Emotional problems (Cronbach's Alpha of $\alpha = .72$), behavioral disorders (Cronbach's Alpha of $\alpha = .53$), hyperactivity and concentration difficulties (Cronbach's Alpha of $\alpha = .65$), problems with peers (Cronbach's Alpha of $\alpha = .49$) and prosocial behavior (Cronbach's Alpha of $\alpha = .69$). The instrument is commonly-used in the international research and has good psychometric properties. Beyond reported Cronbach's Alpha for each subscale, the global SDQ score in this study displays a Cronbach's Alpha of $\alpha = .59$.

3.3. Perceived stress scale (PSS; Cohen, Kamarck, & Mermelstein, 1983)

It is a 10-item inventory, which is used for the assessment of subjective perceived stress and a general vulnerability for stress. It is a measure, which classifies appraised stressful life events. In this survey, we found a Cronbach´s Alpha of $\alpha = .76$.

3.4. BriefCOPE (Carver, 1997)

The BriefCOPE is a widely used self-report assessing 14 different coping strategies on 28 items (on a 4-point Likert-scale, 1 = I haven't been doing this at all; 4 = I've been doing this a lot). In our study, we used an adapted version consisting of the coping strategies Self-Distraction (Cronbach's Alpha of $\alpha = .45$), Active Coping (Cronbach's Alpha of $\alpha = .49$), Positive Reframing (Cronbach's Alpha of $\alpha = .52$), Denial (Cronbach's Alpha of $\alpha = .61$), Self-Blame (Cronbach's Alpha of $\alpha = .75$), and Behavioral Disengagement (Cronbach's Alpha of $\alpha = .62$). Prior studies reported media-focused coping as a common coping mechanism of Internet Addicts (Batthyány et al., 2009; Wölfling & Müller, 2009). Thus, we additionally created two items (e.g. "I tried to forget about the problem by watching television, surfing the internet or playing computer games") assessing media use as another form of coping with stressful events (Media-Related Coping; Cronbach's Alpha of $\alpha = .85$).

Table 1
Prevalence of IGD among free-to-play users according to gender and age.

	Years of age						
	12	13	14	15	16	17	18
♂ (n, %)	2 (3.7)	1 (0.6)	8 (2.8)	16 (5.9)	16 (3.7)	22 (4.8)	7 (2.9)
♀ (n, %)	0 (0.0)	6 (2.8)	10 (3.1)	11(3.7)	13 (3.3)	14 (3.2)	6 (2.4)

Note. n = 1485; table contains only those cases where IGD-criteria are met.

3.5. Average revenue per user (ARPU) [per month]

The amount of money that was spent for free-to-play browser games per month was measured via self-report. Categories were 0€, 1–5€, 6–15€, 16–25€ and more than 25€ (open category). Inspired by Lovell (2011) a definition for Freeloaders, Minnows, Dolphins, and Whales was undertaken. Thus, gamers, who spent 0€ were considered as Freeloaders. Gamers, who spent 1–5€ were considered as Minnows. Those who spent 6–15€ were considered as Dolphins, and persons who spent more than 16€ were classified as Whales.

3.6. Data analysis

All the analyses were conducted using SPSS 22.0 and were based solely on those subjects that reported to have ever used free-to-play games (n = 1.485). Beside general descriptive analyses, chi-square-tests and t-tests were conducted for analyzing group-differences with Cohens *d* as a measure of effect sizes. Hierarchic linear regression analyses were applied to analyze complex relationships. For the prevalence rates, 95% confidence intervals are reported.

4. Results

4.1. Demographic features of adolescent free-to-play-users

Firstly, we analyzed demographic variables associated with free-to-play game use. Among those subjects reporting to use free-to-play games, 45.5% were female (n = 676; age: M = 15.57; SD = 1.68) and 54.5% male (n = 809, age: M = 15.53; SD = 1.64). Most of the users visited vocational (28.7%) and grammar schools (27.1%), followed by middle school (21.0%), middle school plus (8.1%), secondary modern school (3.3%), and integrated school (1.8%). The majority of free-to-play game users was 17 years old (22.0%), followed by 19.9% who were 16 years old, 17.0% aged 14 years, 16.1% aged 15 years, and 12.3% aged 18 years. Lower usage rates were found for the age groups 13 years (9.0%) and 12 years (3.8%).

4.2. Prevalence of internet gaming disorder among free-to-play game users

In a second step, we estimated the prevalence of IGD in association with the use of free-to-play games. According to AICA-S 5.2% (n = 77, CI-95 = 4.0–6.3%) of the sample were classified with IGD and 17.4% (n = 259; CI-95 = 15.6–19.5%) were meeting some criteria for IGD and consequently labeled as risky users. No significant differences were found for gender with 5.7% of the boys being classified with IGD and 4.6% of the girls ($\chi^2(2) = 1.32$, $p = .523$). Table 1 depicts gender- and age-specific differences in IGD, risky, and non-problematic use.

To explore if the frequency of using free-to-play games is associated with different prevalence-rates for IGD, we conducted a chi-square-test that yielded a significant effect ($\chi^2(6) = 114.13$, $p < .001$). The IGD-prevalence was highest among those using free-to-play games "very often" (17.1%; n = 32), followed by those using it "often" (7.0%, n = 19), "sometimes" (3.6%, n = 15), and "seldom" (1.8%, n = 11).

4.3. Differences in psychosocial symptoms, perceived stress, and coping

Symptom severity is significantly increased according to the IGD classification. Medium to high effect sizes is reported in terms of the global SDQ score as well as its subscales "emotional problems", "behavioral problems", and "peer problems". The subscales "hyperactivity" and "prosocial behavior" are statistically less associated with IGD (Table 2).

Perceived stress is significantly contrasting the IGD groups with medium to strong effect sizes. Capabilities to handle stressful life events are significantly linked to a non-clinical classification of IGD. This is indicated by small effect sizes for active coping. Medium to strong effect sized is reported for all sub-dimensions. Media-focused coping shows the strongest effect sizes (Table 3).

Additionally, a hierarchic linear regression analysis was conducted with the AICA-S-score as the criterion and the SDQ-Global Problem Score, PSS-score, and the seven coping strategies as predictors, and controlled for age and gender. Before running the analyses, statistical preconditions were checked (e.g. heteroscedasticity and curvilinear relations). A significant model was found ($p < .001$, $R^2 = .282$) with SDQ-Global Problem Score ($\beta = .25$, $p < .001$), and the coping strategies resignation ($\beta = .09$, $p < .001$), media related coping ($\beta = .28$, $p < .001$), and PSS-score ($\beta = .06$, $p < .001$). Other coping styles were not significantly associated with the increment of the AICA-S score.

4.4. Relationships between financial investments and clinical classification of gaming behavior

ARPU differences were tested for AICA-S group differences. The amount of money spent online significantly allows for a clinical classification of free-to-play use. However, relevant effect sizes are reported for the group difference of risky to addicted, and from non-problematic to addicted players (Table 4).

The Lovell inspired classification of Freeloaders (0€/month), Minnows (1–5€/month), Dolphins (6–15€/month), and Whales (more than 16€/month) is further tested for significance and gender differences. Chi-Square testing for AICA-S scores and the group allocation (Freeloader, Minnows, Dolphins, and Whales) reports a significance level of $p = .013$. Further, significant gender differences ($p < .001$)

Table 2
Symptom severity of free-to-play gamers according to clinical classification of computer gaming behavior.

Dimensions of SDQ	Classification of gaming behavior according to AICA-S			Significance and effect size		
	Non-problematic (NP)	risky (RIS)	Internet Gaming Disorder (IGD)	NP vs. RIS	NP vs. IGD	RIS vs. IGD
	M (*SD*)	*M* (*SD*)	*M* (*SD*)	*p*, *d*	*p*, *d*	*p*, *d*
Global Problem Score	10.37 (4.88)	13.93 (5.24)	16.86 (6.04)	$P < .001$; $d = .70$	$P < .001$; $d = 1.18$	$P < .001$; $d = .52$
Emotional Problems	2.66 (2.18)	3.77 (2.42)	4.78 (2.73)	$P < .001$; $d = .48$	$P < .001$; $d = .86$	$P < .01$; $d = .39$
Behavioral Problems	2.05 (1.48)	3.09 (1.86)	3.68 (2.23)	$P < .001$; $d = .62$	$P < .001$; $d = .87$	$P < .05$; $d = .29$
Hyperactivity	3.49 (2.09)	4.60 (2.16)	5.10 (2.27)	$P < .001$; $d = .52$	$P < .001$; $d = .74$	*ns*
Problems with peers	2.20 (1.60)	2.51 (1.64)	3.31 (1.98)	$P < .01$; $d = .19$	$P < .001$; $d = .61$	$P < .01$; $d = .39$
Prosocial behavior	7.58 (1.99)	7.30 (2.08)	6.76 (2.35)	$P < .05$; $d = .14$	$P < .01$; $d = .38$	*ns*

Note. n = 1485; ns = not significant; *d* = Cohen's d (effect size); *p* = p-value; AICA-S: Scale for the Assessment of Internet and Computer game Addiction; SDQ = Strengths and Difficulties Questionnaire; *M* = mean; *SD* = standard deviation.

Table 3
Perceived stress and coping of free-to-play gamers according to clinical classification of computer gaming behavior.

	Classification of gaming behavior according to AICA-S			Significance and effect size		
	Non-problematic (NP)	Risky (RIS)	Internet Gaming Disorder (IGD)	NP vs. RIS	NP vs. IGD	RIS vs. IGD
	M (*SD*)	*M* (*SD*)	*M* (*SD*)	*p*, *d*	*p*, *d*	*p*, *d*
PSS-score	17.52 (5.55)	20.48 (5.53)	23.55 (6.00)	$P < .001$; $d = .53$	$P < .001$; $d = 1.09$	$P < .001$; $d = .55$
Self-Distraction (BC)	2.15 (0.64)	2.39 (0.74)	2.62 (0.79)	$P < .001$; $d = .36$	$P < .001$; $d = .72$	$P < .05$; $d = .30$
Active Coping (BC)	2.85 (0.63)	2.75 (0.62)	2.62 (0.70)	$P < .05$; $d = .16$	$P < .011$; $d = .36$	ns
Behavioral Disengagement (BC)	1.54 (0.57)	1.91 (0.68)	2.25 (0.78)	$P < .001$; $d = .63$	$P < .001$; $d = 1.20$	$P < .001$; $d = .48$
Self-Blame (BC)	2.40 (0.70)	2.71 (0.70)	2.84 (0.76)	$P < .001$; $d = .45$	$P < .001$; $d = .62$	ns
Media-Related Coping (BC)	2.22 (0.87)	2.99 (0.87)	3.25 (0.84)	$P < .001$; $d = .87$	$P < .001$; $d = 1.17$	$P < .05$; $d = .30$
Positive Reframing (BC)	2.25 (0.72)	2.42 (0.75)	2.53 (0.83)	$P < .01$; $d = .28$	$P < .01$; $d = .39$	ns
Denial (BC)	1.61 (0.63)	1.88 (0.81)	2.25 (0.94)	$P < .001$; $d = .40$	$P < .001$; $d = .97$	$P < .01$; $d = .44$

Note. n = 1485; ns = not significant; *d* = Cohen's d (effect size); *p* = p-value; AICA-S: Scale for the Assessment of Internet and Computer game Addiction; PSS = Perceived Stress Scale; BC = BriefCOPE; *M* = mean; *SD* = standard deviation.

were reported (Table 5). Age differences were also Chi-Square tested, but were not significant ($p = .605$).

5. Discussion

In this study, we were interested in learning more about relationships between the use of free-to-play-games and Internet Gaming Disorder. To that purpose a large sample of children and adolescents reporting to be experienced in using these games was examined. With 37%, a large part of the representative sample of children and adolescents had experience in using free-to-play bowser games. Interestingly, comparable rates of boys and girls were found here. Regarding the prevalence of IGD, we found that a substantial proportion of these subjects met clinical criteria for IGD. The prevalence of 5.2% meeting those criteria is higher than reported in other surveys without explicitly differentiating the use of specific computer game genres (e.g. Rehbein, Kleimann, & Mößle, 2010; Müller et al., 2015). Interestingly, in contrast to prior findings, we found no gender differences among those adolescents classified with IGD. However, this has to be understood as a preliminary finding in need of further validation since it was not possible to control for effects of the use of multiple computer game genres.

Additionally, we investigated correlates of IGD among free-to-play gamers. Comparing adolescents with non-problematic, risky, and addicted use of free-to-play games revealed that meeting the diagnostic criteria for IGD was associated with more severe psychosocial symptoms in any of the SDQ-subscales. The highest effect sizes were found for Behavioral Problems (difficulties regarding impulse control and interpersonal conflicts), Hyperactivity (problems regarding attention and goal prosecution), and Emotional Problems (feelings of depression and anxiety). In so far, our results are matching prior findings on adolescents with Internet Addiction and Internet Gaming Disorder (Cao & Su, 2006; Jang, Hwang, & Choi, 2008; Müller et al., 2015). However, to our best knowledge, this is the first survey explicitly addressing symptoms of IGD and associated psychopathology related to the use of free-to-play games. While the addictive potential of using MMORPGs has been demonstrated before (Kuss et al., 2012; Lam, 2014; Stetina et al., 2011), our results emphasize that also free-to-play games might be regarded as a potential health-related issue.

As hypothesized we found that IGD was related to a higher level of perceived stress and to specific coping strategies. The comparison between non-problematic and addicted gamers revealed that especially Media-Related Coping, Denial, Self-Distraction, Self-Blame, and Behavioral Disengagement were coping strategies prevailing among the IGD-group. Additionally, Active Coping and Positive Reframing were expressed less frequently as a reaction towards stressful events. With regard to the regression analysis conducted, Media-Related Coping and Behavioral Disengagement remained as predictors for IGD. These findings confirm prior results and also validate assumptions of proposed models dealing with preconditions for exhibiting internet and computer game addiction (e.g. Davis, 2001; Dreier, Wölfling, & Müller, 2013; Dong & Potenza, 2014; Brand, Young, & Laier, 2014). These results also indicate potential starting points for prevention and intervention programs, e.g. by implementing preventive (school-based) stress management programs and techniques for cognitive restructuring in treatment programs.

As hypothesized the amount of money spent in free-to-play games is significantly linked to the IGD-classification. Indeed, we found significant associations here with a substantial percentage of children and adolescents meeting criteria for IGD being classified as “Whales”. Interestingly, these subjects spend the highest amounts of money and time on the game.

In the light of growing mobile access and usage by children and adolescents it is reasonable to assume that there is a decreasing threshold for making financial transactions (e.g. via mobile payments and prepaid cards; e.g. Roberts, Yaya, & Manolis, 2014). This may lead to various adverse consequences: Firstly, minors are running the risk of losing track of their financial situation and – in the worst case – are incurring debts. Secondly, as has been mentioned before, monetarization strategies in free-to-play games are thought to increase the gamer's commitment towards the game and therefore might be fostering the risk for an addictive use in the long run.

Especially the capability of solving problematic in-game situation by spending money might be linked to the coping mechanisms of vulnerable free-to-play gamers. A problematic situation can be answered by financial investments. This opportunity supports the vulnerable gamer's attitude to escape problems by applying media-focused coping strategies. This is especially relevant in terms of conditioning processes, which lead to a cognitive bias and severe attachment on the game. The

Table 4
Average Revenue per User (ARPU) of free-to-play gamers according to clinical classification of computer gaming behavior.

	Classification of gaming behavior according to AICA-S			Significance and effect size		
	M (*SD*)	*M* (*SD*)	*M* (*SD*)	*p*, *d*	*p*, *d*	*p*, *d*
	Non-problematic (NP)	Risky (RIS)	Internet Gaming Disorder (IGD)	NP vs. RIS	NP vs. IGD	RIS vs. IGD
ARPU	1.59 (5.57)	2.64 (7.21)	5.15 (10.45)	$P < .01$; $d = .16$	$P < .001$; $d = .43$	$P < .01$; $d = .28$
Play time	3.2 (2.62)	5.22 (2.,79)	6.15 (3.51)	$P < .001$; $d = .75$	$P < .001$; $d = .95$	$P < .001$; $d = .29$

Note. n = 1485; *d* = Cohen's d (effect size); *p* = p-value; AICA-S: Scale for the Assessment of Internet and Computer game Addiction; *M* = mean; *SD* = standard deviation

Table 5
Average Revenue per User (ARPU), clinical classification of computer gaming behavior and gender.

User groups according to AICA-S	Freeloader n (%)		Minnows n (%)		Dolphins n (%)		Whales n (%)	
Non-problematic	684 (75.0%)		20 (64.5%)		20 (58.8%)		18 (54.5%)	
	♀	♂	♀	♂	♀	♂	♀	♂
	287 (73.3%)	397 (76.3%)	2 (50.0%)	18 (66.7%)	2 (40.0%)	18 (62.1%)	0 (0.0%)	18 (54.5%)
Risky	174 (19.1%)		9 (29.0%)		10 (29.4%)		9 (27.3%)	
	♀	♂	♀	♂	♀	♂	♀	♂
	83 (21.2%)	91 (17.5%)	1 (25.0%)	8 (29.6%)	2 (40.0%)	8 (27.6%)	0 (0.0%)	9 (27.3%)
Addicted	54 (5.9%)		2 (6.5%)		4 (11.8%)		6 (18.2%)	
	♀	♂	♀	♂	♀	♂	♀	♂
	22 (5.6%)	32 (6.2%)	1 (25.0%)	1 (3.7%)	1 (20.0%)	3 (10.3%)	0 (0.0%)	6 (18.2%)

Note. n = 1010; table contains only those cases where AICA-S and ARPU is available; AICA-S: Scale for the Assessment of Internet and Computer game Addiction.

longer this kind of behavior is maintained the more likely it is that specific dynamics develop, which eventually might lead to a problematic or even addictive use. In terms of common theories on internet addiction, this is especially relevant since dysfunctional coping has been reported to play a key role in developing Internet Gaming Disorder (Brand et al., 2014; Müller, Beutel, Egloff and Wölfling, 2014). Unsatisfying moments, which would have led gamers of traditional video games to quit or change the game, are now designed essentials of the game. Thus, a higher degree of self-efficacy is persuaded, since striding the paywall solves lots of in-game problems. Individuals suffering from Internet Gaming Disorder are commonly showing a decreased self-efficacy (Jeong & Kim, 2010; Wölfling et al., 2011; Festl, Scharkow, & Quandt, 2013), which might make those even more attracted by free-to-play mechanics.

There are some aspects limiting the generalizability of our findings. A clear limitation regards the conceptualization of browser games as free-to-play games. In 2011 when the representative survey was launched there was no non-free-to-play browser game that was commonly played in Germany. Nonetheless, the conceptualization of free-to-play gamers in general has its limitations based on the framing, which was used in the operationalization. Further research for the meta-concept of free-to-play games regarding different genres would be desirable for future investigations. The calculation with this subsample resulted in a small group of adolescents and children suffering from IGD, which has to be considered in the evaluation of our results. Additionally, the BriefCOPE subscales Self-Distraction ($\alpha = .45$) and Active Coping ($\alpha = .49$) pointed to an unsatisfactory internal reliability. Besides, the subscale Positive Reframing ($\alpha = .52$) showed poor Cronbach's Alpha values. Thus, a validation for our adapted BriefCOPE is required. Furthermore, since our findings are based on a cross-sectional design, it is not possible to draw conclusions regarding the causality of the associations found. For future research it is desirable to take a closer look at the specific genre of free-to-play games and to consolidate our preliminary findings.

6. Conclusion

It has been indicated that free-to-play games are highly associated with IGD. Based on our findings it is evident to talk about healthy Minnows, at risk Dolphins, and addicted Whales. Subjects being at risk of suffering from IGD are more likely to spend higher amounts of money, are less prosocial in terms of behavior, are affected by problems of conduction as well as hyperactivity, and are having problems with peers or within relationships. The degree of psychosocial distress reported by them is significantly increased and they are less likely to face problems by applying functional coping strategies. Additionally, the design of free-to-play games transports the feeling of self-efficacy. We found some evidence that the use of free-to-play games is related to both increased risk of meeting criteria for IGD and willingness for financial in-game-investments. Therefore, strategies preventing (vulnerable) individuals from negative repercussions potentially arising from free-to-play-use (e.g. IGD, debts) should be considered. It is plain to see that the problematic nature of monetarization designs in video games demands the development and implementation of specific countermeasures guaranteeing youth protection and prevention of developing IGD.

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Dreier, M., Wölfling, K., Müller, K.W. prepared the first draft and performed the statistical analysis of the MS. Duven, E. & Giralt, S. collected the data and Beutel, M.E. proofread.

Disclosure of conflict of interest
The authors declare that there is no conflict of interest.

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