

The effectiveness of a parental guide for prevention of problematic video gaming in children: A public health randomized controlled intervention study

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Background and aims: Excessive use of video games among children and adolescents is a growing concern. The aim of this study was to investigate the effectiveness of a brief parental guide with advices and strategies for regulating video gaming in children. *Methods:* A random sample of guardians of children between the age of 8–12 years old ($N = 5,864$) was drawn from the Norwegian Population Registry and equally randomized into an intervention and a control condition. A parental guide based on clinical and research literature was distributed by postal mail to those in the intervention condition. A 4-month follow-up survey comprising questions about problematic video gaming, gaming behavior, sleep activity, and parental video game regulation behavior was administered. *Results:* Independent *t*-tests revealed no significant differences between the two conditions ($N = 1,657$, response rate 30.1%) on any outcome measure. An ANOVA with planned comparisons showed that respondents who reported that they had read and followed the parental guide reported more video game problems and used more parental mediation strategies than those who did not read and follow the guide. *Conclusions:* We found no evidence for the effectiveness of the psychoeducational parental guide on preventing problematic video gaming in children. However, the guide was read and positively assessed by a significant proportion of guardians. Differences between those who studied the guide and those who did not may indicate that parental guides are better aimed at providing important information to those who already have problems rather than as a mean of primary prevention.

Keywords: problematic video gaming, parental guide, video game addiction

INTRODUCTION

Video gaming is a very prevalent pastime among children and adolescents in the developed world. Studies suggest that 88% of all American youths between the age of 8–18 years play video games at least occasionally (Gentile, 2009), whereas 68.6% of male and 43.4% of female Norwegians play video games on a weekly basis (Mentzoni et al., 2011). In a representative German study of adolescents, it was found that mean daily time spent gaming was 141 min (Rehbein, Kleimann, & Mößle, 2010). However, far from all individuals spending much time playing video games seem to have problems because of this (Brunborg, Mentzoni, & Frøyland, 2014). Such gamers are often denoted as highly engaged (Charlton & Danforth, 2007) or enthusiastic gamers (Griffiths & Meredith, 2009). Still, studies have shown that some young people lose control over their game playing behavior to such extent that it is associated with significant problems, such as loneliness and social isolation,

lower academic achievement, depression, anxiety, and sleep problems (Brunborg et al., 2014; Lemmens, Valkenburg, & Peter, 2011; Mentzoni et al., 2011; Wenzel, Bakken, Johansson, Göttestam, & Øren, 2009). Problematic video gaming is also recognized as a potential behavioral disorder, similar to gambling disorder, which is often referred to as video game addiction (Griffiths & Meredith, 2009; Hellman, Schoenmakers, Nordstrom, & van Holst, 2013). This is also reflected in the fifth and most recent version of the *Diagnostic and Statistical Manual of Mental Disorders* (DSM-5) (2013) where “Internet gaming disorder” (IGD) was included as a condition for further studies. Thus, despite the ongoing discussion on how to conceptualize and assess the phenomena (Griffiths et al., 2016; Kuss, Griffiths, & Pontes, 2017),

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there seems to be consensus about the need for generating more knowledge about gaming disorder. A recent Norwegian representative study of gamers (aged 16–74 years) found the prevalence of video game addiction to be 1.4%, and of problematic gaming to be 7.3%. Addiction and problems were inversely related to age (Wittek et al., 2016). Another Norwegian study of eight graders found the prevalence of video game addiction to be 4.2% (Brunborg et al., 2013). A meta-analysis consisting of studies published between 2001 and 2011 reported an overall prevalence rate of 3.1% of video game addiction among youths and young adults (Ferguson, Coulson, & Barnett, 2011), suggesting that problematic video gaming among young people represents a serious public health concern that warrants intervention.

To date, several psychological (Li & Wang, 2013; Pallesen, Lørvik, Bu, & Molde, 2015) and pharmacological (Han, Hwang, & Renshaw, 2010; Han et al., 2009) treatment studies have been conducted, with varying degrees of success (Winkler, Dörsing, Rief, Shen, & Glombiewski, 2013). However, the prevention of problematic video game playing has received much less attention in many countries, despite many benefits that this approach may offer to individuals at risk (King et al., 2017). Proposed primary prevention strategies include: attention-switching (directing youth to other extracurricular activities such as sports), rationalization/education about the risks of online gaming addiction, parental monitoring, restriction of game-related resources (e.g., limiting access to games), and increased cost of playing (Xu, Turel, & Yuan, 2012). For example, parental monitoring has been found to have a positive effect on children's media use, sleep, academic and social behaviors (Gentile, Reimer, Nathanson, Walsh, & Eisenmann, 2014), and setting rules restricting screen time, and encouraging physical activity have demonstrated efficacy in reducing screen time in children (Carlson et al., 2010).

Problematic use of video games in early childhood has been found to be a predictor for addictive behavior in adolescence (Rehbein & Baier, 2013). However, there are also studies indicating that the temporal stability of excessive gaming may be low and resolve spontaneously (Rothmund, Klimmt, & Gollwitzer, in press; Scharkow, Festl, & Quandt, 2014). Nevertheless, a logical target for prevention of problems related to video gaming would be parents of preteen youth, given preteens' commonly premorbid status and their greater receptivity, compared with teenage adolescents, to parental involvement (Lwin, Stanaland, & Miyazaki, 2008; Pasquier, 2001). One cost-efficient prevention strategy with the possibility to reach a broad scope of parents of young children might be distributing leaflets with psychoeducative advice and recommendations intended to incorporate healthy parental strategies. To the best of our knowledge, there have not been previous studies investigating the effect of parental guides on behavioral change, without any other reinforcers. However, a recent review concerned with prevention of Internet addiction called for more studies with interventions aimed at parents and significant others of young children (Vondráčková & Gabrhelík, 2016). Previous studies have also shown that interventions, which focus on parental involvement can yield behavioral change in children (Petrie, Bunn, & Byrne, 2006). One study showed that a simple psychoeducative intervention provided to parents had a positive effects on family

communication and awareness of adolescent substance behavior (Spirito, Hernandez, Cancilliere, Graves, & Barnett, 2015). Furthermore, parent-child communication is, in addition to parental monitoring, regarded as one central parental skill to focus on prevention of Internet addiction (Vondráčková & Gabrhelík, 2016). In line with this, the purpose of this study was to examine the effectiveness of a parental guide for parents of children aged 8–12 years constructed with the aim of preventing the onset or development of problematic video gaming. Based on past research, we predicted that equipping parents with prevention strategies would have a beneficial effect on their children's video gaming behavior, thereby reducing the risk of problematic video gaming and strengthening positive outcomes in general functioning.

METHODS

Participants and procedure

A random sample of 6,000 guardians of children between the ages of 8–12 years old was drawn from the Norwegian Population Registry (Figure 1). In all, 136 guardians were drawn twice on the basis of having several children in our desired age range (8–12 years), reducing our gross sample to 5,864. All guardians were then randomly assigned (using www.randomizer.org) to either the intervention condition or the control condition.

A brief parental guide on “how to regulate video game behavior in children” was developed based on specific clinical recommendations (Griffiths & Meredith, 2009; King, Delfabbro, & Griffiths, 2010, 2012; King, Delfabbro, Griffiths, & Gradisar, 2012; Young, 2009), a treatment manual for video game addiction (Pallesen et al., 2015), factors identified as useful for preventing video game problems (Xu et al., 2012), and clinical experience and feedback from a reference group consisting of parents of children in the age range of 8–12 years old. The guide is presented in Appendix. Participants in the intervention condition received the guide via postal mail in January 2015, along with an explanatory letter informing them that they had been randomly selected to receive the guide. Four months later, guardians in both conditions received a questionnaire along with an invitation to participate in the study and a description of the formalities concerning confidentiality and a statement that the data would be used exclusively for research purposes. If the guardians had several children between the ages of 8–12 years of age, they were instructed to base their answers on the youngest child. The invitation described the aim of the study as mapping out how parents regulate gaming in children, and that they only had to return one questionnaire to participate (single time point). Those who did not respond received a reminder with a new questionnaire approximately 2 months after the first survey. In total, 1,762 guardians completed and returned the questionnaire (i.e., a response rate of 30.1%). In all, 11 cases were duplicates and were excluded. We included cases where the child had already turned 13 years old ($N = 86$), but excluded 82 cases that fell outside our desired age range. A total of 12 cases were excluded because information about the age of the child was missing. The final sample

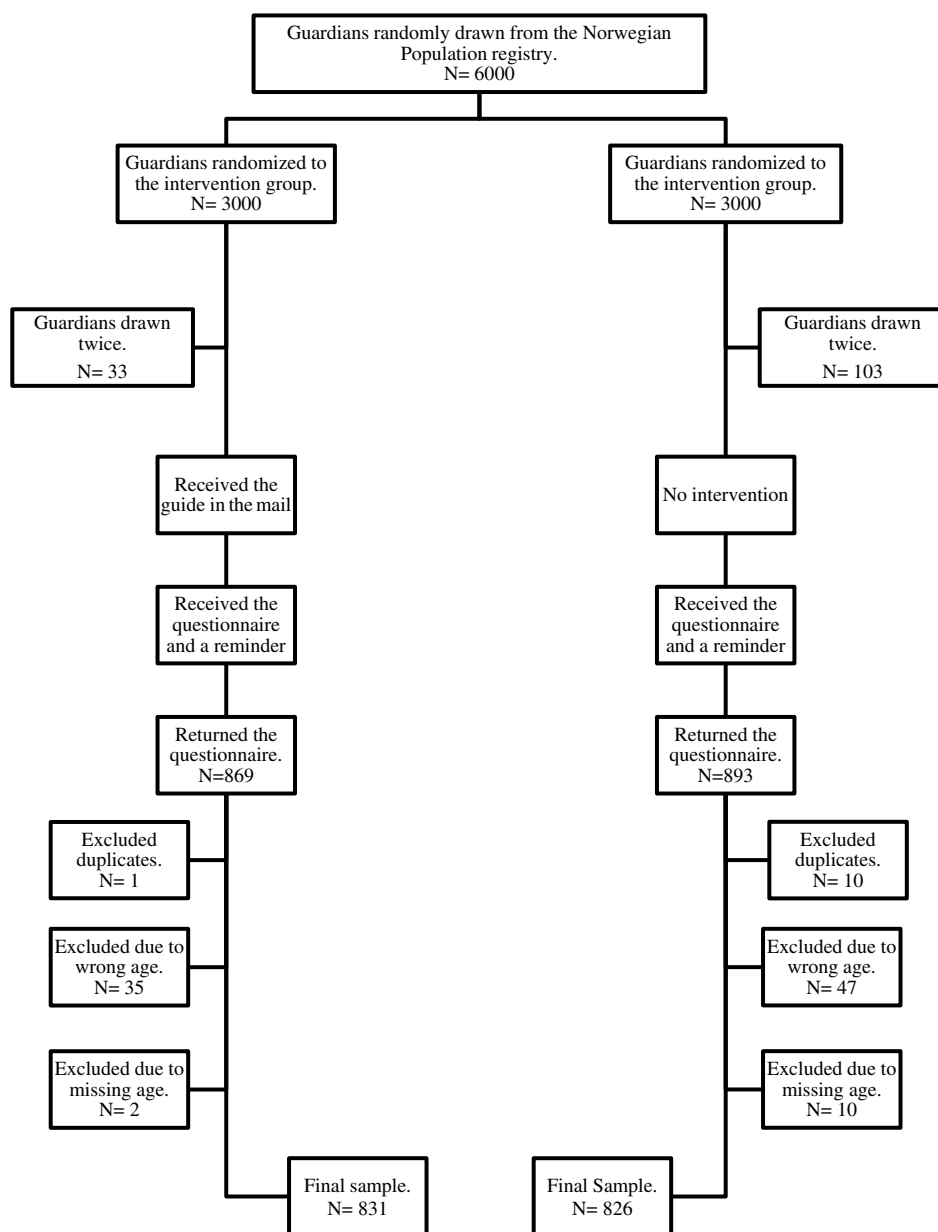


Figure 1. Flow chart depicting the procedure of the randomized controlled trial investigating a parental guide aimed at guardians of children in the age of 8–12 years old

($N = 1,657$) consisted of 831 in the intervention condition and 826 in the control condition. Surveys were received from 583 fathers and 1,022 mothers, 32 “others” (e.g., grandparents, foster parents, etc.) concerning 759 girls and 876 boys. The mean age of the children was 10.1 years.

After completing the questionnaire, the participants were enrolled in a raffle, with the possibility of winning 50 gift certificates (at 500 NOK apiece) and two iPad’s.

Measures

The survey comprised questions about demographics (the child’s age and gender, whom they live with, and parents’ education level). Two items assessing time spent gaming each day on weekdays and weekends were also included. One item assessed whether guardians applied rules

constraining time spent playing video games (“completely disagree,” “partially disagree/agree,” and “completely agree”) (Carlson et al., 2010).

Video game problems. To measure video game problems, a Norwegian translation of the nine criteria proposed for IGD found in DSM-5 (American Psychiatric Association [APA], 2013) was administered. To detect changes occurring within the study period, the time frame was set to the past 3 months. To be able to detect nuances in terms of gaming problems, the response alternatives were aligned along a 5-point Likert scale ranging from “completely disagree” (1) to “completely agree” (5). If guardians agreed (“agree” or “completely agree”) on at least five of the nine items (APA, 2013), the child was categorized with “IGD.” Cronbach’s α for this scale was .90.

Sleep problems and bedtime resistance. Sleep problems and bedtime resistance were addressed using the “bedtime resistance” subscale of the Child Sleep Habits Questionnaire (CSHQ; six items) (Owens, Spirito, & McGuinn, 2000). CSHQ is a screening instrument instructing guardians to indicate on a 3-point scale how many days during the past week, or during a “typical” week, certain sleep habits occur (“usually” 5–7 days, “sometimes” 2–4 days, and “rarely” 0–1 day). We also asked respondents to indicate whether or not the behavior was problematic (“yes” or “no”). Cronbach’s α for bedtime resistance was .67.

Parental mediation. Parental mediation can be defined as the various strategies parents use to control, supervise, and interpret content (Warren, 2001) of video games to guide and regulate gaming (Nikken & Jansz, 2006). To measure parental mediation, we used a parental mediation scale (Nikken & Jansz, 2006) that contained 13 items addressing how often guardians apply certain parental strategies regarding gaming. All items are answered on a 3-point scale (“rarely or never,” “now and then,” and “often”). The scale has three subdimensions: restrictive mediation (five items, e.g., “monitoring gaming behavior”), co-playing (three items, e.g., “playing together”), and active mediation (five items, e.g., “telling games are just fantasy”). Cronbach’s α for restrictive mediation, co-playing, and active mediation were .78, .79, and .79, respectively.

Parental limit setting efficacy. Parental efficacy in terms of perceived ability to set limits for the child’s screen time, game time, and promote physical activities (Jago, Sebire, Edwards, & Thompson, 2013) was assessed by three items. The guardians were asked to indicate how certain they were about managing limit setting in the aforementioned circumstances (e.g., “to limit time used by my child to play video games”). The response alternatives range from 0 (completely certain to fail) to 100 (completely certain to manage) on an 11-point scale.

Assessing general satisfaction with guide. For guardians in the intervention condition, the questionnaire contained one item that asked if they were aware of having received the guide (“yes” or “no”). If they confirmed having received it, they were asked to state if they: (a) studied the content of the guide carefully, (b) tried to follow the recommendations, and (c) thought the recommendations had been positive for their child. These three items were answered along a 5-point Likert scale ranging from strongly disagree (1) to strongly agree (5).

Statistics

Analysis was conducted using SPSS, version 22. To compare the two conditions, data were analyzed using either χ^2 analyses (for nominal variables) or *t*-tests for independent samples (for interval or ratio variables). Scale mean scores were calculated if at least 75% of the items were answered. An a priori power analysis setting the effect size to small ($d=0.20$), α set to .05 (two-tailed), power set to .80 showed that 788 subjects would be needed to detect real group differences (Faul, Erdfelder, Lang, & Buchner, 2007).

To further investigate contrasts between groups who had dealt with the guide in different ways, a one-way ANOVA

with planned contrasts was conducted. Post hoc analysis was carried out with Hochberg *gt*-2 corrections to account for unequal sample sizes. Items asking if the guardians had read the guide carefully and followed the recommendations were used to group the guardians. Answering 1 or 2 (strongly disagree or disagree) at the 5-point Likert scale was defined as denying to have read or followed the guide, whereas answering 3–5 (“neither agree nor disagree” to “strongly agree”) was coded as complying to have read or followed the guidelines. Four unique groups were created: “not read, not followed” (a), “read, not followed” (b), “read, followed” (c), and “remaining of the intervention group,” which comprise guardians who denied having read the guide, but complied to have followed the instructions, and the one who did not notice the guide in the mail (d). These were all compared with the control group, which had not received the guide (e). The following planned contrasts were conducted against the control group: “intervention group” (a, b, c, d, vs. e), “received” (a, b, c, vs. e), “read” (b, c vs. e), and “read and followed” (c vs. e).

Ethics

Returning the survey in a prepaid envelope was regarded as consent. The guardians were informed that participation was voluntary and that they could contact the researchers if they wanted to withdraw from the study after returning the questionnaire. It was also stated that to participate one just had to return the completed questionnaire. The project was approved by the Norwegian Center for Research Data (project no. 41016).

RESULTS

χ^2 analyses revealed no significant difference between the two conditions regarding age of child χ^2 (5, $n=1,657$) = 1.76, $p=.88$, sex χ^2 (1, $n=1,635$) = 0.31, $p=.58$, type of guardian (“mother,” “father,” and “other”) answering the questionnaire χ^2 (2, $n=1,637$) = 0.04, $p=.35$, whom the child lived with χ^2 (5, $n=1,657$) = 3.64, $p=.60$, the education level of the father χ^2 (7, $n=1,657$) = 9.64, $p=.21$, or education level of the mother χ^2 (7, $n=1,657$) = 8.60, $p=.28$. The answers of 77 guardians (4.8%, 95% CI = 3.7%–5.8%) equally distributed between the two conditions χ^2 (1, $n=1,613$) = 0.03, $p=.87$ suggested that their child could be categorized with IGD.

In terms of potential effects of the guide, no significant difference was observed between the conditions on any of the outcome measures (Table 1).

Of the guardians who received the guide, 73.4% ($n=604$) reported that they were aware of having received it. Furthermore, 63.4% ($n=388$) agreed to have read and studied the content carefully and 49.4% ($n=298$) agreed that they tried to follow the recommendations in the guide. Furthermore, 32.6% ($n=197$) of the guardians agreed that the guidelines had had a positive impact on their child (Table 2).

Comparing the different groups of participant (see Table 3 for distribution) against the control group revealed significant differences regarding video game

Table 1. Results of *t*-test and descriptive statistics for the outcome measures by the two conditions of guardians of children between the age of 8–13

Outcome measures	Condition						95% CI for mean difference	<i>t</i>	<i>df</i>	<i>p</i>	<i>d</i>
	Intervention			Control							
	<i>M</i>	<i>SD</i>	<i>n</i>	<i>M</i>	<i>SD</i>	<i>n</i>					
Video game problems	1.95	0.75	800	1.90	0.77	813	−0.12, 0.03	−1.16	1611	.25	−0.06
Child sleep problems	1.96	0.12	677	1.96	0.11	675	−0.01, 0.01	0.19	1350	.85	0.01
Bedtime resistance	1.11	0.23	767	1.11	0.24	728	−0.02, 0.03	0.14	1493	.89	0.08
Game time weekdays	79.55	72.60	784	78.42	76.63	787	−8.52, 6.25	−0.30	1569	.76	−0.02
Game time weekends	138.79	101.26	788	139.07	106	791	−9.96, 10.51	0.05	1574.23	.96	0.00
Time restriction	2.47	0.62	803	2.44	0.64	812	−0.09, 0.03	−0.95	1613	.34	−0.05
Restrictive mediation	2.08	0.51	795	2.10	0.51	807	−0.03, 0.07	0.66	1600	.51	0.03
Co-playing mediation	1.58	0.48	783	1.62	0.50	802	−0.02, 0.08	1.30	1583	.20	0.07
Active mediation	1.85	0.49	794	1.83	0.51	808	−0.07, 0.03	−0.91	1600	.37	−0.05
Parental efficacy screen time	90.70	2.07	827	91.46	20.75	818	−1.24, 2.77	0.75	1643	.45	0.04
Parental efficacy gaming	93.88	18.26	801	93.78	19.79	806	−1.96, 1.76	−0.10	1605	.91	0.00
Parental efficacy activity	96.08	18.87	826	95.98	19.36	811	−1.96, 1.74	−0.12	1635	.91	−0.01

Note. Video game problems range from 1 (“completely disagree”) to 5 (“completely agree”). Child sleep problems range from 1 (“yes”) to 2 (“no”). Bedtime resistance ranges from 1 (“rarely”) to 3 (“usually”). Time restriction ranges from 1 (“completely disagree”) to 3 (“completely agree”). Restrictive, co-playing, and active mediation range from 1 (“rarely or never”) to 3 (“often”). Parental efficacy ranges from 0 (“completely certain to fail”) to 100 (“completely certain to manage”). Game time is reported in minutes per day. *M* = mean; *SD* = standard deviation; CI: confidence interval.

Table 2. Assessment of a parental guide on video game usage by guardians in the intervention condition

Question	Disagree		Neither agree nor disagree		Agree	
	<i>n</i>	%	<i>n</i>	%	<i>n</i>	%
“I have read and studied the content of the guide thoroughly”	89	14.5	135	22.1	388	63.4
“I have tried to follow the advice/recommendation from the guide”	68	11.3	237	39.3	298	49.4
“I think the advice from the guide has had an positive impact on my child”	42	7.0	364	60.4	197	32.6

Note: Categories have been merged. Disagree: “completely disagree” and “disagree;” Neither agree nor disagree: “neither agree nor disagree;” Agree: “completely agree” and “agree.”

problems, restrictive and active mediation, and parental efficacy concerning screen time and physical activity (Table 4). The post hoc analysis showed that the significant differences mostly occurred between different subgroups within the intervention group where those who read and followed the guide reported more gaming problems ($p < .05$) and used more restrictive ($p < .01$) and active mediation strategies ($p < .05$) than the other subgroups compared with the control group. Those who chose not to read or followed the guide reported less-restrictive mediation strategies than the control group ($p < .01$). Furthermore, 29 of the 37 guardians in the intervention group who suggested that their child could be categorized with IGD was located in the subgroup “read and followed,” one was located in the subgroup “read, not followed,” seven in the subgroup “remaining of intervention group,” and zero in the “did not read, did not follow.” There were no significant age differences between the subgroups of participants.

DISCUSSION

The aim of this study was to investigate the effectiveness of a parental guide for gaming activity in a randomized sample of guardians of children between the ages of 8–12 years. Receiving the guide did not produce any behavioral effect either in guardian or child on any of the outcome measures. The lack of effects occurred despite the fact that a significant proportion of guardians in the intervention condition tried to follow the guidelines and assessed them as having a positive impact on their child. Further investigation revealed that the guardians who read and followed the guide reported more video game problems in their children, and used more restrictive and active mediation strategies than those who did not read the guide. The latter group also used less-restrictive mediation strategies compared with the control group.

The lack of effect of the guide might be due to several reasons. One possible explanation might be that the time

Table 3. Distribution of the different subgroups of guardians and the control group

Outcome measures	"Not read, not followed" (a)			"Read, not followed" (b)			"Read, followed" (c)			"Remaining of the intervention group" (d)			Control group (e)		
	n	Mean	SD	n	Mean	SD	n	Mean	SD	n	Mean	SD	n	Mean	SD
Video game problems	41	1.64	0.60	22	2.24	0.76	480	2.00	0.78	250	1.87	0.69	813	1.90	0.77
Child sleep problems	38	1.99	0.03	20	1.95	0.13	404	1.96	0.13	205	1.96	0.10	675	1.96	0.11
Bedtime resistance	41	1.10	0.21	22	1.14	0.25	454	1.10	0.22	238	1.11	0.23	728	1.11	0.24
Game time weekdays	40	70.50	46.83	22	103.18	95.25	473	78.28	73.83	243	82.02	71.60	787	78.42	76.63
Game time weekends	40	121.10	105.96	22	149.32	112.68	475	141.42	101.04	245	137.02	100.31	791	139.07	106.00
Time restriction	41	2.44	0.74	21	2.14	0.655	481	2.49	0.59	251	2.45	0.66	812	2.44	0.64
Restrictive mediation	41	1.75	0.46	22	1.90	0.56	477	2.14	0.48	249	2.03	0.53	807	2.09	0.51
Co-playing mediation	40	1.45	0.49	22	1.65	0.56	472	1.58	0.47	243	1.60	0.49	802	1.62	0.50
Active mediation	41	1.64	0.50	22	1.68	0.45	477	1.90	0.47	248	1.81	0.51	808	1.83	0.51
PE screen time	43	95.81	18.28	22	81.82	23.43	490	90.75	20.57	259	90.35	21.01	818	91.47	20.75
PE gaming	41	97.32	16.58	22	87.73	21.14	480	93.56	18.30	250	94.28	18.27	806	93.78	19.79
PE physical activity	43	98.37	21.37	22	86.82	21.46	488	96.23	18.85	260	96.02	18.33	811	96.02	19.14

Note. Video game problems range from 1 ("completely disagree") to 5 ("completely agree"). Child sleep problems range from 1 ("yes") to 2 ("no"). Bedtime resistance ranges from 1 ("rarely") to 3 ("usually"). Time restriction ranges from 1 ("completely disagree") to 3 ("completely agree"). Restrictive, co-playing, and active mediation range from 1 ("rarely or never") to 3 ("often"). Parental efficacy ranges from 0 ("completely certain to fail") to 100 ("completely certain to manage"). Game time is reported in minutes per day. M: mean; SD: standard deviation.

Table 4. Result of a one-way ANOVA with planned contrast and ad hoc test with Hochberg gt-2 corrections showing comparisons with the control group

Outcome measures	"Intervention group"			"Received"			"Read"			"Read and followed"			Post hoc
	F	df	p	F	df	p	F	df	p	F	df	p	
Video game problems	0.40	1601	.53	0.68	1601	.41	6.46	1601	.01*	5.03	1601	.03*	a < b*, a < c*
Child sleep problems	0.31	41.07	.58	0.21	30.70	.65	0.24	24.17	.63	0.48	751.43	.49	
Bedtime resistance	0.07	1478	.79	0.05	1478	.83	0.23	1478	.63	0.51	1478	.48	
Game time weekdays	0.76	1560	.38	0.60	1560	.44	2.06	1560	.15	0.00	1560	.98	
Game time weekends	0.05	1568	.82	0.03	1568	.86	0.28	1568	.60	0.15	1568	.70	
Time restriction	1.26	77.51	.27	1.60	60.32	.21	2.66	25.70	.12	2.03	1080.58	.15	
Restrictive mediation	13.12	1591	.00**	11.88	1591	.001**	1.73	1591	.19	2.27	1591	.13	a < c**, a < d**, a < e**
Co-playing mediation	1.47	1574	.23	1.41	1574	.24	0.00	1574	.99	1.76	1574	.19	
Active mediation	3.66	1591	.06	3.55	1591	.06	0.49	1591	.49	5.61	1591	.02*	a < c*
PE screen time	1.26	1627	.26	1.03	1627	.31	4.77	1627	.03*	0.36	1627	.55	ns
PE gaming	0.15	1594	.70	0.25	1594	.62	2.06	1594	.15	0.04	1594	.84	
PE physical activity	1.18	1619	.28	1.42	1619	.23	4.14	1619	.04*	0.05	1619	.82	ns

Note. Video game problems range from 1 ("completely disagree") to 5 ("completely agree"). Child sleep problems range from 1 ("yes") to 2 ("no"). Bedtime resistance ranges from 1 ("rarely") to 3 ("usually"). Time restriction ranges from 1 ("completely disagree") to 3 ("completely agree"). Restrictive, Co-playing and Active mediation range from 1 ("rarely or never") to 3 ("often"). Parental efficacy ranges from 0 ("completely certain to fail") to 100 ("completely certain to manage"). Game time is reported in minutes per day. Ad hoc test results refer to the following subgroups a = did not read, did not follow, b = read, did not follow, c = read and follow, d = remaining of intervention, and e = control. ANOVA: analysis of variance; M: mean; SD: standard deviation; ns: not significant.

*p < .05. **p < .01.

span of 4 months between the intervention and the survey is too short to generate any change in guardian or child behavior as the guide consisted of several specific pieces of advice regarding behavioral change. According to the stages of change model, both contemplation and preparation, which alone typically may take 3–6 months, are stages that have to be passed before reaching the action stage (Prochaska, DiClemente, & Norcross, 1992). Conversely, another explanation for the lack of effects may be that the time span of 4 months between the intervention and outcome assessment is too long to produce any change without any reminder of the information in between. In our sample, most of the parents who read the guide reported to have followed the guidelines. However, we do not have any information describing what kind of specific advice they followed and for how long period of time they followed the advice. Accordingly, some guardians might have tried the strategies briefly, and given up after a short period of time. Another possible reason for lack of effects is that the guide failed to be relevant for the guardians who received it. In our sample, the average levels of perceived video game problems and sleep problems in both conditions were overall very low. In addition, guardians in both conditions reported high scores on parental efficacy, and guardians in both conditions reported having enforced time restrictions regarding gaming. Hence, a ceiling effect might have been in play (Cozby & Bates, 2013), which may indicate that most guardians already were setting sensible limits concerning their children's gaming. Still, many of the parents read the guide and the overall evaluation was positive. However, this might suggest that there is a demand for education materials concerning children's use of video games and that further investigation is needed to examine in detail what information is useful. A third possibility for lack of effects is that the outcome measures lacked sensitivity or relevance to measure effects of this intervention. However, care was taken to select outcome measures deemed relevant for the issue at stake. Still, specific questions related to compliance with each specific piece of advice in the guide might have had higher sensitivity in terms of potential effects (Kazdin & Nock, 2003).

Even though the parents on average reported few problems related to video games, 4.8% reported that their child fulfilled at least five of the nine criteria for problematic video gaming from the DSM-5 (APA, 2013). This is in line with previous research that has shown that most gamers do not have any problems related to video games (Brunborg et al., 2013, 2014). As noted earlier, there was no significant difference between the conditions on any outcome measure. However, within the intervention condition, the majority of parents with children who could be categorized with IGD reported to have read and followed the guidelines. Furthermore, there was a significant difference between guardians who read and studied the guide compared with those who did not, in terms of video game problems and parental mediation. In line with previous research, the increased use of restrictive and active parental mediation strategies might indicate that these kind of mediations are instituted more frequently after the problem occurs (Nikken & Jansz, 2006; Xu et al., 2012). This difference might indicate a selection bias where those who already experience some problems regarding gaming behavior in their children were compelled

to study the information more thoroughly. Thus, such kinds of interventions might be effective in spreading information to families who already have challenges with gaming. Parents of children with or without challenges with gaming might possibly require different information packages to meet their interests and level of needs. A recent review of prevention of Internet addiction (Vondráčková & Gabrhelík, 2016) concluded with the need for targeting at-risk populations and their network of support (e.g., guardians and teachers). Our findings seem to support this statement, indicating that guardians with concerns regarding their children's gaming will be more attentive to relevant information. Comparing our findings with previous studies of psychoeducative interventions, we find that other interventions seem to offer other supportive factors as well as written materials (e.g., personal contact with health professionals, group activities, etc.) (Bai, Wang, Yang, & Niu, 2015; Hemdi & Daley, 2017). The lack of supplementary supportive elements may explain why this study had such small impact. Further studies might investigate the possible effect of written advice to guardians whose children already are experiencing problems with video games, and also investigate other means (e.g., school-based interventions) to prevent problematic gaming from occurring in children and adolescents.

One limitation of this study is the lack of a pretest, which precluded us from investigating preintervention differences between the conditions, and changes occurring from before to after the introduction of the written material. Random assignment and a large sample size, however, will increase the likelihood of equivalence between the conditions in a post-test only design (Kazdin, 2010), making the conditions eligible for comparison, especially in the case of similar response rates. Furthermore, our preliminary analysis showed the conditions to be homogeneous on all measures, making it fair to assume that the results presented in this article could be attributed to the efficacy of the guide. It should also be mentioned that the number of participants in the different groups in the planned contrast varied, causing variations in the statistical power of these analyses.

CONCLUSIONS

This is the first study to investigate the effects of written preventive material regarding video game problems in a large general population sample. Lack of effects may be attributed to a short time span to outcome assessment, no repetition/reminder of the information between intervention and survey, ceiling effects, and lack of specificity between the advice given and the outcome measures. Those who read and followed the guide reported more problems with video games in their children than those who did not study the guide, which might suggest that such interventions might be more beneficial for those in specific need of help regarding this issue.

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REFERENCES

- American Psychiatric Association [APA]. (2013). *Diagnostic and statistical manual of mental disorders (DSM-5[®])*. Washington, DC: American Psychiatric Association.
- Bai, G.-N., Wang, Y.-f., Yang, L., & Niu, W.-Y. (2015). Effectiveness of a focused, brief psychoeducation program for parents of ADHD children: Improvement of medication adherence and symptoms. *Neuropsychiatric Disease and Treatment, 11*, 2721. doi:10.2147/NDT.S88625
- Brunborg, G. S., Mentzoni, R. A., & Frøyland, L. R. (2014). Is video gaming, or video game addiction, associated with depression, academic achievement, heavy episodic drinking, or conduct problems? *Journal of Behavioral Addictions, 3*(1), 27–32. doi:10.1556/JBA.3.2014.002
- Brunborg, G. S., Mentzoni, R. A., Melkevik, O. R., Torsheim, T., Samdal, O., Hetland, J., Andreassen, C. S., & Pallesen, S. (2013). Gaming addiction, gaming engagement, and psychological health complaints among Norwegian adolescents. *Media Psychology, 16*(1), 115–128. doi:10.1080/15213269.2012.756374
- Carlson, S. A., Fulton, J. E., Lee, S. M., Foley, J. T., Heitzler, C., & Huhman, M. (2010). Influence of limit-setting and participation in physical activity on youth screen time. *Pediatrics, 126*(1), e89–e96. doi:10.1542/peds.2009-3374
- Charlton, J. P., & Danforth, I. D. (2007). Distinguishing addiction and high engagement in the context of online game playing. *Computers in Human Behavior, 23*(3), 1531–1548. doi:10.1016/j.chb.2005.07.002
- Cozby, P. C., & Bates, S. C. (2013). *Methods in behavioral research* (11th ed.). New York, NY: McGrawHill.
- Faul, F., Erdfelder, E., Lang, A.-G., & Buchner, A. (2007). G* Power 3: A flexible statistical power analysis program for the social, behavioral, and biomedical sciences. *Behavior Research Methods, 39*(2), 175–191. doi:10.3758/BF03193146
- Ferguson, C. J., Coulson, M., & Barnett, J. (2011). A meta-analysis of pathological gaming prevalence and comorbidity with mental health, academic and social problems. *Journal of Psychiatric Research, 45*(12), 1573–1578. doi:10.1016/j.jpsychi.2011.09.005
- Gentile, D. (2009). Pathological video-game use among youth ages 8 to 18: A national study. *Psychological Science, 20*(5), 594–602. doi:10.1111/j.1467-9280.2009.02340.x
- Gentile, D., Reimer, R. A., Nathanson, A. I., Walsh, D. A., & Eisenmann, J. C. (2014). Protective effects of parental monitoring of children's media use: A prospective study. *JAMA Pediatrics, 168*(5), 479–484. doi:10.1001/jamapediatrics.2014.146
- Griffiths, M. D., & Meredith, A. (2009). Videogame addiction and its treatment. *Journal of Contemporary Psychotherapy, 39*(4), 247–253. doi:10.1007/s10879-009-9118-4
- Griffiths, M. D., Van Rooij, A. J., Kardefelt-Winther, D., Starcevic, V., Király, O., Pallesen, S., Müller, K., Dreier, M., Carras, M., Prause, N., King, D. L., Aboujaoude, E., Kuss, D. J., Pontes, H. M., Lopez Fernandez, O., Nagygyorgy, K., Achab, S., Billieux, J., Quandt, T., Carbonell, X., Ferguson, C. J., Hoff, R. A., Derevensky, J., Haagsma, M. C., Delfabbro, P., Coulson, M., Hussain, Z., & Demetrovics, Z. (2016). Working towards an international consensus on criteria for assessing Internet gaming disorder: A critical commentary on Petry et al. (2014). *Addiction, 111*(1), 167–175. doi:10.1111/add.13057
- Han, D. H., Hwang, J. W., & Renshaw, P. F. (2010). Bupropion sustained release treatment decreases craving for video games and cue-induced brain activity in patients with Internet video game addiction. *Experimental and Clinical Psychopharmacology, 18*(4), 297–304. doi:10.1037/a0020023
- Han, D. H., Lee, Y. S., Na, C., Ahn, J. Y., Chung, U. S., Daniels, M. A., Haws, C. A., & Renshaw, P. F. (2009). The effect of methylphenidate on Internet video game play in children with attention-deficit/hyperactivity disorder. *Comprehensive Psychiatry, 50*(3), 251–256. doi:10.1016/j.comppsy.2008.08.011
- Hellman, M., Schoenmakers, T. M., Nordstrom, B. R., & van Holst, R. J. (2013). Is there such a thing as online video game addiction? A cross-disciplinary review. *Addiction Research & Theory, 21*(2), 102–112. doi:10.3109/16066359.2012.693222
- Hemdi, A., & Daley, D. (2017). The effectiveness of a psychoeducation intervention delivered via WhatsApp for mothers of children with Autism Spectrum Disorder (ASD) in the Kingdom of Saudi Arabia: A randomized controlled trial. *Child: Care, Health and Development, 43*(6), 933–941. doi:10.1111/cch.12520
- Jago, R., Sebire, S. J., Edwards, M. J., & Thompson, J. L. (2013). Parental TV viewing, parental self-efficacy, media equipment and TV viewing among preschool children. *European Journal of Pediatrics, 172*(11), 1543–1545. doi:10.1007/s00431-013-2077-5
- Kazdin, A. E. (2010). *Research design in clinical psychology* (4th ed.). Boston, MA: Pearson Education Company.
- Kazdin, A. E., & Nock, M. K. (2003). Delineating mechanisms of change in child and adolescent therapy: Methodological issues and research recommendations. *Journal of Child Psychology and Psychiatry, 44*(8), 1116–1129. doi:10.1111/1469-7610.00195
- King, D. L., Delfabbro, P. H., Doh, Y. Y., Wu, A. M., Kuss, D. J., Pallesen, S., Mentzoni, R., Carragher, N., & Sakuma, H. (2017). Policy and prevention approaches for disordered and hazardous gaming and Internet use: An international perspective. *Prevention Science, 1*–17. doi:10.1007/s11121-017-0813-1
- King, D. L., Delfabbro, P. H., & Griffiths, M. D. (2010). Cognitive behavioral therapy for problematic video game players: Conceptual considerations and practice issues. *Journal of CyberTherapy and Rehabilitation, 3*(3), 261–273. Retrieved from <http://journalofcybertherapy.webs.com/332010.htm>
- King, D. L., Delfabbro, P. H., & Griffiths, M. D. (2012). Clinical interventions for technology-based problems: Excessive

- Internet and video game use. *Journal of Cognitive Psychotherapy*, 26(1), 43–56. doi:10.1891/0889-8391.26.1.43
- King, D. L., Delfabbro, P. H., Griffiths, M. D., & Gradisar, M. (2012). Cognitive-behavioral approaches to outpatient treatment of Internet addiction in children and adolescents. *Journal of Clinical Psychology*, 68(11), 1185–1195. doi:10.1002/jclp.21918
- Kuss, D. J., Griffiths, M. D., & Pontes, H. M. (2017). Chaos and confusion in DSM-5 diagnosis of Internet gaming disorder: Issues, concerns, and recommendations for clarity in the field. *Journal of Behavioral Addictions*, 6(2), 103–109. doi:10.1556/2006.5.2016.062
- Lemmens, J. S., Valkenburg, P. M., & Peter, J. (2011). Psychosocial causes and consequences of pathological gaming. *Computers in Human Behavior*, 27(1), 144–152. doi:10.1016/j.chb.2010.07.015
- Li, H., & Wang, S. (2013). The role of cognitive distortion in online game addiction among Chinese adolescents. *Children and Youth Services Review*, 35(9), 1468–1475. doi:10.1016/j.childyouth.2013.05.021
- Lwin, M. O., Stanaland, A. J., & Miyazaki, A. D. (2008). Protecting children's privacy online: How parental mediation strategies affect website safeguard effectiveness. *Journal of Retailing*, 84(2), 205–217. doi:10.1016/j.jretai.2008.04.004
- Mentzoni, R. A., Brunborg, G. S., Molde, H., Myrseth, H., Skouverøe, K. J. M., Hetland, J., & Pallesen, S. (2011). Problematic video game use: Estimated prevalence and associations with mental and physical health. *Cyberpsychology, Behavior, and Social Networking*, 14(10), 591–596. doi:10.1089/cyber.2010.0260
- Nikken, P., & Jansz, J. (2006). Parental mediation of children's videogame playing: A comparison of the reports by parents and children. *Learning, Media and Technology*, 31(2), 181–202. doi:10.1080/17439880600756803
- Owens, J. A., Spirito, A., & McGuinn, M. (2000). The Children's Sleep Habits Questionnaire (CSHQ): Psychometric properties of a survey instrument for school-aged children. *Sleep*, 23(8), 1–9. doi:10.1093/sleep/23.8.1d
- Pallesen, S., Lørvik, I. M., Bu, E. H., & Molde, H. (2015). An exploratory study investigating the effects of a treatment manual for video game addiction. *Psychological Reports*, 117(2), 490–495. doi:10.2466/02.PR0.117c14z9
- Pasquier, D. (2001). Media at home: Domestic interactions and regulation. In S. Livingstone & M. Bovill (Eds.), *Children and their changing media environment: A European comparative study* (pp. 161–177). Mahwah, NJ: Lawrence Erlbaum Associates.
- Petrie, J., Bunn, F., & Byrne, G. (2006). Parenting programmes for preventing tobacco, alcohol or drugs misuse in children <18: A systematic review. *Health Education Research*, 22(2), 177–191. doi:10.1093/her/cyl061
- Prochaska, J. O., DiClemente, C. C., & Norcross, J. C. (1992). In search of the structure of change. In Y. Klar, J. D. Fisher, J. M. Chinsky, & A. Nadler (Eds.), *Self change* (pp. 87–114). New York, NY: Springer. doi:10.1007/978-1-4612-2922-3_5
- Rehbein, F., & Baier, D. (2013). Family-, media-, and school-related risk factors of video game addiction. A 5 year longitudinal study. *Journal of Media Psychology*, 25(3), 118–128. doi:10.1027/1864-1105/a000093
- Rehbein, F., Kleimann, M., & Mößle, T. (2010). Prevalence and risk factors of video game dependency in adolescence: Results of a German nationwide survey. *Cyberpsychology, Behavior, and Social Networking*, 13(3), 269–277. doi:10.1089/cyber.2009.0227
- Rothmund, T., Klimmt, C., & Gollwitzer, M. (in press). Low temporal stability of excessive video game use in German adolescents. *Journal of Media Psychology*. doi:10.1027/1864-1105/a000177
- Scharkow, M., Festl, R., & Quandt, T. (2014). Longitudinal patterns of problematic computer game use among adolescents and adults—A 2-year panel study. *Addiction*, 109(11), 1910–1917. doi:10.1111/add.12662
- Spirito, A., Hernandez, L., Cancelliere, M. K., Graves, H., & Barnett, N. (2015). Improving parenting and parent-adolescent communication to delay or prevent the onset of alcohol and drug use in young adolescents with emotional/behavioral disorders: A pilot trial. *Journal of Child & Adolescent Substance Abuse*, 24(5), 308–322. doi:10.1080/1067828X.2013.829013
- Vondráčková, P., & Gabrhelík, R. (2016). Prevention of Internet addiction: A systematic review. *Journal of Behavioral Addictions*, 5(4), 568–579. doi:10.1556/2006.5.2016.085
- Warren, R. (2001). In words and deeds: Parental involvement and mediation of children's television viewing. *The Journal of Family Communication*, 1(4), 211–231. doi:10.1207/S15327698JFC0104_01
- Wenzel, H., Bakken, I., Johansson, A., Götestam, K., & Øren, A. (2009). Excessive computer game playing among Norwegian adults: Self-reported consequences of playing and association with mental health problems. *Psychological Reports*, 105(3), 1237–1247. doi:10.2466/PR0.105.F.1237-1247
- Winkler, A., Dörsing, B., Rief, W., Shen, Y., & Glombiewski, J. A. (2013). Treatment of Internet addiction: A meta-analysis. *Clinical Psychology Review*, 33(2), 317–329. doi:10.1016/j.cpr.2012.12.005
- Wittek, C. T., Finserås, T. R., Pallesen, S., Mentzoni, R. A., Hanss, D., Griffiths, M. D., & Molde, H. (2016). Prevalence and predictors of video game addiction: A study based on a national representative sample of gamers. *International Journal of Mental Health and Addiction*, 14(5), 672–686. doi:10.1007/s11469-015-9592-8
- Xu, Z., Turel, O., & Yuan, Y. (2012). Online game addiction among adolescents: Motivation and prevention factors. *European Journal of Information Systems*, 21(3), 321–340. doi:10.1057/ejis.2011.56
- Young, K. (2009). Understanding online gaming addiction and treatment issues for adolescents. *The American Journal of Family Therapy*, 37(5), 355–372. doi:10.1080/01926180902942191

APPENDIX: TRANSLATION OF THE GUIDELINES

- Gaming devices and computers should be located in common rooms such as the living room.
- The bedroom of the child should be free of electronic media devices, such as PC, TV, video games, tablets, and cell phones.
- Avoid letting the child play video games during the last hour before bedtime.
- Support and encourage the child to engage in physical activity. For instance, you can take the child hiking; enroll the child in a sports club or the like.
- Stimulate your child to spend time on other hobbies and interests other than video games.
- Have rules that prohibit the child from prioritizing video games over homework and family meals.
- Do not let the child play during meals.
- Do something pleasurable together with the child at least one or two times per week, for instance cooking, go to the cinema or visit a water park.
- Assess whether the game content is appropriate for the age of your child. Be aware of the fact that some online games can put your child in contact with others, including adults, who might have a negative influence on your child.
- Gather information about the games your child plays. You might also play together with the child. Explain the difference between fantasy and reality in the games.
- You might choose games that foster knowledge and skills for your child.
- To promote a beneficial dialogue with your child about video games, allow your child to tell you about a favorite game and explain to you why this game, in particular, is his/her favorite.
- Apply limits to regulate how much your child is allowed to play, for instance, 1 hr/day for children, and 2 hr/day for teenagers. During weekends or holidays, game time can be increased to 1–3 hr/day.
- Communicate openly with your child if you think that he/she plays to avoid difficult thoughts or feelings.
- Create opportunities for the child to spend time with others. Let your child invite friends over to play video games, or do other activities together.
- Praise your child for doing homework and other duties before playing video games.
- Supervise how much money the child spends on equipment, breaking obstacles, leveling up or the like in games.
- You might discuss with other parents and compose common rules for video games.
- If your child spends a great deal of time home alone, you might consider carefully whether you need to restrict your child's access to the Internet, e.g., by applying router access restrictions.
- Have 1 or 2 days per week without video games.
- Be conscious of yourself as a role model for your child. For instance, you might avoid sending text messages or be online during meals, and do not play video games in the timeframe when the child is prohibited from playing.
- Inform your child clearly about the rules you will put into practice regarding video games. If possible, include the child in a discussion about how the rules should be.
- Be prepared to confiscate video games and/or gaming consoles for a day or a weekend if the child violates the rules repeatedly.
- Pay attention to how much your child plays and ensure you have access to passwords used by the child to play games online.