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BRIEF REPORT

Compliance and alternative behaviors of heavy gamers in adolescents to Chinese online gaming restriction policy

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ABSTRACT

Background and aims: In 2021, China implemented a policy to prevent adolescents from excessive online gaming, with the goal of encouraging healthier leisure activities. *Methods:* Three months after this policy was implemented, we conducted a study involving 430 Chinese adolescents who regularly played online games for over two hours daily before the policy. We collected their responses to the restriction, including their compliance with the policy, engagement in undesirable alternative behaviors (e.g., watching short videos), and engagement in desirable alternative behaviors (e.g., playing sports). We also collected data on individual factors, parental technology interference, and feelings of restriction to use as predictors for behaviors, including those related to violating the restriction or watching short videos. *Results:* A small percentage of heavy gamers violated the restriction by renting others' game accounts (3%) or using a family member's identity (14%), while 59% of the sample shifted to watching short videos. Heavy gamers who lived in rural areas, spent more time on online games prior to the policy, did not feel restricted from playing online games, and experienced parental technology interference were more likely to violate the restriction. Females or those lacking stable hobbies were more inclined to watch short videos. *Conclusions:* Although the policy restricted heavy gaming, it has also led to increased short video use. Policymakers could explore alternative approaches, such as developing infrastructure that supports outdoor leisure activities in rural areas, encouraging parents to model responsible technology use behaviors, and guiding adolescents to cultivate positive hobbies in their leisure time.

KEYWORDS

gaming restriction policy, adolescents, video game playing, addiction, China, regulation, policy, short videos, alternative behaviors

INTRODUCTION

Online gaming is a popular pastime for Chinese adolescents (China Internet Network Information Center, 2021), but excessive use can have negative effects on their physical activity and education (Hong et al., 2019; Kocakoğlu, Karaoğlu, & Kutlu, 2021). While moderate gaming can benefit emotional well-being and social interactions (Lobel, Engels, Stone, & Granic, 2019; Russoniello, O'Brien, & Parks, 2009), it is important to find ways to prevent harm caused by excessive use.

Limiting availability of online gaming through policy measures has been proposed as a solution to prevent excessive gaming (Daniel, 2019; Kiraly et al., 2018). While such measures would perhaps be criticized in the Western world for potentially violating civil liberties, some Asian countries with strong government control have enforced bans on online gaming (Kiraly et al., 2018). In August 2021, China imposed online gaming restrictions for minors under 18, limiting gaming time to one hour on Fridays, Saturdays, Sundays, and holidays.

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This policy aimed to prevent adolescents from excessive online gaming, thereby promoting healthier behaviors, such as social interaction or physical activity, that foster their overall development (The State Press and Publication Administration, 2021).

Despite reports from gaming companies indicating that adolescents are less engaged in online games following the policy, it is unknown what alternative behaviors the heavy gamers would take when the games are unavailable. According to Tencent's earnings report, the percentage of time spent and money consumed by minors among all players has declined in September 2021 compared to the previous year (Tencent, 2021). Some scholars believe that this policy seems useful on the surface (Carrasp, Stavropoulos, Motti-Stefanidi, Labrique, & Griffiths, 2021), but it remains unclear whether any positive outcomes, such as increased physical exercise and social activities, have resulted from the reduction of gaming time and cost (Xiao, 2022). For heavy gamers who spent more than two hours on games prior to the policy, such circumstances can be particularly challenging, as they may have a strong motivation to violate the restriction and find other ways to continue playing or engage in other online activities such as watching short videos (Davies & Blake, 2016). Short videos are becoming a new addictive medium (Lu, Liu, Ge, Bai, & Liu, 2022; Xu, Gao, Wei, Liu, & Zhang, 2023) and may become a common alternative behavior for heavy adolescent gamers. These videos offer novel content and are recommended based on user preferences (Nam & Jung, 2021). Adolescents spend more time watching short videos than young adults (Wu et al., 2021), and 73.6% of them watch such content for entertainment purpose rather than for educational or hobby-related activities (China Internet Network Information Center, 2023). Therefore, examining differences among adolescents and their relationship with the evolution of online behaviors in this context may offer valuable insights for preventing gaming addiction in the future (Carrasp et al., 2021; Stavropoulos, Motti-Stefanidi, & Griffiths, 2022).

Considering the limited empirical studies on heavy gamers in adolescents under this restriction (Kiraly, Browne, & Demetrovics, 2022), the overall aims of this cross-sectional study are:

1. To identify the compliance of heavy gamers with this restriction and determine whether they would violate it.
2. To identify the desirable and undesirable alternative behaviors adopted by heavy gamers under the restriction.
3. To determine the factors (individual factors, feeling of restriction, parent technology interference) that are associated with the behaviors of violating the restriction and watching short videos.

METHODS

Participants

In December 2021, three months after implementing the online gaming restriction, we used convenience sampling to collect data. Researchers contacted primary and middle school teachers in their social network and introduced this study. Then the teachers introduced this project to 2,846 adolescent students in the classroom, and their parents in WeChat groups. Adolescents interested in participating in this study completed the online questionnaires. All questions were listed in "Questionnaire Star", a professional online survey platform widely used in China (Huang, 2021). To investigate the response of heavy gamers to the policy, we selected 430 individuals based on the following inclusion criteria: (1) adolescents aged 9–18 years old; (2) who spent two or more hours per day on online gaming prior to the policy (Gromada, 2022). Exclusion criteria included: (1) adolescents who refused to answer ($n = 10$); (2) adolescents who reported game time exceeding 15 h per day ($n = 7$).

Measures

Behaviors in response to the policy. We used a following multiple-choice question to measure behaviors in response to the policy: "Do you take the following options when you want to play but the game is restricted?". The options were created based on a series of unstructured interviews with adolescent gamers ($n = 48$). To ensure the representativeness of the data, we sampled students from various grades in the middle and primary schools. The researchers conducted individual interviews with each participant and recorded their responses. We included all responses for a comprehensive set of options. From the responses, we identified two types of behaviors that violated the gaming restriction. Internet-focused activities were considered undesirable behaviors as they contradicted the original intention of the policy, while those with potential mental or physical health benefits were classified as desirable behaviors.

Individual factors. Individual factors included age, sex, place of residence, stable hobbies, regular sports, and pre-policy gaming time (Henchoz et al., 2016; Hong et al., 2019). Stable hobbies and regular sports were scored using a two-point system. For instance, hobbies were measured by the question "Do you have stable hobbies? (yes, no)". Participants were also asked about their daily online gaming duration (minutes) before the policy implementation.

Feeling of restriction. Feeling of restriction was measured by the question "After August 30, do you feel restricted in playing online games? (yes, no)".

Parent technology interference. Parent technology interference was measured by the question "When talking or doing activities with your parents, were you frequently interrupted because your parents use electronic devices (mobile phone/TV/tablet/computer/game console/iPad)?" with the same scoring rules as mentioned above (McDaniel & Radesky, 2018).

Data analysis

The compliance was measured by subtracting the proportion of participants who violated the restriction from the

total sample. The prevalence of each undesirable and desirable alternative behavior was determined by calculating their respective proportions among the participants. The factors that related to the behaviors of violating the restriction and watching short videos were tested by multivariate logistic regression analysis. Data analysis was performed using SPSS 26.0, and significance was tested at the $p < 0.05$ level.

Ethics

The study was approved by the ethical committee of the Institute of Psychology, Chinese Academy of Sciences (reference No. H21099). Online informed consent was obtained from all individual participants and the participant has consented for data to be used in the research.

RESULTS

Compliance

84.7% of the heavy gamers complied with the online gaming restriction, but 14% used a family member's identity ($n = 62$) and 3% ($n = 11$) rented the game accounts (see Fig. 1). Additionally, 75.6% of the heavy gamer participants ($n = 325$) reported experiencing restrictions due to the policy (see Table 1).

Alternative behaviors

Figure 1 illustrated the distribution of behaviors among participants in response to the restriction. Among the desirable behaviors, the participants reported listening to music (45%; $n = 195$), studying (41%; $n = 117$), going out with family or friends (38%; $n = 164$), playing sports (36%; $n = 155$), sleeping (32%; $n = 136$), and taking up hobbies such as chess or dance (19%; $n = 83$). In terms of undesirable behaviors, the participants engaged not only in gaming-related activities, including playing other unlimited games (23%; $n = 98$) and watching online game live (20%; $n = 86$), but also in other internet activities, including watching short videos (59%, $n = 255$), watching anime or TV series (51%; $n = 218$), and reading internet novels (20%; $n = 86$).

The most prevalent alternative behavior among heavy gamers was watching short videos. Since it was considered an undesirable behavior, we conducted the further analysis to identify the influencing factors.

The factors influencing the behaviors of violating the restriction and watching short videos

Place of residence, pre-policy gaming time, feeling of restriction, and parental technology interference were predictors of violating the restriction (see Table 1). Compared to participants living in rural areas, those in urban areas (aOR = 0.43, CI: 0.25–0.76) had lower odds of violating the restriction. Similarly, participants who felt restriction from playing online games (aOR = 0.52, CI: 0.28–0.98) had lower odds of violating the restriction, and those who felt parental technology interference (aOR = 1.86, CI: 1.06–0.3.28) had higher odds of violating the restriction. Participants who spent more time on gaming prior to the policy were more likely to violate the restriction.

Sex and stable hobbies were predictors of watching short videos (see Table 1). Compared to females, male participants (aOR = 0.46, CI: 0.29–0.72) had lower odds of watching short videos. Compared to participants who did not have stable hobbies, those who did (aOR = 0.63, CI: 0.42–0.95) had lower odds of watching short videos.

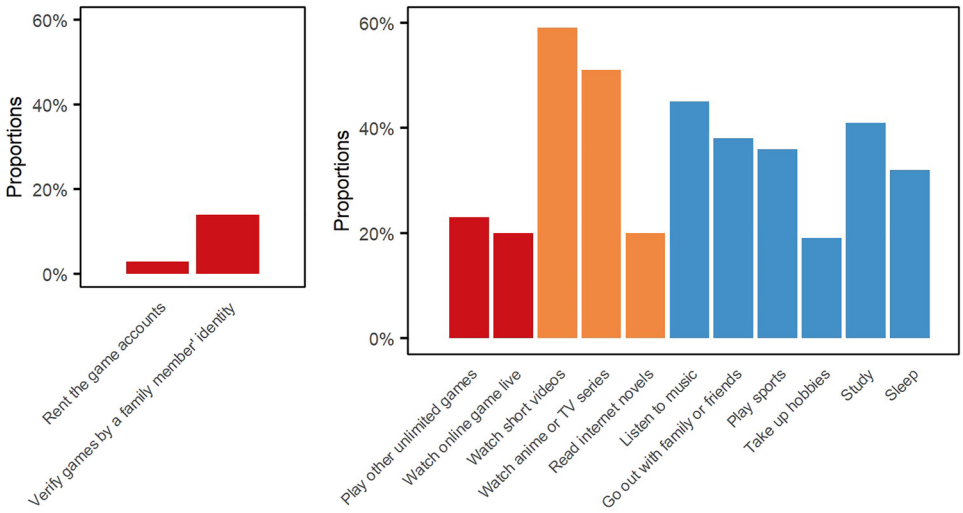

Fig. 1. **Proportions for violating the restriction and each alternative behavior**. The left panel displayed the ratio for using a family member's identity or renting the game accounts to violate the restriction. The right panel showed the ratio for each alternative behavior, including undesirable behaviors (gaming-related activities in red, other internet activities in orange), as well as desirable behaviors (in blue)

Table 1. Weighted adjusted logistic regression models of violating the restriction and watching short videos (n = 430)

	Total	Violate the restriction (n = 66)			Watch short videos (n = 255)		
		n (%)/M (SD)	aOR (95%CI)	p value	n (%)/M (SD)	aOR (95%CI)	p value
Sex				0.229			<0.001
Male	295 (68.6%)	48 (72.7%)	1.46 (0.79, 2.71)		158 (62.0%)	0.46 (0.29, 0.72)	
Female	135 (31.40%)	18 (27.3%)	REF		97 (38.0%)	REF	
Age	12.75 (1.48)	12.70 (1.61)	0.99 (0.82, 1.20)	0.921	12.80 (1.55)	1.05 (0.92, 1.20)	0.473
Place of residence				0.003			0.708
Urban	242 (56.3%)	27 (40.9%)	0.43 (0.25, 0.76)		141 (55.3%)	0.93 (0.62, 1.38)	
Rural	188 (43.7%)	39 (59.1%)	REF		114 (44.7%)	REF	
Pre-policy gaming time	210.91 (127.96)	264.83 (165.89)	1.01 (1.00, 1.01)	<0.001	218.14 (133.078)	1.00 (0.99, 1.00)	0.327
Feeling of restriction				0.040			0.682
Yes	325 (75.6%)	46 (69.7%)	0.52 (0.28, 0.98)		195 (76.5%)	1.10 (0.69, 1.76)	
No	105 (24.4%)	20 (30.3%)	REF		60 (23.5%)	REF	
Stable hobby				0.594			0.028
Yes	250 (58.1%)	40 (60.6%)	1.17 (0.66, 2.06)		136 (53.3%)	0.63 (0.42, 0.95)	
No	180 (41.9%)	26 (39.4%)	REF		119 (46.7%)	REF	
Regular sports				0.537			0.492
Yes	279 (64.9%)	40 (60.6%)	0.83 (0.47, 1.48)		158 (60.2%)	0.86 (0.56, 1.32)	
No	151 (35.1%)	26 (39.4%)	REF		97 (38.0%)	REF	
Parental technology interference				0.031			0.208
Yes	145 (33.7%)	29 (43.9%)	1.86 (1.06, 3.28)		91 (35.7%)	1.32 (0.86, 2.01)	
No	285 (66.3%)	37 (56.1%)	REF		164 (64.3%)	REF	

Notes. Continuous variables are presented using means (standard deviations), while categorical variables are presented using sample size (weighted percentages); aOR = adjusted odds ratio; 95% CI: 95% Confidence interval; REF is reference group.

DISCUSSION

In our study, we found that the majority of heavy gamers among adolescents felt restricted by the policy. Moreover, a small percentage of them violated this restriction by renting the game accounts (3%) or using a family member's identity to authenticate the game (14%). Since renting game accounts was considered illegal, so heavy gamers rarely resorted to this method. Therefore, using a family member's identity for authentication was a more common behavior (Zhan & Chan, 2012), despite companies actively adopting facial recognition for login and during gameplay (May & Chien, 2021).

Surprisingly, more than half of heavy gamers used short videos to pass the time when they were unable to engage in gaming activities. This result coincided with the significant presence of adolescents on short video platforms, as evidenced by the fact that 69.7% of adolescents in the United States (Statista, 2023) and 54.1% of adolescents in China (China Internet Network Information Center, 2023) were active users in 2023. While short videos offer certain benefits, their addictive nature can contribute to excessive screen time, ultimately affecting adolescents' cognitive functions and academic performance (Xu et al., 2023). That is, this policy did not have a satisfactory impact on reducing screen time. Nevertheless, we also found that more than 30% of adolescents opted for desirable behaviors, such as engaging in physical activities and improving social interaction, which enhanced their overall well-being.

The regression analysis identified several influencing factors for undesirable behaviors, including the place of residence, sex, hobbies, and parental technology interference. It revealed that adolescents in rural areas were more likely to violate the restriction, consistent with previous research that highlighted their vulnerability to online gaming addiction (Pawlowska et al., 2015). There is an observed tendency for rural parents to exercise less supervision over their children's internet usage (Chang et al., 2016) and the noted absence of community resources (Li, Liu, Zhang, & Xu, 2015), highlighting the need for rural infrastructure development. Furthermore, adolescents who were distracted by their parents' electronic devices were more likely to ignore game restrictions, indicating that parents should be mindful of their device usage. Moreover, adolescent girls were more inclined to consume short videos as an alternative behavior compared to boys. This is consistent with previous studies showing that adolescent girls watch videos more frequently (Taverno Ross et al., 2013). Besides, heavy gamers who reported having no stable hobbies preferred to use short videos, highlighting the importance of guiding adolescents in developing stable interests (Auhuber, Vogel, Grafe, Kiess, & Poulain, 2019).

To our knowledge, this study was the first to examine the compliance and the alternative behaviors of heavy gamers when faced with gaming policy, as well as factors that contribute to violating the restriction and watching short videos. The results showed that, even though the policy restricted heavy gaming, it also led to undesirable behaviors,

especially watching short videos. To foster the mental and physical well-being of adolescents, governments should prioritize the development of community infrastructure that supports outdoor leisure activities in rural areas. Parents, on the other hand, should demonstrate responsible technology usage behaviors and maintain household discipline. While adolescents should cultivate positive hobbies for resilience against internet addiction.

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Data availability statement: The data that support the findings of this study are available from the corresponding author, XC, upon reasonable request.

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