



# Prevention Strategies to Address Problematic Gaming: An Evaluation of Strategy Support Among Habitual and Problem Gamers

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## Abstract

Psychosocial problems arising from excessive gaming are a public health issue across the developed world. In its most serious form, problematic gaming is recognized as gaming disorder (GD) in the ICD-11. Research has tended to focus on the value of outpatient treatment for GD, but less attention has been paid to broader prevention strategies to address less serious but nevertheless harmful gaming behaviors. Another gap in this literature has been the lack of involvement of the gaming community as stakeholders to identify feasible prevention approaches. This study investigated: (1) regular and problematic gamers' level of support for different prevention strategies within primary, secondary, and tertiary approaches; and, (2) whether self-efficacy is associated with greater support for prevention strategies, as predicted by the Health Belief Model. A total of 992 participants completed an online survey that evaluated support for problem gaming prevention strategies and included measures of self-efficacy, gaming involvement, and GD symptoms, psychological distress, and mental health help-seeking behaviors. Participants reported stronger support for primary prevention strategies, including education, screening, and warning labels, than for other prevention approaches. Overall, 61% of participants expressed support for primary prevention as compared to secondary (39%) and tertiary (36%) approaches. There was stronger support for outpatient care (48%) than inpatient services (25%). In-game shutdown features received the lowest support (65% disapproval). Contrary to the Health Belief Model, self-efficacy was not associated with prevention support. Younger, female, and less frequent gamers were more likely to support primary and secondary prevention strategies. These findings suggest that gamers may be more favorable toward prevention measures aligned with informed decision-making, autonomy, and self-directed actions. Gamers may be strongly opposed to modifications to the structure of gaming activities (e.g., shutdown features). Future research should evaluate the efficacy and cost-effectiveness of problem gaming prevention measures in different populations and regions.

**Keywords** Prevention · Gaming disorder · Hazardous gaming · Self-efficacy · Addiction

## Introduction

Globally, it is estimated that 2.7 billion people play video games (Newzoo, 2020). The vast majority play recreationally and report benefits in cognitive, motivational, emotional, and social domains (Granic et al., 2014). However, some individuals engage in excessive gaming which can lead to negative consequences, including poor psychological health, low self-esteem, relationship difficulties, and poor work or study outcomes (King & Delfabbro, 2018, 2019a; Milani et al., 2018; von der Heiden et al., 2019). Problematic gaming, in its most serious form, has been recognized as gaming disorder (GD) in the ICD-11 (World Health Organization, 2019). This condition is characterized by persistent involvement in gaming activities, impaired control over gaming, and continued use despite harm to multiple areas of functioning. While the clinical validity of problem gaming as a disorder has been the subject of debate (Dullur & Starcevic, 2018; King et al., 2018a, 2018b) and research has focused on clinical interventions (King et al., 2017; Wölfling et al., 2019), there has been less of a focus on broader prevention approaches to address less serious forms of problematic gaming.

Gaming involvement can be considered along a spectrum, from recreational involvement to more excessive or risky use and, in rare cases, problematic and harmful engagement. Prevalence estimates of problematic gaming vary greatly due to the methodological characteristics of studies, but robust studies applying more stringent cut-offs tend to report that about 1–3% of individuals meet the symptoms for gaming disorder (Przybylski et al., 2017; Stevens et al., 2020). A larger proportion of individuals may be considered low or moderate risk players who report some of the symptoms of GD and may be at greater risk of developing more serious gaming-related problems. Government health bodies in many countries have recognized the negative health consequences of excessive gaming and other online activities and have recommended that these activities should be used in moderation (Király et al., 2018). In some regions, however, there is relatively little information and guidelines, or support services, to address excessive and problematic gaming. In Australia, for example, government bodies (e.g., the eSafety Commission) have tended to consider the main risks of online activities as those related to online harassment (predators) and cybersecurity vulnerabilities. The impact of excessive digital media use on mental health, including gaming disorder, has received less attention. It is currently unclear, therefore, what strategies might effectively address problematic gaming, and which approaches may be considered particularly feasible and useful to the gaming population at large. Although some research has consulted gamers' views on the nature of problematic gaming experiences (e.g., Colder Carras et al., 2018; Shi et al., 2019), there has been limited research investigating gamers' level of support for prevention strategies for problematic gaming.

Prevention approaches incorporate a broad range of strategies aimed at: (a) preventing the onset of problem behavior; (b) delaying the onset of the problem; (c)

reducing the severity of the problem; and, (d) promoting psychological and emotional well-being in individuals through other means (Romano & Hage, 2000). Public health models suggest that there are three main types of prevention: primary, secondary, and tertiary. Primary prevention strategies target the general population and aim to maintain gaming at healthy levels. This approach assumes that all individuals who use games can benefit from information and skills to prevent the occurrence of associated problems. Primary approaches typically include educational and public awareness campaigns, including recommendations about accessibility (e.g., removing devices from bedrooms; Xu et al., 2012). In Hong Kong, for example, the Wise-IT Use program has been employed widely to increase awareness of the potential harms of excessive gaming and to promote moderate use and engage in physical exercise (Chau et al., 2019).

Secondary prevention strategies are targeted towards individuals who are more at-risk or more likely to develop problems with gaming, such as individuals who play games habitually, those with comorbid disorders or lower social competence, or who lack non-gaming interests (King et al., 2019a, 2019b). Common secondary strategies include screening tools for adolescent gamers; legislature (e.g., shutdown laws) preventing younger people from gaming at specific times; in-game lockout features (e.g., parental controls and limit-setting features); and school programs aimed at teaching protective skills such as stress and time management, self-regulation, and social skills. School-based educational programs have been developed and implemented widely in Asia. For example, Mun and Lee (2015) developed an 8-session school-based program for vulnerable youth in South Korea based on empowerment and cognitive-behavioral principles, which they reported reduced GD symptoms and improved self-regulation. Similarly, Walther et al. (2014) trial evaluated a program for 1843 students in Germany who participated in an educational program, covering topics of self-regulation, self-monitoring, and positive gaming motivations, which they reported reduced excessive gaming.

Tertiary prevention strategies are targeted at individuals who are either at high risk of, or have already developed, problematic gaming tendencies. Common tertiary strategies include: support groups and communities, outpatient treatment options, and inpatient clinics or rehabilitation centers. Several reviews have highlighted the short-term effectiveness of psychotherapeutic and psychopharmacological treatment for problem gaming, although there are limitations of this evidence base (e.g., lack of standard measures and control groups). For example, a meta-analysis by Stevens et al. (2019) reported that CBT was an effective short-term treatment. Similarly, some drug therapies, such as methylphenidate and bupropion, have also been shown to reduce GD symptoms (see Zajac et al., 2017).

While there is a growing literature on the efficacy of prevention and treatment for problem gaming, there has, to date, been no evaluation of gamers' support for these strategies. Thus, it is not clear to what extent regular gamers, including problem gamers, may be personally inclined to actually seek out and engage with prevention initiatives, and whether any personal or psychological characteristics of gamers might predict greater support and engagement. One of the more widely known models, the Health Belief Model (HBM) argues that individuals' beliefs about their susceptibility to a given problem, the perceived severity of the problem, benefits and

barriers to change, and their self-efficacy beliefs, may explain their level of engagement with behavior change (Becker, 1974; Champion & Skinner, 2008; Rosenstock, 1966, 1974; Rosenstock et al., 1988). Self-efficacy refers to the belief in one's ability to organize and execute certain actions that are necessary to achieve health-promoting behaviors. The HBM suggests that improving an individual's feelings of self-efficacy may make them more inclined to engage in behavior change, as suggested by Social Learning Theory (Bandura, 1977).

Based on this model, problematic gamers with higher levels of self-efficacy may be more inclined to engage with prevention strategies. This would be consistent with GD treatment studies that have reported that greater self-efficacy is associated with reduced gaming time and GD symptoms (Sakuma et al., 2017). This model has been evaluated in studies of the effectiveness of both prevention strategies for gamblers (Messerlian et al., 2005; Tong et al., 2019) and smoking cessation (Khazee-Pool et al., 2017; Mantler, 2013; Rakshani et al., 2010; Shafari-rad et al., 2007). Individuals with greater self-efficacy have a higher likelihood of achieving abstinence from smoking (Gwaltney et al., 2009) and reducing harmful substance use (Choi et al., 2013). On this basis, greater self-efficacy may be associated with stronger support for prevention strategies that facilitate more adaptive engagement with gaming activities or reduce risk of gaming-related harm.

## Our Study

The psychosocial problems arising from excessive gaming have been recognized as an issue of public health interest across the developed world (Fineberg et al., 2018; Rumpf et al., 2018; Saunders et al., 2017). Research has tended to focus on outpatient treatment and overlooked broader prevention strategies to address the often more hidden difficulties that arise from excessive gaming (King & Delfabbro, 2017). For example, there is little research that has involved the gaming community as stakeholders to examine support for various prevention and harm minimization approaches to problem gaming. This population is important to include in studies of prevention strategies because they are the target or active users of these measures, and their feedback may help to refine how prevention is implemented. Our study aimed to investigate: (1) regular and problematic gamers' level of support for different prevention strategies; (2) whether greater self-efficacy predicted stronger support for problem gaming prevention strategies, in line with the HBM; and, (3) whether individuals with higher psychological distress and GD levels would be more likely to support prevention strategies than their less distressed, non-problematic gaming counterparts.

## Method

### Sample and Study Design

Participants for this study were recruited online via advertisements on several gaming related forums (Reddit, Overclockers Australia, Whirlpool, and Gamers Australia). Participants were informed about the study aims, survey length (15 min), and data privacy. A total of 992 participants (82.4% male) with a mean age of 29.1 years ( $SD=7.9$ ), completed the survey. Most participants were Australian or New Zealander (33.1%), or European (32.7%). About half were employed full-time (53.9%) and had a university degree (45.5%). Participants were eligible if they: (a) played games on a weekly basis, and (b) were over 18 years of age. Survey completers entered a prize draw for a \$50 gift card. Ethics approval was granted by the University of Adelaide Human Research Ethics Subcommittee in the School of Psychology (ID: 20/07). Data were collected between March and April 2020.

### Measures

Each participant provided socio-demographic information, including gender, age, ethnicity, country of residence, relationship status, employment status (casual [i.e., varying hours, no benefits], part-time, full time, unemployed, retired, studying), and highest level of educational attainment (high-school, higher education [i.e., university or college]). Participants also reported the typical number of hours spent gaming each day (i.e., individual ratings for Monday through Sunday) in the last 3 months (scores were summed to provide an estimate of weekly gaming time), the number of games currently being played, and history of gaming experience (i.e., number of years). For the purpose of chi-square analyses, weekly gaming hours were grouped into three categories (0–20, 21–39, and 40+). These categories were selected to allow for groups large enough for comparison and did not have any underlying theoretical meaning.

### Prevention Strategy Support

Participants rated their level of support for nine different prevention strategies, which we drew from King et al.'s (2018a, 2018b) international reviews of prevention strategies for problematic gaming. The questions encompassed four primary prevention strategies (e.g., “School-based education”); three secondary strategies (e.g., “Self-monitoring tools”); and two tertiary strategies (e.g., “Outpatient treatment”). Each item included an accompanying description of the prevention strategy to explain its implementation. Five response options ranged from 1 (“*Strongly do not support*”) to 5 (“*Strongly support*”). Higher scores indicated greater support for strategies. While the survey included diverse views across different prevention topics (i.e., all

responses reflected subjective opinions), these questions together demonstrated high internal consistency ( $\alpha=0.86$ ).

### Self-Efficacy

The General Self-Efficacy Scale (GSE; Chen et al., 2001) is a standard, widely-used 8-item questionnaire used to assess respondents' capacity to handle life challenges. Participants are asked to rate their agreement with statements such as "In general, I think I can obtain outcomes that are important to me." Responses were scored across a 5-point Likert scale, ranging from 1 ("*Strongly disagree*") to 5 ("*Strongly agree*"). Higher scores indicated greater self-efficacy. For the purpose of chi-square analyses, participants scores were used to categorize them as either low or high using a median split. Cronbach's alpha indicated high internal consistency ( $\alpha=0.89$ ).

### Problematic Gaming and Help-Seeking

Petry et al.'s (2014) checklist is a 9-item self-report measure used to assess the DSM-5 gaming disorder (APA, 2013). Response options were dichotomous (Yes/No). A score of 5+ indicated problematic status. The checklist has been used in clinical and neurobiological studies of GD and has shown strong psychometric qualities (King et al., 2020a, 2020b). The internal consistency of the scale in this study was 0.69, which is relatively low for a unidimensional measure but may reflect that some symptoms in the measure (e.g., preoccupation, withdrawal, tolerance) have been criticized for being too sensitive (e.g., capturing highly engaged players; Billieux et al., 2019). For the purpose of chi-square analyses, participants' scores were used to categorize them as either non-problem (<5) or problem gamers (5+). Additional questions concerned overall impression of the gaming-related problems, onset of problems, and treatment-seeking intentions and history (e.g., social support, online support, counselling, and psychotherapy options). For the purpose of chi-square analyses, participants' responses were used to categorize them as either help-seeking (currently seeking or previously sought help for gaming problems) or non-help-seeking (never sought help).

### Psychological Distress

The Kessler Psychological Distress Scale (K10; Kessler et al., 2003) is a 10-item checklist that yields a global measure of distress in the previous four-week period. Questions relate to anxiety (e.g., "*About how often did you feel nervous?*") and depressive symptoms (e.g., "*About how often did you feel worthless?*") and are scored from 1 ("*None of the time*") to 5 ("*All of the time*"). Scores on the K10 range from 10 to 50, with scores from 10 to 19 indicating minimal distress, 20–29 indicating mild distress, 30–39 indicating moderate distress, and 40–50 indicating severe distress. The K10 is suitable for use in normal and clinical populations. The internal consistency of the K10 was high ( $\alpha=0.90$ ).

## Results

### Sample Characteristics

Table 1 provides a summary of participant characteristics. Participants reported an average age of 29.1 years ( $SD=7.9$ , range 18–67), an average total weekly playing time of 26.4 h ( $SD=14.3$ , range 0–70) and an average of 20.0 years ( $SD=7.9$ , range 4–48) of gaming experience. Their most commonly played games included role-playing games (65.5%), massively multiplayer online games (53.8%), and first-person shooter games (45.2%). Based on GD checklist scores, there were 221 (22.2%)

**Table 1** Summary of participant demographic characteristics

Variable	<i>N</i> (992)	(%)
<i>Age</i>	<i>M</i> = 29.1	<i>SD</i> = 7.9
<i>Gender</i>		
Male	817	82.4
Female	153	14.4
Non-binary	22	2.2
<i>Education</i>		
High School	205	2.7
Further (i.e., TAFE)	160	16.1
Higher (i.e., Undergraduate)	451	45.5
Postgraduate	176	17.7
<i>Employment</i>		
Casual	59	5.9
Part-time	117	11.8
Full-time	535	53.9
Unemployed	145	14.6
Retired	9	.9
Student	219	22.1
<i>Income</i>		
\$0–\$20,000	289	29.1
\$20,001–\$40,000	151	15.2
\$40,001–\$60,000	143	14.4
\$60,001–\$80,000	109	11.0
\$80,001–\$100,000	74	7.5
Over \$100,000	93	9.4
Prefer not to say	133	13.4
<i>Nationality</i>		
Australian/NZ	328	33.1
European	324	32.7
American	224	22.6
Asian	48	4.8
Other	68	6.9

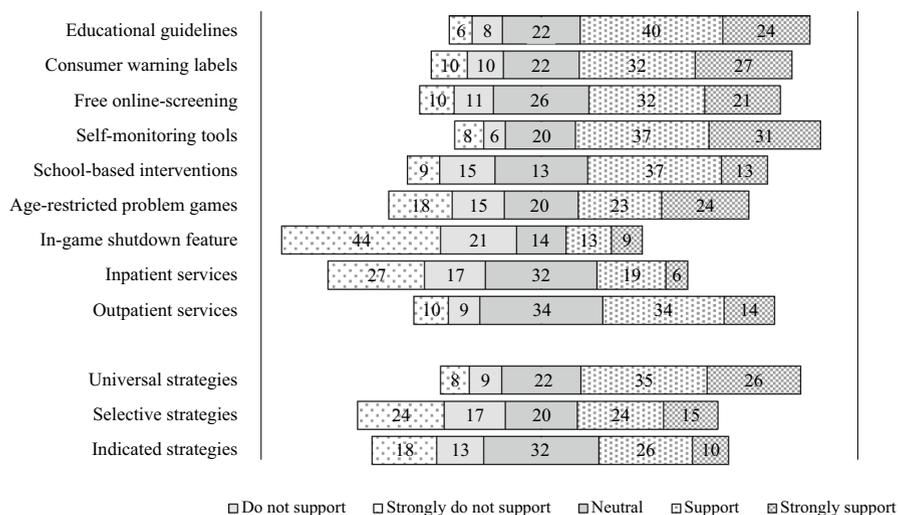
problem gamers, including 77 (or 34.8% of problem gamers) who reported that their problems had been present for more than 12 months. Sixty-nine respondents (7.0%) reported currently receiving help for any mental health issues (not including gaming-related problems), and 149 (15.0%) had previously sought help. Eight respondents reported current or past help-seeking for gaming-related problems.

### Support for Prevention Approaches

Figure 1 displays the level of support (in % categories) for each prevention approach (primary, secondary, and tertiary) and its constituent strategies (e.g., education, screening, age restrictions). Overall, 61% of participants expressed support for primary strategies, as compared to secondary (39%) and tertiary (36%) strategies. Only 17% did not indicate support for any primary strategies, compared to secondary (41%) and tertiary (21%) strategies. The highest disapproval rating was for in-game shutdown features, with 65% not supporting this strategy.

All four primary strategies received a majority of favorable responses. A total of 64% of respondents indicated support for educational guidelines; 59% of respondents supported consumer warning labels; 68% of respondents supported self-monitoring tools and apps; and 51% of respondents supported free online screening tools. Between 22 and 26% of participants were neutral or ambivalent toward these strategies, and between 14 and 21% indicated that they did not support these strategies.

Secondary prevention strategies were mostly supported. Half of respondents (50%) indicated support for school-based interventions, and 47% indicated support for age restriction labels on games. However, only 24% supported in-game shutdown features, which was rated the lowest of all strategies and contributed to a lower overall rating of secondary prevention. Between 14 and 26% of



**Fig. 1** Support levels for individual and grouped prevention strategies

participants were neutral or ambivalent toward these strategies, and between 24 and 33% indicated they did not support them.

The tertiary prevention strategies also received mixed support. There was greater support for outpatient services (48% support) than for inpatient services (25%). For these two strategies, participants indicated similar levels of neutral responses (32 and 34%), but 44% indicated that they did not support inpatient care for gaming-related problems. Inpatient care received the second highest overall disapproval rating among participants.

### Individual Differences in Prevention Support

Table 2 presents the results of Chi-square tests which examined the association between each prevention approach (i.e., primary, secondary, tertiary) and other variables. These included: age (i.e., 18–29, 30–39, 40+); gender (i.e., male, female, non-binary); GD status (i.e., problem, non-problem); self-efficacy (i.e., low, high); weekly gaming hours (i.e., 0–20, 21–39, 40+); and help-seeking behaviors (i.e., no help-seeking, help-seeking). For the purpose of the analysis, scores for each prevention strategy were averaged and used to determine mean support. For example, the mean ratings of the four primary strategies were calculated for each participant, as well as the mean for the three secondary and the two tertiary strategies. Each participant’s mean ratings were rounded to the nearest integer in the analysis.

Support for primary and secondary prevention was more common among younger, female, and less frequent gamers. No significant association was found between support for tertiary strategies and any of the other variables we examined. Support for prevention strategies did not differ according to self-efficacy or GD scores.

**Table 2** Chi-square tests of association between demographic and gaming characteristics, and prevention support

Variable	Universal strategies			Selective strategies			Indicated strategies		
	$\chi^2$	<i>p</i>	<i>V</i>	$\chi^2$	<i>p</i>	<i>V</i>	$\chi^2$	<i>p</i>	<i>V</i>
Age	18.42*	.02	.10	19.72*	.01	.10	15.23	.06	.09
Gender	20.82*	.01	.10	15.98*	.04	.09	12.93	.11	.08
Nationality	16.98	.39	.07	25.42	.06	.08	21.78	.15	.07
GD status	4.27	.37	.07	3.49	.48	.06	3.77	.44	.06
Self-efficacy	7.26	.12	.09	2.92	.57	.05	6.62	.16	.08
Gaming time	23.87*	.01	.13	26.76*	.01	.13	11.63	.17	.09
Help-seeking	1.94	.87	.03	.95	.94	.03	1.46	.92	.03

Age: 18–29 years, 30–39 years, 40+ years; Gender: male, female, non-binary; GD (problem gaming) status: problem, non-problem; Self-efficacy: low, high; Gaming time: 0–20 h, 21–39 h, 40+h; Help-seeking: no help-seeking, help-seeking. \**p* < .05

## Correlations

Table 3 summarizes the Spearman's rank-order correlations among the study's main variables. Self-efficacy was associated with age, gender, and help-seeking behaviors, but did not correlate significantly with support for any strategy. GD symptoms were not significantly correlated with any prevention support variables but were significantly negatively correlated with self-efficacy and positively correlated with current help-seeking. Psychological distress was positively correlated with all three prevention types.

There were significant but very small positive correlations between support for all three types of prevention approaches and psychological distress, history of GD, history for help-seeking for gaming-related problems, and current help-seeking for problem gaming. There were also significant but small negative correlations between support for prevention approaches strategies and age, gender, weekly gaming time, and gaming experience. Similar patterns of correlations (i.e.,  $r < 0.20$  for all associations) were observed for all individual prevention strategies.

## Self-Efficacy and Problem Gaming Status

In order to examine relationships between prevention support and predictors of self-efficacy and problem gaming status, we conducted three separate hierarchical regression analyses, with step 1 (age, gender, weekly gaming time), and step 2 (self-efficacy, GD status) predicting prevention support (primary, secondary, tertiary). All three models explained between 3 and 5% of the variance in prevention support, and only 1% of the variance when age, gender and gaming hours were held constant. Therefore, these models demonstrate low predictive value of these variables. Table 4 presents a summary of each model.

## Discussion

Our study investigated gamers' general support for different prevention approaches and the role of individual differences. Overall, the results showed that gamers supported primary prevention strategies, including education, screening, and warning labels, but reported only mixed support for secondary and tertiary strategies. There was stronger support for outpatient care (48%) than inpatient services (25%). In-game shutdown features received the lowest support (65% disapproval) of all strategies. Younger, female, and less frequent gamers were marginally more likely to support primary and secondary prevention strategies. These findings suggest that gamers may be more favorable toward prevention measures that support informed decision-making, autonomy, and self-directed actions than mandatory restrictive measures. In particular, this gaming population was strongly opposed to modifications to the structure of gaming activities (e.g., shutdown features).

**Table 3** Spearman's rank-order correlations between demographics, help-seeking, and prevention strategy support

Variable	1	2	3	4	5	6	7	8	9	10	11	12
1. Age												
2. Gender	.02											
3. Weekly gaming time	-.17*	.01										
4. Gaming experience	.80*	.07*	-.08*									
5. Psychological distress	-.14*	-.17*	.03	-.12*								
6. Problem gaming symptoms	-.16*	.02	.20*	-.16*	.36*							
7. Self-efficacy	.12*	.19*	-.15*	.11*	-.35*	-.20*						
8. History of problem gaming	-.10*	.04	.02	-.09*	.26*	.26*	-.07*					
9. History of help-seeking	-.05	-.07	.07	-.06	.32*	.10*	-.15*	.21*				
10. Current help-seeking	-.10*	-.08*	.13*	-.08*	.32*	.20*	-.17*	.16*	.45*			
11. Universal strategies	-.09*	-.13*	-.14*	-.10*	.19*	.06	-.04	.12*	.12*	.11*		
12. Selective strategies	-.04	-.11*	-.15*	-.10*	.09*	.01	-.02	.08*	.12*	.08*	.58*	
13. Indicated strategies	.01	-.10*	-.13*	-.05	.10*	.00	.03	.12*	.09*	.05	.51*	.49*

\**p* < .05

**Table 4** Hierarchical stepwise regression models of prevention strategy support, based on demographic and psychological predictors

Prevention model	Included predictors	<i>F</i> ( <i>df</i> )	<i>p</i>	Adjusted <i>R</i> <sup>2</sup>	<i>R</i> <sup>2</sup> change
1. Primary	Step 1	10.34 (3,765)	< .001	.04	–
	Step 2	7.71 (5,763)	< .001	.05	.01
2. Secondary	Step 1	7.90 (3,765)	< .001	.03	–
	Step 2	6.22 (5,765)	< .001	.03	.01
3. Tertiary	Step 1	3.23 (3,765)	.022	.01	–
	Step 2	4.61 (5,765)	< .001	.02	.01

Step 1: age, gender, weekly gaming hours; Step 2: GD (problem gaming), self-efficacy

Contrary to the Health Belief Model (Rosenstock et al., 1988), individual differences in self-efficacy were not associated with respondents' level of support for prevention measures. In addition, the hypothesis guided by the Health Belief Model (i.e., that greater problem awareness and belief in one's ability to achieve positive change would correspond to stronger support for strategies to facilitate change) was not supported. These findings were inconsistent with previous studies involving other behaviors such as gambling (Ladouceur et al., 2013; Messerlian et al., 2005; Shead et al., 2011) and smoking cessation (Parlove, 2002). The results also indicated no association (or associations with only very small effect sizes) between self-reported problem gaming symptoms or help-seeking behaviors and support for any of the prevention strategies specified. These findings may be due to the fact that gaming may be perceived as being less likely to cause serious harms than are more established addictive behaviors. Written feedback indicated that, instead of approving of stronger regulatory measures, gamers endorsed the importance of more proximal supports such as the role of parents in regulating the behavior of young people (Smith et al., 2015). Further analysis of our extensive written material is presented elsewhere (see Stevens et al., 2021). In contrast, other participants stated that the industry should be more closely scrutinized and highlighted their current lack of regulation. It is also possible that many gamers may be cautious in supporting strategies to reduce problem gaming because this could be construed as support for the view that gaming is inherently harmful ('addictive'). For example, the influence of previous debates on gaming and violent behavior may have stymied attempts to draw attention to the risks associated with excessive gaming. These earlier debates have sometimes been likened to a form of 'moral panic' (Aarseth et al., 2017; Markey & Ferguson, 2017), with dubious connections, for example, being drawn between gaming and emasculation in males (Zimbardo & Duncan, 2012) or violent games and gun violence (Anderson, 2004; Anderson & Dill, 2000). As a result, it may not be surprising to find that some gamers will be skeptical of 'strategies' that imply the need for sweeping changes by the authorities who may be seen as overstating gaming's potential harms or relying upon questionable evidence to do so.

Given the low predictive value of self-efficacy and problem gaming status reported in our analyses, the results we have presented suggest that other variables not measured in this study may have been related to endorsement of prevention

strategies. Accordingly, with reference to Health Belief Model (HBM) concepts, it may be helpful for further studies to determine the extent to which gamers perceive any personal or other benefits of prevention strategies and, further, whether they perceive problem gaming to be sufficiently severe to warrant these measures. For example, recent studies have shown that some highly engaged gamers are opposed to the concept of gaming disorder (Colder Carras et al., 2018; Stevens et al., 2021), which is likely to adversely affect their attitudes towards prevention efforts. Our sample included individuals who had sought help for mental health issues, but very few who had sought help specifically for gaming-related problems. Therefore, ratings of support for strategies may have been based on judgements that were unrelated to personal reasons or circumstances, despite the relatively high number of problem gamers in this sample. The substantial proportion of ‘neutral’ responses (23%, on average) to prevention items may reflect the perception that these strategies were not overly relevant or necessary, regardless of personal views on problem gaming.

The results did, however, provide a clear indication of what strategies may not be supported or received well. Shutdown features in games received the strongest disapproval. These systems have been implemented in some games in China (Davies & Blake, 2016), but their effectiveness is unclear. Although there are some major differences between gaming and gambling (e.g., financial requirements), the closest comparison to gaming shutdown features may be mandatory pre-commitment features in electronic gambling machines (i.e., setting limits on financial expenditure to prevent continuous gambling) such as those implemented in Norway, where gamblers cannot spend beyond a certain monthly limit. Reviews of pre-commitment features (e.g., Delfabbro & King, 2020; Ladouceur et al., 2012) have concluded that mandatory pre-commitment may have a modest effect on financial expenditure, but gamblers are generally not in favor of pre-commitment and may instead seek out other unregulated gambling machines or activities. Participants’ lack of support for shutdown features in video games may reflect similar concerns about feasibility (e.g., needing to log in and set limits), reduced enjoyment (e.g., receiving notifications that interrupt immersion), and the potential likelihood of diverting players away to other gaming activities that do not include these features.

We acknowledge that this study has limitations. First, our study employed purposive sampling to recruit experienced gamers. For this reason, these findings are unlikely to generalize to the wider gaming population. Further, this sample may contain a greater proportion of individuals with higher education qualifications than found in the general population of gamers (e.g., 63.2% compared to 2019 Australian census data that indicate 28.4% of the population have a university degree; [statista.com](https://www.statista.com)). To enhance the validity of these findings, we suggest that future research might seek to identify a broader range of gamers, including clinical samples, using different methods of recruitment. Second, our study targeted Western gamers whose gaming experiences are likely to differ from those in Asia, which generally have more restrictive regulations and countermeasures to limit gaming, including lockdowns at night for underage gamers. Third, our study was conducted during the COVID-19 pandemic. Thus, although most of the variables we examined are likely to be relatively stable, participants may have responded differently due to pandemic-related stress and uncertainties. In particular, the pandemic may have influenced

individuals' views of gaming activities, such as the value of gaming for stress-relief during self-isolation (King, Billieux, et al., 2020; King, Chamberlain, et al., 2020; King, Delfabbro, et al., 2020). Fourth, the time-based categories (e.g., weekly gaming hours) were selected to enable comparisons between groups of sufficient size. The category bounds we employed were somewhat arbitrary in that respect, and further studies may identify more meaningful categories. Finally, our study did not investigate industry responsibility or regulatory issues related in-game spending (e.g., loot-boxes and other microtransactions; see Drummond et al., 2019; King & Delfabbro, 2019b; King et al., 2019a, 2019b). With the increasing digital cross-over of gaming and gambling, it would be useful to investigate views related to applying gambling prevention and regulation approaches to gaming activities.

## Conclusions

We investigated regular and problematic gamers' level of support for prevention strategies related to problematic gaming. Overall, there was stronger support for primary prevention strategies, including education, screening, and warning labels, than for other prevention approaches. These results underscore the value of surveying individuals who are highly engaged in gaming activities to gather a range of views and to understand the perspectives of those who are likely to be the target of prevention strategies aimed at gaming in general. However, it was not entirely clear from our data why these gamers were more favorable toward prevention measures that support informed decision-making, autonomy, and self-directed actions. It seems likely that measures of this kind tend to align with the cultural values of Western individualized societies and would be consistent with previous studies undertaken with gamblers (Harris & Griffiths, 2017). Although gaming disorder and hazardous gaming are recognized in the ICD-11, there is some uncertainty as to whether the gaming community generally embraces these concepts and makes connections between gaming-related harms and preventive countermeasures. Future research should involve regular gamers and clinical samples in more detailed, consultative interviews to determine their personal needs and understanding of excessive gaming, and what practical solutions they may be more inclined to support (e.g., asking "what measures would have been helpful before your gaming became a problem?"). Although our data suggest that gamers may tend to oppose measures that alter the gaming activity itself (e.g., limits, shutdown features), it is possible that some implementations that draw from primary prevention principles may be more readily embraced. Ideally, such interventions should be designed to target the harmful features of games and prevent the development of harm without detracting from the fundamental enjoyment of gaming experiences.

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## Declarations

**Conflict of interest** The authors declare no competing interests. The authors alone are responsible for the content and writing of the paper.

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